CITY OF ENID
ENID, OKLAHOMA

SANITARY SEWER MASTER PLAN

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TABLE OF CONTENTS

INTRODUCTION

The City of Enid is located in the north central part of Oklahoma in the Garfield County along the eastern edge of the Great Plains. Growth of industries in and around the City of Enid plays a vital role in the employment and economic development of Enid. The expansion and construction of two major industries as well as additional population growth resulting from these expansions has prompted the City of Enid to evaluate its existing sanitary sewer collection and treatment system and develop a Sanitary Sewer Master Plan to make the improvements to its existing sanitary sewer collection and treatment system.

PSA-Dewberry and its consulting engineer ENVIROTECH was retained to provide engineering services required to complete a master plan for the City of Enid sanitary sewer water collection and treatment system. The purpose of the master plan was to evaluate the existing system, project the future needs, and provide the improvement plan over the planning horizon. The master plan was developed through three major tasks which culminated in following Technical Memoranda:

- TM 1: Evaluation of the Existing Water Pollution Control Facility (WPCF)
- TM 2: Evaluation of the Existing Collection System and Recommended Improvements
- TM 3: Wastewater Treatment System Alternatives and Recommended Improvements

The following sections provide a summary of the above technical memoranda, including the capital improvement plan for the recommended improvements.

PLANNING HORIZON

The planning period or planning horizon is the time span over which the sanitary sewer collection and treatment facility needs are forecasted. Therefore, proposed facilities are planned to meet the system's needs projected over the planning timeframe. Most utility master plans are prepared for medium-term planning horizons, which range from 20 to 25 years. This period is based on the longest term in which reasonable detailed forecasts for growth and capacity can be made. For this master plan the planning horizon of 25 years has been chosen. Future wastewater loads and flows will be projected for the design year 2030.

POPULATION PROJECTIONS

Our review of the available population and community development data indicated that the City's recent population is relatively stable. For population projection, this report uses 0.005 rule adopted by Enid Vision 2025 Committee. The rule 0.005 assumes straight line growth compounded at one-half of one (0.5) percent per year. This is a reasonable assumption based on the recent trend in population growth and is not likely to change unless there are any significant shifts in the City's economic market sectors. The projection for the year 2030 based on this rule is 54,638 whereas the Oklahoma Department of Commerce projection for the same year is 50,860. This report will use the population figure of 54,638 for flow projections and wastewater facility expansions.

LAND USE

Land use map for the Enid Metropolitan area is shown in the City of Enid Metropolitan Area Comprehensive Plan 2025. Enid Metropolitan area includes area within the City limits as well as outside. Most of the land outside the City limits is designated as agricultural land. The developed and undeveloped area within the City limits as of July 2002 as shown in the Enid Metropolitan Area Comprehensive Plan is tabulated below in **Table ES 1-1**.

Table ES 1-1: Developed Area within the City

Land use	Total Area (acre)	Developed (acre)	Undeveloped (acre)
Residential	10,595	6,707	3,888
Commercial	2,186	1,400	786
Industrial	3,678	1,127	2,551
Agricultural	10,916	384	10,532
Special use	1,352	811	541

For the industrial land development calculations, it is more prudent to use the employment growth rate than the population growth. As per the U.S. Census Bureau information, the work force in the City of Enid has grown from 19,100 to 20,680, equivalent to 0.84% annual growth between the year 1990 and 2000. Assuming 1% employment growth rate, in the design year 2030 there will be a 30% aggregate industrial growth. However as the nature of the new industries and their water consumption and wastewater production rates are highly variable, this report assumes development of all undeveloped area within industrial land use category (100% development). This allows for conservative projection of industrial flows and provides flexibility in allowing diverse nature of industries within the City.

WASTEWATER CHARACTERISTICS AND PLANT FLOW PROJECTION

It is important to determine the flow rates and understand the nature of wastewater in order to evaluate the existing wastewater treatment facility and propose alternative treatment technologies appropriate for the City of Enid. The wastewater treatment facility plant records were evaluated to determine the historic loadings for flow, organic, suspended solids, and ammonia nitrogen. This information was then used along with population projections, land use and future industrial users information to determine the design loadings.

Flow Analysis

Plant flow records for the years 1996 through 2004 were obtained from the plant operations staff. Daily average wastewater flows (DAF) have fluctuated for the past nine years with the years 1999 and 2003 being the highest at 9.44 MGD and lowest with 5.91 MGD, respectively. Wastewater flows (DAF) for the past nine years have averaged 6.92 MGD with a standard deviation of 1.02 MGD.

The total per capita wastewater generation rate (GPCD) have fluctuated for the past nine years with the years 1999 and 2003 being the highest at 209 GPCD and lowest with 127 GPCD, respectively. The per capita wastewater generation rate for the past nine years has averaged 151 GPCD.

Our review of the available population and community development data indicated that the City's population tends to be relatively stable and there has been a steady reduction in the wastewater flow rate over the past five (5) years. The review of the existing documents indicate that the City has studied the effect of infiltration and inflow (I/I) on its collection system and implemented an aggressive program to significantly reduce those flows. If these I/I control strategies continue to be implemented, the DAF to the facility and per capita generation rate should stabilize and may actually decrease. Since the City's implementation program to correct I/I in the collection system (years 2000 to present) the per capita flow have decreased and stabilized at an average of 133 GPCD. Therefore, for the purposes of this study, the average per capita wastewater generation rate of 130 GPCD has been assumed in addition to any anticipated future industrial flows.

It is also important to determine the peaking factors for the influent wastewater. Peaking factors are used to determine the size of the various treatment processes. Our review of historical flow data related to peaking factors for the total service area revealed that the average peaking factors for the maximum month and maximum day for the past nine (9) years are 1.14 and 1.51, respectively. For the purposes of this report, the peaking factor used for maximum month and maximum day are 1.25 and 2.0, respectively.

The City of Enid has eleven (11) major institutions/hospitals or industries within its drainage boundary. Their combined average flow discharge to the City's collection system is about 0.726 MGD at an average Five Day Biochemical Oxygen Demand (BOD_5) concentration of 645 mg/l and Total Suspended Solids (TSS) of 389 mg/l. Land use map for the City of Enid for the year 2025 classifies about 3,678 acres of land for industrial development. Currently, existing industries occupied 1,127 acres of land leaving approximately 2,551 acres for future industrial development. Non-domestic wastewater flow rates from industrial sources vary with the type and size of industry, the degree of water reuse, and onsite wastewater treatment methods, if any. Typical design values for estimating the flows from industrial areas that have no or little wet-process type industries are 1,000-1,500 gal/acre-day for light industrial developments. Typical design values for medium industrial developments are 1,500 to 3,000 gal/acre-day. Currently, average wastewater contribution from the existing industries is estimated to be 643 gal/acre-day. As the natures of future industries are unknown, this report assumes a design value of 1,200 gal/acre.day for future industrial flow projection.

Conversations with City of Enid staff have indicated that one of the existing industries, Advance Food is planning to expand in 2007. The City also anticipates the establishment of two new Ethanol plants in the area. Expansion of Advance Food industry will likely discharge an additional flow of 0.5 mgd at 664 mg/l BOD5 and 382 mg/l TSS by year 2007. The proposed discharges from new Ethanol plants are expected to be 0.144 MGD and 0.15 MGD respectively at the concentration of 1,000 mg/l BOD5 and 350 mg/l TSS in the year 2008.

Analysis of wastewater characteristics

The City conducts extensive measurements of influent wastewater quality prior to the existing WPCF. These influent quality parameters include Five Day Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), Ammonia (NH_3), Dissolved Oxygen (DO), and Total Alkalinity. The influent wastewater quality data reveals that the average per capita BOD_5 in the past nine (9) years is 0.30 lbs per capita per day. The per capita BOD_5 loading for domestic wastewater is typically in the range of 0.18 to 0.26 pounds (lb) of BOD_5 per capita per day. This suggests that there is significant BOD_5 loading from industrial sources.

The per capita suspended solids and total kjeldahl nitrogen (TKN) loadings for domestic wastewater are typically in the range of 0.20 to 0.33 and 0.022 to 0.044 lbs per capita per day, respectively. The influent data for the past nine (9) years reveals that the average per capita loadings of suspended solids and ammonia nitrogen in influent wastewater are 0.314 and 0.019 lbs per capita per day, respectively. The suspended solids and nitrogen loading in the influent wastewater are within suggested normal range.

The BOD5 concentration for an equivalent flow of 130 GPCD and a BOD5 loading of 0.302 lb per capita per day equates to 278 mg/l. The suspended solids concentration for the same flow at per capita solids loading of 0.314 lb per capita per day is 289 mg/l. The ammonia nitrogen concentration for the equivalent flow of 130 GPCD at 0.019 lb per capita per day equates to 17 mg/l.

Based on the analysis of influent loadings as presented above, this master plan will use the concentrations of BOD5, TSS and ammonia nitrogen as 300 mg/l, 300 mg/l and 25 mg/l respectively for the purpose of evaluating possible treatment alternatives.

Wastewater Flow Projection for Year 2030

Based on an analysis of the flow information presented above and the additional anticipated growth, the design information that will be used for evaluation of treatment alternatives is summarized in **Table ES 1-2.**

TABLE ES 1-2: Wastewater Flow Projection for Year 2030

Estimated Population	54,638
Design Per Capita for Wastewater Generation	130 GPCD
Domestic Wastewater Flow	7.10 MGD
Industrial Flow	
Advance Food Plant Expansion	0.50 MGD
Ethanol Plant (OE)	0.15 MGD
Ethanol Plant (Orion)	0.15 MGD
From Future Industrial Growth (2551 acres @ 1200 gpd/acres)	3.06 MGD
	3.86 MGD
Average Daily Wastewater Flow	10.96 MGD
Maximum Month Flow (factor 1.25)	14.00 MGD
Peak Daily Flow (factor 2.0)	28.00 MGD
Influent BOD5	300 mg/l
Influent TSS	300 mg/l
Influent NH4-N	25 mg/l

EFFLUENT DISCHARGE LIMITATIONS

The Oklahoma Department of Environmental Quality (ODEQ) has issued an OPDES permit to the City of Enid on August 1, 2003. The current discharge permit will expire on July 31, 2008. The OPDES permit is based on a plant design flow of 8.5 MGD and allows the treatment facility to discharge the effluent through two outfalls into Boggy Creek.

EXISTING WASTEWATER TREATMENT EVALUATION

The City of Enid Wastewater Treatment Facility began its operation in 1954 with an initial capacity of 3.5 MGD conventional activated sludge plant, known as South Plant. In 1970, the City of Enid expanded its treatment facility to 8.50 MGD by building another 5.0 MGD conventional activated sludge plant known as North Plant to the north of the existing 3.5 MGD South Plant. In 1991, the City of Enid built a 8.50 MGD Tertiary Treatment Plant for the removal of ammonia nitrogen from the effluent produced from the North and South Plants. The 1991 plant improvements also included upgrading of the existing sludge processing facilities. With the series of improvements described above, the existing wastewater treatment plant has a designed capacity of 8.50 MGD.

Plant Headworks

The plant headworks consist of two aerated grit chambers, two screen channels, a parshall flume and a lift station. The headwork units are designed for a peak flow of 21 MGD and split the flow to the North and South plants. The available capacities of individual treatment units are evaluated based on the current ODEQ regulations and standard design criteria and are presented in **Table ES 1-3.** In general, all units in the headworks appear to be in poor conditions. Some of the units like bar screen and parshall flume do not meet current design criteria. The plant headworks may require either major rehabilitation or replacement to meet the proposed flows in future.

South Plant

The South Plant was constructed in 1954 and consists of two primary sedimentation tanks, two aeration tanks, two secondary sedimentation tanks and other associated appurtenances such as air diffusers, blowers, sludge pumps, etc. The available capacities of individual treatment units are evaluated based on the current ODEQ regulations and standard design criteria and are presented in **Table ES 1-3.**

The Plant has operated well beyond its life expectancy without significant maintenance and improvements performed to its treatment units and equipment. The current improvements to the South Plant undertaken by the City of Enid are very critical to handle the current flow as well as industrial growth expected in near future and will extend the life of this plant for few more years before it is replaced.

North Plant

The North Plant was constructed in 1970 and consists of two primary clarifiers, two aeration tanks, two secondary clarifiers and other associated appurtenances such as air diffusers, blowers, sludge pumps, etc. The available capacities of individual treatment units are evaluated based on the cnrrent ODEQ regulations and standard design criteria and are presented in **Table ES 1-3.**

In regard to the condition of the North Plant, this facility was constructed in 1970 and has been in operation for over 30 years. The Plant is currently operating well even though it is operated well over its rated capacity (4.62 MGD). With some structural repairs to the walls of the primary clarifiers and the ongoing maintenance program for replacing worn out parts. The North Plant could have a useful life of another 10 to 15 years without major significant improvements.

Nitrification Plant

The Nitrification Plant was built in the year 1991 and was designed to treat 8.5 MGD of secondary treated effluent from the North and South Plants for the removal of ammonia nitrogen. The Nitrification Plant consist of a nitrification basin, four rectangular clarifiers and other associated appurtenances such as lime and methanol feeders, disc aerators, sludge pumping etc.

Table ES 1-3 Summary of Treatment Capacity and Condition of Major Liquid Process Treatment Units

Unit Process	No. of units	Design Capacity		Treatment Capacity, per ODEQ criteria		Condition Rating
		Ave. MGD	Peak MGD	Ave. MGD	Peak MGD	Peak MGD
Headworks						
Grit chamber	2	-	21.0	-	21.0	Poor
Bar screen	2	-	21.0	-	17.0	Poor
Parshall flume	1	-	21.0	-	**15.9**	Poor
Lift station (two 75 HP & two 100 HP)	-	-	21.0	-	21.0	Poor
North Plant						
Primary clarifiers	2	5.0	-	5.0	-	Fair
Aeration basins	2	5.0	-	4.66	-	Fair
Final clarifiers	2	5.0	-	**4.62**	9.24	Fair
South Plant						
Primary sedimentation tank	2	3.5	-	3.5	-	Fair
Aeration basins	2	3.5	-	**3.23**	-	Fair
Secondary sedimentation tank	2	3.5	-	3.5	7.0	Fair
Nitrification Plant						
Nitrification basins	1	8.5	-	8.5	-	Good
Nitrification clarifiers	4	8.5	-	8.5	-	Good

Based on the above evaluation, the Nitrification Plant can handle the average daily flow of 8.5 MGD as designed. However, conversations with plant personnel have revealed that solids carry over occur when the plant flow exceeds 7 MGD. They also have experienced problems with the operation of the traveling bridge on the nitrification clarifiers, especially during snow and ice periods. The Nitrification Plant, in overall, needs some improvements to correct all operational problems.

Solids Handling Units

The solids handling facility at the City of Enid originally consists of two anaerobic digesters, two aerobic digesters, two thickeners, two one-meter belt presses, and forty (40) sludge drying beds (total drying bed area 68,700 square foot). These sludge handling units were constructed at different times, some in 1956, some in 1978 and the rest in 1991.

Due to the age and deterioration of many existing solids process units, the bio-solids treatment system at the treatment facility was in jeopardy of becoming non-complaint. Therefore, the City of Enid made major improvements to its bio-solids treatment system in 2006. The improvements to the bio-solids treatment system included selective demolition and improvements to the existing aerobic digesters and equipment, selective demolition and converting the existing anaerobic digesters to aerobic digesters and equipment, new blower facility, modification to the existing blower facility, a new 2 meter belt filter press and dewatered sludge conveyors, improvements to the filter press feed pump system, polymer dosing system, flow measurement equipments, controls, yard piping, electrical and instrumentation work, and other appurtenances. With the completion of these improvements, the solids handling capacity of the treatment facility will increase to about 15,490 pounds/ day on dry solids basis which is equivalent to solids produced from treating wastewater flow of about 10 MGD at the exiting liquid process treatment units.

EVALUATION OF EXISTING COLLECTION SYSTEM AND RECOMMENDED IMPROVEMENTS

Existing Collection System

The City of Enid sanitary sewer collection system for the study area is hydraulically divided into two watersheds, Watershed No. 1 and Watershed No. 2. Watershed No. 1 contains sixteen (16) collection basins which have been designated (1A) through (1P). Watershed No.2 contains eleven (11) collection basins which have been designated (2A) through (2K). All discharges in to the city collection system are conveyed to the City Water Pollution Control Facility located in the extreme southeast corner of the City.

A total of eleven (11) pump stations and force mains are located on the City of Enid's sanitary sewer collection system. Of the eleven (11) pump stations, only the pump station located at 541 South 54th Street appears on the model. The remaining pump stations either exist outside the mapped parameters of the City of Enid's sanitary sewer basins or are located far upstream and utilized for isolated residential districts and therefore, these pump stations are inconsequential to the system.

A total of three (3) modeled wet weather peak holding facilities are located in the City of Enid. The first holding facility is located at 658 West Willow on the 1-O line and a second facility is located at 1901 East Randolph on the 1-C line. Both facilities were modeled as a 500,000-gal. facilities with appropriate control structures. The third holding facility is located at the City of Enid's sanitary sewer treatment plant for wet weather overflow. The sanitary sewer department estimates the volume of this holding basin to be approximately 280-ac-ft.

Flow Metering and Analysis

For the determination of inflow and infiltration (I/I) in to the collection system, Flo Tote sanitary sewer monitoring devices were utilized to measure the flow at strategic locations throughout the City of Enid for both dry and wet weather conditions. The flow meters were initially placed on trunk and secondary trunk lines. As flow information was assimilated, the flow meters were relocated to tertiary lines that were suspected sources of inflow and infiltration.

The flow-monitoring program provided both dry and wet weather flows. Each meter remained in-place until the line experienced a significant wet weather flow before being relocated to isolate the suspected sources of inflow and infiltration. This data was utilized in conjunction with a hydraulic model to predict sanitary sewer flows throughout the City of Enid. In addition, the City of Enid provided the daily sanitary sewer treatment rates (i.e., amount of treated sewage from all sources) which are on file at the City of Enid's 54th Street treatment facility. For the project's duration, the facility treated an average of 6.8 MGD of sanitary sewage.

The City of Enid's sanitary sewer system was modeled utilizing the United States Environmental Protection Agency Sanitary Water Management Model (USEPA SWMM) (version 5.0.011), based on sanitary sewer collection system data and calculated dry flow usage rates provided by the City of Enid.

Following completion of the SWMM model, the model was calibrated utilizing flow documentation recorded by the Flo Tote sanitary sewer monitoring devices.

Adequacy of Existing System

An analysis of the SWMM model pipeline was conducted to identify problem areas during both dry and wet weather flow conditions. Although the current system is old, it is in a fairly well-preserved condition. Much of the system continues to receive less than 200-gal./pipe dia./mi./day of infiltration. With the exception of a few isolated lines, infiltration exceeds 200-gal./pipe dia./mi./day by relatively small amounts. Additional sanitary sewer investigations will assist in decreasing the amount of inflow and infiltration into the system. However, some upgrades are necessary in the immediate future to accommodate wet flows and new industrial flows as the City of Enid develops.

Dry Flow Condition Analysis:

During periods of no precipitation, Line 1 Basin A (1A) and Line 1 Basin P (1P) pipes appear to be flowing at or near capacity and therefore, the City of Enid intends to construct an additional pipeline adjacent to the current 1P pipe for increased flow capacity. Although the 1A pipeline performs at or above capacity during dry flow conditions, plans should be implemented to increase this pipeline's capacity as well.

There is some confusion regarding the 1N pipeline that extends toward North Enid. Two (2) lines converge in the vicinity of the 1N008 manhole, but neither City of Enid nor ENVIROTECH engineers could determine the exact path of the sanitary sewer manholes. In the current model set-up, the manhole connecting the two (2) branches of the 1N pipeline surcharges during dry flow conditions.

The 1N pipeline in the vicinity of North Van Buren receives inordinately high flow rates for the businesses and residents served in the area. This pipeline was recently upgraded to accommodate these higher flow rates. Although an additional investigation may help identify the source of these flows, the new pipeline can adequately manage these higher flow rates.

The 1-J pipeline trunk line flows above capacity during dry periods. Both the 1-J and 1-K Basins feed this pipeline. Plans should be made to increase the capacity of this pipeline.

Wet Flow Condition Analysis:

During precipitation events, flows in the sanitary sewer pipelines greatly increase due to Inflow and Infiltration (I/I). According to the wet condition model, the capacity of most pipelines is sufficient to accommodate the increased flow rates. However, flow back-ups occur in the 1A and 2A pipelines due to sanitary sewer treatment plant and pipeline capacity limitations associated with the additional flows. Due to the increased flows, additional back-ups will also occur in lower portions of the 1B, 1D, and 2B pipelines.

The 1N pipeline appears to experience additional surcharging during storm events in addition to the surcharging experienced during dry events. In addition, the 1-J pipeline remains surcharged for extended periods during wet events due to increased flow.

Inadequacies in the Existing System:

Currently, the City of Enid's sanitary sewer collection system experiences an annual peak dry flow of approximately 7-MGD. Several collection basins exhibit the need for investigation, rehabilitation, or increased capacity.

Currently, the 12-in. trunk line serving the 1P Basin is operating at capacity and therefore, system expansion should be considered to allow for continued growth in east Enid. Therefore, we recommend construction of a second, minimum 24-in.-dia. pipeline adjacent to the existing 12 in. dia. pipeline. This upgrade will accommodate flows from both the uew Advanced Foods facility and Ethanol plants. The cost for this upgrade will be approximately $2.5 million.

The City of Enid has experienced overflow events in the 1A and 2A pipelines near the WPCF at Boggy Creek. Based on both the physical evidence and SWMM modeled flows, this treud will continue to occur and therefore, construction of a peak flow holding tank appears to be the most effective solution. Although additional study and design is necessary, we recommend utilizing the old sanitary sewer treatment facility as an appropriate site. The overflow tank's capacity should be approximately 800,000-gal. and the cost is estimated to be $1.5 million.

The 1-J pipeline flows above capacity during dry periods and remains surcharged for long periods during wet events. Therefore, ENVIROTECH recommends that an investigation of the I/I sources utilizing smoke testing, door-to-door surveys, and video mouitoring, where appropriate, be conducted. In addition, the pipe capacity needs to be expanded and may include a few small pipe and manhole replacements to the entire pipeline replacemeut. Based on the results of the I/I study, this project will cost between $100,000 and $600,000.

Basin 2H receives little inflow during small storm events and exceedingly high amounts of inflow during large events. Since the pipeline is located near a stormwater channel, a possibility exists that the line is receiving inflow from the channel. Therefore, we recommend that a more detailed I/I study be conducted in this basin to include smoke testing and video monitoring, where appropriate.

The exact configuration of Basin 1N near the confluence with the 24-in. cross-town main is not known. In addition, the 1N basin receives high amounts of inflow during storm events. Therefore, we recommend that a more detailed investigation of the 1N basin be conducted to include smoke testing, door-to-door surveys, and video monitoring, where appropriate.

Basins 2G and 2K receive higher than EPA recommended rates of infiltration. Therefore, we recommend conducting additional sanitary sewer inflow and infiltration investigations in these basins to include smoke testing and video monitoring, where appropriate.

Future Collection System Evaluation

Recent trends in the City of Enid's expansion efforts reflect growth to the east, northwest and west, with each direction of growth representing a different type of development. Industry in east Enid has expanded as a result of construction of the Advanced Foods Processing Plant and the proposed Ethanol production facilities. Residential development is steadily expanding northwest of Enid while a combination of commercial and residential development dominates westward expansion along Owen K. Garriott Road. As a result of this growth, recommendations for expanding the affected sanitary sewer basins are summarized in the following sections of this report.

Hydraulic Capacity Evaluation - Year 2010 (9-MG)

Basins 2H and 2K Expansion Recommendations: Residential expansion northwest of Enid poses minimal short-term problems regarding the sanitary sewer system's capacity. Although Basins 2H and 2K have not yet reached total flow volume capacity, additional residential growth may require system expansion in the future. Expansion recommendations for Basins 2H and 2K are as follows:

BASIN 2H. Since several collection lines will eventually reach capacity, alternative collection lines may be required to service the expanding community. The 12-in. line that services Sub-basin 2H-2 will most likely reach capacity and subsequently, the 18-, 21-, 24- and 27-in. collection pipelines will also near capacity. In addition, some of these lines may require improvement. The cost to upgrade the 12-in. pipeline alone is estimated to be $500,000. Additional upgrades to the 18- and 21-in. collection pipelines will cost approximately $1.3 million.

BASIN 2K. The 12-in. collection line that services Basin 2K and flows north-south down Cleveland Road will eventually reach capacity. This will subsequently affect the same 24- and 27-in. collection lines referenced above for Basin 2H, resulting in surcharging and backup in the pipelines. Depending upon peak flow rates, the 30-in. Frantz Street line may also require improvement. The cost to upgrade the 12-in. pipeline is estimated to be $1.3 million. Additional upgrades to the 24- and 27-in. pipelines will cost approximately $1.8 million. The cost to improve the 30-in. Frantz Street pipeline is estimated between $2 million and $7 million, depending on the extent of pipeline replacement required.

Basin 2G Expansion Recommendations. Continued commercial and residential growth westward along Owen K. Garriott Road may be impeded by the existing sanitary sewer system that services this area. Currently, the Basin 2 pipeline that transverses the southern portion of the City has sufficient capacity to easily accommodate expansion both west and northwest of Enid. However, once the pipelines reach Oakwood Road, the sizes decrease to 12- and 8-in.-dia. beyond Bob's Farm residential development. Therefore, it is recommended that the pipeline network capacity be expanded from the Bob's Farm complex westward along Oakwood Road to accommodate additional growth. This can be accomplished by either expanding the 12-in. pipeline that services Bob's Farm further west, or installing a second 12-in. pipeline westward on the north side of Owen K. Garriott Road. The cost to complete this work is estimated to be $800,000. In addition, the 12- and 18-in. collection pipelines that service the Bob's Farm pipeline will require improvement. The cost to upgrade the 12- and 18-in. collection pipelines is estimated to be $2 million.

Hydraulic Capacity Evaluation - Year 2015 (11-MGD)

In the event the City of Enid continues to develop/expand and flows increase to 11-MGD, several of the main lines will begin to back-up and flows will push into residential lines. Most lines above 18-in.-dia., including some select lines below 18-in.-dia., will require upgrading to accommodate the increased flows. Alternatively, additional collection lines paralleling existing lines would be required to alleviate the increased flows.

These upgrades represent improvements that must be made to the system in addition to those already summarized above.

Sanitary Sewer Main Expansion: Several sanitary sewer mains that transverse the City will experience increased flows and therefore, many will need to be replaced and include (a) 1A and 2A main lines south of the City; (b) north-south 36-in. main from 11TH Street to Van Buren and Willow; (c) Frantz Street 30-in. cross-town main; and (d) 2D line servicing Vance Air Force Base (VAFB). The cost for this expansion is estimated to be in the $20 million range.

The secondary collection pipelines that will require improvements are as follows:

> The Oakwood pipeline will require an additional $1 million expansion north of Owen K. Garriott Road.
>
> The north-south 36-in. main will require that a collection pipe be extended to the north along Van Buren. This line will most likely require construction of an additional pump station and therefore, the expansion will cost approximately $2.5 million.
>
> The 1N pipeline will require improvement, both east and north, at an approximate cost of $2 million.
>
> The Basin 2D 10-in. pipeline that services southeast Van Buren will require improvement at an approximate cost of $2 million.
>
> Although additional flows north of Basin 1C will burden the existing pipelines, they should maintain below full-capacity.

Peak Storage Basins: As a result of high flow rates, the occurrence of stormwater seepage will be significant and therefore, construction of two (2) additional stormwater peak storage basins should be considered. One (1) tank should be located on south Cleveland Road where the Oakwood and Cleveland sanitary sewer systems converge; and the second tank should be located where the 2D and 2A pipelines merge. Each facility should detain approximately 800,000- to 1-million-gal. Estimated Cost to Construct Both Facilities will be $4 million.

WASTEWATER TREATMENT SYSTEM ALTERNATIVES AND RECOMMENDED IMPROVEMENTS

The wastewater treatment system alternatives are developed based on the needs identified during the analysis and evaluation of previous reports and facility plans, the inspection and evaluation of the existing units and facilities at the Water Pollution Control Facility, and interviews/meetings with City personnel.

Description of Alternatives

The alternatives are developed with the objective of meeting the projected design capacity of the WPCF for the year 2030 is 14 MGD. The projected design capacity for the years 2010, 2015 and 2020 will be 9.00 MGD and 10.50 MGD and 12.00 MGD, respectively. The above projection include domestic flows from projected population, future flows from the expansion of Advance Foods, two new Ethanol Plants and other industries which are unknown at this time. The options for Plant expansions will be phased in stages that provide flexibility during expansion. The alternatives were developed based on the premise that the existing WPCF with the exception of bio-solids processing facility will be decommissioned either in 2010 or in 2020 after utilizing its useful life. The existing renovated sludge processing facility capable of processing the sludge generated from a 10 MGD wastewater treatment facility will be expanded to 14 MGD as and when necessary based on the plant capacity of the given alternative. The alternatives considered are as follows:

Option 1: New 14 MGD treatment facility

This Option consists of building a new 14 MGD treatment plant by in the year 2010 that would cater to the projected ultimate flow for 2030. The bio-solids processing facility would be expanded from the current capacity of 10 MGD to 14 MGD in the year 2020.

Option 2: New 14 MGD treatment facility with an ability to treat industrial wastes directly without pretreatment

This Option consists of building a new 14 MGD treatment plant to treat wastewater with a high organic loading. This Option was developed with the purpose of receiving the industrial wastes within the City without significant pretreatment. Option 2 is identical to Option 1 with the exception of its design to treat the high strength wastewater. Under this Option, the existing bio-solids processing facility will be upgraded immediately as a result of increased bio-solids production from the high strength wastewater.

Option 3: New 12 MGD treatment facility with expansion to 14 MGD

This Option consists of building a new 12 MGD treatment plant in the year 2010 and expanding to 14 MGD in the year 2020 to meet the projected ultimate flow. The expansion to 14 MGD and upgrading of the existing bio-solids processing facility will occur in year 2020.

Option 4: Using existing treatment facility and building a new 7 MGD treatment facility with expansion to 14 MGD

This Option consists of building a new treatment plant in two stages, 7 MGD treatment facility in the year 2010 and expanding it to 14 MGD in the year 2020. Building a first stage 7 MGD plant will allow for the replacement of existing headworks and South Plant. The second stage expansion to 14 MGD plant will allow for the replacement of existing North Plant and BNR Plant.

Option 5: New 9 MGD treatment facility for domestic flows and a separate new 5 MGD treatment facility for industrial flows

This Option consists of building two new treatment plants at two different sites, the first, a new 9 MGD treatment facility in the year 2010 for treating domestic flows and a second a 5 MGD treatment facility in the year 2010 for treating industrial flows.

Option 6: New 9 MGD treatment facility for domestic flows and a separate new 2.5 MGD treatment facility for industrial flows with expansion to 5 MGD

This Option is similar to Option 5 except that the 5 MGD treatment facility for industrial flows is expanded in two stages of 2.5 MGD (2.5 MGD each, in the year 2010 and 2020 respectively) treatment capacity each.

Evaluation of Alternatives

The Options developed in the previous sections were presented to the City staff and after discussions on each of these Options, the following three (3) Options to proceed further with detailed analysis.

TABLE ES 1-4: *Top Selected Options for Detailed Analysis.*

Option	Description
1	New 14 MGD treatment facility
3	New 12 MGD treatment facility with expansion to 14 MGD
4	Using existing treatment facility and building new 7 MGD treatment facility with expansion to 14 MGD

Each of the selected Options in **Table ES 1-4** were further divided into two Options based on the two chosen process types namely, conventional activated sludge process and sequential batch reactor process, and analyzed in detail for capital and operation and maintenance costs. Process selection is very important step in the design of wastewater treatment plant as it provides an opportunity to implement the treatment system that suits local environmental conditions, construction and operation costs, energy considerations, operator's skills, process flexibility, etc. In this study, a conventional activated sludge process and sequential batch reactor process were considered and the top three selected options were expanded to six alternatives, each Option using two different processes, conventional activated sludge and sequencing batch reactor processes. These Options are as follows.

Option 1A: New 14 MGD treatment facility using conventional activated sludge process

This process is a two stage treatment process, first stage for BOD removal and the second stage for the removal of ammonia. The Option is designed to handle the projected ultimate design flow of 14 MGD, and replaces the existing WPCF facility in totality with the exception of the biosolids processing facility.

Option 1B: New 14 MGD treatment facility using sequencing batch reactor process

The designed capacity of this plant is the same as Option 1A except it uses SBR process. The BOD and ammonia removal are accomplished in several steps using the same basin/tank.

Option 3A: New 12 MGD treatment facility using conventional activated sludge process with expansion to 14 MGD

This Option uses conventional activated sludge process. The preliminary treatment unit consisting of screen, grit removal, parshall flume and lift station, primary clarifier and UV disinfection system are designed for an ultimate design flow of 14 MGD and the remaining treatment units are designed for 12 MGD with the Option to expand to 14 MGD in the year 2020. This Option also replaces the existing WPCF facility in totality with the exception of bio-solids processing facility.

Option 3B: New 12 MGD treatment facility using sequencing batch reactor process with expansion to 14 MGD

The designed capacities and expansion phasing of this Option is the same as Option 3A except it uses SBR process.

Option 4A: Using the existing treatment facility and building a new 7 MGD treatment facility using conventional activated sludge process with expansion to 14 MGD

This Option uses conventional activated sludge process. The preliminary treatment unit consisting of screen, grit removal, parshall flume and lift station, and UV disinfection system are designed for ultimate design flow of 14 MGD and the remaining treatment units are designed for 7 MGD with the Option to expand to them to 14 MGD in the year 2020. This Option will still use the North Plant until 2020. As a result it will require some rehabilitation work to existing primary and secondary clarifiers in the North Plant and construction of new nitrification clarifiers at existing BNR system.

Option 4B Using the existing treatment facility and building a new 7 MGD treatment facility using sequencing batch reactor process with expansion to 14 MGD

The designed capacities and expansion phasing of this Option is the same as Option 3A except it uses SBR process.

Summary of capital cost and operation and maintenance cost for each of the above six Options is shown in **Table ES 1-5.**

TABLE ES 1-5: ***Summary of capital and operation and maintenance cost***

OPTION	DESCRIPTION	CAPITAL COST		O & M COST	
		2010	2020	2010 - 2020	2020 - 2030
1A	14 MGD New Plant Conventional Activated Sludge Process	$ 48,316,100	$ 4,935,100	$ 1,717,680	$ 1,888,480
1B	14 MGD New Plant SBR Process	$ 46,580,700	$ 4,935,100	$ 1,442,030	$ 1,612,830
3A	12 MGD New Plant Conventional Activated Sludge Process W/ Expansion to 14 MGD	$ 42,796,500	$ 11,077,500	$ 1,514,290	$ 1,888,480
3B	12 MGD New Plant SBR Process W/ Expansion to 14 MGD	$ 42,121,600	$ 9,430,200	$ 1,289,790	$ 1,612,830
4A	Using Existing Treatment Facility and building new 7 MGD New Plant Conventional Activated Sludge Process W/ Expansion to 14 MGD	$ 33,039,300	$ 26,421,000	$ 1,627,910	$ 1,888,480
4B	Using Existing Treatment Facility and building new 7 MGD New Plant SBR Process W/Expansion to 14 MGD	$ 31,930,500	$ 24,026,400	$ 1,577,340	$ 1,612,830

From the capital and operations costs listed in **Table ES 1-5**, the Present Worth Cost for each Option was calculated. A summary of the Present Worth Costs can be seen below in **Table ES 1-5**. The following assumptions were used in the Present Worth Cost Analysis.

1. Present Worth Analysis was performed for the year 2006
2. Evaluation period used is 20 years, between years 2010 and 2030
3. Capital costs were expected to occur in two stages, year 2010 and 2020. Capital cost for the year 2020 includes additional expansion to meet the ultimate condition.
4. Annual operations and maintenance costs were divided in to two time periods, one for the period 2010-2020 and the other for the period 2020-2030 as the expansion at 2020 would increase the operation and maintenance cost.
5. Inflation factor of 4.5% per year was used for Present worth Analysis.

TABLE ES 1-6: ***Summary of present worth cost***

Option	Description	Present Worth Cost
1 A	14 MGD New Plant Conventional Activated Sludge Process	$ 62,646,975
1 B	14 MGD New Plant SBR Process	$ 58,184,959
3 A	12 MGD New Plant Conventional Activated Sludge Process W/ Expansion to 14 MGD	$ 59,985,628
3 B	12 MGD New Plant SBR Process W/ Expansion To 14 MGD	$ 55,862,804
4 A	Using Existing Treatment Facility and Building a 7 MGD New Plant Conventional Activated Sludge Process W/ Expansion to 14 MGD	$ 60,842,593
4 B	Using Existing Treatment Facility and Building a 7 MGD New Plant SBR Process W/ Expansion To 14 MGD	$ 57,106,473

Normally the recommended alternative selection is based upon the Present Worth Cost Analysis described and summarized above. The Present Worth Cost information presented in **Table ES 1-6**, worth indicates that Option 3B has the lowest present worth cost among all of the alternatives evaluated. Therefore it is recommended that Option 3B be considered by the City of Enid for implementation. This Option is discussed in more detail in the following section.

Recommended Alternative

The recommendations below are based on an extensive evaluation of the existing treatment units and the introduction of new treatment concepts. During this evaluation, the basis for selection was the cost effectiveness of the system process. Generally, the alternative with the lowest present worth cost was recommended. In this evaluation, *Option 3B* has the lowest present worth cost, and therefore fore it is recommended that *Option 3B* be considered by the City of Enid for implementation.

The proposed improvements under *Option 3B* will provide the City of Enid Water Pollution Control Facility with the following attributes:

- Replaces the existing WPCF facility in totality with the exception of the bio-solids processing facility;
- Less / no disruption to current plant operations while new facility is being built;
- Improved effluent quality;
- Elimination of primary, secondary clarifiers and return sludge recirculation, elimination of short circuiting;
- Ability to handle shock in hydraulic and organic loading;
- Ability to remove nutrients;
- Easy to expand and replicate the additional reactors;
- Less land requirements than other processes.

The improvements recommended under *Option 3B* consist of expanding the plant in two stages as follows:

Improvements at 2010:

- New headworks including screening, grit removal and flow measurement to handle ultimate peak flow of 28 MGD;
- New low lift pump station to handle ultimate peak flow of 28 MGD;
- SBR reactors to treat an average daily flow of 12 MGD;
- New sludge holding basins;
- Disinfection system;
- Effluent flow measurement structure;
- Influent/effluent outfall; site work, piping, electrical, instrumentation & controls;
- Decommissioning of the existing WPCF facility in totality except bio-solids processing facility.

Improvements at 2020:

- One additional SBR reactor to increase the design capacity of the SBR reactors from 12 MGD to 14 MGD of average daily flow;
- Expanding the capacity of the existing bio-solids processing facility from 10 MGD to 14 MGD by bnilding two new aerobic digesters and additional dewatering system consisting of belt press, polymer dosing system, sludge conveyor, etc.;
- Sitework, piping, electrical, instrumentation & controls.

The approximate capital construction cost to build all recommended improvements has been estimated to be $42,121,600 and $9,430,200 for the years 2010 and 2020, respectively. **Table ES 1-7** shows the breakdown of these estimated capital costs for the recommended improvements. The estimated construction costs are based on August 2006, Engineering News Record (ENR) construction cost index (7722).

TABLE ES 1-7: *Capital construction cost for recommended alternative, Option 3B*

Unit Description	Capital Construction Cost	
	2010	2020
Mobilization	$ 773,900	$ 224,800
Sitework	$ 2,220,600	$ 680,600
Headworks		
Screening	$ 510,400	-
Grit Removal	$ 783,100	-
Parshall Flume	$ 240,500	-
Low Lift Pump Station	$ 1,383,900	-
SBR Reactors	$ 16,590,200	$ 2,370,100
Sludge Holding Basins	$ 1,174,100	-
Disinfection System	$ 1,975,300	-
Aerobic Digesters	-	$ 1,295,800
Dewatering System	-	$ 1,200,300
Electrical	$ 2,251,500	$ 608,800
Instrumentation & Controls	$ 1,187,700	$ 293,600
Piping	$ 2,560,000	$ 580,000
Influent / Effluent outfall	$ 750,000	-
SUB TOTAL	**$ 32,401,200**	**$ 7,254,000**
Non-Construction Cost (15%)	$ 4,860,200	$ 1,088,100
Contingency (15%)	$ 4,860,200	$ 1,088,100
TOTAL	**$ 42,121,600**	**$ 9,430,200**

The annual operation and maintenance cost for the years 2010-2020 and 2020-2030 are $1,289,790 and $1,612,830 respectively.

SUMMARY OF RECOMMEDED IMPROVEMENTS

To guide the City of Enid in implementation of recommended improvements, the phasing and cost for recommended improvements are summarized and is shown in **Table ES 1-8**. The improvements shown are based on the evaluation of the existing system and the projected future needs. As with any master plan, as the city grows and the needs change, the master plan should be continually updated to accommodate such changes.

TABLE ES 1-8: *Summary of recommended improvements*

IMPROVEMENT DESCRIPTION	ESTIMATED COST INVESTMENTS			
	2007	2010	2015	2020
Wastewater Treatment System Improvements				
Construction of new 12 MGD wastewater treatment system		$ 42,121,600		
Expansion to 14 MGD				$ 9,430,200
Wastewater Collection System Improvements				
Basin 1P Expansions				
Construction of new 24-inch line	$ 2,500,000			
Basin 1A and 2A Peak Holding Tank				
Peak holding tank, 800,000 gallon	$ 1,500,000			
Basin 1J and 1K Expansions	$ 300,000			
Basin 2H and 2K Expansions				
Basin 2H - 12 inch line upgrade		$ 500,000		
Basin 2H - 18 and 21 inch line upgrade		$ 1,300,000		
Basin 2K - 12 inch line upgrade		$ 1,300,000		
Basin 2K - 24 and 27 inch upgrade		$ 1,800,000		
Basin 2K - 30 inch Frantz Street pipeline		$ 4,000,000		
Basin 2G Expansions				
12 inch line westward on north of Owen K. Garriot Road		$ 800,000		
12 and 18 inch line upgrade - Bob's Farm		$ 2,000,000		
Sanitary Sewer Main Expansion			$ 20,000,000	
1A and 2A main lines south of City				
North-south 36-in. main (11TH Street to Van Buren & Willow)				
Frantz Street 30-inch cross-town main				
2D line servicing Vance Air Force Base (VAFB).				
Sanitary Sewer Collection Mains				
Oakwood pipeline			$ 1,000,000	
North-south 36-inch extension (along Van Buren)			$ 2,500,000	
1N pipeline improvement			$ 2,000,000	
Basin 2D 10-inch pipe improvement (southeast of Van Buren)			$ 2,000,000	
Peak Storage Basins				
South Cleveland Road			$ 2,000,000	
At 2D and 2A pipeline merge			$ 2,000,000	

EVALUATION OF THE EXISTING WATER POLLUTION CONTROL FACILITY

INTRODUCTION

The purpose of this technical memorandum is to summarize the work efforts performed in connection with the evaluation of the existing City of Enid Water Pollution Control Facility (WPCF). This technical memorandum will also serve as a basis for the development of treatment alternatives during this study. The specific components of this technical memorandum include a review of the plant records, an analysis of wastewater flows and its characteristics, limitations on the effluent discharges and evaluation of existing liquid treatment and sludge treatment units.

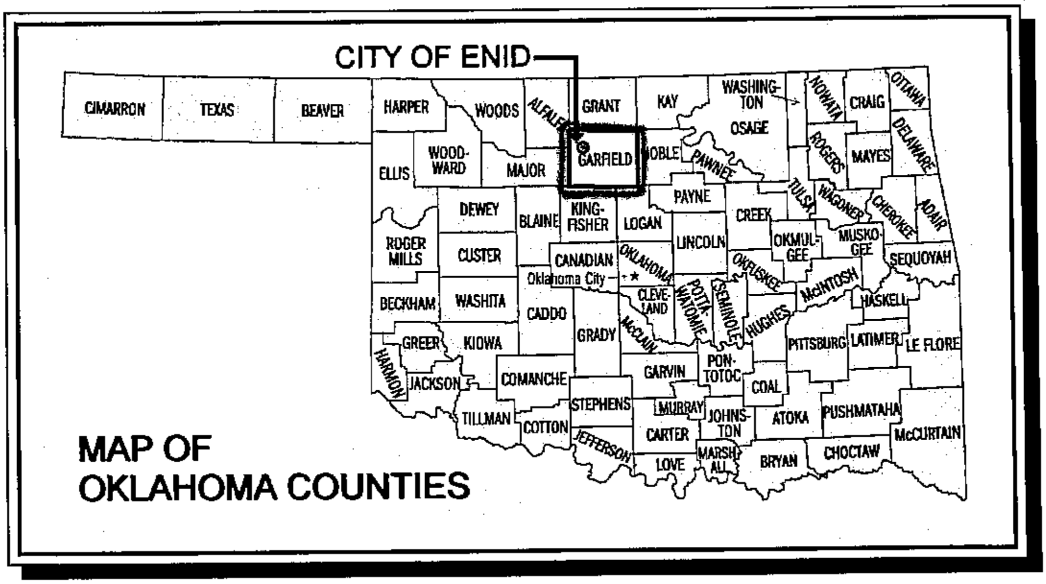
In preparation for this task, previous documents were reviewed for background information and they are listed below:

- Facility Plan Wastewater Collection and Treatment System, Eagle Consultants, Inc., April 2000
- Wastewater Facility Plan for Bio-Solids System, Dewberry, April 2004
- Enid Metropolitan Area Comprehensive Plan, Enid Vision 2025 Committee, April 2005
- Sanitary Sewer Collection System Study – Final Report Phase III and IV, Wilson & Company, July 1990
- Inflow and Infiltration Program: 1990-1993 – Summary Report, Envirotech Services, Inc., August 1993
- Sanitary Sewer System Master Plan, City of Enid Engineering Department, January 1996
- Year 2000 Flow Monitoring Report, Rowe Porterfield, LLC, July 2000
- Chapter 656. Water Pollution Control Facility Construction Standards, Oklahoma Department of Environmental Quality, 2001.

STUDY AREA

The City of Enid is located in the north central part of Oklahoma in the Garfield County along the eastern edge of the Great Plains as seen in **Figure TM 1-1.** The study area consists of the incorporated limits of the City of Enid and those unincorporated areas that drain or utilize the City's sanitary sewer collection system. The sanitary sewer collection system for the study area is hydraulically divided into two watersheds, Watershed No. 1 and Watershed No. 2. Watershed No. 1 contains sixteen collection basins

Figure TM 1-1: Enid Location Map



which have been designated (1A) through (1P). Watershed No.2 contains eleven collection basins which have been designated (2A) through (2K). The location and boundaries of the 27 collection basins are illustrated on the basin location map presented in **Figure TM 1-2.** All discharges in to the city collection system are conveyed to the City Water Pollution Control Facility located in the extreme southeast corner of the City.

The topography of the study area varies from gently rolling to flat prairie. Drainage ways regularly dissect the level prairie at approximately mile intervals. The predominant drainage direction is from northwest to southeast. The major streams in the county generally have wide floodplains of up to 2 miles. The elevation in the County varies between 1300 feet to 1100 feet mean sea level.

The area's climate is sub-humid, continental and temperate with well defined seasons. The winter is cool to cold with average temperatures ranging from 50° F and 29° F for winter daily average and daily minimum, respectively, and a record low of -20 ° F. Likewise, the area's climate is hot in the summer with average temperatures ranging from 94° F and 70° F for summer daily average and daily minimum, respectively, and a record high of 118 ° F.

Average rainfall for the area is 29-inches and average snowfall is 8-inches. Rainfall is fairly constant throughout the year with 70 percent coming from April through September. The prevailing wind direction is from the south during the March to November time period with a significant northerly shift during the winter months. The highest monthly average is 13 mph during March and April. The yearly gross lake evaporation rate for the study area is 62-inches per year.

PLANNING HORIZON

The planning period or planning horizon is the time span over which the wastewater facility needs are forecasted. Therefore, proposed facilities are planned to meet the system's needs projected over the planning timeframe and the alternative's costs are amortized over this planning horizon which is typically referred to as the facility's life. Thus, the planning horizon is used as a method of equalization of the

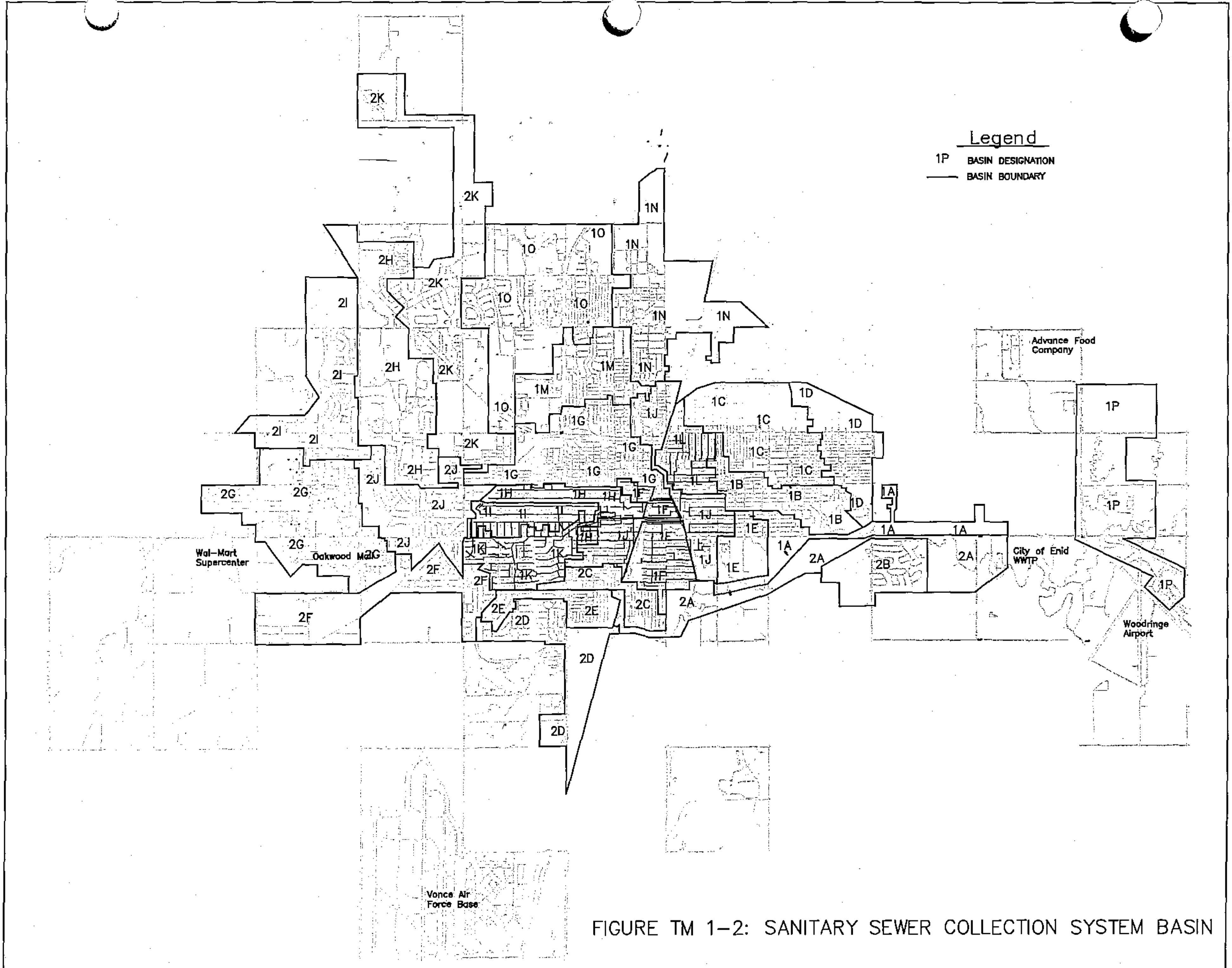


FIGURE TM 1-2: SANITARY SEWER COLLECTION SYSTEM BASIN various alternatives. It should be noted, the term "life" does not imply the useful life of the project, which is typically greater than the planning horizon.

Most utility master plans are prepared for medium-term planning horizons, which range from 20 to 25 years. This period is based on the longest term in which reasonable detailed forecasts for growth and capacity cau be made. For this facility plan the planuing horizon of 25 years has beeu chosen. Future wastewater loads and flows will be projected for the year 2030.

POPULATION PROJECTIONS

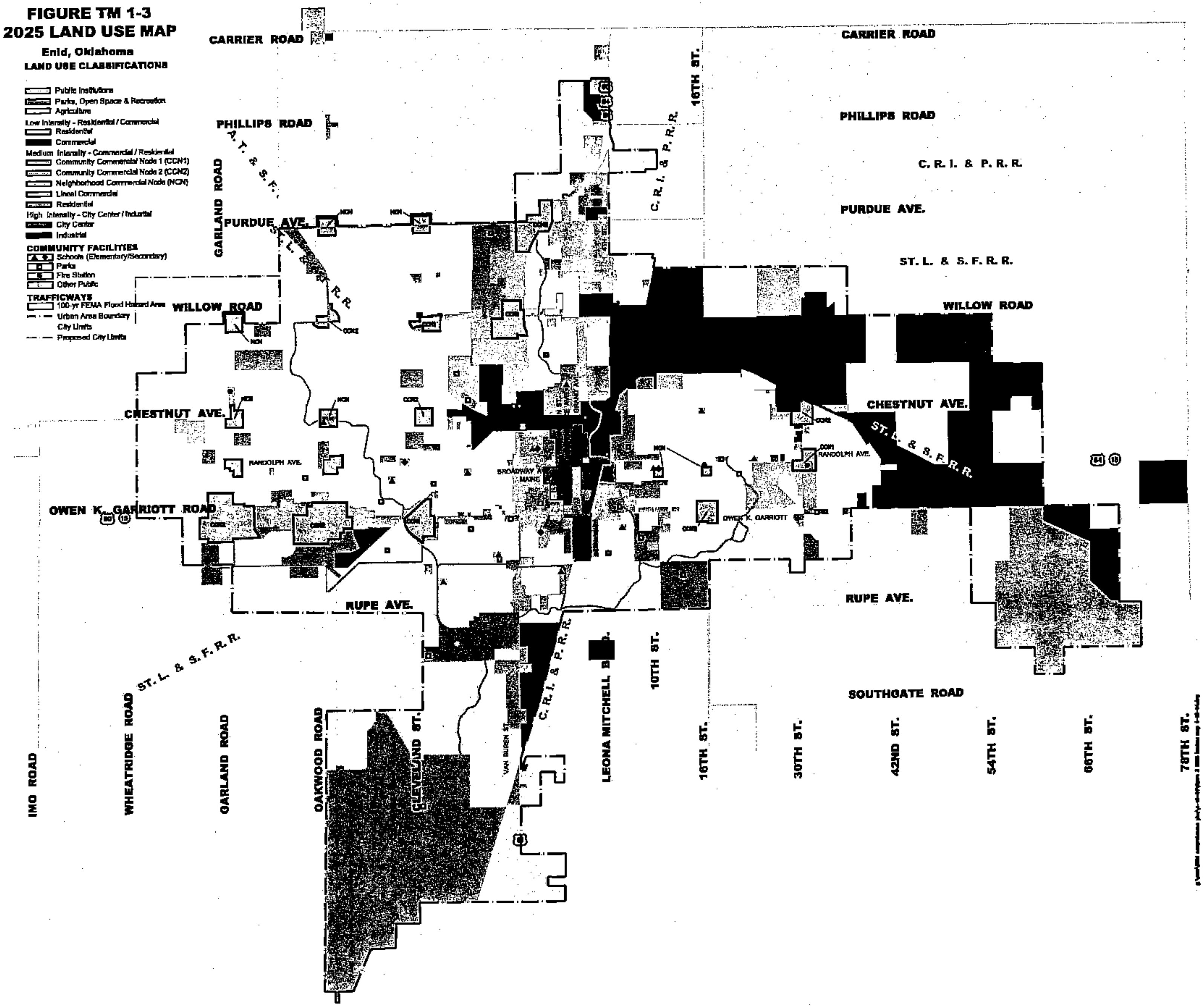
Our review of the available population and community development data indicated that the City's recent population is relatively stable. Population Projections were made utilizing the United States Census Bureau's data and growth rate used in Enid Metropolitan Area Comprehensive Plan 2000 – 2025. The projections were also compared with the Oklahoma Department of Commerce projections. The summary of this data is shown in **Table TM 1-1.**

Table TM 1-1 Population Projection

Year	US Census Bureau Population		Oklahoma Department of Commerce Projections		Projection for this Master Plan	
	Population	Percent increase	Population	Percent increase	Population	Percent increase
1950	36,000					
1960	38,900	+ 0.81				
1970	44,986	+ 1.56				
1980	50,636	+ 1.26				
1990	45,309	- 1.06				
2000	47,045	+ 0.38				
2010			48,170	+ 0.24	49,451	+ 0.50
2020			49,640	+ 0.31	51,980	+0.50
2030			50,860	+ 0.25	54,638	+0.50

For population projection, this report uses 0.005 rule adopted by Enid Vision 2025 Committee. The rule 0.005 assumes straight line growth compouuded at one-half of oue percent per year. This is a reasonable assumption based on the recent trend in population growth and is not likely to change unless there are any significant shifts in the City's economic market sectors. The projection for the year 2030 based on this rule is 54,638 whereas the Oklahoma Department of Commerce projection for the same year is 50,860. This report will use the population figure of 54,638 for flow projections and wastewater facility expansious.

FIGURE TM 1-3
2025 LAND USE MAP



LAND USE MAP

Land use map for the Enid Metropolitan area as shown in the City of Enid Metropolitan Area Comprehensive Plan 2025 can be seen in **Figure TM 1-3**. Enid Metropolitan area includes area within the City limits as well as outside. Most of the land outside the City limits is designated as agricultural land. The developed and undeveloped area within the City limits as on July 2002 as shown in Enid Metropolitan Area Comprehensive Plan is tabulated below in **Table TM 1-2**.

Table TM 1-2: Developed Area within the City as of July 2002

Land use	Total area (acre)	Developed (acre)	Undeveloped (acre)
Residential	10,595	6,707	3,888
Commercial	2,186	1,401	786
Industrial	3,678	1,127	2,551
Agricultural	10,916	384	10,532
Special use	1,352	811	541

For the industrial land development calculations, it is more prudent to use the employment growth rate than the population growth. As per the U.S. Census Bureau information, the work force in the City of Enid has grown from 19,100 to 20,680, equivalent to 0.84% annual growth between the year 1990 and 2000. Assuming 1% employment growth rate, in the design year 2030 there will be 30% aggregate industrial growth. However as the nature of the new industries and their water consumption and wastewater production rates are highly variable, this report assumes development of all undeveloped area within industrial land use category (100% development). This allows for conservative projection of industrial flows and provides flexibility in allowing diverse nature of industries within the City.

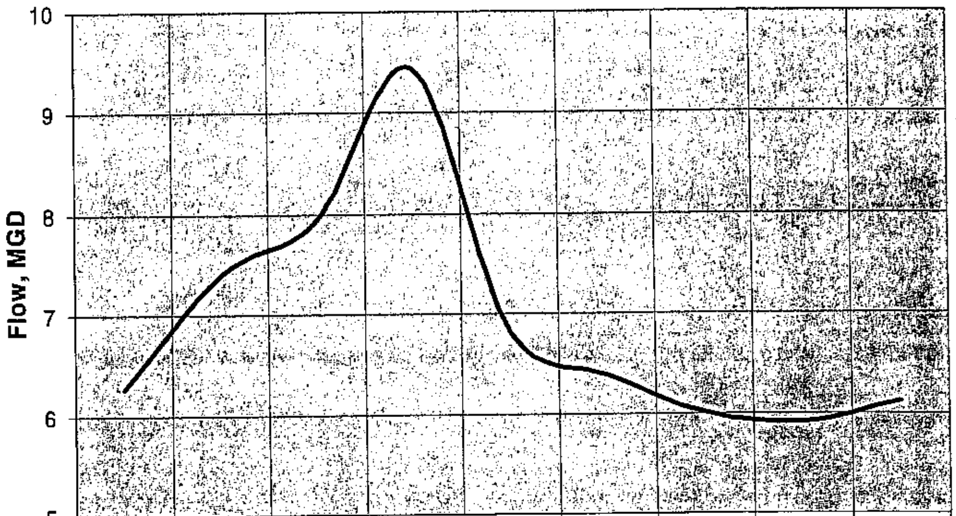
WASTEWATER CHARACTERISTICS

It is important to determine the flow rates and understand the nature of wastewater in order to evaluate the existing wastewater treatment facility and propose alternative treatment technologies appropriate for the City of Enid. The wastewater treatment facility plant records were evaluated to determine the historic loadings for flow, organic, suspended solids, and ammonia nitrogen. This information was then used along with population projections, land use and future industrial users information to determine the design loadings.

Flow Analysis

Plant flow records for the years 1996 through 2004 were obtained from the plant operations staff (See **Appendix TM 1-1**). Daily average wastewater flows (DAF) have fluctuated for the past nine years with the years 1999 and 2003 being the highest at 9.44 MGD and lowest with 5.91 MGD, respectively. **Figure TM 1-4** shows the actual fluctuation. Wastewater flows (DAF) for the past nine years have averaged 6.92 MGD with a standard deviation of 1.02 MGD.

Figure TM 1-4: Influent Wastewater Flow (MGD)



	1996	1997	1998	1999	2000	2001	2002	2003	2004
Influent Flow (MGD)	6.264	7.396	7.937	9.439	6.804	6.384	6.015	5.912	6.121

Year

The population of the service area for the years 1996 through 2004 and the per capita wastewater generation rate is shown in **Table TM 1-3.** The total per capita wastewater generation rate (GPCD) have fluctuated for the past nine years with the years 1999 and 2003 being the highest at 209 GPCD and lowest with 127 GPCD, respectively. The per capita wastewater generation rate for the past nine years has averaged 151 GPCD. It should be noted that this per capita wastewater generation rate includes residential, industrial and commercial wastewater as well as infiltration and inflow (I/I) into the collection system.

Our review of the available population and community development data indicated that the City's population tends to be relatively stable and there has been a steady reduction in the wastewater flow rate over the past five (5) years. The review of the existing documents indicate that the City has studied the effect of infiltration and inflow (I/I) on its collection system and implemented an aggressive program to significantly reduce those flows. If these I/I control strategies continue to be implemented, the DAF to the facility and per capita generation rate should stabilize and may actually decrease.

TABLE TM 1-3: Per Capita Wastewater Generation Rate

Year	Total Service Population	Average Annual Flow (MGD)	Per capita flow rate (GPCD)
1996	45,320	6.264	138
1997	45,190	7.396	164
1998	45,250	7.937	175
1999	45,200	9.439	209
2000	47,045	6.804	145
2001	46,590	6.384	137
2002	46,530	6.015	129
2003	46,480	5.912	127
2004	46,630	6.121	131

The Oklahoma Department of Environmental Quality (ODEQ) construction standards indicate that new sewage systems shall be designed on the basis of an average daily per capita flow of sewage not less than 100 gpcd. The 100 gpcd is assumed to cover normal infiltration. However an additional allowance should be made if conditions are unfavorable. A total dry-weather base flow of 120 gpcd has been established by EPA as a historical average where infiltration is not excessive. This base flow includes 70 gpcd for domestic flows, 10 gpcd for commercial and small industrial flows, and 40 gpcd for infiltration.

Since the City's implementation program to correct I/I in the collection system (years 2000 to present), the per capita flow have decreased and stabilized at an average of 133 gpcd. Therefore, for the purposes of this study, the average per capita wastewater generation rate of 130 gpcd has been assumed in addition to any anticipated future industrial flows. Flows from existing industries, projections for industrial flows and impact of industrial discharges on the existing treatment facility are discussed separately in this report.

It is also important to determine the peaking factors for the influent wastewater. Peaking factors are used to determine the size of the various treatment processes. The historical flow data related to peaking factors for the total service area is presented in **Table TM 1-4.** It shows that the average peaking factors for the maximum month and maximum day for the past nine years are 1.14 and 1.51, respectively. However, this peaking factor may not be a true value, since during high flow conditions excess flow is conveyed to the equalization basin, and latter processed through the plant, when flows resumed to normal. For the purposes of this report, the peaking factor used for maximum month and maximum day are 1.25 and 2.0, respectively.

TABLE TM 1-4: Historical Flow Peaking Data

Year	Average Annual Flow (MGD)	Maximum Month Flow (MGD)	Maximum Day Flow (MGD)	Maximum Month Factor	Maximum Day Factor
1996	6.264	7.064	11.922	1.13	1.90
1997	7.396	7.866	8.846	1.06	1.20
1998	7.937	9.637	14.724	1.21	1.86
1999	9.439	12.780	15.407	1.35	1.63
2000	6.804	8.207	11.387	1.21	1.67
2001	6.384	7.250	8.362	1.14	1.31
2002	6.015	6.358	8.887	1.06	1.48
2003	5.912	6.401	7.380	1.08	1.25
2004	6.121	6.400	7.800	1.05	1.27

Analysis of wastewater characteristics

Presently, the City conducts extensive measurements of influent wastewater prior to the existing WPCF. Influent pollutant concentrations for the past nine (9) years are shown in **Table TM 1-5** and include the following pollutants Five Day Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), Ammonia (NH_3), Dissolved Oxygen (DO), and Total Alkalinity. The mean and standard deviation are also shown.

TABLE TM 1-5: Influent Wastewater Quality

Year	Influent BOD_5 (mg/l)	Influent TSS (mg/l)	Influent NH_3 (mg/l)	Influent DO (mg/l)	Influent Alkalinity (mg/l)
1996	333	274	15.8	2.3	368
1997	245	257	14.6	1.2	359
1998	222	261	12.8	1.1	356
1999	196	227	11.1	1.0	354
2000	206	222	15.9	1.1	357
2001	268	283	16.7	-	-
2002	230	254	17.4	-	-
2003	220	248	18.3	-	-
2004	271	234	17.5	1.3	359
Mean	**243**	**251**	**15.6**	**1.3**	**359**
Stan. Dev	**42**	**21**	**2.4**	**0.5**	**5**

Historical loading data for BOD5, suspended solids and ammonia nitrogen for the last nine years and the equivalent per capita contribution of each is shown in **Table TM 1-6**. The per capita BOD5 loading is typically in the range of 0.18 to 0.26 pounds (lb) of BOD5 per capita per day (Metcalf & Eddy). The influent loading data reveals that the average per capita BOD5 in the past 9 years is 0.30 lbs per capita per day which suggests that there is significant BOD5 loading from industrial sources.

The per capita suspended solids and total kjeldahl nitrogen (TKN) loadings are typically in the range of 0.20 to 0.33 and 0.022 to 0.044 lbs per capita per day, respectively (Metcalf & Eddy). The average per capita loadings of suspended solids and ammonia nitrogen in influent wastewater are 0.314 and 0.019 lbs per capita per day, respectively. The suspended solids and nitrogen loading in the influent wastewater are within suggested normal range.

The BOD5 concentration for an equivalent flow of 130 gpcd and a BOD5 loading of 0.302 lb per capita per day equates to 278 mg/l. The suspended solids concentration for the same flow at per capita solids loading of 0.314 lb per capita per day is 289 mg/l. The ammonia nitrogen concentration for the equivalent flow of 130 gpcd at 0.019 lb per capita per day equates to 17 mg/l.

TABLE TM 1-6: Influent Loading Data for Organic(BOD), Solids and Ammonia Nitrogen

Year	BOD_5		TSS		NH_3	
	lb/d	lb/d/capita	lb/d	lb/d/capita	lb/d	lb/d/capita
1996	17,397	0.384	14,314	0.316	825	0.018
1997	15,112	0.334	15,852	0.351	901	0.020
1998	14,695	0.325	17,277	0.382	847	0.019
1999	15,429	0.341	17,870	0.395	874	0.019
2000	11,690	0.248	12,597	0.268	902	0.019
2001	14,269	0.306	15,058	0.323	888	0.019
2002	11,538	0.248	12,742	0.274	871	0.019
2003	10,847	0.233	12,228	0.263	902	0.019
2004	13,834	0.297	11,945	0.256	892	0.019
Mean	**13,868**	**0.302**	**14,443**	**0.314**	**878**	**0.019**

Based on the analysis of influent loadings as presented above, this facility plan will use the concentrations of BOD5, TSS and ammonia nitrogen as 300 mg/l, 300 mg/l and 25 mg/l respectively for the purpose of evaluating possible treatment alternatives.

INDUSTRIAL DISCHARGES AND PRETREATMENT

Growth of industries in and around the City of Enid plays a vital role in the employment and economic development of Enid. Enid Metropolitan and Comprehensive Plan 2000-2025 has established polices for future land use patterns such as residential, manufacturing/industrial uses, commercial, recreational and mixed uses. For the purpose of this report, the land use map of the Enid Metropolitan and Comprehensive Plan 2000-2025 will serve as a basis for projection of industrial flows.

The City of Enid has eleven major institutions/hospitals or industries within its drainage boundary. Their combined average flow discharge to the City's collection system is about 0.726 MGD at an average BOD_5 concentration of 645 mg/l and TSS of 389 mg/l. The individual flows and wastewater characteristics for each industry are summarized in **Table TM 1-7**.

TABLE TM 1-7: SIGNIFICANT INDUSTRIAL USERS INFORMATION

No.	Industrial User	Avg Daily Flow (MGD)	Average BOD_5		Average TSS	
			mg/l	lbs/d	mg/l	lbs/d
1	INTEGRIS HOSPITAL	0.052	294	127.5	99	42.9
2	LANDFILL LEACHATE	0.028	59	13.8	315	73.6
3	CHEM-CAN	0.010	5,040	420.3	159	13.3
4	BROADWAY TEXACO	0.004	10	0.3	8	0.3
5	ADVANCE-E WILLOW	0.030	661	165.4	144	36.0
6	ADVANCE-RALEIGH RD	0.274	838	1,915.0	499	1,140.3
7	ADVANCE-PINE ST	0.079	1,172	772.2	1,047	689.8
8	ST MARY'S HOSPITAL	0.069	373	214.6	226	130.1
9	VANCE AFB	0.171	173	246.7	151	215.3
10	SEABOARD FARMS	0.005	642	26.8	254	10.6
11	RED CARPET LANDFILL	0.004	77	2.6	20	0.7
	TOTAL	**0.726**		**3,905.2**		**2,352.8**

Industrial Flow, Average:	**0.726 MGD**
Composite BOD_5:	**645 mg/l**
Composite TSS:	**389 mg/l**

Although the existing industries contribute about 10% of the total flow to the City of Enid Water Pollution Control Facility, the amount of organic load they contribute is about 30% of the total loading contributed to the City's WPCF. This was the main reason that the per capita BOD5 contribution based on the population equivalent as indicated earlier in this report was higher (0.30 lbs per capita per day) than typical ranges (0.18 to 0.26).

Industrial Pretreatment is a requirement of the Federal Clean Water Act for public wastewater treatment facilities treating over 5 MGD of wastewater. The Act is intended to protect sewerage facilities and worker's health, to prevent inhibition of the treatment processes and violations of surface water quality standards, and to maintain biosolids quality within USEPA's "Clean Sludge" criteria for trace metals. The City of Enid has an approved industrial pretreatment program that regulates the discharge of industrial users. The industrial pretreatment program has established local limits to certain pollutants like arsenic, cadmium, chromium, copper, lead, nickel, silver, zinc, mercury, cyanide, phenol & phenolic compounds pH, temperature and oil and grease. The City's industrial pretreatment program has not established any specific limit for oxygen-demanding pollutants (BOD5). However, it prohibits discharge of any pollutants including oxygen -demanding pollutants (BOD5) released in a discharge rate and/or pollutant concentration which will cause interference to the Publicly Owned Treatment Works (POTW). The City also reserves the right to increase the restrictions or to adopt more stringent limitations or requirements on industrial discharges that allows the City to protect its treatment system.

Land use map for the city of Enid for the year 2025 classifies about 3,678 acres of land for industrial development. Currently, existing industries occupied 1,127 acres of land leaving approximately 2,551 acres for future industrial development. Non-domestic wastewater flow rates from industrial sources vary with the type and size of industry, the degree of water reuse, and onsite wastewater treatment methods, if any. Typical design values for estimating the flows from industrial areas that have no or little wet-process type industries are 1,000-1,500 gal/acre-day for light industrial developments. Typical design values for medium industrial developments are 1,500 to 3,000 gal/acre-day (Metcalf & Eddy). Currently, average wastewater contribution from the existing industries is estimated to be 643 gal/acre-day. As the nature of future industries are unknown, this report assumes a design value of 1,200 gal/acre.day for future industrial flow projection.

Conversations with City of Enid staff have indicated that one of the existing industries, Advance Food is planning to expand in 2007. The City also anticipates the establishment of two new Ethanol plants in the area. Expansion of Advance Food industry will likely discharge an additional flow of 0.5 mgd at 664 mg/l BOD5 and 382 mg/l TSS by year 2007. The proposed discharges from new Ethanol plants are expected to be 0.144 MGD and 0.15 MGD respectively at the concentration of 1,000 mg/l BOD5 and 350 mg/l TSS in the year 2008. As these industries are expected to go online soon, the impacts of these proposed discharges on the existing wastewater treatment units were reviewed and addressed to the City separately in a letter memorandum. A copy of which is enclosed in **Appendix TM 1-2.**

The industrial flow projected for the year 2030 is shown in **Table TM 1-8.** However, the organic loading from the industries varies significantly based on its manufacturing activity. As a result, the City may have to review the industries discharge loading with respect to the total wastewater plant loading and impose the limit on organic loading as and when necessary to protect its WPCF from any interference to its treatment process.

DESIGN INFORMATION FOR THE PLAN YEAR 2030

Based on an analysis of the flow information presented above and the additional anticipated growth, the design information that will be used for evaluation of treatment alternatives is summarized in **Table TM 1-8.**

TABLE TM 1-8: Wastewater Flow Projection for Year 2030	
Estimated Population	54,638
Design Per Capita for Wastewater Generation	130 gpcd
Domestic Wastewater Flow	7.10 mgd
Industrial Flow Advance Food Plant Expansion Ethanol Plant (OE) Ethanol Plant (Orion) From Future Industrial Growth (2551 acres @ 1200 gpd/acres)	 0.50 mgd 0.15 mgd 0.15 mgd 3.06 mgd 3.86 mgd
Average Daily Wastewater Flow	10.96 mgd
Maximum Month Flow (factor 1.25)	14.00 mgd
Peak Daily Flow (factor 2.0)	28.00 mgd
Influent BOD5	300 mg/l
Influent TSS	300 mg/l
Influent NH4-N	25 mg/l

EFFLUENT DISCHARGE LIMITATIONS

The Oklahoma Department of Environmental Quality (ODEQ) has issued an Oklahoma Discharge Elimination System OPDES permit to the City of Enid on August 1, 2003. The current discharge permit will expire on July 31, 2008 (See **Appendix TM 1-3**). The OPDES permit is based on a plant design flow of 8.5 MGD and allows the treatment facility to discharge the effluent through two outfalls into Boggy Creek. **Table TM 1-9** below shows the OPDES effluent discharge limitations on various effluent parameters.

Table TM 1-9: OPDES Effluent discharge limitations

Effluent characteristics	Outfall 002 only		Outfall 002 only		Outfall 001 and or Outfall 002	
	April – May		June – October		November – March	
	mg/l	Lbs/d	Mg/l	lbs/d	mg/l	lbs/d
$CBOD_5$	20	1417.8	15	1063.4	20	1417.8
TSS	30	2126.7	30	2126.7	30	2126.7
NH_3-N	2	141.8	2	141.8	4.1	290.6
DO	6	-	5	-	5	-

*Outfall 001 and 002 are located west and east of the treatment facility respectively

The City of Enid is currently meeting the OPDES requirements with the existing treatment facility. It may be noted that the City of Enid has seasonal and stricter limitations on BOD_5 and NH_3-N during certain portions of the year. Therefore, it is anticipated that there may not be any change in effluent limitation in the near future and the evaluation of treatment alternatives will be based on the current discharge limitations. However, ongoing conversations with ODEQ will continue to ensure that future limits are considered in the final recommendation for the City of Enid WPCF expansion.

EXISTING WASTEWATER TREATMENT FACILITY OVERVIEW

The City of Enid Wastewater Treatment Facility began its operation in 1954 with an initial capacity of 3.5 MGD conventional activated sludge plant, known as South Plant. In 1970, the City of Enid expanded its treatment facility to 8.50 MGD by building another 5.0 MGD conventional activated sludge plant (North Plant) to the north of the existing 3.5 MGD South Plant. In 1991, the City of Enid built a 8.50 MGD Tertiary Treatment Plant for the removal of ammonia nitrogen from the effluent produced from the North and South Plants. The 1991 plant improvements also included upgrading of the existing sludge processing facilities. With the series of improvements described above, the existing wastewater treatment plant has a designed capacity of 8.50 MGD.

The City of Enid Water Pollution Control Facility is located in the Northwest quarter of section 14, Township 22 North, Range 6 west of the Indian Meridian, Garfield County, Oklahoma. The treatment facility is positioned between the East Market Avenue and Boggy Creek. A site plan showing the actual location of the process treatment units is shown in **Figure TM 1-5**. The process flow diagram showing the current operation of the individual treatment units is shown in **Figure TM 1-6**.

Existing Liquid Process Treatment Units

The wastewater generated in the City of Enid reaches the existing wastewater treatment facility through a 36-inch reinforced concrete pipe (RCP) gravity main from the west, a 33-inch RCP gravity main from the north and an 8-inch force main from the east. Flows in excess of the Treatment Facility capacity overflow in to an existing 10 million gallon storm water holding basin. Influent wastewater from the 36-inch and 33 gravity sewer mains and 8-inch sewer force main are combined in a manhole west of the treatment facility and conveyed to the plant headworks by gravity.

The plaut headworks consist of two aerated grit chambers, two screen channels, a parshall flume and a low lift pump station. Record information obtained from the City, revealed that the headwork units were designed for a peak flow of 21 MGD. Sizes of the individual units are shown in **Table TM 1-10**. Wastewater influent first passes through the grit chambers where the inorganic grit materials are removed. The forward flow from the grit chambers enters the bar screen for the removal of floating and other larger objects. One of the bar screen is mechanically cleaned with clear spacing of 1 inch and the other is a manually cleaned with clear bar spacing of 3 inches. The screened wastewater flows through an 18- inch throat width Parshall flume which measures the influent flow to the treatment plant. The forward flow from the parshall flume enters the low lift pump station wet well where influent is split and pumped to the North and South Plants for primary and secondary treatment. The raw sewage low lift pump station is equipped with two 75 HP and two 100 HP centrifugal pumps.

The South Plant is a conventional activated sludge treatment plant which has a treatment capacity of 3.5 MGD. The South Plant consist of two primary sedimentation tanks, two aeration tanks, two secondary sedimentation tanks and other associated appurtenances such as air diffusers, blowers, sludge pumps, etc. Sizes of the major individual units are shown in **Table TM 1-10.** The wastewater from the headworks low lift pump station flows through the primary sedimentation tanks for the removal of suspended solids. Followiug the primary clarification, the wastewater flows in to the conventional activated sludge aeration basins. Sufficient air is provided to the aeration basins through coarse bubble diffusers by centrifugal blowers. The treated effluent from the aeration basim flows through the secondary sedimentation tanks for solids separation. The clear treated effluent which overflows from the sedimentation tanks is conveyed to the low lift station. The settled solids from the secondary sedimentation tanks are returned to the aeration basins for maintaining desired level of mixed liquor suspended solids (MLSS). The excess sludge is pumped to the bio-solids processing facility for bio-solids stabilization and dewatering.

The North Plant is designed for an average flow of 5.0 MGD and uses conventional activated sludge process. The North Plant consists of two primary clarifiers, two aeration tanks, two secondary clarifiers and other associated appurtenances such as air diffusers, blowers, sludge pumps, etc. Sizes of the major individual units are shown in the **Table TM 1-10.** The influent from the headworks low lift pump station flows through the primary clarifiers for the removal of suspended solids. Following the primary clarification, the wastewater flows in to the conventional activated sludge aeration basins. Sufficient air is provided to the aeration basins through coarse bubble diffusers by the centrifugal blowers. The treated effluent from the aeration basin is conveyed to the secondary clarifiers for solids separation and the clear supernatant flows to the low lift station. Solids separated from the secondary clarifiers are recirculated back to the aeration basins and the excess solids are pumped to the bio-solids processing facility for bio-solids stabilization and dewatering.

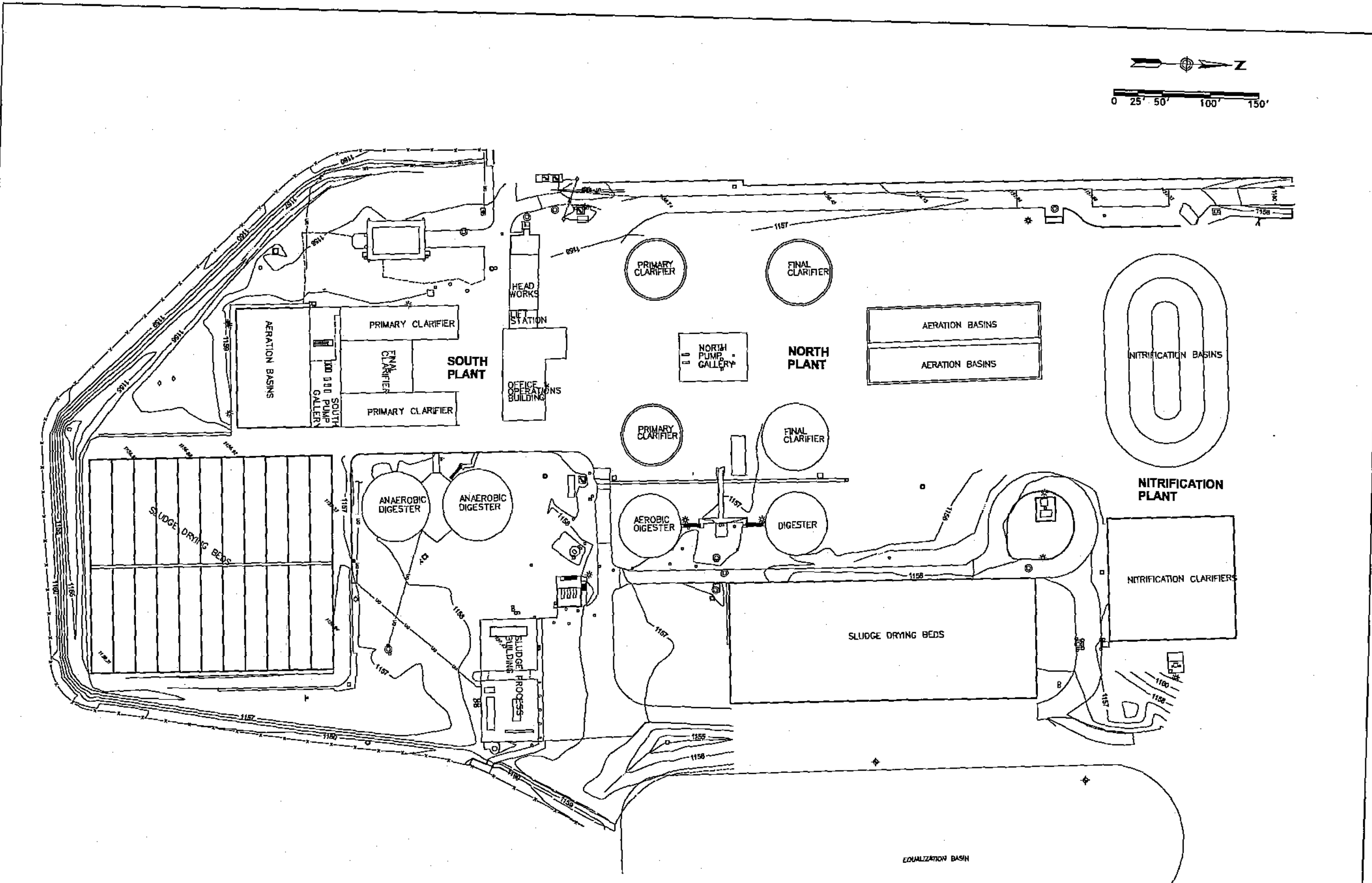


FIGURE TM 1-5: SITE PLAN - ENID WASTEWATER TREATMENT FACILITY

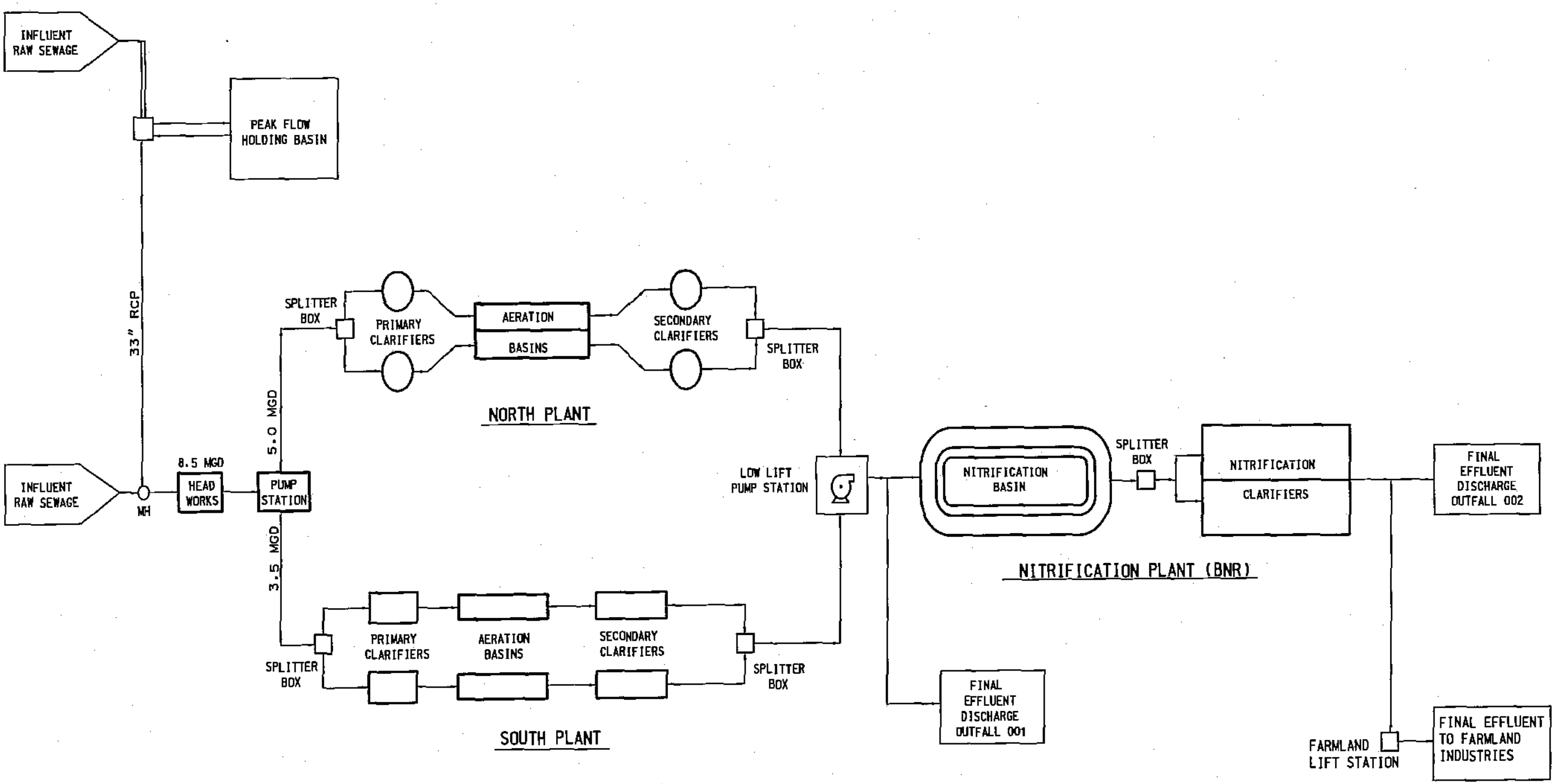


FIGURE TM 1-6: LIQUID PROCESS TREATMENT UNITS - CURRENT PROCESS

The secondary treated effluent from the North and South Plants flows to a low lift pump station from where it is pumped to the nitrification plant for removal of ammonia nitrogen and effluent polishing. The low lift pump station is equipped with a total of four (4) pumps, one driven by a 75Hp, another by a 60HP motor and the remaining pumps each by a 30HP motor. The low lift pump station has a firm pumping capacity of about 25.3 MGD. The low lift pump station also has bypass arrangements with necessary piping and valves to discharge the secondary treated effluent directly to Outfall 001 west of the existing treatment plant, during the permitted seasonal period.

Table TM 1-10 Summary of the major liquid process treatments units and their sizes

Unit process	No. of Units	Size of each unit				Design Capacity	
		Length, Ft	Width, ft	Dia., Ft	SWD, ft	Ave. MGD	Peak MGD
Headworks							
Grit chamber	2	20	10	-	10	-	21
Bar screen	2	-	5	-	6	-	21
Parshall flume	1	-	1.5	-	-	-	21
Lift pump station (two 75 HP & two 100 HP)	-	-	-	-	-	-	21
North Plant							
Primary clarifiers	2	-	-	65	8.5	5	-
Aeration basins	2	360	18	-	15	5	-
Final clarifiers	2	-	-	70	10.5	5	-
South Plant							
Primary sedimentation tank	2	72	27	-	11	3.5	-
Aeration basins	2	150	29	-	15.5	3.5	-
Secondary sedimentation tank	2	97	30	-	7.5	3.5	-
Nitrification Plant(BNR)							
Nitrification basins	1	-	-	-	12	8.5	-
Nitrification clarifiers	4	120	30	-	12	8.5	-

The nitrification plant was designed to treat 8.5 MGD of secondary treated effluent from the North and South Plants for the removal of ammonia nitrogen. The nitrification plant consist of a nitrification basin, four rectangular clarifiers and other associated appurtenances such as lime feeders, disc aerators, sludge pumping, etc. The nitrification basin is an oxidation ditch facility with three concentric channels equipped with disc aerators. The nitrified effluent from the nitrification basin flows to the four rectangular clarifies where solids are separated and the effluent is conveyed to the Farm Land lift pump station and to the existing outfall structure where the final effluent is disinfected and discharged to Boggy Creek through Outfall 002. The outfall structure has a 24-inch wide Parshall flume and sonic flow meter for recording flow discharges. The Farmland Industry lift pump station, located ahead of the outfall structure, conveys the final treated effluent to the Farm Land Industries for reuse.

Existing Solids Handling Units

The bio-solids (sludge) generated at the City of Enid Water Pollution Control Facility comes from the primary sedimentation tanks / primary clarifiers, secondary sedimentation tanks / secondary clarifiers and nitrification clarifiers. Originally when the South and North Plants were commissioned, the sludge generated from the liquid treatment process were stabilized either anaerobically or aerobically in the digesters and dewatered in the sludge drying beds before they were hauled off to an approved land fill. In 1991, the City of Enid upgraded its solids processing facility by changing the existing mode of operation of solids handling with new additional equipment for solids handling. **Figure TM 1-7** illustrates the current operation of solids treatment facility.

The primary sludge from the primary clarifiers and biological sludge from the secondary clarifiers and nitrification clarifiers are thickened in the gravity belt thickener. The concentrated solids from the gravity belt thickener are stored in the anaerobic digesters where it is stabilized. The stabilized sludge is fed in to the belt filter press for dewatering. The dewatered sludge from the belt filter press is transported to an approved land fill for final disposal. **Table TM 1-11** shows the available solids handling units and their sizes.

Table TM 1-11 Summary of the major solids handling units

Solid handling unit	No. of Units	Size and description
Anaerobic digesters	2	70 ft diameter and 24.25 ft WSD each
Aerobic digesters	2	65 ft diameter and 17 ft SWD each
Gravity belt thickeners	2	Aquabelt type 85 size II (Belt width 67.5")
Belt filter press	2	Ashbrook winklepress 1.0 m belt filter press
Sludge drying beds, south	12	Total bed area 29,700 sq.ft.
Sludge drying beds, north	28	Total bed area 39,000 sq.ft.

Data obtained from the plant records indicates that the amount of solids disposed to the landfill averages 7000 lb/day on dry basis (See **Appendix TM 1-1**). Assuming volatile suspended (VSS) solids concentration of 50% and VSS reduction of 40% in the digesters, the sludge generated at the plant averages 8,750 lb/day dry basis, which is equivalent to 1,265 pounds of sludge / MGD of flow. Typical sludge generation rate for an activated sludge plant with primary sedimentation ranges from 1,500 to 2,200 pounds of sludge / MGD of flow. The sludge production rate at the existing facility is slightly lower than typical suggested ranges, but this variation is not unusual as the solids production rate is influenced by many factors like the actual quantity of solids entering the plant, removal efficiencies of various processes, etc. However, this facility plan will use the sludge production rate of 1,500 pounds of sludge on dry basis/ day/MGD of flow for evaluation of treatment alternatives.

EVALUATION OF EXISTING TREATMENT PLANT AND CONDITION ASSESSMENT

As a part of the master planning process, it is important to evaluate the available capacity of each major treatment unit and its condition to address the deficiencies in the existing treatment system and plan for future expansions. For the purpose of the capacity evaluation, the current ODEQ criteria for the water pollution control facility construction have been used as a bench mark. The following paragraphs discuss the condition and available capacity of each treatment units.

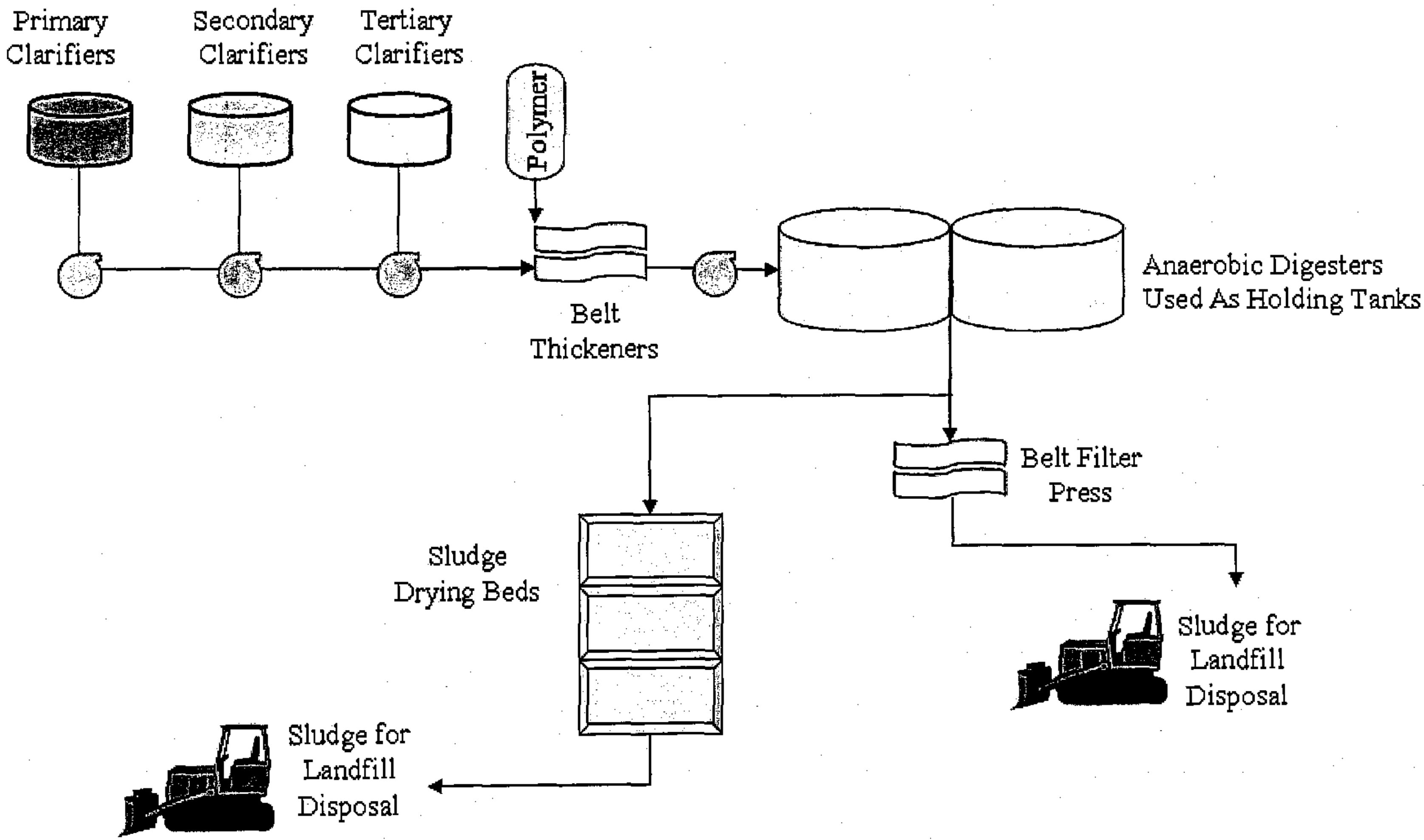


FIGURE TM 1-7: CURRENT OPERATION OF SOLIDS HANDLING FACILITY

LIQUID PROCESS TREATMENT UNITS

As discussed in the previous section, the wastewater reaching the City of Enid Water Pollution Control Facility is treated in four stages which include preliminary treatment, primary treatment, secondary treatment and tertiary treatment.

Headworks

Preliminary treatment at the City of Enid Pollution Control facility consists of grit chamber and bar screen located in the Headworks. The grit chamber was constructed in 1954 aud designed to handle a peak flow of 21 mgd. There is significant wear and tear on the grit chamber equipmeuts. The bar screens were originally designed for a peak flow of 21 mgd but the maximum flow they can handle based on ODEQ design standards is 17 mgd. The clear open space between the bars in the manual cleaned bar screen is 3 inches which exceeds the ODEQ standard of 1.75 inches.

After the preliminary treatment, the influent flow is measured in the Parshall flume and is pumped to the North and South plants by the Low lift pump station. The Parshall flume has a throat width of 18 inches which has a recommended maximum flow of 15.9 MGD. Flows in excess of 15.9 MGD could result in submerged flow condition leading to inaccurate flow measurement. The headworks lift station is equipped with two 60 HP pumps and two 100 HP pumps and has a firm pumping capacity of 29.7 MGD. There appears to be some wear and deterioration on exposed surfaces of the low lift pump station and may require painting and water proof coating.

In general, all units in the headworks appear to be in poor conditions. Some of the units like bar screen and parshall flume do not meet current design criteria. The plant headworks may require either major rehabilitation or replacement to meet the proposed flows in future.

South Plant

Primary treatment and secondary treatment at the South plant consists of two primary sedimentation tanks, two aeration tanks, two secondary sedimentation tanks and other associated appurtenances such as air diffusers, blowers, sludge pumps, etc.

The primary sedimentation tanks are rectangular tanks of size 72 feet long by 27 feet wide and 11 feet side water depth (SWD) each and are equipped with traveling bridge mechanism for collection of sludge. There are no specific criteria in the ODEQ construction standards for primary sedimentation tanks. However, as per typical design criteria recommended in Metcalf & Eddy, the primary sedimentation tanks can handle an average design flow of 3.5 mgd. At the average design flow of 3.5 mgd, the overflow rate and detention time of each tank is 900 g/ft^2/d and 2.2 hour, respectively which are within acceptable design ranges (Metcalf & Eddy).

The aeration basins are rectangular tanks of size 150 feet long, 29 feet wide and 15.5 feet SWD and are equipped with diffusers for oxygen distribution in to the basin. At the average design flow of 3.5 mgd, the organic loading rate, detention time and F/M ratio for each tank are 43 lbs of BOD_5/1000 ft^3/d, 6.90 hours and 0.27, respectively. As per ODEQ design criteria, the allowable organic loading rate range for a conventional activated sludge process is 30 to 40 lbs of BOD_5/1000 ft^3/d which restricts the treatment capacity of the aeration basins to an average flow of 3.23 mgd.

The secondary sedimentation tanks are rectangular tanks of size 97 feet long, 30 feet wide and 7.5 feet SWD each. The tanks are equipped with traveling bridge mechanism for collection of sludge. Based on the overflow rate recommended by the ODEQ design criteria of 600 g/ft^2/d, the average flow that can be handled by these tanks is 3.5 mgd. However the overflow rate at peak hourly flow shall not exceed 1,200 g/ft^2/d which restrict the peak flow to the tanks to 7.0 mgd.

Based on the above evaluation, the average flow that the South Plant can handle based on current ODEQ standards is **3.23 mgd** due to the overloading of the organic load on the aeration basins. The overflow rate on the secondary sedimentation tanks will be a limiting factor on handling the peak hourly flow. Peak flows exceeding 7.0 mgd will overload the secondary sedimentation tanks on the South Plant and deteriorate the effluent quality. **Table TM 1-12** summarizes the capacity of each treatment unit as per current ODEQ design criteria. **Table TM 1-12** also summarizes current condition rating. A template of the facility condition rating protocol can be seen in **Appendix TM 1-4**.

In regards to the condition of the South Plant, this facility was built in 1954 and has been in operation for nearly 50 years before it was taken out of service few years ago. The plant has operated well beyond its life expectancy without any significant maintenance and improvements performed to its treatment units and equipment. The concrete walkways and gratings have also deteriorated to the point that staff safety around these structures could be compromised. Therefore, major improvements will be required to bring the South Plant back in to operation. This will include, but not limited to the installation of new pumps, valves, slide and sluice gates, pipe sections, replacing tracks at the primary and secondary clarifiers and other items. The work will also require the rewiring at the existing MCC's inside the building, including labels, alarm indicators and other miscellaneous items required to get the equipment running and provide the proper alarming and SCADA to the main Control Panel. The other item, which is of more concern, is the safety of plant personnel around these structures. As previously indicated, several walkways are in need of hand railing, most of the gratings are corroded and need replacing, specially the wooded grates around the aeration basins. The wood appeared to be deteriorated through the years and will need to be replaced to handle the proper load. The south gallery where most of the electrical controls and pumps are housed is also, in need of maintenance, including the replacement of flow meters and gauges. The piping inside the gallery appeared to be corroded and the original painting for the most part is flaking off and will need to be repainted. The ventilation system appeared to be working. However, it will need to be verified that it is designed to provide the proper ventilation or number of air changes per minute required under confined spaces to satisfy ODEQ standards. The concrete walkways are cracked and for the most deteriorated to the point that the gravel is exposed and pealing off from the concrete slab. These areas will require resurfacing with concrete products to re establish its original integrity.

The Plant has operated well beyond its life expectancy without significant maintenance and improvements performed to its treatment units and equipment. The current improvements to the South Plant undertaken by the City of Enid are very critical to handle the current flow as well as industrial growth expected in near future and will extend the life of this plant for some more years before it is replaced.

North Plant

Primary treatment and secondary treatment at the North Plant consists of two primary clarifiers, two aeration tanks, two secondary clarifiers and other associated appurtenances such as air diffusers, blowers, sludge pumps, etc. The North Plant was constructed in 1970. Most of the equipment/mechanical parts are in good condition due to regnlar maintenance. However, concrete structures for the primary clarifiers are showing hairline cracks that will need to be repaired to preserve their structural integrity.

Primary treatment in the North Plant is accomplished through two primary clarifiers of size 65 feet diameter and 8.5 feet SWD each. The primary clarifiers are equipped with circular clarifier mechanisms for scum and sludge removal. The concrete structures are water tight although the walls reflect hair line cracks primarily in the area where the effluent launders are connected. At an average design flow of 5.0 mgd, the overflow rate and detention time of each tank is 753 g/ft^2/d and 2.0 hours, respectively which are within acceptable design ranges (Metcalf & Eddy).

Secondary treatment is provided in the aeration basins and secondary clarifiers. The aeration basins are rectangular tanks of size 360 feet long by 18 feet wide with 15 feet SWD. At the average design flow of 5.0 mgd, the organic loading rate, detention time and F/M ratio for each basin are 43 lbs of BOD_5/1000 ft^3/d, 7.0 hours and 0.28, respectively. Based on ODEQ design criteria, the allowable organic loading rate range for a conventional activated sludge process is 30 to 40 lbs of BOD_5/1000 ft^3/d, which restricts the treatment capacity of the aeration basins to an average flow of about 4.66 mgd.

The secondary clarifiers are circular tanks of diameter 70 feet and 10.5 feet SWD each. The average flow that can be handled by these tanks at the overflow rate recommended by the ODEQ design criteria of 600 g/ft^2/d is **4.62 mgd**. The peak hourly flow that can be handled by the clarifiers at the overflow rate of 1,200 g/ft^2/d recommended by ODEQ is 9.23 mgd.

Based on the above evaluation, the average flow that the North Plant can handle based on current ODEQ standards is **4.62 mgd** due the overloading of the secondary clarifiers. The overflow rate on the secondary clarifier is the limiting factor on handling the average aud peak hourly flows. Flows exceeding 4.62 mgd (average) and 9.24 mgd (peak) will result in increased hydraulic loading on the secondary clarifiers and minimize the solids removal efficiency. **Table TM 1-12** summarizes the treatment capacity of each treatment units as per current ODEQ design criteria and current condition rating.

In regard to the condition of the North Plant, this facility was constructed in 1970 and has been in operation for over 30 years. The plant is currently operating well even though it is running well over its rated capacity (4.62 mgd). With some structural repairs to the walls of the primary clarifiers and the ongoing maiutenance program for replacing worn out parts. The North Plant could have a useful life of another 10 to 15 years without major significant improvements.

Table TM 1-12 Summary of treatment capacity and condition of major liquid process treatment units

Unit process	No. of units	Design capacity		Treatment capacity, per ODEQ criteria		Condition rating
		Ave. MGD	Peak MGD	Ave. MGD	Peak MGD	Peak MGD
Headworks						
Grit chamber	2	-	21.0	-	21.0	Poor
Bar screen	2	-	21.0	-	17.0	Poor
Parshall flume	1	-	21.0	-	**15.9**	Poor
Lift station (two 75 HP & two 100 HP)	-	-	21.0	-	21.0	Poor
North Plant						
Primary clarifiers	2	5.0	-	5.0	-	Fair
Aeration basins	2	5.0	-	4.66	-	Fair
Final clarifiers	2	5.0	-	**4.62**	9.24	Fair
South Plant						
Primary sedimentation tank	2	3.5	-	3.5	-	Fair
Aeration basins	2	3.5	-	**3.23**	-	Fair
Secondary sedimentation tank	2	3.5	-	3.5	7.0	Fair
Nitrification Plant						
Nitrification basins	1	8.5	-	8.5	-	Good
Nitrification clarifiers	4	8.5	-	8.5	-	Good

Nitrification Plant (Biological Nutrient Removal – BNR)

The nitrification plant was built in 1991 and was designed to treat 8.5 MGD of secondary treated effluent from North and South Plants for the removal of ammonia nitrogen. The nitrification plant consist of a nitrification basin, four rectangular clarifiers and other associated appurtenances such as lime feeders, disc aerators, sludge pumping etc. The concrete structures appeared to be in good condition. However, there are some mechanical problems with some of the equipment which are explained later in this section.

The nitrification basin is an oxidation ditch type facility with three concentric channels equipped with disc aerators. Each channel is 20 feet wide with 12 feet SWD. The volume of outer, middle and inner channels is 122,440 ft^3, 92,280 ft^3 and 62,120 ft^3, respectively. The total detention time in the nitrification basin at an average design flow of 8.5 mgd is 5.85 hours. ODEQ does not have specific design criteria for nitrification plants.

The nitrification clarifiers are rectangular type with basin dimensions of 120 feet long, 30 feet wide and 12 feet SWD each. The clarifiers are equipped with a traveling bridge used for collection of sludge settled at the basin bottom. At an average design flow of 8.5 mgd, the hydraulic overflow rate from each of the clarifier is 590 g/ft^2/d which is within acceptable ranges (Metcalf & Eddy).

Based on the above evaluation, the nitrification plant can handle the average daily flow of 8.5 mgd as designed. However, conversations with plant personnel have revealed that solids carry over occurs when the plant flow exceeds 7 mgd. They also have experienced problems with the operation of the traveling bridge on the nitrification clarifiers, especially during snow and ice periods. This operational issue has been separately addressed in a memorandum circulated to the City of Enid staff (See **Appendix TM 1-5**). The Nitrification plant, in overall, needs some improvements to correct all operational problems.

Existing Liquid Treatment Plant Capacity

Based on the above analysis of the existing treatment units, the total treatment capacity of the existing Water Pollution Control Facility including the North and South treatment facilities is **7.85 MGD**. The capacities of each plant are summarized in **Table TM 1-13** below. However, it should be noted that the South Plant has not been in operation for the last few years due to the major rehabilitation required for its equipments and other appurtenances. As a result, the total design capacity of the existing facility is rated as only 4.62 MGD.

The influent wastewater to the existing WPCF currently averages 6.12 MGD. Since the South Plant is not in use, the North Plant and Nitrification Plant are operated well above its design capacity to make up for the loss of the South Plant, and have no redundancy in case of an emergency.

**TABLE TM 1-13:
City of Enid Pollution Control Facility
Treatment Capacity Summary**

	Average Daily Flow, MGD
North Treatment Plant	**4.62**
South Treatment Plant	3.23
Nitrification Plant	8.50
Total Capacity	**7.85**

SOLIDS HANDLING UNITS

Due to the age and deterioration of the existing solids process units, the bio-solids treatment system at the treatment facility is in jeopardy of becoming non-complaint. Therefore, in 2004, the City of Enid retained the services of Dewberry to evaluate its solids operation and prepare a bio-solids facility plan. This facility plan evaluated various alternatives for producing CLASS B bio-solids with the option of land filling for final disposal. The most cost-effective and preferred alternative recommended in the bio-solids facility plan was to use the existing digesters for aerobic digestion and belt filter press for dewatering the digested sludge. The process schematic depicting the proposed improvements is shown in **Figure TM 1-8.**

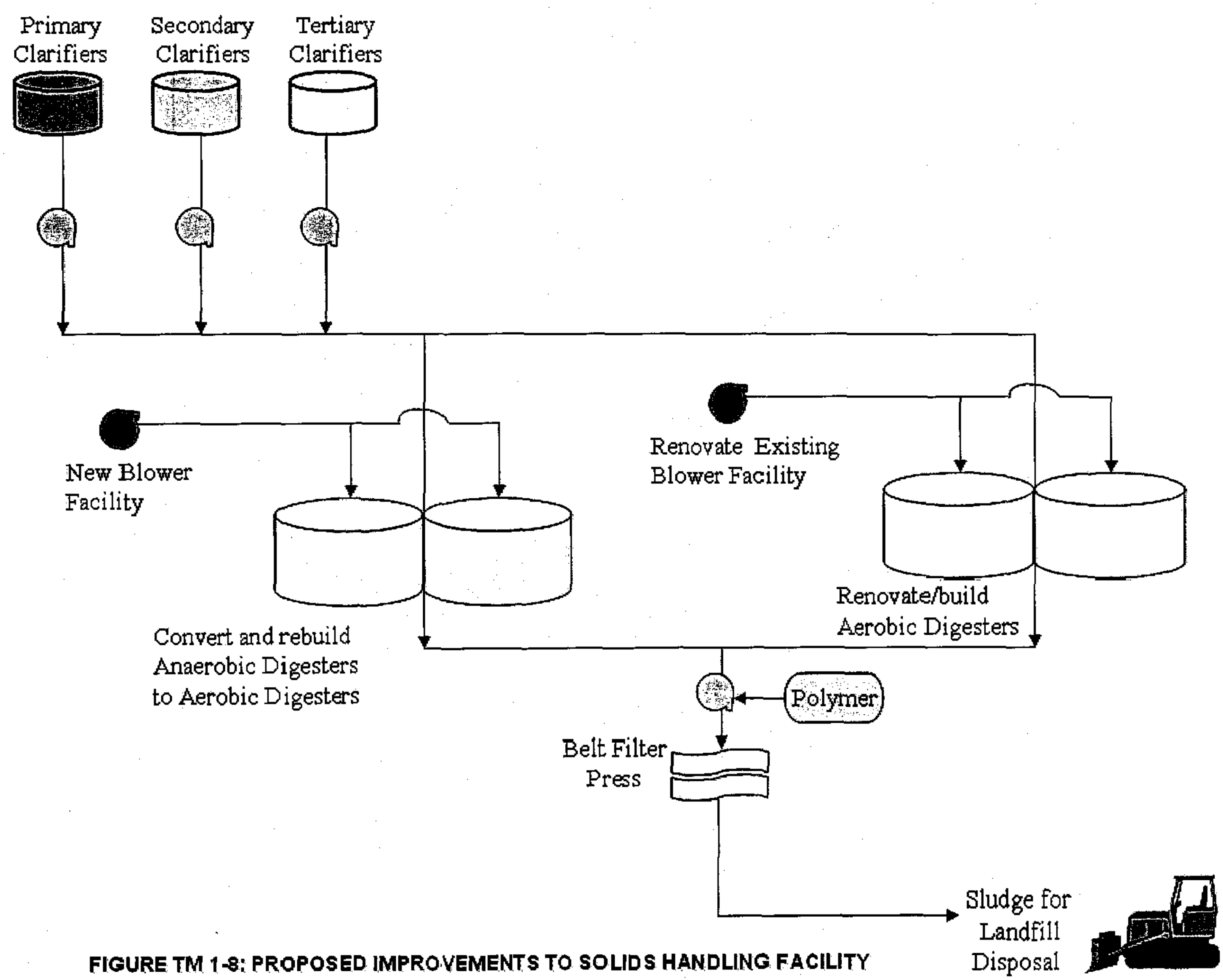


FIGURE TM 1-8: PROPOSED IMPROVEMENTS TO SOLIDS HANDLING FACILITY

The proposed improvements to the bio-solids treatment system consists of the following: selective demolition and improvements to the existing aerobic digesters and equipment, selective demolition and converting the existing anaerobic digesters to aerobic digesters and equipment, new blower facility, modification to the existing blower facility, a new 2m belt filter press and dewatered sludge conveyors, improvements to the filter press feed pump system, polymer dosing system, flow measurement equipments, controls, yard piping, electrical and instrumentation work, and other appurtenances to produce Class B bio-solids.

The proposed improvements are expected to be completed at the end of the year 2006. With the completion of the above proposed improvements, the solids handling capacity of the treatment facility will increase to about 15,490 pounds/ day on dry solids basis which is equivalent to solids produced from treating wastewater flows of about 10 MGD at the exiting liquid process treatment units.

APPENDICES

APPENDIX TM 1-1

RAW DATA FROM PLANT RECORDS

Historical Flow Peaking Data					
Year	**Average Annual Flow (mgd)**	**Maximum Month Flow (mgd)**	**Maximum Day Flow (mgd)**	**Maximum Month Factor**	**Maximum Day Factor**
1996	6.264	7.064	11.922	1.13	1.90
1997	7.396	7.866	8.846	1.06	1.20
1998	7.937	9.637	14.724	1.21	1.86
1999	9.439	12.780	15.407	1.35	1.63
2000	6.804	8.207	11.387	1.21	1.67
2001	6.384	7.250	8.362	1.14	1.31
2002	6.015	6.358	8.887	1.06	1.48
2003	5.912	6.401	7.380	1.08	1.25
2004	6.121	6.400	7.800	1.05	1.27
Average	6.919			**1.14**	**1.51**

Influent Wastewater Characteristics					
Year	Influent BOD_5 (mg/l)	Influent TSS (mg/l)	Influent NH_3 (mg/l)	Influent DO (mg/l)	Influent Alkalinity (mg/l)
1996	333	274	15.80	2.30	368
1997	245	257	14.60	1.20	359
1998	222	261	12.80	1.10	356
1999	196	227	11.10	1.00	354
2000	206	222	15.90	1.10	357
2001	268	283	16.67	-	-
2002	230	254	17.36	-	-
2003	220	248	18.30	-	-
2004	271	234	17.48	1.26	356
Mean	**243**	**251**	**15.56**	**1.34**	**359**
Std. Dev.	**42**	**21**	**2.4**	**0.54**	**5**

Per capita wastewater genaration rate

Year	Total Service population	Average Annual Flow (mgd)	Percapita rate gpcd
1996	45,320	6.264	138
1997	45,190	7.396	164
1998	45,250	7.937	175
1999	45,200	9.439	209
2000	47,045	6.804	145
2001	46,590	6.384	137
2002	46,530	6.015	129
2003	46,480	5.912	127
2004	46,630	6.121	131

Sludge Production Records at the Existing Facility

SHEET	MONTH / YR	TOTAL SLUDGE GALLONS	TOTAL SLUDGE CF PER MONTH	TOTAL SLUDGE CF PER DAY
1	Jan-95	2590575	346334	11172
2	Feb-95	2790340	373040	13323
3	Mar-95	3041700	406644	13118
4	Apr-95	2887300	386003	12867
5	May-95	1794900	239960	7741
6	Jun-95	594000	79412	2647
7	Jul-95	1273545	170260	5492
8	Aug-95			
9	Sep-95			
10	Oct-95	1659812	221900	7158
11	Nov-95	1210972	161895	5396
12	Dec-95	1488050	198937	6417
13	Jan-96	1378331	184269	5944
14	Feb-96	1153731	154242	5509
15	Mar-96	1308950	174993	6734
16	Apr-96	1054483	140974	4699
17	May-96	1561451	208750	6734
18	Jun-96	1562531	208895	6963
19	Jul-96	1687081	225546	7276
20	Aug-96	13294371	1777322	57333
21	Sep-96	2175010	290777	9693
22	Oct-96	2191146	292934	9449
23	Nov-96	2706903	361885	12063
24	Dec-96	4016038	536903	17319
25	Jan-97	3080936	411890	13287
26	Feb-97	1947000	260294	9296
27	Mar-97	2112000	282353	9108
28	Apr-97	1503000	200936	6698
29	May-97	1321000	176604	5697
30	Jun-97	973000	130080	4336
31	Jul-97	971000	129813	4188
32	Aug-97	1009000	134893	4351
33	Sep-97	1017000	135963	4532
34	Oct-97	945000	126337	4075
35	Nov-97	872000	116578	3886
36	Dec-97	1157000	154679	4990
37	Jan-98	892000	119251	3847
38	Feb-98	660000	88235	3151
39	Mar-98	1196861	160008	5162
40	Apr-98	1903000	254412	8480
41	May-98	1226000	163904	5287
42	Jun-98	1228000	164171	5472
43	Jul-98	949000	126872	4093
44	Aug-98	1003500	134158	4328
45	Sep-98	714000	95455	3182
46	Oct-98	630000	84225	2717
47	Nov-98	512347	68496	2283
48	Dec-98	512347	68496	2210
49	Jan-99	921000	123128	3972
50	Feb-99	989495	132285	4724

51	Mar-99	582500	77874	2512
52	Apr-99	416384	55666	1856
53	May-99	416384	55666	1796
54	Jun-99	416384	55666	1856
55	Jul-99	571262	76372	2464
56	Aug-99	112452	15034	485
57	Sep-99	100381	13420	447
58	Oct-99	152188	20346	656
59	Nov-99			
60	Dec-99	349400	46711	1507
61	Jan-00	362932	48520	1565
62	Feb-00	326268	43619	1558
63	Mar-00	1172410	156739	5056
64	Apr-00	500448	66905	2230
65	May-00	500448	66905	2158
66	Jun-00	1480739	197960	6599
67	Jul-00	1280750	171223	5523
68	Aug-00	716337	95767	3089
69	Sep-00	775500	103676	3456
70	Oct-00	985500	131751	4250
71	Nov-00	945500	126404	4213
72	Dec-00	962000	128610	4149
73	Jan-01			
74	Feb-01	638865	85410	3050
75	Mar-01	989544	132292	4267
76	Apr-01	524446	70113	2337
77	May-01	664603	88851	2866
78	Jun-01	455591	60908	2030
	AVG.	***1,352,242***	***180,781***	**5,951**

Quantity of Solids Landfilled

Year	ton/year	lb/d
1996	1513	8290
1997	1679	9200
1998	1062	5819
1999	-	-
2000	1164	6378
2001	1284	7036
2002	1067	5847
2003	1188	6510
Average	1280	7011

APPENDIX TM 1-2

INFORMATION ABOUT INDUSTRIES

			FLOWS, BOD5, TSS AT SIGNIFICANT INDUSTRIAL USERS 2004 AVERAGE						
NO.	INDUSTRIAL USER	AVG DAILY FLOW (MGD)	AVG BOD5	BOD5 LBS	AVG TSS	TSS LBS			
1	INTEGRIS HOSPITAL	0.052	294	127.5	99	42.9			
2	LANDFILL LEACHATE	0.028	59	13.8	315	73.6			
3	CHEM-CAN	0.01	5040	420.3	159	13.3			
4	BROADWAY TEXACO	0.004	10	0.3	8	0.3			
5	ADVANCE-E WILLOW	0.03	661	165.4	144	36.0			
6	ADVANCE-RALEIGH RD	0.274	838	1915.0	499	1140.3			
7	ADVANCE-PINE ST	0.079	1172	772.2	1047	689.8			
8	ST MARY'S HOSPITAL	0.069	373	214.6	226	130.1			
9	VANCE AFB	0.171	173	246.7	151	215.3			
10	SEABOARD FARMS	0.005	642	26.8	254	10.6			
11	RED CARPET LANDFILL	0.004	77	2.6	20	0.7			
	TOTAL	0.726	9339	3905.2	2922	2352.8			
	AVERAGE	0.066	849	355.0	266	213.9			
	2004 AVG FLOW AT POTW	6.12	271		234				
	SIU PERCENT OF TOTAL FLOW	11.86							

September 13, 2005

Mr. Robert Hitt, P.E.
Director of Development Services
City of Enid
P.O. Box 1768
Enid, Oklahoma 73702

Re: City of Enid
Sanitary Sewer Master Plan Agreement
"Additional Organic Loading from Advance Foods and New Ethanol Plant"

Dear Mr. Hitt,

On Monday September 12, 2005, we were notified by your staff on the anticipated discharge from the proposed ethanol plant. As a result of this anticipated discharge and in addition to Advance Foods , we felt that it would be necessary to reevaluate the treatment capacity of the existing Water Pollution Control Facility.

Currently, the Influent flow and its BOD5 and TSS concentrations to the existing Water Pollution Control Facility average at 6.24 mgd, 280 mg/l and 226 mg/l, respectively. As you know both the North and South treatment plants were designed for an average BOD and TSS concentrations of 300 mg/l and 250 mg/l, respectively. In addition, our current evaluation of these two plants based on current ODEQ design standards has revealed that the North and South treatment plant are rated at 4.62 mgd and 3.23 mgd, respectively. Based on this information the total combined design capacity of the existing Water Pollution Control Facility for the City of Enid is about 19,641 pounds per day for BOD5 and 16, 367 pounds per day for TSS.

With the anticipated discharge limits proposed by Advance Foods of 0.5 mgd, 664 mg/l BOD and 382 mg/l TSS and the new ethanol plant flow of 0.12 mgd, 1000 mg/l BOD and 350 mg/l TSS, we have estimated that the influent flow and raw wastewater characteristics for BOD and TSS to the existing facility will increase to 6.853 mgd, 320 mg/l and 240 TSS, respectively. Under these conditions the projected loading to the existing Water Pollution Control Facility will be approximately 18,313 pounds per day for BOD and 13,689 pounds per day for TSS.

From the information shown above it appears that the existing facility has the capacity to handle the additional loading, since the projected loading is slightly lesser. However, the BOD5 concentration of the projected influent flow (320 mg/l) is greater than the designed BOD5 concentration (300 mg/l) for the existing facility. Operating under these conditions could impact the effluent quality of the treatment plant and possibly exceed the current NPDES permit.

In order to maintain the influent BOD5 and TSS concentrations to the existing facility within the original design parameters, the BOD5 and TSS discharge concentration from these two industries will have to set at 500 mg/l, each. However, Conversations with your staff have also, revealed that Advance Foods is anticipating doubling production in the next two years that will add an additional flow of 0.5 mgd to the existing facility which will worsen conditions and exceed the BOD5 design parameter and possibly impact the effluent quality of the existing facility. With and anticipated additional flow of 1.0 mgd from Advance Foods and 0.12 mgd from the new ethanol plant, the ultimate combined flow to the existing plant will average at 7.4 mgd. Under this scenario the existing facility will be operating at about 94% capacity of its current rated capacity.

Based on the anticipated additional loadings described above and the operation of the existing Water Pollution Control Facility with both the North and South plants and the use of the Biological nutrient removal train as an effluent polishing process, we recommend that the City's pretreatment program shall ensure that any future pretreatment discharge limit for BOD5 does not exceed 300 mg/l until further expansion to the treatment plant is evaluated and designed.

Should you have any questions, please feel free to contact me.

Very truly yours,

Dewberry Design Group Incorporated

Jose A. Pereira, P.E.
Associate

Cc: James McClain, Public Service Director City of Enid
Muralikumar Katta-Muddanna, Project Engineer City of Enid
Barry Brummit, Pretreatment Director City of Enid
Joyce Hight, Superintendent City of Enid
Vel Subramanian, Dewberry

APPENDIX TM 1-3

CITY OF ENID OPDES PERMIT

AUTHORIZATION TO DISCHARGE UNDER THE OKLAHOMA POLLUTANT DISCHARGE ELIMINATION SYSTEM

PART I.

In compliance with the Oklahoma Pollutant Discharge Elimination System Act (OPDES Act), Title 27A O.S., § 2-6-201 *et seq.* and the rules of the State of Oklahoma Department of Environmental Quality (DEQ) adopted there under (See OAC 252:605); the Federal Clean Water Act, Public Law 95-217 (33 U.S.C. 1251 *et seq.*), Section 402; and NPDES Regulations (40 CFR Parts 122, 124 and 403),

City of Enid
(State ID No. S-20931)
P.O. Box 1768
Enid, Oklahoma 73702

is hereby authorized to discharge treated wastewater from a facility located at approximately

NE¼ of SW¼ of NW¼ of Section 14
Township 22 North, Range 6 West, I.M.
Garfield County, State of Oklahoma

to receiving water: Boggy Creek, tributary to Skeleton Creek, tributary to the Cimarron River at a point located approximately

	Outfall 001	Outfall 002	
Latitude:	36° 23' 11.904" N	36° 23' 11.148" N	(GPS: NAD-27 CONUS)
Longitude:	97° 48' 58.968" W	97° 48' 49.787" W	(GPS: NAD-27 CONUS)

Planning Segment No. 620910 (Water body ID # 620910030250)

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, III and IV hereof.

This permit replaces and/or supersedes the previous permit modification issued on March 1, 2001

The issuance date of this permit is July 31, 2003

This permit shall become effective August 1, 2003

This permit and authorization to discharge shall expire at midnight, July 31, 3008

For the Oklahoma Department of Environmental Quality:

Edward Dihrberg

Edward Dihrberg, P.E., Manager
Municipal Permits Section
Water Quality Division

Carl D Parrott

for Jon L. Craig, Director
Water Quality Division

A. Effluent Limitations

During the period beginning the effective date and lasting through date of expiration the permittee is authorized to discharge treated wastewater in accordance with the following limitations:

1. Conventional and Non-Conventional Pollutants

Effluent Characteristics	Discharge Limitations			Monitoring Requirements	
	Mass (lbs/d)	Concentration (mg/l)		Measurement Frequency	Sample Type
	30-day Average	30-day Average	7-day Average		
Spring (April – May): Outfall 002 only					
Carbonaceous Biochemical Oxygen Demand - 5 Day ($CBOD_5$) [80082]	1417.8	20.0	30.0	3/week	12-hour composite
Total Suspended Solids (TSS) [00530]	2126.7	30.0	45.0	2/week	
Ammonia (NH3-N) [00610]	141.8	2.0	3.0	1/week	
Dissolved Oxygen (DO) [00300] [b] Minimum 6 mg/l				3/week	Grab
Summer (June – October): Outfall 002 only					
Carbonaceous Biochemical Oxygen Demand - 5 Day ($CBOD_5$) [80082]	1063.4	15.0	22.5	3/week	12-hour composite
Total Suspended Solids (TSS) [00530]	2126.7	30.0	45.0	2/week	
Ammonia (NH3-N) [00610]	141.8	2.0	3.0	1/week	
Dissolved Oxygen (DO) [00300] [b] Minimum 5 mg/l				3/week	Grab
Winter (November - March): Outfall 001 and/or Outfall 002					
Biochemical Oxygen Demand - 5 Day (BOD_5) [00310]	1417.8 [a]	20.0	30.0	3/week	12-hour composite
Total Suspended Solids (TSS) [00530]	2126.7 [a]	30.0	45.0	2/week	
Ammonia (NH3-N) [00610]	290.6 [a]	4.1	9.9 [Daily max]	3/week [c]	
Dissolved Oxygen (DO) [00300] [b] Minimum 5 mg/l				3/week	Grab

[a] The combined mass loading from each outfall may not exceed this value if both outfalls are used simultaneously.

[b] If simultaneously discharging from outfalls 001 and 002, grab samples will be taken from both outfalls, and the lower of the two dissolved oxygen values reported.

[c] If the highest daily maximum ammonia level reported during this season for the first year after the effective date of these limits is less than or equal to 1.5 times the monthly average limit (i.e., 1.5 × 4.1 = 6.15 mg/l), the monitoring frequency may be reduced to 1/week for that season. Otherwise, the monitoring frequency continues at 3/week for that season for the remaining term of the permit.

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

The pH shall not be less than 6.5 standard units nor greater than 9.0 standard units at any time, it shall be monitored by grab samples collected 3/week.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the discharge from the final treatment unit.

Flow (measured in million gallons per day) shall be monitored daily by totalized measurement and reported as a 30-day average and a daily maximum.

2. Whole Effluent Toxicity Reporting and Monitoring Requirements (Outfalls TX1, TX2).

During the period beginning the effective date of the permit and lasting through the expiration date, the permittee is authorized to discharge from Outfall TX1 and Outfall TX2 (functionally identical to Outfall 001 and Outfall 002). The discharge consists of biologically treated sanitary wastewater. Such discharges shall be limited and monitored by the permittee as specified below:

Whole Effluent Toxicity Reporting and Monitoring Requirements (Outfalls TX1 and TX2)

Effluent Characteristic				Reporting Requirements [a]		Monitoring Requirements	
	Test	Critical Dilution	Parameter	30-day Avg Min	7-day Min	Testing Frequency [b]	Sample Type
Routine Testing	*Ceriodaphnia dubia*, 7-day chronic NOEC static renewal, freshwater	100%	Pass/Fail Survival [TLP3B]	---	Report	2/season for TX1 [e], and 1/quarter [f] for TX2	24-hr comp
			$NOEC_L$ Survival [TOP3B]	Report	Report		
			% Mortality at Critical Dilution [TJP3B]	Report	Report		
			Pass/Fail Reproduction [TGP3B]	---	Report		
			$NOEC_S$ Reproduction [TPP3B]	Report	Report		
			% Coeff of Variation [TQP3B]	Report	Report		
	Pimephales promelas (Fathead minnow), 7-day chronic NOEC static renewal, freshwater	100%	Pass/Fail Survival [TLP6C]	---	Report	2/season for TX1 [e], and 1/quarter [f] for TX2	24-hr comp
			$NOEC_L$ Survival [TOP6C]	Report	Report		
			% Mortality at Critical Dilution [TJP6C]	Report	Report		
			Pass/Fail Growth [TGP6C]	---	Report		
			$NOEC_S$ Growth [TPP6C]	Report	Report		
			% Coeff of Variation [TQP6C]	Report	Report		
Retesting	Retest #1 [22415] [c]			---	Report	As required [d]	24-hr comp
	Retest #2 [22416] [c]			---	Report		

a See Part II, Section A, Whole Effluent Toxicity Testing, for additional monitoring and reporting conditions.

b Reporting periods commence with the effective date of the permit. A valid WET test shall be reported for each species for each reporting period. Results of retests conducted pursuant to prior test failure shall not be submitted on DMRs in lieu of routine test results (see Part II, Section A, Item 2.a).

c Applies to either or both test species, according to results of test failure triggering monthly retests.

d Monthly retesting required only if the routine test for reporting period (for either species) fails.

e When discharging, no frequency reduction will be applied to TX1 for biomonitoring (November – March).

f The frequency of testing may be reduced to twice per year for TX2, if requested and if there are no lethal or sublethal failures in WET testing during the first two years of the permit. See the provision for WET testing monitoring frequency reduction after the first two years (Part II, Section A, Item 5).

Whole effluent toxicity reporting and monitoring requirements apply beginning the effective date of the permit.

WET testing summary reports: Reports of all WET testing initiated, regardless of whether such tests are carried to completion, shall follow the requirements of Part II, Section A, Item 4.

Whole effluent toxicity concurrent testing provision: Concurrent analysis of total ammonia and pH is required on all effluent samples, including static renewals, collected for Fathead minnow WET testing or retesting. Reporting of results shall be in accordance with the following requirements.

Concurrent Effluent Testing - Reporting Requirements

Effluent Characteristic	Concentration[a]			Monitoring Requirements	
	Daily Min	Montly Avg	Daily Max	Monitoring Frequency	Sample Type
Ammonia, total [STORET 00610]	Report [b]	Report [b]	Report [b]	2/season for TX1 [c], and 1/quarter [d] for TX2	24 hr composite
pH (std units) [STORET 00400]	Report [b]	---	Report [b]		Note[e]

[a] Concentration units are mg/l unless otherwise specified.
[b] Report only those effluent samples collected for Fathead minnow WET testing.
[c] Measured in each composite effluent sample, including static renewals, just prior to first use.
[d] The frequency of testing can be reduced to twice per year for TX2, if requested and if there are no lethal or sublethal failures in WET testing during the first two years of the permit.
[e] When discharging (November – March).

3. **Priority Pollutants**

a. **Monitoring Requirements for Copper for Outfall 002** (period effective beginning eighteen months before the expiration date of the permit and to last one year).

During the period stated above, the permittee shall monitor for one year the effluent for copper and report the results as follows:

Effluent Characteristics	Discharge Limitations			Monitoring Requirements	
	Mass (lbs/day)	Concentration(ug/l)		Measurement Frequency	Sample Type
	Monthly Avg.	Monthly Avg.	Daily Maximum		
Copper, Total	Report	Report	Report	1/month	24-hr composite

If any individual test result is less than the minimum quantification level (MQL) of 10 ug/l for copper (monthly and/or daily maximum), a value of zero (0) may be used for the discharge monitoring report (DMR) calculations and reporting requirements.

b. **Monitoring Requirements for Hardness** (Outfall 999)

During the period beginning eighteen months before the expiration of the permit, the permittee shall monitor the upstream hardness for one year, and report the results as follows:

Upstream Characteristics	Upstream Monitoring			Monitoring Requirements	
	Mass (lbs/day)	Concentration(mg/l)		Measurement Frequency	Sample Type
	Monthly Avg.	Monthly Avg.	Daily Maximum		
Hardness	NA	NA	Report	1/month	Grab

B. Sanitary Sewer Overflows

Any bypass in the collection system [sanitary sewer overflow (SSO)] shall be reported in accordance with Part III.B.6. of this permit.

In addition, all reports shall be summarized and reported in tabular format with the Discharge Monitoring report (DMR) for the month in which the bypasses occurred.

PART II. OTHER PERMIT REQUIREMENTS

A. WHOLE EFFLUENT TOXICITY TESTING (7-DAY CHRONIC NOEC, STATIC RENEWAL, FRESHWATER)

1. SCOPE AND METHODOLOGY

a. The permittee shall test the effluent for toxicity in accordance with the provisions in this section. Applicability to multiple outfalls is described in Item 3.d.5 of this section. The permittee shall biomonitor for *Ceriodaphnia dubia* and *Pimephales promelas* in accordance with the WET testing frequencies prescribed in Part I. Intervals between test initiation dates shall be a function of the required testing frequency, as follows:

- Monthly retests: No less than 20 days and no more than 40 days.
- Quarterly: No less than 2 months and no more than 4 months.
- Semi-annually: No less than 4 months and no more than 8 months.

APPLICABLE TO OUTFALL(S):	001 and 002
REPORTED ON DMR AS OUTFALL(S):	TX1 and TX2
CRITICAL DILUTION:	100%
EFFLUENT DILUTION SERIES (ALL TESTS):	32%, 42%, 56%, 75%, and 100%
COMPOSITE SAMPLE TYPE:	Defined at Part I
TEST SPECIES/METHODS:	40 CFR 136

Ceriodaphnia dubia chronic static renewal 7-day survival and reproduction test, Method 1002.0, EPA/600/4-91/002 or the most recent update thereof. A minimum of ten (10) replicates consisting of one (1) organism each must be used in the control and in each effluent dilution of this test. This test should be terminated when 60% of the surviving females in the control produce three broods or at the end of eight days, whichever comes first. If these criteria are not met at the end of 8 days, the test must be repeated.

Pimephales promelas (Fathead minnow) chronic static renewal 7-day larval survival and growth test, Method 1000.0, EPA/600/4-91/002, or the most recent update thereof. A minimum of five (5) replicates with eight (8) organisms per replicate must be used in the control and in each effluent dilution of this test.

b. CHRONIC LETHAL EFFECT TEST FAILURE

The $NOEC_L$ (No Observed Lethal Effect Concentration) is defined as the greatest effluent dilution at and below which lethality that is statistically different from the control (0% effluent) at the 95% confidence level does not occur. Chronic lethal test failure (chronic

$NOEC_L$ test) is defined as a demonstration of a statistically significant lethal effect at test completion to a test species at or below the critical dilution.

c. CHRONIC SUBLETHAL EFFECT TEST FAILURE

The $NOEC_S$ (No Observed Sublethal Effect Concentration) is defined as the greatest effluent dilution at and below which sublethality (inhibited reproduction in the *Ceriodaphnia dubia* test or inhibited growth in the Fathead minnow test) that is statistically different from the control (0% effluent) at the 95% confidence level does not occur. Chronic sublethal test failure (chronic $NOEC_S$ test) is defined as a demonstration of a statistically significant sublethal effect at test completion to a test species at or below the critical dilution.

d. REOPENER CLAUSE

This permit may be reopened to require whole effluent toxicity limits, chemical specific effluent limits, additional testing, and/or other appropriate actions to address toxicity.

2. TESTING REQUIREMENTS DUE TO CHRONIC TEST FAILURE

Upon becoming aware of the failure of any test, the permittee shall notify the DEQ Water Quality Division Toxics Coordinator immediately, and in writing within 5 working days of the test failure, with a summary of the results of and any other pertinent circumstances associated with the failed test.

a. Whenever there is a lethal effect test failure for either species during routine testing, the frequency of testing for the affected species shall automatically increase to, or continue at, as appropriate, the WET testing frequency prescribed in Part I for the remaining life of the permit. In addition, two (2) additional monthly tests (retests) of the affected species are required. The two additional tests shall be conducted monthly during the next two consecutive months. The permittee shall not substitute either of the two additional tests for routine toxicity testing. Additional tests are not required for a sublethal effect test failure. A full laboratory report for the failed routine test and both additional tests, if required, shall be prepared and submitted to the DEQ in accordance with procedures outlined in Item 4 of this section.

b. PERSISTENT LETHALITY

(1) If either of the two additional tests result in an $NOEC_L$ value less than the critical dilution, persistent lethality is exhibited, and the permittee shall initiate a Toxicity Reduction Evaluation (TRE) as specified in Item 5 of this section. The TRE initiation date will be the test completion date of the first failed retest.

(2) The retesting requirements in Item 2.a are suspended upon submittal of the TRE Action Plan.

c. INTERMITTENT LETHALITY

If both additional tests result in an $NOEC_L$ value greater than or equal to the critical dilution, persistent lethality is not exhibited. However, if any routine test lethal effect failure occurs within 18 months of a prior lethal effect test failure, intermittent lethality is exhibited, and the permittee may be required by the DEQ to initiate a TRE, as described in Item 5 of this section, based on the severity and pattern of such lethal effect over time.

d. PERSISTENT SUBLETHALITY

Barring persistent lethality, if two consecutive routine tests result in a sublethal effect failure for a species, persistent sublethality is exhibited, and the permittee:

(1) Shall increase the frequency of testing for the affected species to, or continue at, as appropriate, the WET testing frequency prescribed in Part I for the remaining life of the permit; and

(2) May be required by the DEQ to initiate a TRE, as specified in Item 5 of this section, based on the severity and pattern of such sublethal effect over time.

3. REQUIRED TOXICITY TESTING CONDITIONS

a. Test Acceptance

The permittee shall repeat a test, including the control and all effluent dilutions, if the procedures and quality assurance requirements defined in the test methods or in this permit are not satisfied, including the following additional criteria:

(1) The toxicity test control (0% effluent) must have survival equal to or greater than 80%.

(2) The mean number of *Ceriodaphnia dubia* neonates produced per surviving female in the control (0% effluent) must be 15 or more.

(3) Sixty (60) percent of the surviving *Ceriodaphnia dubia* control females must produce three broods.

(4) The mean dry weight of surviving Fathead minnow larvae at the end of the 7 days in the control (0% effluent) must be 0.25 mg per larva or greater.

(5) The percent coefficient of variation between replicates shall be 40% or less in the control (0% effluent) for the young of surviving females in the *Ceriodaphnia dubia* reproduction test and for the growth and survival endpoints of the Fathead minnow test.

(6) The percent coefficient of variation between replicates shall be 40% or less in the critical dilution, unless significant lethal or sublethal effects are exhibited for the young of surviving females in the *Ceriodaphnia dubia* reproduction test and for the growth and survival endpoints of the Fathead minnow test.

(7) As documented at test termination, no more than forty (40) percent of the *Ceriodaphnia dubia* test organisms in the control (0% effluent) or any effluent dilution shall be male.

Test failure may not be construed or reported as invalid due to a coefficient of variation value of greater than 40% in the critical dilution. A repeat test shall be conducted within the reporting period of any test determined to be invalid.

b. Statistical Interpretation

(1) For the *Ceriodaphiia dubia* survival test, the statistical analyses used to determine if there is a significant difference between the control and the critical dilution shall be Fisher's Exact Test as described in EPA/600/4-91/002, or the most recent update thereof.

(2) For the *Ceriodaphnia dubia* reproduction test and the Fathead minnow larval survival and growth test the statistical analyses used to determine if there is a significant difference between the control and the critical dilution shall be in accordance with the methods for determining the No Observed Effect Concentration (NOEC) as described in EPA/600/4-91/002, or the most recent update thereof.

(3) If the conditions of test acceptability are met in Item 3.a above and the percent survival of the test organism is equal to or greater than 80% in the critical dilution concentration and all lower dilution concentrations, the test shall be considered to be a passing test, and the permittee shall report an $NOEC_L$ of not less than the critical dilution for the DMR reporting requirements found in Item 4 below.

c. Dilution Water

(1) Dilution water used in the toxicity tests will be receiving water collected as close to the point of discharge as possible but unaffected by the discharge. The permittee shall substitute synthetic dilution water of similar pH, hardness and alkalinity to the closest downstream perennial water where the toxicity test is conducted on an effluent discharge to a receiving stream classified as intermittent or to a receiving stream with no flow due to zero flow conditions.

(2) If the receiving water is unsatisfactory as a result of instream toxicity (fails to fulfill the test acceptance criteria of Item 3.a.), the permittee must submit the test results exhibiting receiving water toxicity with the full test report required in Item 4 below and may thereafter substitute synthetic dilution water for the receiving water in all subsequent tests provided the unacceptable receiving water test met the following stipulations:

(a) A synthetic dilution water control which fulfills the test acceptance requirements of Item 3.a. was run concurrently with the receiving water control;

(b) The test indicating receiving water toxicity was carried out to completion; and

(c) The synthetic dilution water had a pH, hardness and alkalinity similar to that of the receiving water or closest downstream perennial water not adversely affected by the discharge, provided the magnitude of these parameters will not cause toxicity in the synthetic dilution water.

d. Samples and Composites

(1) The permittee shall collect three flow-weighted 24-hour composite samples representative of the flows during normal operation from the outfall(s) listed at Item 1.a above. Unless otherwise specified in Part I of the permit, a 24-hour composite sample consists of a minimum of 12 effluent portions collected at equal time intervals

representative of a 24-hour operating day and combined proportional to flow or a sample continuously collected proportional to flow over a 24-hour operating day.

(2) The first composite effluent sample shall be used to initiate each test and must be collected so that its holding time (between collection of the last portion of the sample and test initiation) does not exceed 36 hours. Collection of the second and third composite effluent samples must be timed so as to permit an approximately equal use distribution of the three composite samples for daily static renewals. In no case shall the holding time of the second and third composite samples (between collection of the last portion of the sample and its first use) exceed 72 hours. All samples shall be chilled to 4 °C during collection, shipping and/or storage.

(3) The permittee shall collect the 24-hour composite samples such that the effluent samples are representative of any periodic episode of chlorination, biocide usage or other potentially toxic substance discharged on an intermittent basis.

(4) If the flow from the outfall(s) being tested ceases during the collection of effluent samples, the requirements for the minimum number of effluent samples, the minimum number of effluent portions and the sample holding time are waived during that sampling period. However, the permittee must collect an effluent composite sample volume during the period of discharge that is sufficient to complete the required toxicity tests with daily renewal of effluent. When possible, the effluent samples used for the toxicity tests shall be collected on separate days if the discharge occurs over multiple days. The effluent composite sample collection duration and the static renewal protocol associated with the abbreviated sample collection must be documented in the full test report required in Item 4 of this section.

(5) MULTIPLE OUTFALLS: If the provisions of this section are applicable to multiple outfalls, as specified in Part I of the permit, the permittee shall combine the composite effluent samples in proportion to the average flow from the outfalls listed in Item 1.a of this section for the day the sample was collected. The permittee shall perform the toxicity test on the flow-weighted composite of the outfall samples.

4. REPORTING

a. The permittee shall prepare a full report of the results of all tests conducted pursuant to this section in accordance with the Report Preparation Section of EPA/600/4-91/002, or the most current publication, for every valid or invalid toxicity test initiated, whether carried to completion or not. The permittee shall retain each full report pursuant to the records retention provisions of Part III of this permit. The permittee shall submit full test reports for all tests initiated, regardless of whether the tests are carried to completion, to the DEQ no later than the 15th day of the month following completion of the test, including any test which is considered invalid, is terminated early for any reason, or which indicates receiving water toxicity.

b. A valid test for each species (excluding retests) must be reported on the DMR for each reporting period specified in Part I of this permit unless the permittee is performing a TRE, which may increase the frequency of testing and reporting. A DMR must be submitted by the 15th day of the month following completion of any valid test. The full report for the test (see Item 4.a above) shall be submitted along with the DMR. If a survival test failure is experienced for either test species, two copies of the blank DMR for the applicable reporting period shall be made in advance of completing and submitting the DMR so that the DMR copies may be used to report results of the required retests. If more than one valid test (excluding retests) is performed on a species during a reporting period, the permittee shall report the lowest survival test results as the 7-day minimum for each species tested, and the arithmetic average of the results of the survival tests shall be reported as the 30-day average minimum. The sublethal test results reported for each species on the DMR are determined in the same manner. If the permittee performs only one valid test (excluding retests) on a species during the reporting period, then the results of that test shall be reported as both the 7-day minimum and the 30-day average minimum on the DMR. The 30-day average minimum does not apply to the pass/fail parameters (TLP3B, TGP3B, TLP6C and TGP6C) in Item 4.c below.

If any test results in anomalous $NOEC_L$ or $NOEC_S$ findings (i.e., it indicates an interrupted dose response across the dilution series), the DEQ recommends that the permittee contact its DEQ toxicity coordinator for a technical review of the test results prior to submitting the full test report and DMR. A summary of all tests initiated during the reporting period, including invalid tests, repeat tests and retests, shall be attached to the reporting period DMR for DEQ review. A test is a REPEAT test if it is performed as a result of a previously invalid test. A test is a RETEST if it is performed as a result of a previously failed test. Each time a DMR is submitted, put the new submittal date in the lower right-hand corner of the DMR.

(1) The reporting period test summary attached to the DMR shall be organized as follows:

(a) Invalid tests (basis for test invalidity must be described)

(b) Valid tests (other than retests) initiated during current reporting period

(c) Valid retests for tests failed during previous reporting period (if not submitted in the previous reporting period test summary)

(d) Valid retests for tests failed during current reporting period

(2) The following information shall be listed in the reporting period test summary for each valid test in categories (b) through (d) in Item 4.b(1) above:

(a) Test species

(b) Date of test initiation at laboratory

(c) Results of all concurrent effluent analyses specified in Part I of this permit

(d) All test result parameters for the test species specified in Item 4.c below.

c. The permittee shall report the following results for all VALID toxicity tests (excluding retests) on the DMR(s) for that reporting period in accordance with Item 4.b above and Part III of this permit.

(1) *Ceriodaphnia dubia*

(a) Parameter TLP3B: If the *Ceriodaphnia dubia* $NOEC_L$ for survival is less than the critical dilution, report a "1"; otherwise, report a "0".

(b) Parameter TOP3B: Report the *Ceriodaphnia dubia* $NOEC_L$ value for survival.

(c) Parameter TJP3B: Report the *Ceriodaphnia dubia* percent mortality in the critical dilution at test completion.

(d) Parameter TGP3B: If the *Ceriodaphnia dubia* $NOEC_S$ for reproduction is less than the critical dilution, report a "1"; otherwise, report a "0".

(e) Parameter TPP3B: Report the *Ceriodaphnia dubia* $NOEC_S$ value for reproduction.

(f) Parameter TQP3B: Report the highest coefficient of variation (critical dilution or control) for *Ceriodaphnia dubia* reproduction.

(2) *Pimephales promelas* (Fathead minnow)

(a) Parameter TLP6C: If the Fathead minnow $NOEC_L$ for survival is less than the critical dilution, report a "1"; otherwise, report a "0".

(b) Parameter TOP6C: Report the Fathead minnow $NOEC_L$ value for survival.

(c) Parameter TJP6C: Report the Fathead minnow percent mortality in the critical dilution at test completion.

(d) Parameter TGP6C: If the Fathead minnow $NOEC_S$ for growth is less than the critical dilution, report a "1"; otherwise, report a "0".

(e) Parameter TPP6C: Report the Fathead minnow $NOEC_S$ value for growth.

(f) Parameter TQP6C: Report the highest coefficient of variation (critical dilution or control) for Fathead minnow survival and growth.

d. The permittee shall report the following results for all VALID toxicity retests on the DMR(s) for that reporting period.

(1) Retest #1 (STORET 22415): If the first monthly retest following failure of a routine test for either test species results in an $NOEC_L$ for survival less than the critical dilution, report a "1"; otherwise, report a "0".

(2) Retest #2 (STORET 22416): If the second monthly retest following failure of a routine test for either test species results in an $NOEC_L$ for survival less than the critical dilution, report a "1"; otherwise, report a "0".

Results of all retests shall be reported on a copy of the DMR for the reporting period (see Item 4.b above) in which the triggering routine test failure is experienced by no later than the 15th day of the month following completion of the retest. The full report for the retest (see Item 4.a above) shall be submitted along with the retest DMR. Even if a retest cannot be conducted before the end of the reporting period for which it is required (due to test initiation interval requirements), the retest results shall still be reported for the reporting period in which the triggering test failure is experienced. In this manner, both retests are reported for the same reporting period as the failed routine test. Each time a DMR is submitted, put the new submittal date in the lower right-hand corner of the DMR. If retesting is not required during a given reporting period, the permittee shall leave these DMR fields blank.

5. MONITORING FREQUENCY REDUCTION

a. The permittee may apply for a testing frequency reduction upon the successful completion of the first two years of testing for one or both test species with no lethal or sublethal effects demonstrated at or below the critical dilution. Certification in accordance with Item 5.b of this section shall be submitted at the time of such application for monitoring frequency reduction. If granted, the monitoring frequency may be reduced to not less than once per 6 months (once each during the periods June 1 through September 30 and December 1 through March 31) for either test species.

b. CERTIFICATION: The permittee must certify in writing that no lethal or sublethal test failures have occurred for the species for which the monitoring frequency reduction is being requested and that all tests meet all test acceptability criteria in Item 3.a. above. In addition, the permittee must provide a summary of all tests initiated during the period of certification including test initiation dates, species, test acceptability parameters, $NOEC_l$ values, percent mortality at the critical dilution, $NOEC_S$ values, and coefficients of variation for the controls and critical dilutions. If the certification is approvable, the DEQ will issue a letter of confirmation of the monitoring frequency reduction. A copy of the confirmation letter will be forwarded to the DEQ's Permit Compliance System unit to update the permit reporting requirements. The DEQ may deny the certification if it determines that, during the period for which the certification is submitted, there were errors in meeting test acceptability requirements, errors in statistical interpretation affecting test results reported on DMRs, late submissions of test reports or submissions of substantively incomplete test reports. If the certification is denied, the permittee shall continue biomonitoring of the affected test species at a frequency of once per quarter until the permit is reissued.

c. SUBLETHAL FAILURES DURING FIRST YEAR OF TESTING: If, during the first year of testing, only a sublethal effect is demonstrated to a test species, continued routine testing for that species is required for the remainder of the first year and, as necessary, into the following year(s) at the frequency prescribed in Part I until the effluent passes four consecutive routine tests for both lethal and sublethal test endpoints, at which time the permittee may apply for a monitoring frequency reduction in a manner consistent with Item 5.a above. Certification in accordance with Item 5.b of this section shall be submitted at the time of such application for monitoring frequency reduction. If granted, the monitoring frequency may be reduced in accordance with Item 5.a.

d. SURVIVAL FAILURES AFTER A MONITORING FREQUENCY REDUCTION: If any test fails the survival endpoint at any time after the granting of a monitoring frequency reduction, two monthly retests are required in accordance with Item 2 of this section (unless the permittee is performing a TRE) and the monitoring frequency for the affected test species shall be increased to the WET testing frequency prescribed in Part I until the permit is reissued.

c. This monitoring frequency reduction applies only until the expiration date of this permit, at which time the monitoring frequency for both test species reverts to the WET testing frequency prescribed in Part I until the permit is reissued.

6. <u>TOXICITY REDUCTION EVALUATION (TRE)</u>

a. Within ninety (90) days of confirming lethality in the retests for a test species, the permittee shall submit to the DEQ a Toxicity Reduction Evaluation (TRE) Action Plan and Schedule for conducting a TRE. The TRE Action Plan shall specify the approach and methodology to be used in performing the TRE. A Toxicity Reduction Evaluation is an investigation intended to determine those actions necessary to achieve compliance with water quality-based effluent limits by reducing an effluent's toxicity to an acceptable level. A TRE is defined as a step-wise process which combines toxicity testing and analyses of the physical and chemical characteristics of a toxic effluent to identify the constituents causing effluent toxicity and/or treatment methods which will reduce the effluent toxicity. The TRE Action Plan shall lead to the successful elimination of effluent toxicity at the critical dilution and include the following:

(1) Specific Activities. The plan shall detail the specific approach the permittee intends to utilize in conducting the TRE. The approach may include toxicity characterizations, identifications and confirmation activities, source evaluation, treatability studies, or alternative approaches. When the permittee conducts Toxicity Characterization Procedures the permittee shall perform multiple characterizations and follow the procedures specified in the documents "Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures" (EPA-600/6-91/003) and "Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I" (EPA-600/6-91/005F), or alternate procedures. When the permittee conducts Toxicity Identification Evaluations and Confirmations, the permittee shall perform multiple identifications and follow the methods specified in the documents "Methods for Aquatic Toxicity Identification Evaluations, Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity" (EPA/600/R-92/080) and "Methods for Aquatic Toxicity Identification Evaluations, Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity" (EPA/600/R-92/081), as appropriate.

The documents referenced above may be obtained through the National Technical Information Service (NTIS) by phone at (703) 487-4650, or by writing:

U.S. Department of Commerce
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

(2) Sampling Plan (e.g., locations, methods, holding times, chain of custody, preservation, etc.). The effluent sample volume collected for all tests shall be adequate to perform the toxicity test, toxicity characterization, identification and confirmation procedures, and conduct chemical specific analyses when a probable toxicant has been identified. Where the permittee has identified or suspects specific pollutant(s) and/or source(s) of effluent toxicity, the permittee shall conduct, concurrent with toxicity testing, chemical specific analyses for the identified and/or suspected pollutant(s) and/or source(s) of

effluent toxicity. Where lethality was demonstrated within 48 hours of test initiation, each composite sample shall be analyzed independently. Otherwise, the permittee may substitute a composite sample, comprised of equal portions of the individual composite samples, for the chemical specific analysis.

(3) Quality Assurance Plan (e.g., QA/QC implementation, corrective actions, etc.).

(4) Project Organization (e.g., project staff, project manager, consulting services, etc.).

b. The permittee shall initiate the TRE Action Plan within thirty (30) days of plan and schedule submittal. The permittee shall assume all risks for failure to achieve the required toxicity reduction.

c. The permittee shall submit to the DEQ a quarterly TRE Activities Report with the Discharge Monitoring Report in the months of (to be specified), containing information on toxicity reduction evaluation activities including:

(1) any data and/or substantiating documentation which identifies the pollutant(s) and/or source(s) of effluent toxicity;

(2) any studies/evaluations and results on the treatability of the facility's effluent toxicity; and

(3) any data which identifies effluent toxicity control mechanisms that will reduce effluent toxicity to the level necessary to meet no significant lethality at the critical dilution.

d. The permittee shall submit to the DEQ a Final Report on Toxicity Reduction Evaluation Activities no later than twenty-eight (28) months from confirming lethality in the retests, which provides information pertaining to the specific control mechanism selected that will, when implemented, result in reduction of effluent toxicity to no significant lethality at the critical dilution. The report will also provide a specific corrective action schedule for implementing the selected control mechanism.

e. Quarterly testing during the TRE is a minimum monitoring requirement. The DEQ recommends that permittees required to perform a TRE not rely on quarterly testing alone to ensure success in the TRE, and that additional tests be performed to capture toxic samples for identification of toxicants. Failure to identify the specific chemical compound causing toxicity test failure will normally result in a permit limit for whole effluent toxicity per federal regulations at 40 CFR 122.44(d)(1)(v).

B. SEWAGE SLUDGE REQUIREMENTS

The sludge produced at the facility is presently sent to the Enid Municipal Landfill located in the NE of Sections 29, Township 22-N, Range 6 W. I.M., Garfield County, Oklahoma..

Sewage sludge disposal practices shall comply with the federal regulations for landfills, sludge, and solid waste disposal established at 40 CFR Part 257, 503 and the DEQ rules governing Sludge Management (OAC 252:648) as applicable.

The permittee shall give 120 days prior notice to DEQ of any change planned in the sewage sludge disposal practice.

In addition, the permittee shall comply with other sludge requirements specified in Part IV of this permit.

The permittee is required to maintain all records relevant to sewage sludge disposal for the life of the permit. These records shall be made available to DEQ upon request.

C. POLLUTION PREVENTION REQUIREMENTS

1. The permittee shall institute a program within 12 months of the effective date of the permit (or continue on existing one) directed towards optimizing the efficiency and extending the useful life of the facility. The permittee shall consider the following items in the program:

   a. The influent loadings, flow and design capacity;
   b. The effluent quality and plant performance;
   c. The age and expected life of the wastewater treatment facility's equipment;
   d. Bypasses and overflows of the tributary sewerage system and treatment works;
   e. New developments at the facility;
   f. Operator certification and training plans and status;
   g. The financial status of the facility;
   h. Preventative maintenance programs and equipment conditions and;
   i. An overall evaluation of conditions at the facility.

2. The permittee shall prepare the following information on the sewage sludge generated by the facility.

   a. An annual quantitative tabulation of the ultimate disposition of all sewage sludge (including, but not limited to, the amount beneficially reused, landfilled, surface disposed, and incinerated).

   b. An assessment of technological processes and an economic analysis evaluating the potential for beneficial reuse of all sewage sludge not currently beneficially reused including a listing of any steps which would be required to achieve the sludge quality necessary to beneficially reuse the sludge.

   c. A description of, including the expected results and the anticipated timing for, all projects in process, in planning and/or being considered which are directed towards additional beneficial reuse of sewage sludge.

   d. An analysis of one composite sample of the sludge collected prior to ultimate re-use or disposal shall be performed for the pollutants listed in Part IV, Element 1, Section III, Table 3 of the permit.

   e. A listing of the specific steps (controls/changes) which would be necessary to achieve and sustain the quality of the sludge so that the pollutant concentrations in the sludge fall below the pollutant concentration criteria listed in Part IV, Element I, Section III, Table 3 of the permit.

   f. A listing of, and the anticipated timing for, all projects in process, in planning, and/or being considered which are directed towards meeting the sludge quality referenced in (c) above.

The permittee shall certify in writing, within three years of the effective date of the permit, that all pertinent information is available. This certification shall be submitted to:

Oklahoma Department of Environmental Quality
Water Quality Division
Wastewater Discharge Permit Section
P. O. Box 1677;
707 North Robinson Street
Oklahoma City, Oklahoma 73101-1677

D. CONTRIBUTING INDUSTRIES AND PRETREATMENT REQUIREMENTS

1. The permittee shall operate an industrial pretreatment program in accordance with Section 402(b)(8) of the Clean Water Act, the General Pretreatment Regulations (40 CFR Part 403) and the approved POTW pretreatment program submitted by the permittee. The pretreatment program was approved on October 15, 1984 and modified on July 15, 1994 and March 1, 2001. A Publicly Owned Treatment Works (POTW) facility is defined in 40 CFR 403.3(o) "as any devices and systems used in storage, treatment, recycling and reclamation of municipal sewage and industrial wastes of a liquid nature. It also includes sewers, pipes and other conveyances only if they convey wastewater to a POTW Treatment Plant. The term also means the municipality as defined in section 502(4) of the Act, which has jurisdiction over the Indirect Discharges to and from such treatment works." The POTW pretreatment program is hereby incorporated by reference and shall be implemented in a manner consistent with the following requirements:

   a. Industrial user information shall be updated at a frequency adequate to ensure that all IUs are properly characterized at all times;

   b. The frequency and nature of industrial user compliance monitoring activities by the permittee shall be commensurate with the character, consistency and volume of waste. However, in keeping with the requirements of 40 CFR 403.8 (f)(2)(v), the permittee must inspect and sample the effluent from each Significant Industrial User at least once a year. This is in addition to any industrial self-monitoring activities;

   c. The permittee shall enforce and obtain remedies for noncompliance by any industrial users with applicable pretreatment standards and requirements;

   d. The The permittee shall control through permit, order, or similar means, the contribution to the POTW by each Industrial User to ensure compliance with applicable Pretreatment Standards and requirements. In the case of Industrial Users identified as significant under 40 CFR 403.3(t), this control shall be achieved through permits or equivalent individual control mechanisms issued to each such user. Such control mechanisms must be enforceable and contain, at a minimum, the following conditions:

      (1). Statement of duration (in no case more than five years);

      (2). Statement of non-transferability without, at a minimum, prior notification to the POTW and provision of a copy of the existing control mechanism to the new owner or operator;

      (3). Effluent limits based on applicable general pretreatment standards, categorical pretreatment standards, local limits, and State and local law;

(4). Self-monitoring, sampling, reporting, notification and record keeping requirements, including an identification of the pollutants to be monitored, sampling location, sampling frequency, and sample type, based on the applicable general pretreatment standards in 40 CFR 403, categorical pretreatment standards, local limits, and State and local law; and

(5). Statement of applicable civil and criminal penalties for violation of pretreatment standards and requirements and any applicable compliance schedule. Such schedules may not extend the compliance date beyond federal deadlines.

e. The permittee shall evaluate, at least once every two years, whether each Significant Industrial User needs a plan to control slug discharges. If the POTW decides that a slug control plan is needed, the plan shall contain at least the minimum elements required in 40 CFR 403.8 (f)(2)(v);

f. The permittee shall provide adequate staff, equipment, and support capabilities to carry out all elements of the pretreatment program; and,

g. The approved program shall not be modified by the permittee without the prior approval of the DEQ.

2. The permittee shall establish and enforce specific limits to implement the provisions of 40 CFR Parts 403.5(a) and (b), as required by 40 CFR Part 403.5(c). Each POTW with an approved pretreatment program shall continue to develop these limits as necessary and effectively enforce such limits.

The permittee shall, within sixty days of the effective date of this permit, (1) submit a WRITTEN CERTIFICATION that a technical evaluation has been performed demonstrating that the existing technically based local limits (TBLL) are based on the current state water quality standards and are adequate to prevent pass through of pollutants, inhibition of or interference with the treatment facility, worker health and safety problems, and sludge contamination, OR (2) submit a WRITTEN NOTIFICATION that a technical evaluation revising the current TBLL and a draft sewer use ordinance which incorporates such revisions will be submitted within 12 months of the effective date of this permit.

All specific prohibitions or limits developed under this requirement are deemed to be conditions of this permit. The specific prohibitions set out in 40 CFR Part 403.5(b) shall be enforced by the permittee unless modified under this provision.

3. The permittee shall analyze the treatment facility influent and effluent for the presence of the toxic pollutants listed in 40 CFR 122 Appendix D (NPDES Application Testing Requirements) Table II at once per year and the toxic pollutants in Table III at least once every six months. If, based upon information available to the permittee there is reason to suspect the presence of any toxic or hazardous pollutant listed in Table V, or any other pollutant, known or suspected to adversely affect treatment plant operation, receiving water quality, or solids disposal procedures, analysis for those pollutants shall be performed at least once every six months on both the influent and the effluent.

The influent and effluent samples collected shall be composite samples consisting of at least 12 aliquots collected at approximately equal intervals over a representative 24 hour period and composited according to flow. Sampling and analytical procedures shall be in accordance with guidelines established in 40 CFR 136. The effluent samples shall be analyzed to a level as required in item 6 below. Where composite samples are inappropriate, due to sampling, holding time, or analytical constraints, at least 4 grab samples, taken at equal intervals over a representative 24 hour period, shall be taken.

4. The permittee shall prepare annually a list of Industrial Users which during the preceding twelve months were in significant noncompliance with applicable pretreatment requirements. For the purposes of this Part, significant noncompliance shall be determined based upon the more stringent of either criteria established at 40 CFR Part 403.8(f)(2)(vii) [rev. 7/24/90] or criteria established in the approved POTW pretreatment program. This list is to be published annually in the largest daily newspaper in the municipality during the month of December.

   In addition, during the month of December the permittee shall submit an updated status report to DEQ containing the following information:

   a. An updated list of all significant industrial users. For each industrial user listed the following information shall be included (Note: A sample table, which includes the requested information has been provided on Page 20 for your convenience):

      (1). Standard Industrial Classification (SIC) code and categorical determination;

      (2). Control document status. Whether the user has an effective control document, and the date such document was last issued, reissued, or modified, (indicate which industrial users were added to the system (or newly identified) within the previous 12 months);

      (3). A summary of all monitoring activities performed within the previous 12 months. The following information shall be reported:

      - total number of inspections performed;
      - total number of sampling visits made;

      (4). Status of compliance with both effluent limitations and reporting requirements. Compliance status shall be defined as follows:

      - Compliant (C) - no violations during the previous 12 month period;
      - Non-compliant (NC) - one or more violations during the previous 12 months but does not meet the criteria for significantly non-compliant industrial users;
      - Significant Noncompliance (SN) - in accordance with requirements described in d. above; and

      (5). For significantly noncompliant industrial users, indicate the nature of the violations, the type and number of actions taken (notice of violation, administrative order, criminal or civil suit, fines or penalties collected, etc.) and current compliance status. If ANY industrial user was on a schedule to attain compliance with effluent limits, indicate the date the schedule was issued and the date compliance is to be attained (Note: A sample table, which includes the requested information has been provided on Page 19 for your convenience);

b. A list of all significant industrial users whose authorization to discharge was terminated or revoked during the preceding 12 month period and the reason for termination;

c. A report on any interference, pass through, upset or POTW permit violations known or suspected to be caused by industrial contributors and actions taken by the permittee in response;

d. The results of all influent and effluent analyses performed pursuant to "item 3 above". These results and comparisons to the appropriate technically based local limit allowances and effluent water quality standards may be presented in tabular form as per the sample table provided on Page 18 for your convenience;

e. A copy of the newspaper publication of the significantly non-compliant industrial users giving the name of the newspaper and the date published;

5. The permittee shall provide adequate notice of the following:

   a. Any new introduction of pollutants into the treatment works from an indirect discharger which would be subject to Sections 301 and 306 of the CWA and/or Sections 40 CFR 405-499 if it were directly discharging those pollutants; and

   b. Any substantial change in-the volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into the treatment works at the time of issuance of the permit.

   Adequate notice shall include information on (i) the quality and quantity of effluent to be introduced into the treatment works, and (ii) any anticipated impact of the change on the quality or quantity of effluent to be discharged from the POTW.

6. All effluent monitoring conducted in accordance with "item 3 above" shall meet the Minimum Quantification Levels (MQLs) shown in the attached tables.

MINIMUM QUANTIFICATION LEVELS (MQLs)

METALS AND CYANIDE	(ug/L)	EPA METHOD
Antimony (Total)[1]	60	200.7
Arsenic (Total)[1]	10	206.2
Beryllium (Total)[1]	5	200.7
Cadmium (Total)[2]	1	213.2
Chromium (Total)[1]	10	200.7
Chromium (3+)[1]	10	200.7
Chromium (6+)[1]	10	200.7
Copper (Total)[2]	10	220.2
Lead (Total)[2]	5	239.2
Mercury (Total)[1]	0.2	245.1
Nickel (Total)[1] [Freshwater]	40	200.7
Nickel (Total)[2] [Marine]	5	249.2
Selenium (Total)[1]	5	270.2
Silver (Total)[2]	2	272.2
Thallium (Total)[1]	10	279.2
Zinc (Total)[1]	20	200.7
Cyanide (Total)[1]	10	335.2
DIOXIN		
1,7,8-Tetrachloro-dibenzo-p-dioxin (TCDD)[5]	.00001	1613
VOLATILE COMPOUNDS		
Acrolein[4]	50	624
Acrylonitrile[4]	50	624
Benzene[4]	10	624
Bromoform[5]	10	624
Carbon Tetrachloride[5]	10	624
Chlorobenzene[5]	10	624
Chlorodibromomethane[5]	10	624
Chloroethane[6]	50	624
2-Chloroethyl vinyl ether[4]	10	624
Chloroform[5]	10	624
Dichlorobromomethane[5]	10	624
1,1-Dichloroethane[5]	10	624
1,2-Dichloroethane[5]	10	624
1,1-Dichloroethylene[5]	10	624
1,2-Dichloropropane[5]	10	624
1,3-Dichloropropylene[5]	10	624
Ethylbenzene[5]	10	624
Methyl Bromide [Bromomethane][6]	50	624
Methyl Chloride [Chloromethane][6]	50	624
Methylene Chloride[5]	20	624

VOLATILE COMPOUNDS	(ug/L)	EPA METHOD
1,1,2,2-Tetrachloroethane[5]	10	624
Tetrachloroethylene[5]	10	624
Toluene[5]	10	624
1,2-trans-Dichloroethylene[5]	10	624
1,1,1-Trichloroethane[5]	10	624
1,1,2-Trichloroethane[5]	10	624
Trichloroethylene[5]	10	624
Vinyl Chloride[5]	10	624
ACID COMPOUNDS		
2-Chlorophenol[5]	10	625
2,4-Dichlorophenol[5]	10	625
2,4-Dimethylphenol[7]	10	625
4,6-Dinitro-o-Cresol		
[2 methyl 4,6-dinitrophenol][5]	50	625
2,4-Dinitrophenol[5]	50	625
2-Nitrophenol[5]	20	625
4-Nitrophenol[5]	50	625
p-Chloro-m-Cresol		
[4 chloro-3-methylphenol][6]	10	625
Pentachlorophenol[5]	50	625
Phenol[5]	10	625
2,4,6-Trichlorophenol[5]	10	625
BASE/NEUTRAL COMPOUNDS		
Acenaphthene[5]	10	625
Acenaphthylene[5]	10	625
Anthracene[5]	10	625
Benzidine[4]	50	625
Benzo(a)anthracenes[5]	10	625
Benzo(a)pyrene[5]	10	625
3,4-Benzofluoranthene[5]	10	625
Benzo(ghi)perylene[6]	20	625
Benzo(k)fluoranthene[5]	10	625
Bis(2-chloroethoxy) methane[5]	10	625
Bis(2-chloroethyl) ether[5]	10	625
Bis(2-chloroisopropyl) ether[5]	10	625
Bis(2-ethylhexyl) phthalate[5]	10	625
4-Bromophenyl phenyl ether[5]	10	625
Butyl benzyl phthalate[5]	10	625
2-Chloronapthalene[5]	10	625
4-Chlorophenyl phenyl ethers[5]	10	625
Chrysene[5]	10	625

MINIMUM QUANTIFICATION LEVELS (MQLs)

BASE/NUETRAL COMPOUNDS	(ug/L)	EPA METHOD
Dibenzo (a,h) anthracene[6]	20	625
1,2-Dichlorobenzene[5]	10	625
1,3-Dichlorobenzene[5]	10	625
1,4-Dichlorobenzene[5]	10	625
3,3'-Dichlorobenzidirm[6]	50	625
Diethyl Phthalate[5]	10	625
Dimethyl Phthalate[5]	10	625
Di-n-Butyl Phthalate[5]	10	625
2,4-Dinitrotoluene[5]	10	625
2,6-Dinitrotoluene[5]	10	625
Di-n-octyl Phthalate[5]	10	625
1,2-Diphenylhydrazine[4]	20	625
Fluoranthene[5]	10	625
Fluorene[5]	10	625
Hexachlorobenzene[5]	10	625
Hexachlorobutadiene[5]	10	625
Hexachlorocyclopentadiene[5]	10	625
Hexachloroethane[6]	20	625
Indeno (1,2,3-cd) pyrene[6] (2,3-o-phenylene pyrene)	20	625
Isophorone[5]	10	625
Naphthalene[5]	10	625
Nitrobenzene[5]	10	625
N-nitrosodimethylamine[6]	50	625
N-nitrosodi-n-propylamine[6]	20	625
N-nitrosodiphenylamine[6]	20	625
Phenanthrene[5]	10	625
Pyrene[5]	10	625
1,2,4-Trichlorobenzene[5]	10	625

PESTICIDES	(ug/L)	EPA METHOD
Aldrin[7]	0.05	608
Alpha-BHC[7]	0.05	608
Bet&-BHC[7]	0.05	609
Gamma-BHC (Lindane)[7]	0.05	608
Delta-BHC[7]	0.05	608
Chlordane[7]	0.2	608
4,4'-DDT[7]	0.1	608
4,4'-DDE (p,p-DDX)[7]	0.1	608
4,4'-DDD (p,p-TDE)[7]	0.1	608
Dieldrin[7]	0.1	608
Alpha-endosulfan[7]	0.1	608
Beta-endosulfan[7]	0.1	608
Endosulfan sulfate[7]	0.1	608

PESTICIDES	(ug/L)	EPA METHOD
Endrin[7]	.1	609
Endrin aldehyde[7]	.1	609
Heptachlor[7]	.05	608
Heptachlor epoxide[7] (BHC-hexachlorocyclohexane)	.05	608
PCB-1242[7]	1.0	608
PCB-1254	1.0	608
PCB-1221	1.0	608
PCB-1232	1.0	608
PCB-1248	1.0	608
PCB-1260	1.0	609
PCB,1016	1.0	608
Toxaphene[7]	5.0	608

[1] Based on Contract Required Detection level (CRDL) developed pursuant to 40 CFR Part 300.430(b)(8)

[2] Method 213.2, 239.2, 220.2, 272.2

[3] Dioxin National Strategy

[4] No CRQL(Contract required Quantification Level developed pursuant to 40 CFR Part 300.430(b)(8)) established

[5] CRQL basis, equivalent to ML

[6] ML basis, higher than CRQL

[7] CRQL basis, no ML established

[8] CRQL basis, higher than ML

OKLAHOMA DEQ SAMPLE
POTW MONITORING RESULTS [1] SUMMARY TABLE
FOR THE (CA NAME) ANNUAL PRETREATMENT REPORT, (MONTH & YEAR)

POLLUTANT	Minimum Quantification Level (MQL)	Detection Level (DL) Concentration Used (mg/l or ug/l)	POTW Monitoring Results (Concentrations in mg/l unless otherwise noted)					Comparative Standards (Loadings in lbs/day; concentration in mg/l unless otherwise noted)		
	Concentration (mg/l or ug/l) [2]		Average Influent Concentration	POTW Average Flow (MGD)	Calculated Headworks Loading (lbs/d)	Maximum Effluent Concentration	Average Effluent Concentration	Maximum Allowable Headworks Loading or Concentration	Permit or OK Limits Concentrations	
									Daily Maximum	Daily Maximum
Arsenic (Total										
Cadmium (Total										
Chromium (Total)										
Copper (Total)										
Lead (Total)										
Mercury (Total))										
Nickel (Total)										
Silver (Total))										
Zinc (Total										
Cyanide (Total)										
Other pollutants detected:										

[1] It is advised that the influent and effluent samples are collected considering flow detention time through each plant. Analytical MQLs should be used so that the data can also be used for Local Limits assessment and NPDES application purposes.

SIGNIFICANTLY NON-COMPLIANT USERS – ENFORCEMENT ACTIONS TAKEN

INDSUSTRIAL USER	NATURE OF VIOLATION		NUMBER OF ACTIONS TAKEN					PENALTIES COLLECTED	COMPLIANCE SCHEDULE		CURRENT STATUS	COMMENTS
	REPORTS	LIMITS	N.O.V.	A.O.	CIVIL	CRIMINAL	OTHER		DATE ISSUED	DATE DUE		

PRETREATMENT PROGRAM STATUS REPORT -- UPDATED SIGNIFICANT INDUSTRIAL USERS LIST

INDUSTRIAL USER	SIC CODE	CATEGORICAL DETERMINATION	CONTROL DOCUMENT		NEW USER	TIMES INSPECTED	TIMES SAMPLED	COMPLIANCE STATUS				
								REPORTS				EFFLUENT LIMITS
			Y/N	LAST ACTION				BMR	90-DAY	SEMI-ANNUAL	SELF-MONITORING	

PART III. STANDARD CONDITIONS FOR OPDES MUNICIPAL/DOMESTIC PERMIT

SECTION A. Definitions

In addition to the definitions included in the Oklahoma Pollutant Discharge Elimination System Act (OPDES Act), Title 27 O.S. Supp. 1996, Section 2-6-201 et seq., and the rules of the State of Oklahoma Department of Environmental Quality (DEQ) adopted thereunder (See OAC 252:605); the following definitions shall apply to this permit:

1. "Act" means the OPDES Act as amended.

2. "Applicable effluent standards and limitations" means all state and federal effluent standards and limitations to which a discharge is subject under the Act, including, but not limited to, effluent limitations, standards of performance, toxic effluent standards and prohibitions, and pretreatment standards.

3. "Applicable water quality standards" means all water quality standards to which a discharge is subject under the Act.

4. "Average limitations"

   a. "7-day average" (or weekly average), other than for coliform bacteria, is the arithmetic mean of the daily values for all effluent samples collected during a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The "7-day average" for coliform bacteria is the geometric mean of the values for all effluent samples collected during a calendar week.

   b. "30-day average" (or monthly average), other than for coliform bacteria, is the arithmetic mean of the daily values for all effluent samples collected during a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month. The "30-day average" for coliform bacteria is the geometric mean of the values for all effluent samples collected during a calendar month.

5. "Bypass" means the diversion, whether intentional or unintentional, of waste streams from any portion of the collection system or treatment facility.

6. "Daily discharge" means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in terms of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the sampling day. For pollutants with limitations expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the sampling day. "Daily discharge" determination of concentrations made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the "daily discharge" determination of concentration shall be the arithmetic average (weighted by flow value) of all samples collected during that sampling day.

7. "Daily maximum" discharge limitation means the highest allowable "daily discharge" during the calendar month.

8. "Environmental Protection Agency" (EPA) means the U.S. Environmental Protection Agency.

9. "Executive Director" means the Executive Director of the State of Oklahoma Department of Environmental Quality (DEQ) or his/her authorized representative(s).

11. "Industrial user" means a nondomestic discharger, as identified in 40 CFR Part 403, introducing pollutants to a publicly owned treatment works.

12. "Oklahoma Pollutant Discharge Elimination System" (OPDES) means the state program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under the Act.

13. "Oklahoma Department of Environmental Quality" also known as (DEQ), means the State of Oklahoma Department of Environmental Quality.

14. "OPDES Act" means the Oklahoma Pollutant Discharge Elimination System Act, Title 27 O.S. Supp. 1996, Section 2-6-201 et seq.

15. "Samples"

    a. For coliform bacteria, a sample consists of one effluent grab portion collected during a 24-hour period at peak loads.

    b. "Grab sample" means an individual sample collected in less than 15 minutes.

    c. "SBR (sequential batch reactor) sample and the various composite samples" are as defined in the OPDES Act, the Oklahoma Environmental Quality Code, rules transferred to or promulgated thereunder by DEQ.

    SBR Composite Sample:

    SBR Sample

    A minimum of three aliquots collected from the discharge of a reactor. The first aliquot must be collected no later than ¼ time, the second approximately ½ time, and the third no earlier than ¾ time from the initiation of a discharge cycle to the stoppage of the discharge cycle. The three aliquots shall consist of equal portions unless the rate of discharge from the reactor varies significantly during the cycle, in which case the measurement of the flow occurring at the time of their collection

Single Composite SBR Sample

One SBR sample collected from each reactor during one discharge cycle and composited proportional to the volume discharged from each of the reactors. The sample from at least one of the reactors shall represent the expected period of peak influent organic loading.

Two-Cycle Composite SBR Sample

One SBR sample collected from two consecutive discharge cycles of each reactor and composited proportional to the volume discharged during each cycle of each reactor. The sample from at least one cycle shall represent the expected period of peak influent organic loading.

Three-Cycle Composite SBR Sample

One SBR sample collected from three consecutive discharge cycles of each reactor and composited proportional to the volume discharged during each cycle of each reactor. The sample from at least one cycle shall represent the expected period of peak influent organic loading.

d. "24-hour composite sample" consists of a minimum of 12 effluent portions collected at equal time intervals over the 24-hour period and combined proportional to flow or a sample collected at frequent intervals proportional to flow over the 24-hour period.

e. "12-hour composite sample" consists of 12 effluent portions collected no closer together than one hour and composited according to flow. The daily sampling intervals shall include the highest flow periods.

f. "6-hour composite sample" consists of six effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.

g. "3-hour composite sample" consists of three effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.

16. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

17. "Sewage sludge" means the solids, residues and precipitates separated from or created in sewage by the unit processes of a publicly owned treatment works. Sewage as used in this definition means any wastes, including wastes from humans, households, commercial establishments, industries, and storm water runoff, that are discharged to or otherwise enter a publicly owned treatment works.

18. "Treatment works" means any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage and industrial wastes of a liquid nature to implement the Act, or necessary to recycle or reuse water at the most economical cost over the estimated life of the works, including intercepting sewers, sewage collection systems, pumping, power and other equipment, and their appurtenances, extension, improvement, remodeling, additions, and alterations thereof.

19. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

20. "MGD" means million gallons per day.

21. "mg/l" means milligrams per liter or parts per million (ppm).

22. "μg/l" means micrograms per liter or parts per billion (ppb).

SECTION B. Monitoring, Record Keeping, Reporting and Liabilities

1. Monitoring

a. Site and Frequency

All monitoring undertaken in compliance with the terms of this permit shall be conducted at the frequency and sample site specified in Part I, Section A of this permit and in accordance with the OPDES Act and the Oklahoma Environmental Quality Code. Grab or composite in Part III, Section B.5 below.

b. Representative Samples

Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

c. Averaging of Measurements

Calculations of all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Executive Director in the permit.

d. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report (DMR). Such increased monitoring frequency shall also be indicated on the DMR.

2. Testing Requirements

a. Methods

All sampling and analytical methods used to meet monitoring requirements specified above shall conform to the Act, 40 CFR Part 136, and DEQ rules and regulations.

b. Maintenance and Calibration

The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instruments at intervals frequent enough to ensure accuracy of measurements and shall maintain appropriate records of such activities.

c. Quality Control

An adequate analytical quality control program, including the analyses of sufficient standards, spikes, and duplicate samples to insure the accuracy to all required analytical results shall be maintained by the permittee or designated commercial laboratory.

3. Flow Measurements

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to insure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than 10% from true discharge rates throughout the range of expected discharge rates.

4. Records

a. Contents

Records of monitoring information shall include:

(1) The date, exact place, and time of sampling or measurements;
(2) The individual(s) who performed the sampling or measurements;
(3) The date(s) and time(s) analyses were performed;
(4) The individual(s) who performed the analyses;
(5) The analytical techniques or methods used; and
(6) The results of such analyses.

b. Retention

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report, or application. This period may be extended by request of the Executive Director at any time.

5. Discharge Monitoring Reports (DMRs)

All monitoring information required in Part I, Section A of this permit shall be included on DMRs (EPA form 3320-1). Reporting periods shall end on the last day of the month. The reports shall be prepared monthly. The original and one copy shall be submitted to the Oklahoma Department of Environmental Quality at the address shown below no later than the tenth (10th) day of the following month. A copy shall also be submitted simultaneously to the appropriate local DEQ office. All operating records and reports shall comply with the OPDES Act, the Oklahoma Environmental Quality Code, and the requirements of 40 CFR 122.41(j).

Water Quality Division
Oklahoma Department of Environmental Quality
P.O. Box 1677
Oklahoma City, OK 73101-1677

6. Noncompliance Reports

a. Twenty-Four Hour Reporting

(1) The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. The DEQ shall be notified by calling 1-800-256-2365 or 702-8290 (Oklahoma City Metropolitan Area). A written submission shall be provided within five (5) days of the time the permittee becomes aware of the circumstances. The report shall contain the following information:

(a) A description of the noncompliance and its cause;
(b) The period of noncompliance including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and,
(c) Steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

(2) The following shall be included as information which must be reported within 24 hours:

(a) Any unanticipated bypass which exceeds any effluent limitation in the permit;
(b) Any upset which exceeds any effluent limitation in the permit;
(c) Any violation of a maximum daily discharge limit for any of the pollutants listed by the Executive Director in Part I, Section A; and,
(d) Any bypass in the collection system [sanitary sewer overflow (SSO)].

(3) The Executive Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

b. Other Noncompliance

The permittee shall report all instances of noncompliance not reported under Part III, Sections B.5 and B.6.a or the reporting requirements of any Schedule of Compliance included in Part I, Section B at the time monitoring reports are submitted. The reports shall contain the information listed at Part III, Section B.6.a.

7. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under the Act.

8. Federal Penalties for Violations of Permit Conditions

Nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Any false or materially misleading representation or concealment of information required to be reported by the provisions of the permit, the Act, or applicable regulations, which avoids or effectively defeats the regulatory purpose of the permit may subject the Permittee to criminal enforcement pursuant to 18 U.S.C. Section 1001.

a. Criminal

(1) Negligent Violations

The Act provides that any person who negligently violates permit conditions implementing the Act is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than one (1) year, or both.

(2) Knowing Violations

The Act provides that any person who knowingly violates permit conditions implementing the Act is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than three (3) years, or both.

(3) Knowing Endangerment

The Act provides that any person who knowingly violates permit conditions implementing the Act and who knows at that time that he is placing another person in imminent danger of death or serious bodily injury is subject to a fine of not more than $250,000, or by imprisonment for not more than fifteen (15) years, or both.

(4) False Statements

The Act provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the Act or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under the Act, shall upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than two (2) years, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment shall be by a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four (4) years, or by both. (See Section 2-6-206 of the Act).

b. Civil Penalties

The Act provides that any person who violates a permit condition implementing the Act is subject to a civil penalty not to exceed $27,500 per day for each violation.

c. Administrative Penalties

The Act provides that any person who violates a permit condition implementing the Act is subject to an administrative penalty, as follows:

(1) Class I Penalty

Not to exceed $11,000 per violation nor shall the maximum amount exceed $27,500.

(2) Class II Penalty

Not to exceed $11,000 per day for each day during which the violation continues nor shall the maximum amount exceed $137,500.

9. State Penalties

a. Civil and Administrative

For any violation of the limitations and/or conditions of this permit, the State may assess a fine of up to $10,000 per day per violation.

b. Criminal

Violations of the terms of this permit constitute a misdemeanor under Oklahoma Statutes with various provisions for fines and jail terms.

SECTION C. Other Conditions

1. Permit Application

a. Timely Application

Upon timely application for a permit, any prior permit remains in effect until a new one is issued.

b. Date of Application

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application shall be submitted at least 180 days before the expiration date of this permit unless otherwise authorized by the Executive Director. He or she may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date. Continuation of expiring permits shall be governed by regulations promulgated at 40 CFR 122.6 and any subsequent amendments.

c. Relevant Facts

When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Executive Director, it shall promptly submit such facts or information.

2. Changes

a. Change in discharge

(1) Anticipated Noncompliance

The permittee shall give advance notice of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

(2) Municipal Permits

Any change in the facility discharge (including the introduction of any new source or significant discharge or significant changes in the quantity or quality of existing discharges to the treatment system that may result in new or increased discharges of pollutants) must be reported to the permitting authorities. In no case are any new connections, increased flows, or significant changes in influent quality permitted that will cause violations or add to existing violations of the effluent limitations specified herein.

(3) Other Permits

The permittee shall give notice to the Executive Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

(a) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or,

(b) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to all pollutants whether or not they are subject to effluent limitations in the permit.

h. Transfer of ownership or control

This permit is not transferable to any person except after notice to the Executive Director. The Executive Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as necessary under the Act.

3. Property Rights

This permit does not convey any property rights of any sort, or any exclusive privilege.

4. Duty to Comply

a. All authorized discharges shall comply with the rules of the DEQ, which are hereby incorporated by reference: the Act and OPDES Regulations, and all provisions, conditions, and requirements included in this permit.

b. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of applicable state and federal laws and the Act, the Oklahoma Environmental Quality Code and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

c. The permittee shall comply with effluent standards or prohibitions established under the Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

5. Duty to mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

6. Duty to halt or reduce activity

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

7. Duty to provide information

The permittee shall furnish within a reasonable time, any information which the Executive Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish, upon request, copies of records required to be kept by this permit.

8. Permit modification, suspension and revocation

After notice and opportunity for a hearing, as is required by law, this permit may be modified, suspended, revoked and reissued, or terminated during its term in accordance with 40 CFR 122.62 and 122.64; and Title 27 O.S. Supp. 1996, Section 2-6-201 et seq., and the rules of the State of Oklahoma Department of Environmental Quality (DEQ) adopted thereunder [See OAC 252:605]. The filing of a request for a permit modification or reissuance, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

9. Proper operation and maintenance

a. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by permittee as efficiently as possible and in a manner which will minimize upsets and discharges of excessive pollutants and will achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

b. The permittee shall provide an adequate operating staff which is duly qualified to carry out operation, maintenance and testing functions required to insure compliance with the conditions of this permit.

c. Collected screenings, slurries, sludges and other solids shall be disposed of in accordance with the Oklahoma Solid Waste Management Act and in such a manner as to prevent entry of those wastes (or runoff from the wastes) into waters of the state and in compliance with applicable rules of the DEQ.

10. Power Failure

The permittee is responsible for maintaining adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failures either by means of alternative power sources, standby generators, or retention of inadequately treated effluent.

11. Upsets and Bypasses

a. Upsets

(1) An upset constitutes an affirmative defense to an enforcement action brought for noncompliance with technology-based permit effluent limitations if the following requirements are met. A permittee who wishes to establish the affirmative defense of upset shall demonstrate through properly signed, contemporaneous operating logs, or other relevant evidence that:

(a) An upset occurred and that the permittee can identify the specific cause(s) of the upset;

(b) The permitted facility was at the time being properly operated;

(c) The permittee submitted notice of the upset as required in Part III, Section B.6 of this permit;

(d) The permittee complied with any remedial measures under Part III, Section C.5.

(2) Burden of Proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

b. Bypasses

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

(a) Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the reporting requirements of Part III, Sections C.11.b(1) and (2).

(b) Bypass exceeding limitations is prohibited, and the Executive Director may take enforcement action against a permittee for bypass, unless:

i. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

ii. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and,

iii. The permittee submitted notices required by Part III, Section B.6.

(c) The Executive Director may allow an anticipated bypass that exceeds limitations after considering its adverse effects, if he/she determines that it will meet the three conditions listed at Part III, Section C.11.b.(1)(b).

(2) Unanticipated bypass. The permittee shall, within 24 hours, submit notice of an unanticipated bypass as required in Part III, Section B.6.

12. Percent Removal

For publicly owned treatment works, the 30-day average (or monthly average) percent removal for Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS) shall not be less than 85 percent unless otherwise authorized by the permitting authority in accordance with 40 CFR 133.103. This requirement may be waived in permits containing mass loading limits for BOD and TSS.

13. Right of entry

The permittee shall allow the Executive Director, and/or his/her authorized representative(s), upon presentation of credentials and such other documents as may be required by the law to:

a. Enter upon the permittee's premises or other premises under the control of the permittee, where an effluent source is located or may be located or in which any records are required to be kept under the terms and conditions of this permit;

b. Have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit, or the Act or DEQ rules;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), maintenance, practices or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

14. Toxic Effluent Standards

Notwithstanding Section III.C.8 of this permit, if any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under the Act for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this permit, this permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition.

15. Signatory Requirements

All applications, reports, or information submitted to the Executive Director shall be signed and certified.

a. All permit applications shall be signed as follows:

(1) For a corporation - by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

(a) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation; or,

(b) The manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

(2) For a partnership or sole proprietorship - by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal, or other public agency - by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a federal agency includes:

(a) The chief executive officer of the agency, or

(b) A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

b. All reports required by the permit and other information requested by the Executive Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described above;

(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. A duly authorized representative may thus be either a named individual or an individual occupying a named position; and,

(3) The written authorization is submitted to the Executive Director.

c. Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

16. Confidentiality

Except for applications, effluent data, permits, and other data specified in 40 CFR 122.7, any information submitted pursuant to this permit may be claimed as confidential by the submitter. The Executive Director will rule upon such claim in accordance with the Act. If no claim is made at the time of submission, information may be made available to the public without further notice.

Part IV
SEWAGE SLUDGE REQUIREMENTS
PERMIT
INSTRUCTIONS TO PERMITTEES

Select only those Elements and Sections which apply to your sludge reuse or disposal practice.

If your facility utilizes more than one type of disposal or reuse method (for example, Element 1 and Element 2 apply) or the quality of your sludge varies (for example, Section II and Section III of Element 1 apply) use a separate Discharge Monitoring Report (DMR) for each Section that is applicable.

The sludge DMRs shall be due by February 19th of each year and shall cover the previous January through December time period.

The sludge conditions do not apply to wastewater treatment lagoons where sludge is not wasted for final reuse/disposal. If the sludge is not removed, the permittee shall indicate on the DMR "No Discharge."

ELEMENT 1 - LAND APPLICATION

ELEMENT 2 - MUNICIPAL SOLID WASTE LANDFILL DISPOSAL

ELEMENT 1 - LAND APPLICATION

SECTION I. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE LAND APPLICATION

A. **General Requirements**

1. The permittee shall handle and dispose of sewage sludge in accordance with the Oklahoma Pollutant Discharge Elimination System (OPDES) Act (hereafter "the Act") and all other applicable federal and state regulations to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants which may be present in the sludge.

2. If requirements for sludge management practices or pollutant criteria become more stringent than the sludge pollutant limits or acceptable management practices in this permit, or control a pollutant not listed in this permit, this permit may be modified or revoked and reissued to conform to the requirements promulgated under the Act. If new limits for molybdenum are promulgated prior to permit expiration, then those limits shall become directly enforceable.

3. In all cases, if the person (permit holder) who prepares the sewage sludge supplies the sewage sludge to another person for land application use or to the owner or lease holder of the land, the permit holder shall provide necessary information to the parties who receive the sludge to assure compliance with these regulations.

4. The permittee shall give prior notice to the Director, Water Quality Division, State of Oklahoma Department of Environmental Quality (DEQ), 707 North Robinson, Oklahoma City, Oklahoma 73101-1677 of any planned changes in the sewage sludge disposal practice, in accordance with 40 CFR 122.41(l)(1)(iii). These changes may justify the application of permit conditions that are different from or absent in the existing permit. Change in the sludge use or disposal practice may be cause for modification of the permit in accordance with 40 CFR 122.62(a)(1).

B. **Testing Requirements**

1. Sewage sludge shall be tested once during the life of the permit within one year from the effective date of the permit in accordance with the method specified at 40 CFR Part 268, Appendix I [Toxicity Characteristic Leaching Procedure (TCLP)] or other approved methods. Sludge shall be tested after final treatment prior to leaving the publicly owned treatment works (POTW) site. Sewage sludge determined to be a hazardous waste in accordance with 40 CFR Part 261, shall be handled according to Resource Conservation and Recovery Act (RCRA) standards for the disposal of hazardous waste in accordance with 40 CFR Part 262. The disposal of sewage sludge determined to be a hazardous waste, in other than a certified hazardous waste disposal facility shall be prohibited. The DEQ, Waste Management Division at 405-702-5100, shall be notified of test failure within 24 hours. A written report shall be provided to this division within 7 days after failing the TCLP. The report will contain test results, certification that unauthorized disposal has not occurred and a summary of alternative disposal plans that comply with RCRA standards for the disposal of hazardous waste. The report shall be addressed to the Director, Waste Management Division, DEQ, 707 N. Robinson, Oklahoma City, Oklahoma 73101-1677 and a copy sent to the Director, Water Quality Division, DEQ, at the same address.

2. Sewage sludge shall not be applied to the land if the concentration of the pollutants exceeds the pollutant concentration criteria in Table 1. The frequency of testing for pollutants in Table 1 is found in Element 1, Section I.C.

TABLE 1

Pollutant	Ceiling Concentration (milligrams per kilogram)*
Arsenic	75
Cadmium	85
Copper	4300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
PCBs	49
Selenium	100
Zinc	7500

* Dry weight basis

3. Pathogen Control

All sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site shall be treated by either the Class A or Class B pathogen requirements. Sewage sludge that is applied to a lawn or home garden shall be treated by the Class A pathogen requirements. Sewage sludge that is sold or given away in a bag shall be treated by the Class A pathogen requirements.

Class A Sludge Requirements:

a. Six alternatives are available to demonstrate compliance with Class A sewage sludge. All 6 options require either the density of fecal coliform in the sewage sludge be less than 1000 Most Probable Number (MPN) per gram of total solids (dry weight basis), or the density of *Salmonella sp.* bacteria in the sewage sludge be less than three MPN per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed; at the time the sewage sludge is prepared for sale or given away in a bag or other container for application to the land. Below are the additional requirements necessary to meet the definition of a Class A sludge.

Alternative 1 - The temperature of the sewage sludge that is used or disposed shall be maintained at a specific value for a period of time. See 40 CFR 503.32(a)(3)(ii) and OAC 252:648 for specific information.

Alternative 2 - The pH of the sewage sludge that is used or disposed shall be raised to above 12 and shall remain above 12 for 72 hours.

The temperature of the sewage sludge shall be above 52 degrees Celsius for 12 hours or longer during the period that the pH of the sewage sludge is above 12.

At the end of the 72 hour period during which the pH of the sewage sludge is above 12, the sewage sludge shall be air dried to achieve a percent solids in the sewage sludge greater than 50 percent.

Alternative 3 - The sewage sludge shall be analyzed for enteric viruses prior to pathogen treatment. The limit for enteric viruses is one Plaque-forming Unit per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 40 CFR 503.32(a)(5)(ii) for specific information. The sewage sludge shall be analyzed for viable helminth ova prior to pathogen treatment. The limit for viable helminth ova is less than one per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 40 CFR 503.32(a)(5)(iii) and OAC 252:648 for specific information.

Alternative 4 - The density of enteric viruses in the sewage sludge shall be less than one Plaque-forming Unit per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed or at the time the sludge is prepared for sale or given away in a bag or other container for application to the land.

The density of viable helminth ova in the sewage sludge shall be less than one per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed or at the time the sewage sludge is prepared for sale or given away in a bag or other container for application to the land.

Alternative 5 - Sewage sludge shall be treated by one of the Processes to Further Reduce Pathogens (PFRP) described in 40 CFR 503 Appendix B. PFRPs include composting, heat drying, heat treatment, and thermophilic aerobic digestion.

Alternative 6 - Sewage sludge shall be treated by a process that is equivalent to a PFRP, if individually approved by the Pathogen Equivalency Committee representing the DEQ.

Class B Sludge Requirements:

b. Three alternatives are available to demonstrate compliance with Class B sewage sludge.

Alternative 1 - (i) Seven separate random samples representative of the sewage sludge shall be collected for one monitoring episode at the time the sewage sludge is used or disposed.

(ii) The geometric mean of the density of fecal coliform in the samples collected shall be less than either 2,000,000 MPN per gram of total solids (dry weight basis) or 2,000,000 Colony Forming Units per gram of total solids (dry weight basis).

Alternative 2 - Sewage sludge shall be treated in one of the Processes to Significantly Reduce Pathogens (PSRP) described in 40 CFR 503 Appendix B.

Alternative 3 - Sewage sludge shall be treated in a process that is equivalent to a PSRP, if individually approved by the Pathogen Equivalency Committee representing the DEQ.

In addition, the following site restrictions must be met if Class B sludge is land applied:

i. Food crops with harvested parts that touch the sewage sludge/soil mixture and are totally above the land surface shall not be harvested for 14 months after application of sewage sludge.

ii. Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of sewage sludge when the sewage sludge remains on the land surface for 4 months or longer prior to incorporation into the soil.

iii. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of sewage sludge when the sewage sludge remains on the land surface for less than 4 months prior to incorporation into the soil.

iv. Food crops, feed crops, and fiber crops shall not be harvested for 30 days after application of sewage sludge.

v. Animals shall not be allowed to graze on the land for 30 days after application of sewage sludge.

vi. Turf grown on land where sewage sludge is applied shall not be harvested for 1 year after application of the sewage sludge when the harvested turf is placed on either land with a high potential for public exposure or a lawn, unless otherwise specified by the permitting authority.

vii. Public access to land with a high potential for public exposure shall be restricted for 1 year after application of sewage sludge.

viii. Public access to land with a low potential for public exposure shall be restricted for 30 days after application of sewage sludge.

4. Vector Attraction Reduction Requirements

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site shall be treated by one of the following alternatives 1 through 10 for Vector Attraction Reduction. If bulk sewage sludge is applied to a home garden, or bagged sewage sludge is applied to the land, only Alternatives 1 through 8 shall be used.

Alternative 1 - The mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38 percent.

Alternative 2 - If Alternative 1 cannot be met for an anaerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30 and 37 degrees Celsius. Volatile solids must be reduced by less than 17 percent to demonstrate compliance.

Alternative 3 - If Alternative 1 cannot be met for an aerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge with a percent solids of two percent or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20 degrees Celsius. Volatile solids must be reduced by less than 15 percent to demonstrate compliance.

Alternative 4 - The specific oxygen uptake rate (SOUR) for sewage sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20 degrees Celsius.

Alternative 5 - Sewage sludge shall be treated in an aerobic process for 14 days or longer. During that time, the temperature of the sewage sludge shall be higher than 40 degrees Celsius and the average temperature of the sewage sludge shall be higher than 45 degrees Celsius.

Alternative 6 - The pH of sewage sludge shall be raised to 12 or higher by alkali addition and, without the addition of more alkali, shall remain at 12 or higher for two hours and then at 11.5 or higher for an additional 22 hours.

Alternative 7 - The percent solids of sewage sludge that does not contain unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 75 percent based on the moisture content and total solids prior to mixing with other materials. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 8 - The percent solids of sewage sludge that contains unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90 percent based on the moisture content and total solids prior to mixing with other materials. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 9 -

(i) Sewage sludge shall be injected below the surface of the land.

(ii) No significant amount of the sewage sludge shall be present on the land surface within one hour after the sewage sludge is injected.

(iii) When sewage sludge that is injected below the surface of the land is Class A with respect to pathogens, the sewage sludge shall be injected below the land surface within eight hours after being discharged from the pathogen treatment process.

Alternative 10 -

(i) Sewage sludge applied to the land surface or placed on a surface disposal site shall be incorporated into the soil within six hours after application to or placement on the land.

(ii) When sewage sludge that is incorporated into the soil is Class A with respect to pathogens, the sewage sludge shall be applied to or placed on the land within eight hours after being discharged from the pathogen treatment process.

C. **Monitoring Requirements**

1. Toxicity Characteristic Leaching Procedure (TCLP) Test performed within one year from the effective date of the permit. — Once/Permit Life

2. PCBs — Once/Year

3. All other pollutants shall be monitored at the frequency shown below:

Amount of sewage sludge* (metric tons per 365 day period)	Frequency
0 ≤ Sludge < 290	Once/Year
290 ≤ Sludge < 1,500	Once/Quarter
1,500 ≤ Sludge < 15,000	Once/Two Months
15,000 ≤ Sludge	Once/Month

*Either the amount of bulk sewage sludge applied to the land or the amount of sewage sludge received by a person who prepares sewage sludge that is sold or given away in a bag or other container for application to the land (dry weight basis).

Representative samples of sewage sludge shall be collected and analyzed in accordance with the methods referenced in 40 CFR 503.8(b) and OAC 252:648.

SECTION II. REQUIREMENTS SPECIFIC TO BULK SEWAGE SLUDGE FOR APPLICATION TO THE LAND MEETING CLASS A or B PATHOGEN REDUCTION AND THE CUMULATIVE LOADING RATES IN TABLE 2, OR CLASS B PATHOGEN REDUCTION AND THE POLLUTANT CONCENTRATIONS IN TABLE 3

For those permittees meeting Class A or B pathogen reduction requirements and that meet the cumulative loading rates in Table 2 below, or the Class B pathogen reduction requirements and contain concentrations of pollutants below those listed in Table 3 found in Element 1, Section III, the following conditions apply:

1 Pollutant Limits:

TABLE 2

Pollutant	Cumulative Pollutant Loading Rate (kilograms per hectare)
Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Molybdenum	Report
Nickel	420
Selenium	100
Zinc	2800

2. Pathogen Control

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, a reclamation site, or lawn or home garden shall be treated by either Class A or Class B pathogen reduction requirements as defined above in Element 1, Section I.B.3.

3. Management Practices

a. Bulk sewage sludge shall not be applied to agricultural land, forest, a public contact site, or a reclamation site that is flooded, frozen, or snow-covered so that the bulk sewage sludge enters a wetland or other waters of the state, as defined in 40 CFR 122.2, except as provided in a permit issued pursuant to the Act.

b. Bulk sewage sludge shall not be applied within 100 feet of a water of the state.

c. Bulk sewage sludge shall be applied at or below the agronomic rate in accordance with recommendations from the following references:

i. STANDARDS 1992, Standards, Engineering Practices and Data, 39th Edition (1992) American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, MI 49085-9659.

ii. National Engineering Handbook Part 651, Agricultural Waste Management Field Handbook (1992), P.O. Box 2890, Washington, D.C. 20013.

iii. Recommendations of local extension services or Soil Conservation Services.

iv. Recommendations of a major university's Agronomic Department.

d. An information sheet shall be provided to the person who receives bulk sewage sludge that is sold or given away. The information sheet shall contain the following information:

i. The name and address of the person who prepared the sewage sludge that is sold or given away in a bag or other container for application to the land.

ii. A statement that application of the sewage sludge to the land is prohibited except in accordance with the instructions on the label or information sheet.

iii. The annual whole sludge application rate for the sewage sludge that does not cause any of the cumulative pollutant loading rates in Table 2 above to be exceeded, unless the pollutant concentrations in Table 3 found in Element 1, Section III below are met.

4. Notification requirements

a. If bulk sewage sludge is applied to land in a state other than the state in which the sludge is prepared, written notice shall be provided prior to the initial land application to the permitting authority for the state in which the bulk sewage sludge is proposed to be applied. The notice shall include:

i. The location, by either street address or latitude and longitude, of each land application site.

ii. The approximate time period bulk sewage sludge will be applied to the site.

iii. The name, address, telephone number, and Oklahoma Pollutant Discharge Elimination System or National Pollutant Discharge Elimination System, whichever is applicable, permit number (if appropriate) for the person who prepares the bulk sewage sludge.

iv. The name, address, telephone number, and Oklahoma Pollutant Discharge Elimination System or National Pollutant Discharge Elimination System, whichever is applicable, permit number (if appropriate) for the person who will apply the bulk sewage sludge.

b. The permittee shall give 60 days prior notice to the DEQ of any change planned in the sewage sludge practice. Any change shall include any planned physical alterations or additions to the permitted treatment works, changes in the permittee's sludge use or disposal practice, and also alterations, additions, or deletions of disposal sites. These changes may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional disposal sites not reported during the permit application process or absent in the existing permit. Change in the sludge use or disposal practice may be cause for modification of the permit in accordance with 40 CFR 122.62(a)(1).

c. The permittee shall provide the location of all existing sludge disposal/use sites to the State Historical Commission within 90 days of the effective date of this permit. In addition, the permittee shall provide the location of any new disposal/use site to the State Historical Commission prior to use of the site.

The permittee shall within 30 days after notification by the State Historical Commission that a specific sludge disposal/use area will adversely effect a National Historic Site, cease use of such area.

5. Recordkeeping Requirements - The sludge documents will be retained on site at the same location as other OPDES records.

The person who prepares bulk sewage sludge or a sewage sludge material shall develop the following information and shall retain the information for five years. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for recordkeeping found in 40 CFR 503.17 and OAC 252:648 for persons who land apply.

a. The concentration (mg/Kg) in the sludge of each pollutant listed in Table 3 found in Element 1, Section III and the applicable pollutant concentration criteria (mg/Kg), or the applicable cumulative pollutant loading rate and the applicable cumulative pollutant loading rate limit (kg/ha) listed in Table 2 above.

b. A description of how the pathogen reduction requirements are met (including site restrictions for Class B sludges, if applicable).

c. A description of how the vector attraction reduction requirements are met.

d. A description of how the management practices listed above in Section II.3 are being met.

e. The recommended agronomic loading rate from the references listed in Section II.3.c above, as well as the actual agronomic loading rate shall be retained.

f. A description of how the site restrictions in 40 CFR 503.32(b)(5) and OAC 252:648 are met for each site on which Class B bulk sewage sludge is applied.

g. The following certification statement:

"I certify, under penalty of law, that the management practices in 40 CFR 503.14 have been met for each site on which bulk sewage sludge is applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices have been met. I am aware that there are significant penalties for false certification including fine and imprisonment."

h. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment. See 40 CFR 503.17(a)(4)(i)(B) or 40 CFR 503.17(a)(5)(i)(B) as applicable to the permittees sludge treatment activities.

i. The permittee shall maintain information that describes future geographical areas where sludge may be land applied.

j. The permittee shall maintain information identifying site selection criteria regarding land application sites not identified at the time of permit application submission.

k. The permittee shall maintain information regarding how future land application sites will be managed

The person who prepares bulk sewage sludge or a sewage sludge material shall develop the following information and shall retain the information indefinitely. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for recordkeeping found in 40 CFR 503.17 and OAC 252:648 for persons who land apply.

i. The location, by either street address or latitude and longitude, of each site on which sludge is applied.

ii. The number of hectares in each site on which bulk sludge is applied.

iii. The date and time sludge is applied to each site.

iv. The cumulative amount of each pollutant in kilograms/hectare listed in Table 2 applied to each site.

v. The total amount of sludge applied to each site in metric tons.

vi. The following certification statement:

"I certify, under penalty of law, that the requirements to obtain information in 40 CFR 503.12(e)(2) have been met for each site on which bulk sewage sludge is applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the requirements to obtain information have been met. I am aware that there are significant penalties for false certification including fine and imprisonment."

vii. A description of how the requirements to obtain information in 40 CFR 503.12(e)(2) and OAC 252:648 are met.

6. Reporting Requirements - The permittee shall report annually on the DMR the following information:

a. Pollutant Table (2 or 3) appropriate for permittee's land application practices.

b. The frequency of monitoring listed in Element 1, Section I.C which applies to the permittee.

c. Toxicity Characteristic Leaching Procedure (TCLP) results (Pass/Fail).

d. The concentration (mg/Kg) in the sludge of each pollutant listed in Table 1 (defined as a monthly average) as well as the applicable pollutant concentration criteria (mg/Kg) listed in Table 3 found in Element 1, Section III, or the applicable pollutant loading rate limit (kg/ha) listed in Table 2 above if it exceeds 90% of the limit.

e. Level of pathogen reduction achieved (Class A or Class B).

f. Alternative used as listed in Section I.B.3.(a. or b.). Alternatives describe how the pathogen reduction requirements are met. If Class B sludge, include information on how site restrictions were met in the DMR comment section or attach a separate sheet to the DMR.

g. Vector attraction reduction alternative used as listed in Section I.B.4.

h. Annual sludge production in dry metric tons/year.

i. Amount of sludge land applied in dry metric tons/year.

j. Amount of sludge transported interstate in dry metric tons/year.

k. The certification statement listed in 40 CFR 503.17(a)(4)(i)(B) or 40 CFR 503.17(a)(5)(i)(B) whichever applies to the permittees sludge treatment activities shall be attached to the DMR.

l. When the amount of any pollutant applied to the land exceeds 90% of the cumulative pollutant loading rate for that pollutant, as described in Table 2, the permittee shall report the following information as an attachment to the DMR.

i. The location, by either street address or latitude and longitude.

ii. The number of hectares in each site on which bulk sewage sludge is applied.

iii. The date and time bulk sewage sludge is applied to each site.

iv. The cumulative amount of each pollutant (i.e., kilograms/hectare) listed in Table 2 in the bulk sewage sludge applied to each site.

v. The amount of sewage sludge (i.e., metric tons) applied to each site.

vi. The following certification statement:

"I certify, under penalty of law, that the requirements to obtain information in 40 CFR 503.12(e)(2) have been met for each site on which bulk sewage sludge is applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the requirements to obtain information have been met. I am aware that there are significant penalties for false certification including fine and imprisonment."

vii. A description of how the requirements to obtain information in 40 CFR 503.12(e)(2) and OAC 252:648 are met.

SECTION III. REQUIREMENTS SPECIFIC TO BULK OR BAGGED SEWAGE SLUDGE MEETING POLLUTANT CONCENTRATIONS IN TABLE 3 AND CLASS A PATHOGEN REDUCTION REQUIREMENTS

For those permittees with sludge that contains concentrations of pollutants below those pollutant limits listed in Table 3 for bulk or bagged (containerized) sewage sludge and also meet the Class A pathogen reduction requirements, the following conditions apply (Note: All bagged sewage sludge must be treated by Class A pathogen reduction requirements.):

1 Pollutant limits - The concentration of the pollutants in the municipal sewage sludge is at or below the values listed.

TABLE 3

Pollutant	Monthly Average Concentration (milligrams per kilogram)*

Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Molybdenum	Report
Nickel	420
Selenium	36
Zinc	2800

* Dry weight basis

2. Pathogen Control

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, a reclamation site, or lawn or home garden shall be treated by the Class A pathogen reduction requirements as defined above in Element 1, Section I.B.3. All bagged sewage sludge must be treated by Class A pathogen reduction requirements.

3. Management Practices - None.

4. Notification Requirements - None.

5. Recordkeeping Requirements - The permittee shall develop the following information and shall retain the information for five years. The sludge documents will be retained on site at the same location as other OPDES records.

a. The concentration (mg/Kg) in the sludge of each pollutant listed in Table 3 and the applicable pollutant concentration criteria listed in Table 3.

b. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment. See 40 CFR 503.17(a)(1)(ii) or 40 CFR 503.17(a)(3)(i)(B), and OAC 252:648 whichever applies to the permittees sludge treatment activities.

c. A description of how the Class A pathogen reduction requirements are met.

d. A description of how the vector attraction reduction requirements are met.

6. Reporting Requirements - The permittee shall report annually on the DMR the following information:

a. Pollutant Table 3 appropriate for permittee's land application practices.

b. The frequency of monitoring listed in Element 1, Section I.C which applies to the permittee.

c. Toxicity Characteristic Leaching Procedure (TCLP) results. (Pass/Fail).

d. The concentration (mg/Kg) in the sludge of each pollutant listed in Table 1 (defined as a monthly average) found in Element 1, Section I. In addition, the applicable pollutant concentration criteria listed in Table 3 should be included on the DMR.

e. Pathogen reduction Alternative used for Class A bagged or bulk sludge as listed in Section I.B.3.a.

f. Vector attraction reduction Alternative used as listed in Section I.B.4.

g. Annual sludge production in dry metric tons/year.

h. Amount of sludge land applied in dry metric tons/year.

i. Amount of sludge transported interstate in dry metric tons/year.

j. The certification statement listed in 40 CFR 503.17(a)(1)(ii) or 40 CFR 503.17(a)(3)(i)(B), and OAC 252:648 whichever applies to the permittees sludge treatment activities, shall be attached to the DMR.

SECTION IV. REQUIREMENTS SPECIFIC TO SLUDGE SOLD OR GIVEN AWAY IN A BAG OR OTHER CONTAINER FOR APPLICATION TO THE LAND THAT DOES NOT MEET THE POLLUTANT CONCENTRATIONS in Table 3

1. Pollutant Limits

TABLE 4

Pollutant	Annual Pollutant Loading Rate (kilograms per hectare per 365 day period)

Arsenic	2.0
Cadmium	1.9
Copper	75.0
Lead	15.0
Mercury	0.85
Molybdenum	Report
Nickel	21.0
Selenium	5.0
Zinc	140.0

2. Pathogen Control

All sewage sludge that is sold or given away in a bag or other container for application to the land shall be treated by the Class A pathogen requirements as defined in Section I.B.3.a.

3. Management Practices

Either a label shall be affixed to the bag or other container in which sewage sludge that is sold or given away for application to the land, or an information sheet shall be provided to the person who receives sewage sludge sold or given away in another container for application to the land. The label or information sheet shall contain the following information:

a. The name and address of the person who prepared the sewage sludge that is sold or given away in a bag or other container for application to the land.

b. A statement that application of the sewage sludge to the land is prohibited except in accordance with the instructions on the label or information sheet.

c. The annual whole sludge application rate for the sewage sludge that will not cause any of the annual pollutant loading rates in Table 4 above to be exceeded.

4. Notification Requirements - None.

5. Recordkeeping Requirements - The sludge documents will be retained on site at the same location as other OPDES records.

The person who prepares sewage sludge or a sewage sludge material shall develop the following information and shall retain the information for five years.

a. The concentration in the sludge of each pollutant listed above in found in Element 1, Section I, Table 1.

b. The following certification statement found in 40 CFR 503.17(a)(6)(iii).

"I certify, under penalty of law, that the management practices in 40 CFR 503.14(e), the Class A pathogen requirement in 40 CFR 503.32(a), and the vector attraction reduction requirement in (insert vector attraction reduction option) have been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices, pathogen requirements, and vector attraction reduction requirements have been met. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment".

c. A description of how the Class A pathogen reduction requirements are met.

d. A description of how the vector attraction reduction requirements are met.

e. The annual whole sludge application rate for the sewage sludge that does not cause the annual pollutant loading rates in Table 4 to be exceeded. See Appendix A to 40 CFR Part 503 - Procedure to Determine the Annual Whole Sludge Application Rate for a Sewage Sludge.

6 Reporting Requirements - The permittee shall report annually on the DMR the following information:

a. Pollutant listed in, Table 4 as appropriate for permittee's land application practices.

b. The frequency of monitoring listed in Element 1, Section I.C which applies to the permittee.

c. Toxicity Characteristic Leaching Procedure (TCLP) results (Pass/Fail).

d. The concentration (mg/Kg) in the sludge of each pollutant listed above in Table 1 (defined as a monthly average) found in Element 1, Section I.

e. Class A pathogen reduction Alternative used as listed in Section I.B.3.a. Alternatives describe how the pathogen reduction requirements are met.

f. Vector attraction reduction Alternative used as listed in Section I.B.4.

g. Annual sludge production in dry metric tons/year.

h. Amount of sludge land applied in dry metric tons/year.

i. Amount of sludge transported interstate in dry metric tons/year.

j. The following certification statement found in 40 CFR 503.17(a)(6)(iii) shall be attached to the DMR.

"I certify, under penalty of law, that the management practice in 40 CFR 503.14(c), the Class A pathogen requirement in 40 CFR 503.32(a), and the vector attraction reduction requirement (insert appropriate option) have been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel gather and evaluate the information used to determine that the management practice, pathogen requirements, and vector attraction reduction requirements have been met. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

ELEMENT 2 - MUNICIPAL SOLID WASTE LANDFILL DISPOSAL

SECTION I. <u>REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE DISPOSED IN A MUNICIPAL SOLID WASTE LANDFILL</u>

1. The permittee shall handle and dispose of sewage sludge in accordance with the Act and all other applicable federal and state regulations to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present. The permittee shall ensure that the sewage sludge meets the requirements in 40 CFR Part 258 concerning the quality of the sludge disposed in the municipal solid waste landfill (MSWLF) unit.

2. If requirements for sludge management practices or pollutant criteria become more stringent than the sludge pollutant limits or acceptable management practices in this permit, or control a pollutant not listed in this permit, this permit may be modified or revoked and reissued to conform to the requirements promulgated under the Act.

3. If the permittee generates sewage sludge and supplies that sewage sludge to the owner or operator of a MSWLF for disposal, the permittee shall provide to the owner or operator of the MSWLF appropriate information needed to be in compliance with the provisions of this permit.

4. The permittee shall give prior notice to the Director, Water Quality Division, DEQ, 707 N. Robinson, Oklahoma City, Oklahoma 73101-1677, of any planned changes in the sewage sludge disposal practice, in accordance with 40 CFR 122.41(l)(1)(iii). These changes may justify the application of permit conditions that are different from or absent in the existing permit. Change in the sludge use or disposal practice may be cause for modification of the permit in accordance with 40 CFR 122.62(a)(1).

5. The permittee shall provide the location of all existing sludge disposal/use sites to the State Historical Commission within 90 days of the effective date of this permit. In addition, the permittee shall provide the location of any new disposal/use site to the State Historical Commission prior to use of the site.

The permittee shall within 30 days after notification by the State Historical Commission that a specific sludge disposal/use area will adversely affect a National Historic Site, cease use of such area.

6. Sewage sludge shall be tested once during the life of the permit within one year from the effective date of the permit in accordance with the method specified at 40 CFR Part 268, Appendix I [Toxicity Characteristic Leaching Procedure (TCLP)] or other approved methods. Sludge shall be tested after final treatment prior to leaving the POTW site. Sewage sludge determined to be a hazardous waste in accordance with 40 CFR Part 261, shall be handled according to RCRA standards for the disposal of hazardous waste in accordance with 40 CFR Part 262. The disposal of sewage sludge determined to be a hazardous waste, in other than a certified hazardous waste disposal facility shall be prohibited. The DEQ, Waste Management Division at (405) 271-5338, shall be notified of test failure within 24 hours. A written report shall be provided to this office within 7 days after failing the TCLP. The report will contain test results, certification that unauthorized disposal has not occurred and a summary of alternative disposal plans that comply with RCRA standards for the disposal of hazardous waste. The report shall be addressed to the Director, Waste Management Division, DEQ, 707 N. Robinson, Oklahoma City, Oklahoma 73101-1677, and a copy sent to the Director, Water Quality Division, DEQ, at the same address.

7. Sewage sludge shall be tested as needed, or at a minimum, once/year in accordance with the method 9095 (Paint Filter Liquids Test) as described in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods" (EPA Pub. No. SW-846).

8. Recordkeeping requirements - The permittee shall develop the following information and shall retain the information for five years.

   a. The description, including procedures followed, and results of the Paint Filter Tests performed.

   b. The description, including procedures followed, and results of the TCLP Test.

9. Reporting requirements - The permittee shall report annually on the Discharge Monitoring Report the following information:

   a. Results of the Toxicity Characteristic Leaching Procedure Test conducted on the sludge to be disposed (Pass/Fail).

   b. Annual sludge production in dry metric tons/year.

   c. Amount of sludge disposed in a municipal solid waste landfill in dry metric tons/year.

   d. Amount of sludge transported interstate in dry metric tons/year.

   e. A certification that sewage sludge meets the requirements in 40 CFR Part 258 concerning the quality of the sludge disposed in a municipal solid waste landfill unit shall be attached to the DMR.

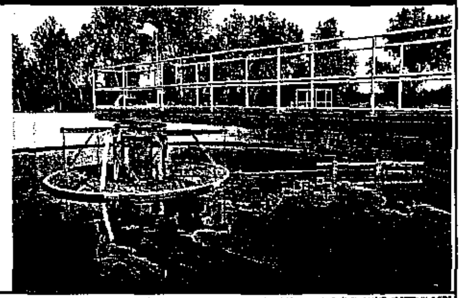
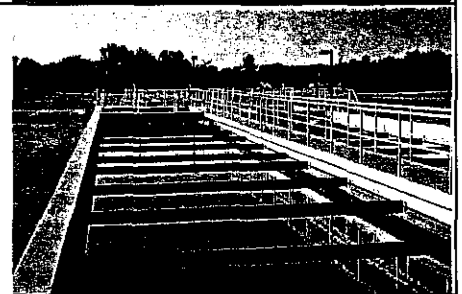
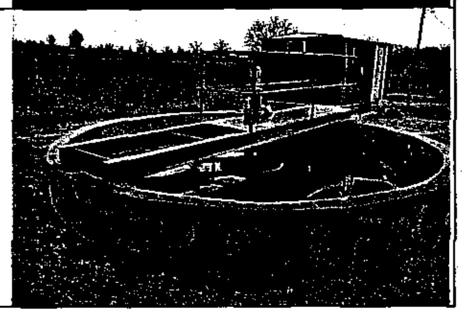
f:\standard\municipal permit documents\part iv.doc
updated 8/21/98

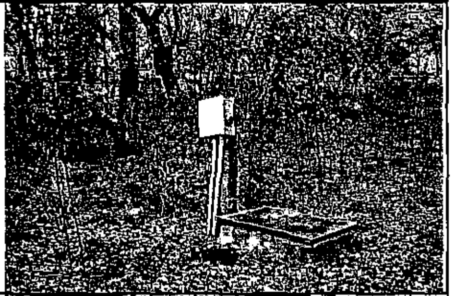
APPENDIX TM 1-4

TEMPLATE FOR CONDITION RATING

FACILITY INSPECTIONS

Condition Assessment Ratings

Condition Rating	Percent of Useful Life Remaining	General Description of Condition	Photo Examples
New	100-90	✓ Newly built to recently built ✓ No wear ✓ Operates as designed ✓ No maintenance needed	
Excellent	90-75	✓ Recently built ✓ Little to no appreciable wear ✓ Operates as designed ✓ Normal maintenance	
Good	75-55	✓ Within first half of useful life ✓ Slight wear ✓ Operates as designed ✓ Normal to slight maintenance needed	
Fair	55-35	✓ At or beyond first half of useful life ✓ Slight to significant wear ✓ Normally operates as designed ✓ Slight to supplementary maintenance needed	

Condition Rating	Percent of Useful Life Remaining	General Description of Condition	Photo Examples
Poor	35-15	✓ Beyond first half of useful life to at the end of useful life ✓ Significant to major wear ✓ Operates as designed with additional to significant maintenance ✓ Significant to burdensome maintenance necessary	
Replace	15-0	✓ Beyond useful life in need of replacement ✓ Major wear ✓ Will not operate as designed without significant and constant maintenance, is inoperable or abandoned ✓ Significant to burdensome constant maintenance necessary	

APPENDIX TM 1-5

NITRIFICATION CLARIFIER OPERATIONAL ISSUES

Memorandum

To: Robert Hitt; Jim McClain, Muralikumar, Joyce Hight,

From: Jose Pereira

Date: September 19, 2005

Re: Nitrification Clarifiers – Handling capacity & operational issues - S-0505A

During a site visit on 08/31/05 to the City of Enid Water Pollution Control Facility, the facility staff indicated that when flows exceed 7 mgd there is high solids carryover in the final effluent, although the design capacity of the final clarifiers in the nitrification plant were designed to handle 8.5 mgd. This technical memorandum offers our comments/recommendation on the operation of the nitrification plant following our inspection of the nitrification plant and review of as-built plans.

As you know, the nitrification plant was originally designed to handle average and peak flows of 8.5 mgd and 21 mgd, respectively at an average BOD_5 of 30 mg/l and TSS of 20 mg/l. The nitrification plant is equipped with four rectangular clarifiers, each 30' wide by 120' long by 12' SWD. These rectangular clarifiers are equipped with traveling bridge mechanisms for the collection and removal of settled sludge and effluent troughs with V- notch weirs to distribute the flow uniformly and improve the effluent quality. Our calculations show that the surface overflow rates at average and peak flows are 590gpd/ft^2 and 1,458gpd/ft^2 respectively. The weir loading rates at average and peak flows are estimated to be 5,902 gpd/ft and 14,583 gpd/ft respectively, which are within recommended design criteria (10,000 gpd/ft at average flow and 15,000 gpd/ft at peak flow). However, during our visual inspection of the traveling bridge clarifiers, we noticed few operational issues that could possibly impair the effluent quality, particularly during high flow conditions. These Observations are as follow:

a. The nitrification plant rectangular clarifier effluent troughs are not leveled, which affects the V-notch weirs elevation. The elevation of the V-notch weirs at the east end of the clarifiers is lower than the west end. As a result, there is no overflow on the V- notch weirs located at the west end of the clarifier troughs and most of the flow occurs through the east end creating more undercurrent and turbulence. This is confirmed by the operators when the flow exceeds 7 mgd the v-notch weirs at the east end of the clarifier troughs become submerged. The V-notch weir submergence does not reflect under designed of the weirs but instead overcharge due to the unleveled surface.

b. The traveling bridge mechanism used for sludge collection has a supporting truss extending all the way down in to the clarifier bottom. The traveling bridge also has too many moving parts for its operation and the movement of the bridge on the rail is not smooth and at times, creating a jerk sudden movement possibly due to wear and tear on the traveling parts as result of the equipment age. The truss/other parts on the traveling bridge, and agitation due to the sudden jerk movement could possibly create an under current wave that could stir the settled/settling solids in the clarifier through out the basin and impact the effluent quality, particularly during the high flow conditions.

In summary, it is our opinion that if the plant is operated within the design range and if the above operational deficiencies are corrected, as well as other manufacturer recommendations to fine tune its operation, we anticipate that the final clarifiers could see a major improvement and handle the flow as originally designed. However, additional information and evaluation will be required before final conclusions are recommended.

1. INTRODUCTION

Dewberry was retained by the City of Enid to prepare a Sanitary Sewer Master Plan. In turn, ENVIROTECH ENGINEERING & CONSULTING, INC., was retained by Dewberry Engineering to provide an evaluation of the existing sanitary sewer collection system and provide recommendations for sewer improvements, based on current and future. The ENVIROTECH study assessed the current sanitary sewer system to include sanitary sewer mains, pump stations, wet weather holding facilities, and run-off basins. In addition, a sanitary sewer monitoring program recorded flow data from strategic points throughout the sanitary sewer system. Estimated sanitary sewer usage rates were calculated for dry flow conditions and all of the data was entered into a computer model and calibrated against the sanitary sewer monitoring program.

During rainfall events, the stormwater runoff entering the sanitary sewer collection system is defined as Inflow and Infiltration (I/I). This runoff can potentially overwhelm the sanitary sewer system's capacity and result in discharges to local waterways. ENVIROTECH utilized the sanitary sewer monitoring program to determine stormwater I/I flows. The storm event was increased to a 100-year event, and these flows were compared to EPA's maximum allowable I/I flows to determine the extent of I/I that the collection system was experiencing. The computer model was used to diagnose the inadequacies in the sanitary sewer collection system and determine the improvements needed.

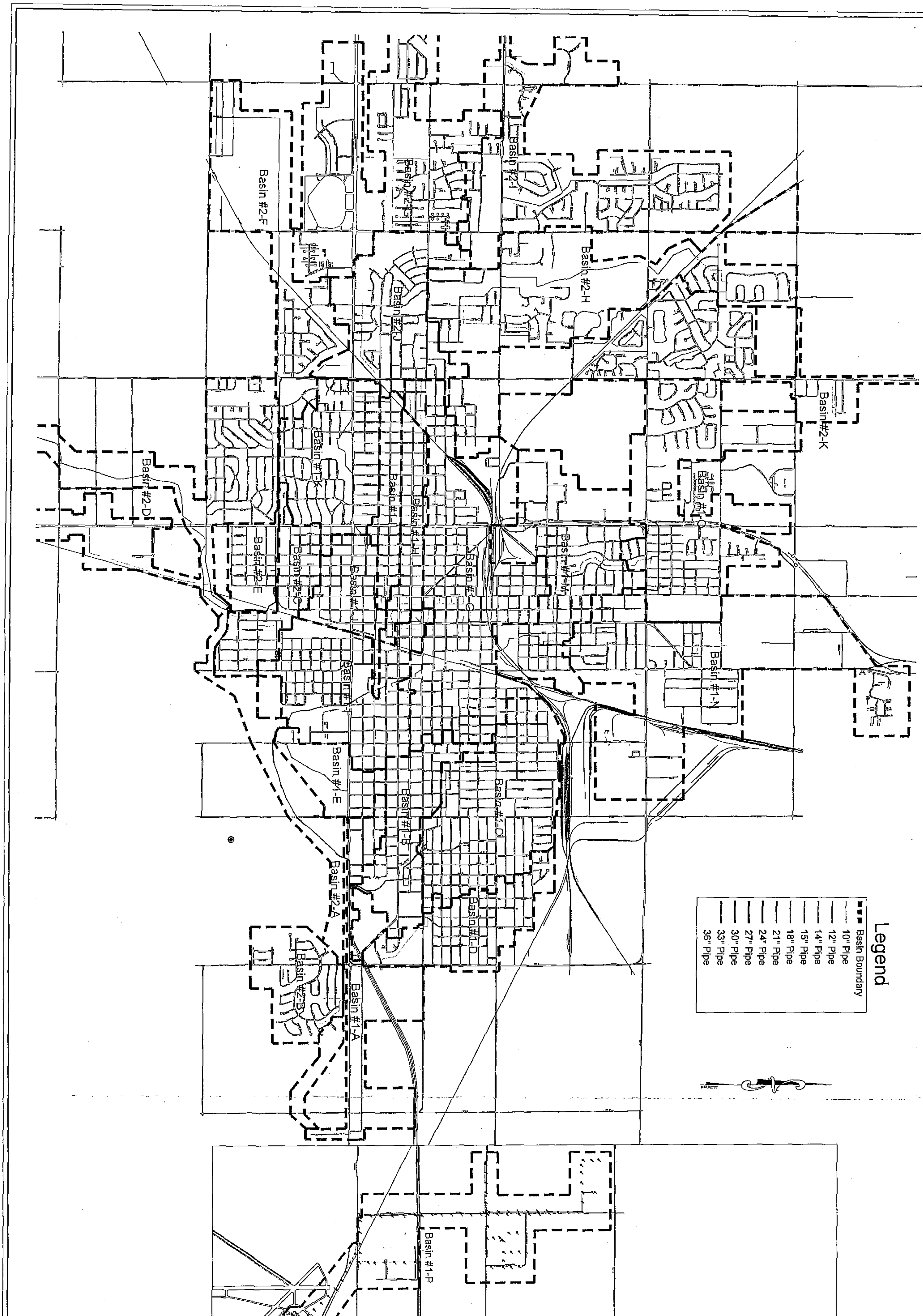
2. EXISTING COLLECTION SYSTEM

2.1 **Sanitary Sewer Drainage Basins.** The City of Enid's engineering department assisted during the sanitary sewer computer model development by providing manhole inspection reports, an AutoCAD sanitary sewer model, and pumping and sanitary sewer storage data. This information can be reviewed at the City of Enid's administrative offices located at 401 West Owen K. Garriott Road.

ENVIROTECH continued with the City of Enid's previously-implemented manhole labeling system during development of the sanitary sewer model. The City is divided into two (2) major sanitary sewer pipelines encompassing 16 basins (A-P) and 11 basins (A-K), respectively. Each sanitary sewer system basin was divided into sub-basins for a total of 125 sub-basins. The sanitary sewer system sub-basins are graphically depicted on *Figure 1*.

Although this report is limited to the study area provided by the City of Enid, sanitary sewer lines extend beyond the area mapped by the City of Enid. This mainly includes lines in the 1-N basin in the vicinity of Northwestern University on 30TH Street and Purdue Road as well the 2-D basin that services Vance Air Force Base. A trunk line fed by a pump station services the Base, but remains outside the City of Enid's mapped limits.

2.2 **Pump Stations and Force Mains.** A total of eleven (11) pump stations and force mains are located on the City of Enid's sanitary sewer pipeline. Of the eleven (11) pump stations, only the pump station located at 541 South 54TH Street appears on the model. The remaining



Date:	August 2008
Scale:	1"= 1250
Designed by:	J. Voss
Drawn by:	J. Voss
Checked By:	J.Stallings
Project No.	05.123

ENVIROTECH
ENGINEERING & CONSULTING, INC.

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C.A. #1960 - Expiration Date: 6-30-2008
www.envirotechconsulting.com

Figure 1 - Sanitary Sewer Basins

Enid Sanitary Sewer Monitoring

City of Enid

Dewberry®

pump stations either exist outside the mapped parameters of the City of Enid's sanitary sewer basins or are located far upstream and utilized for isolated residential districts and therefore, these pump stations are inconsequential to the system. Pump station details, locations, and reasons for not including them in the model are summarized in *Table 1*.

TABLE 1.

SUMMARY OF STATIONS NOT INCLUDED IN THE MODEL COMPARISON

STATION	LOCATION	PUMP RATING (gpm)	INCLUDED	BASIN	COMMENTS
Chisholm Creek	4607 Chisholm Creek	N/A	No	1N4	Feeds from Basin 1N4 (North Enid)
Fairgrounds	225 W. Purdue	10	No	1N4	Outside existing model
54TH Street	541 S. 54TH Street	1,520	Yes	1P	Lifts all from the 1-P Basins
Phillips	2429 1/2 N. 30TH	100	No	1N7	Small and outside existing model
S. Hayes	1600 S. Hayes	160	No	2D2	Services a small portion of the 2D2 Basin
Neilson	3105 W. Maine	385	No	2J5	Services a small portion of the 2J5 Basin
Scooters	N. Van Buren	125	No	1O5	Outside existing model (from Scooters)
Union	2811 N. 6TH Street	75	No	1N6	Services a small portion of the 1N6 Basin
Willow Underpass	833 E. Willow	385	No	1N6	Services a small portion of the 1N6 Basin
Airport	66TH St. and Airport	80	No	1P3	Pumps directly to the 54TH Street Lift Station
Vance AFB	Vance AFB	N/A	No	2D3	Outside existing model

2.3 **Wet Weather Holding Facilities.** A total of three (3) modeled wet weather peak holding facilities are located in the City of Enid. The first holding facility is located at 658 West Willow on the 1-O line and a second facility is located at 1901 East Randolph on the 1-C line. Both facilities were modeled as a 500,000-gal. facilities with appropriate control structures.

The third holding facility is located at the City of Enid's sanitary sewer treatment plant for wet weather overflow. The sanitary sewer department estimates the volume of this holding basin to be approximately 280-ac-ft.

3. FLOW METERING AND ANALYSIS

During storm events, a dramatic increase in the inflow into the City of Enid's sanitary sewer treatment plants occurs and in some instances, overflow storage is utilized to prevent the increased flows from exceeding the plant's capacity. Excessive wastewater treatment due to stormwater run-off has historically been a problem for the City of Enid. These increased stormwater flows originate from inflow and infiltration.

Inflow is defined as additional stormwater flowing into the wastewater stream from *aboveground sources* to include downspouts, foundation drains, leaking manhole covers, and cracked pipelines in stormwater channels. ***Infiltration*** is defined as additional stormwater entering the wastewater stream from the *surrounding soil* resulting from cracked pipelines and service laterals, separated joints, and leaking manholes.

Several investigative methods are utilized during sanitary sewer system evaluations to determine the most effective method of decreasing inflow and infiltration to include the following:

- ❒ **Inflow and Infiltration (I/I) Studies.** Inflow and Infiltration (I/I) studies are useful for determining where the increased flows are originating in order to establish solutions for the increased sanitary sewer flows. The results of these studies mainly determine the approximate locations for conducting more rigorous sanitary sewer investigations. Sanitary sewer flow monitoring is used in conjunction with the Inflow and Infiltration (I/I) study to calibrate and evaluate the generated computer model.

- ❒ **Dye Testing.** Dye testing is a large-scale analysis that involves introducing dyes in upstream catch basins. The quantity of dye recovered in the sanitary sewer treatment plant is used as an indicator of inflow in a particular basin. However, these test results can be misleading and are often difficult to accurately calibrate due to the inflow sources.

- ❒ **Smoke Testing.** Smoke testing is accomplished by introducing (i.e., pumping) non-toxic smoke into the sanitary sewer system while simultaneously observing and documenting the location of the exiting smoke. Smoke testing activities will reveal pipeline cracks, connected roof drains, unsealed manholes, yard drains, and other sources associated with damaged pipelines and/or associated connections. It should be noted that smoke testing is a location-specific procedure and therefore, it is not recommended for extensive areas.

- ❒ **TV Inspection.** TV inspection is a testing procedure limited to a single pipe per test inspection. However, this test will reveal cracked or broken pipelines in addition to eroded piping that results in groundwater infiltration or root intrusion that is not revealed by smoke testing activities.

- ❒ **Door-to-Door Surveys.** Door-to-door surveys can assist in locating downspouts, gutter drains, sump pumps, and other stormwater inflow into the sanitary sewer system. Homeowners are often knowledgeable about sanitary sewer connections and can assist during smoke testing operations.

3.1 **Flow Metering Program.** In conjunction with Dewberry, ENVIROTECH conducted flow-monitoring services for the inflow and infiltration study. *Flo Tote* sanitary sewer monitoring devices were utilized at strategic locations throughout the City of Enid for both dry and wet conditions. The meters were initially placed on trunk and secondary trunk lines. As flow information was assimilated, the meters were relocated to tertiary lines that were suspected sources of inflow and infiltration.

The flow-monitoring program provided both dry and wet weather flows. Each meter remained in-place until the line experienced a significant wet weather flow before being relocated to isolate the suspected sources of inflow and infiltration. This data was utilized in conjunction with a hydraulic model to predict sanitary sewer flows throughout the City of Enid and is included in *TM-2-1*.

In addition, the City of Enid provided Envirotech with daily sanitary sewer treatment rates (i.e., amount of treated sewage from all sources) which is on file at the City of Enid's 54^{TH} Street treatment facility. For the project's duration, the facility treated an average of 6.8-MGD of sanitary sewage.

3.2 **Determination of Dry Flows and Model Development.** Typical sanitary sewer usage flow rate values, published by the *Oklahoma Department of Environmental Quality (ODEQ), Title 252, Chapters 656 and 641,* were utilized to determine the flows from each basin. The developed flows were then calculated on a typical daily sanitary sewer usage curve and input into the SWMM sanitary sewer model. The usage calculations are included in *TM-2-2*.

3.3 **Description of Hydraulic Model.** The City of Enid's sanitary sewer system was modeled utilizing the *United States Environmental Protection Agency Sanitary Water Management Model (USEPA SWMM)* (version 5.0.011), based on sanitary sewer collection system data and calculated dry flow usage rates provided by the City of Enid. This model was utilized to evaluate the following scenarios:

- Pipelines that have reached or exceeded their full capacity during normal everyday flow events that require upgrading or replacement.
- Pipelines that have reached or exceeded full capacity during a storm event that require construction of an additional in-system storage facility to alleviate impacts to the system.
- Problematic areas in the sanitary sewer system for future study. These areas may include cracked or eroded pipes, unsealed manholes, or stormwater drains connected to the sanitary sewer system.

Following completion of the SWMM model, the model was calibrated utilizing flow documentation recorded by the *Flo Tote* sanitary sewer monitoring devices. The relationship between the modeled values and actual recorded values for dry flow conditions is summarized in *Table 2*.

TABLE 2.
COMPARISON OF MODELED VALUES VS. ACTUAL RECORDED VALUES FOR DRY FLOW CONDITIONS

Name	Basin	Location	Metered Flow		Model Flow	
			Base Flow (gpm)	Peak Flow (gpm)	Base Flow (gpm)	Peak Flow (gpm)
North Main	1-A	West 16TH	550	1700	1352	3495
NOC	1-B 1-C	NOC	280	930	350	875
		19TH & Randolph	15	65	30	71
30TH Street	1-D	30TH & Garriott	65	140	56	135
Downtown	1-F Fed by 1-G and 1-H	2ND & Randolph	2	14	7	16
		Pasttimes	31	78	32	77
		3RD & Main	40	110	53	130
	1G2	5TH & Randolph	60	225	50	220
	1-I Fed by 1-J and 1-K	Ind. & Oklahoma	150	300	167	280
		Integris Pavilion	363	775	330	744
North Enid	1-N	4TH & Beech	70	275	123	295
		3RD & Beech	85	300	166	320
N. Van Buren	1-O	N. Van Buren	NA	330	148	356
54TH Street	1-P	54TH Street Lift	274	1200	504	1210
Brookside	2-B	BS Trunk Line	500	1750	1377	2470
		BS Res.	2	20	NA	NA
South Main	2-C	East 16TH Street	440	1650	390	1450
		West 16TH Street	550	1700	1258	2373
S. Van Buren	2-D	S. Van Buren	40	240	101	245
Frantz Main	2-E	Jeff & Frantz	650	1850	1050	2200
Oakwood Mall	2-G	Mall	330	920	278	890
		Indian Oaks	200	650	300	758
Cleveland	2-H	Rand & Mck.	100	500	219	512
	2-I	Lisa Lane	35	143	53	130
	2-K	Cleveland & Chestnut	120	240	111	270

3.4 **Determination of Wet Weather Flows and Inflow and Infiltration.** In order to determine the wet weather events, the amount of rainfall each sanitary sewer basin receives must be known. Initially, the catch basins were modeled in accordance with the *United States Department of Agriculture (USDA) TR-55 Urban Hydrology for Small Watersheds.* A modified version of the Soil Conservation Service (SCS) runoff curve method was utilized to determine infiltration. Although the run-off curve factor was calculated pursuant to the above-referenced USDA TR-55 document, the soil conductivity and basin width factors were substituted for time-of-concentration (as per the USEPA SWMM 5.0 Help Files.) Utilizing this data, unit hydrographs were produced for each basin and input into the model. In addition, the diameter and length of the pipe in each sub-basin was determined. The USCS calculations and piping information are included herein as *TM-2-3.*

For calibration purposes, rainfall was based on data obtained from the City of Enid's rainfall gauges and patterned on the rainfall distribution on the website weatherunderground.com for the Enid area, each rainfall event was modeled as an intensity hydrograph. The events were input into the model in order to calculate the inflow/infiltration for the associated storm event and compared to monitored storm events. For final modeling purposes, an SCS 8-in. Type II rainfall event was incorporated in the model as the 100-year design event. The patterned rain events are included herein as *TM-2-4.*

The limiting factor for infiltration is the storm event. A value of 200-gal./pipe dia./mi./day was assumed to occur during a 100-year storm event. Therefore, 200-gal. of infiltration/ pipe dia./mi. was introduced into the sanitary sewer model with subsequent smaller storms events derived from the 100-year event. The SWMM engine calculated the smaller storm events and infiltration values from the SWMM Model were compared to the metered events recorded by the Flo Tote monitoring equipment. Actual infiltration values for gal./pipe dia./mi./day were derived for each monitoring point, as summarized in *Table 3.* A more detailed explanation of inflow/infiltration model development is included in *TM-2-5* and the final SWMM model output data is included in *TM-2-6.* In addition, an electronic copy of this model is included herewith and made a part of this report.

3.5 **Model Limitations.** While the SWMM model is extensive, the model limitations include the following:

- The model includes all 10-in. pipes and above, but ignores all 8-in. pipes and below.
- The model is also only as good as the input data provided. Much of the manhole and pipe data was old and contained only approximate manhole depths without invert elevations.
- New pipelines along Purdue Street and older pipeline at Vance Air Force Base were not available for inclusion in the model.
- Calibration data for dry and wet weather flows was incomplete. Although a large area was monitored, some flows remained uncalibrated and extrapolated from known flows for similar land uses.

TABLE 3.

SUMMARY OF MONITORING POINT INFILTRATION VALUES

Name	Basin	Location	100-Year Model Infiltration (gpm)	Storm Event	Date	Metered Flow gpm	Storm Event Infiltration gpm	Stormwater Infiltration gal./d/in./mil.
North Main	1-A	West 16TH	4542	1.54	6/23/06	4654	4156	221
NOC	1-B 1-C	NOC	1291	2.7	4/28/06	1220	1220	200
		19TH & Randolph	185	1.32	6/23/06	107	143	133
30TH Street	1-D	30TH & Garriott	296	2.7	4/28/06	167	201	159
Downtown	1-F Fed by 1-G and 1-H	2ND & Randolph	41	1.32	6/23/06	49	32	269
		Pasttimes	115	NA	NA	NA	NA	NA
		3RD & Main	190	2.36	4/28/06	420	185	312
	1-I Fed by 1-J and 1-K	Ind. & Oklahoma	370	Any	Any	680	370	291
		Integris Pavilion	838	1.32	6/23/06	2237	745	333
North Enid	1-N	3RD & Rock Island	386	2.36	4/28/06	1036	354	332
		4TH & Beech	374	1.01	5/24/07	331	406	155
		3RD & Beech	370	1.32	6/23/06	NA	316	NA
N. Van Buren	1-O	N. Van Buren	518	1.01	5/24/07	766	418	291
54TH Street	1-P	54TH Street Lift	1229	Any	Any	NA	1229	NA
Brookside	2-B	BS Trunk Line	5897	1.73	4/13/07	3748	3443	216
South Main	2-C	East 16TH Street	5617	1.3	8/20/06	2033	5030	-95
S. Van Buren	2-D	S. Van Buren	601	1.11	3/30/07	482	499	193
Oakwood Mall	2-G	Mall	1999	1.32	6/23/06	1901	1203	273
		Indian Oaks	986	NA	NA	NA	NA	NA
Cleveland	2-H	Rand. & Mck.	1473	0.8	5/30/07	840	888	189
	2-I	Lisa Lane	441	2.36	4/28/06	805	280	330
	2-K	Cleveland & Chestnut	811	1.32	6/23/06	574	520	219

Note: Modeled infiltration falues based on 200-gal./day/in./dia./mi.

4. ADEQUACY OF EXISTING SYSTEM

4.1 **Current Design Conditions.** An analysis of the SWMM model pipeline was conducted to identify problem areas during both dry and wet weather flow conditions. Pipe capacity is often referred to as the fundamental factor in determining the volume of flow a sanitary sewer system can convey in a specific location. Pipe capacity is defined as the volume of flow a pipe at 3/4-full capacity can convey and is based on the minimum slope and actual diameter of the pipe. The steeper the slope or larger the pipe's diameter, the greater the pipe's capacity to convey increased flow volumes.

4.2 **Existing System Evaluation.** Although the current system is old, it is in a fairly well-preserved condition. Much of the system continues to receive less than 200-gal./pipe dia./mi./day of infiltration. With the exception of a few isolated lines, infiltration exceeds 200-gal./pipe dia./mi./day by relatively small amounts. Additional sanitary sewer investigations will assist in decreasing the amount of inflow and infiltration into the system. However, some upgrades are necessary in the immediate future to accommodate wet flows and new industrial flows as Enid develops.

4.2.1 **Dry Flow Condition Analysis.** During periods of no precipitation, the Line 1 Basin A (1A) and Line 1 Basin P (1P) pipes appear to be flowing at or near capacity and therefore, the City of Enid intends to construct an additional pipeline adjacent to the current 1P pipe for increased flow capacity. Although the 1A pipeline performs at or above capacity during dry flow conditions, plans should be implemented to increase this pipeline's capacity as well.

There is some confusion regarding the 1N pipeline that extends toward North Enid. Two (2) lines converge in the vicinity of the 1N008 manhole, but neither City of Enid or ENVIROTECH engineers could determine the exact path of the sanitary sewer manholes. In the current model set-up, the manhole connecting the two (2) branches of the 1N pipeline surcharges during dry flow conditions.

The 1N pipeline in the vicinity of North Van Buren receives inordinately high flow rates for the businesses and residents served in the area. This pipeline was recently upgraded to accommodate these higher flow rates. Although an additional investigation may help identify the source of these flows, the new pipeline can adequately manage these higher flow rates.

The 1-J pipeline trunk line flows above capacity during dry periods. Both the 1-J and 1-K Basins feed this pipeline. Plans should be made to increase the capacity of this pipeline.

4.2.2 **Wet Flow Condition Analysis.** During precipitation events, flows in the sanitary sewer pipelines greatly increase due to Inflow and Infiltration (I/I). According to the wet condition model, the capacity of most pipelines is sufficient to accommodate the increased flow rates. However, flow back-ups occur in the 1A and 2A pipelines due to sanitary sewer treatment plant and pipeline capacity limitations associated with the additional flows. Due to the increased flows, additional back-ups will also occur in lower portions of the 1B, 1D, and 2B pipelines.

The 1N pipeline appears to experience additional surcharging during storm events in addition to the surcharging experienced during dry events. In addition, the 1-J pipeline remains surcharged for extended periods during wet events due to increased flow.

4.3 **Inadequacies in the Existing System.** Currently, the City of Enid's sanitary sewer collection system experiences an annual peak dry flow of approximately 7-mgd. Several collection basins exhibit the need for investigation, rehabilitation, or increased capacity. The basins requiring improvement and the degree of urgency are graphically depicted on *Figure 2*. A description of the affected basins and associated improvement recommendations are summarized in the following paragraphs.

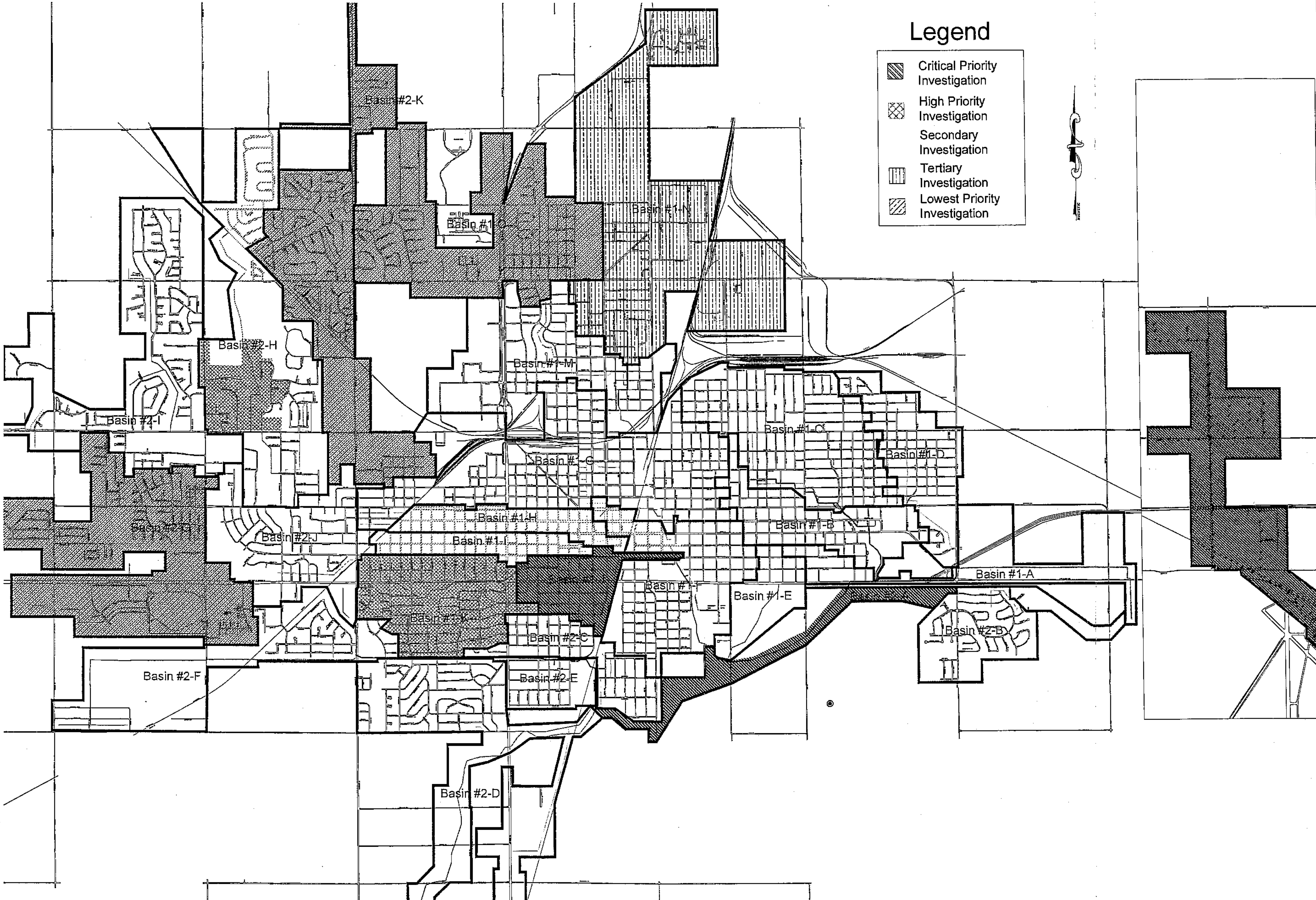
4.3.1 **Basin 1P Expansion Recommendations.** Currently, the 12-in. trunk line serving the 1P Basin is operating at capacity and therefore, system expansion should be considered to allow for continued growth in east Enid. ENVIROTECH recommends construction of a second, minimum 24-in.-dia. pipeline adjacent to the existing 12-in.-dia. pipeline. This upgrade will accommodate flows from both the new Advanced Foods facility and Ethanol treatment facilities.

The cost for this upgrade will be approximately $2.5 million.

4.3.2 **Basins 1A and 2A Peak Holding Tank Recommendations.** The City of Enid has experienced overflow events in the 1A and 2A pipelines near the sanitary sewer treatment plant at Boggy Creek. Based on both the physical evidence and SWMM modeled flows, this trend will continue to occur and therefore, construction of a peak flow holding tank appears to be the most effective solution. Although additional study and design is necessary, ENVIROTECH recommends utilizing the old sanitary sewer treatment facility as an appropriate site.

The overflow tank's capacity should be approximately 800,000-gal. and the cost is estimated to be $1.5 million.

4.3.3 **Basins 1J and 1K Expansion Recommendations.** The 1-J pipeline flows above capacity during dry periods and remains surcharged for long periods during wet events. Therefore, ENVIROTECH recommends that an investigation of the I/I sources utilizing smoke testing, door-to-door surveys, and video monitoring, where appropriate, be conducted. In addition, the pipe capacity needs to be expanded and may include a few small pipe and manhole replacements to the entire pipeline replacement.



Dewberry®

Figure 2 - Sewer Investigation

Enid Sanitary Sewer Monitoring

City of Enid

ENVIROTECH
ENGINEERING & CONSULTING, INC.
2500 North 11th Street, Enid, Oklahoma 73701
Phone (580) 234-8780, Fax (580) 237-4302
C.A. #1960 - Expiration Date: 6-30-2008
www.envirotechconsulting.com

Date: August 2008
Scale: 1"= 1250
Designed by: J. Voss
Drawn by: J. Voss
Checked By: J.Stallings
Project No. 05.123

Based on the results of the I/I study, this project will cost between $100,000 and $600,000.

4.3.4 **Basin 2H Investigation.** Basin 2H receives little inflow during small storm events and exceedingly high amounts of inflow during large events. Since the pipeline is located near a stormwater channel, a possibility exists that the line is receiving inflow from the channel. Therefore, ENVIROTECH recommends that a more detailed I/I study be conducted in this basin to include smoke testing and video monitoring, where appropriate.

4.3.5 **Basin 1N Investigation.** The exact configuration of Basin 1N near the confluence with the 24-in. cross-town main is not known. In addition, the 1N basin receives high amounts of inflow during storm events. Therefore, ENVIROTECH recommends that a more detailed investigation of the 1N basin be conducted to include smoke testing, door-to-door surveys, and video monitoring, where appropriate.

4.3.6 **Basins 2G and 2K Investigations.** Basins 2G and 2K receive higher than EPA-recommended rates of infiltration. Therefore, ENVIROTECH recommends conducting additional sanitary sewer inflow and infiltration investigations in these basins to include smoke testing and video monitoring, where appropriate.

Total Estimated Cost (7-MGD - 2007) .... $4.3 million

5. FUTURE COLLECTION SYSTEM EVALUATION

In order to alleviate manhole surcharging and prepare for expanding the sanitary sewer pipeline network, ENVIROTECH has prepared recommendations for sanitary sewer improvements and additional Inflow and Infiltration (I/I) investigation(s).

5.1 **Future Design Conditions.** Recent trends in the City of Enid's expansion efforts reflect growth to the east, northwest and west, with each direction of growth representing a different type of development. Industry in east Enid has expanded as a result of construction of the Advanced Foods Processing Plant and the proposed Ethanol production facilities. Residential development is steadily expanding northwest of Enid while a combination of commercial and residential development dominates westward expansion along Owen K. Garriott Road. As a result of this growth, recommendations for expanding the affected sanitary sewer basins are summarized in the following sections of this report.

5.2 **Hydraulic Capacity Evaluation - Year 2010 (9-MGD).** As the City of Enid develops/expands and the sanitary sewer capacity reaches 8.5- to 9-MGD, several expansions to the sanitary sewer collection system will be necessary.

5.2.1 **Basins 2H and 2K Expansion Recommendations.** Residential expansion northwest of Enid poses minimal short-term problems regarding the sanitary sewer system's capacity. Although Basins 2H and 2K have not yet reached total flow volume capacity, additional residential growth may require system expansion in the future. Expansion recommendations for Basins 2H and 2K are as follows:

- *BASIN 2H.* Since several collection lines will eventually reach capacity, alternative collection lines may be required to service the expanding community. The 12-in. line that services Sub-basin 2H-2 will most likely reach capacity and subsequently, the 18-, 21-, 24- and 27-in. collection pipelines will also near capacity. In addition, some of these lines may require improvement.

  The cost to upgrade the 12-in. pipeline alone is estimated to be $500,000. Additional upgrades to the 18- and 21-in. collection pipelines will cost approximately $1.3 million.

  Total Estimated Cost...$1.8 million

- *BASIN 2K.* The 12-in. collection line that services Basin 2K and flows north-south down Cleveland Road will eventually reach capacity. This will subsequently affect the same 24- and 27-in. collection lines referenced above for Basin 2H, resulting in surcharging and backup in the pipelines. Depending upon peak flow rates, the 30-in. Frantz Street line may also require improvement.

  The cost to upgrade the 12-in. pipeline is estimated to be $1.3 million. Additional upgrades to the 24- and 27-in. pipelines will cost approximately $1.8 million. The cost to improve the 30-in. Frantz Street pipeline is estimated between $2 million and $7 million, depending on the extent of pipeline replacement required.

  Total Estimated Cost...$7.1 million

5.2.2 **Basin 2G Expansion Recommendations.** Continued commercial and residential growth westward along Owen K. Garriott Road may be impeded by the existing sanitary sewer system that services this area. Currently, the Basin 2 pipeline that transverses the southern portion of the City has sufficient capacity to easily accommodate expansion both west and northwest of Enid. However, once the pipelines reach Oakwood Road, the sizes decrease to 12- and 8-in.-dia. beyond Bob's Farm residential development. Therefore, it is recommended that the pipeline network capacity be expanded from the Bob's Farm complex westward along Oakwood Road to accommodate additional growth.

This can be accomplished by either expanding the 12-in. pipeline that services Bob's Farm further west, or installing a second 12-in. pipeline westward on the north side of Owen K. Garriott Road. The cost to complete this work is estimated to be $800,000.

In addition, the 12- and 18-in. collection pipelines that service the Bob's Farm pipeline will require improvement. The cost to upgrade the 12- and 18-in. collection pipelines is estimated to be $2 million.

Total Estimated Cost.. $2.8 million

Estimated Cost for Section 5.2 Improvements.. $11.7 million

Total Estimated Cost (9-MGD - 2010) .... $16 million

5.3 **Hydraulic Capacity Evaluation - Year 2015 (11-MGD).** In the event the City of Enid continues to develop/expand and flows increase to 11-MGD, several of the main lines will begin to back-up and flows will push into residential lines. Most lines above 18-in.-dia., including some select lines below 18-in.-dia., will require upgrading to accommodate the increased flows. Alternatively, additional collection lines paralleling existing lines would be required to alleviate the increased flows.

These upgrades represent improvements that must be made to the system in addition to those already summarized in sections 4.3 and 5.2.

5.3.1 **Sanitary Sewer Main Expansion.** Several sanitary sewer mains that transverse the City will experience increased flows and therefore, many will need to be replaced and include **(a)** 1A and 2A main lines south of the City; **(b)** north-south 36-in. main from 11TH Street to Van Buren and Willow; **(c)** Frantz Street 30-in. cross-town main; and **(d)** 2D line servicing Vance Air Force Base (VAFB).

The cost for this expansion is estimated to be in the $20 million range.

5.3.2 **Sanitary Sewer Collection Lines.** The secondary collection pipelines that will require improvements in addition to those outlined in Section 5.2 are as follows:

- The Oakwood pipeline will require an additional $1 million expansion north of Owen K. Garriott Road.

- The north-south 36-in. main will require that a collection pipe be extended to the north along Van Buren. This line will most likely require construction of an additional pump station and therefore, the expansion will cost approximately $2.5 million.

- The 1N pipeline will require improvement, both east and north, at an approximate cost of $2 million.
- The Basin 2D 10-in. pipeline that services southeast Van Buren will require improvement at an approximate cost of $2 million.
- Although additional flows north of Basin 1C will burden the existing pipelines, they should maintain below full-capacity.

5.3.3 **Peak Storage Basins.** As a result of high flow rates, the occurrence of stormwater seepage will be significant and therefore, construction of two (2) additional stormwater peak storage basins should be considered. One (1) tank should be located on south Cleveland Road where the Oakwood and Cleveland sanitary sewer systems converge; and the second tank should be located where the 2D and 2A pipelines merge. Each facility should detain approximately 800,000- to 1-million-gal.

Estimated Cost to Construct Both Facilities .... $4 million.

Estimated Cost for Section 5.3 Improvements.. $31 million

Total Estimated Cost (11-MGD - 2015) .... $47 million

6. CONCLUSIONS

The sanitary sewer collection model constructed for the City of Enid should be considered a working model that should be continually updated as new information becomes available. This will provide the City of Enid a real-time tool to answer questions concerning current sanitary sewer capacity and future growth.

Overall, the City of Enid's sanitary sewer capacity can adequately accommodate flows of 8-MGD and below. As the City expands, additional sanitary sewer capacity will be required. In addition, as flows increase to 10-MGD, some minor expansion projects will be required to ensure sufficient sanitary sewer capacity. Once flows reach 11-MGD, major expansions to the sanitary sewer system will be required.

The SWMM computer model and the 2007 AutoCAD sanitary sewer system drawing are included in electronic format with this report.

Engineering Calculations (I/I Study)

Engineering Notes:

Problem: Determine amount of I/I in each Sewer Basin

Assumption: The maximum allowable inflow/infiltration for a sewer operating within "normal" limits is 200 gallons/mile/day/in-diameter

Step 1:	TM 2-1	From the flow data gathered from the city sewers, determine average and peak daily flows as well as peak storm water flows. Correlate the storm flows with their individual storm Flow data was divided into yearly quarters and analyzed for peak flows. Flow data was analyzed on a 15 minute basis to determine flow profile and base flow for each monitoring point. Some conditions were taken into account, such as line back ups, surcharging, and seasonal flows.
Step 2:	TM 2-2	Calculate the Municipal sewer inflows Utilizing typical inflows from municipal sources, inflows in the various sub-basins were calculated throughout the city.
Step 3:	TM 2-3	Determine the US SCS curve numbers, % impervious, and conductivity for each sub-basin. Caculated utilizing TR-55 techniques through observation
Step 4:	TM 2-3	Determine the length*in-diameter of the sewer pipe and area of each sub-basin. Calculated by observation.
Step 5:	TM 2-4	Determine the rainfall for the 100-year storm and the individual storms in Enid Data obtained from TR-55 and weatherunderground.com in combination with the City of Enid raingauges
Step 6:	TM 2-5	Determine the hydrograph of the infiltration/inflow The SWMM model is divides the I/I hydrograph into Start Tern Response (ST), Median Term Response (MT), and Long Term Reponses (LT). Within each hydrograph is a ratio of the flow (R) Proportional to the Response Term, a Time to the Peak (T), and (K) the Step 4a Find Proportionality between each response From the CN values, a Proportionality curve was generated for each response time Step 2b Determine the T and K factors The conductivity of the soil divided by the depth of soil/manhole was used to calculate the T factor. In general the K factor is approximately 2:1 for a typical curve (Twice the lag time to initial concentration)
Step 7:	TM 2-5	Determine the sewer area necessary to provide a 200 gal/mil/day/in-dia flow. Step 5a: Find the amount of inflow required to provide the 200 g/m/d/in for the sub-basin. The 200 g/m/d/in term was multiplied by the observed length*dia term in Step 3. Step 5b: Find the relationship between sewer inflow area and required inflow The relationship between inflow and the sewer basin inflow area term is liner with a 0 y-intercept for a given CN value and MH depth. Step 5c: Find the relationship between CN and sewer inflow Since the inflow relationship is liner with a y-intercept = 0, the slopes of the CN values for each manhole depth were fit to a inflow*area vs. CN graph. Step 5d: Determine the sewer inflow area. The CN value was inputted into the graphical relationship in 5c and an area*inflow value was found. The factor was divided by the necessary inflow rate determined in Step 5a, and an area value was determined on a 5-ft depth basis (5, 10, 15, 20, and 25-ft deep sewers). The values were interpolated against the actual sewer depth and the inflow area term was determined for an infiltration value of 200 gallon/mile/in-diameter/day.
Step 8:	TM 2-6	SWMM Model and Output The SWMM model was developed from the above data. The input/final output report appear in Appendix F.

WATEWATER TREATMENT SYSTEM ALTERNATIVES

DEVELOPMENT NEEDS

The following needs were identified during the analysis and evaluation of previous reports and facility plans, the inspection and evaluation of the existing units and facilities at the Water Pollution Control Facility, and interviews/meetings with City personnel. The needs presented below cover the liquid process as well as bio-solids process.

The Oklahoma Department of Environmental Quality's Design Criteria for Sewerage Systems was used to benchmark unit conditions and establish permissible guidelines for future unit designs. Onsite evaluation of facilities, current and future flow analysis, interviews with operations staff, and an analysis of existing site conditions were all incorporated in the projection of system needs. Finally, each unit and process was evaluated with respect to the following areas of concern:

- Health & Safety,
- System Operations and Maintenance, and
- Future Growth.

The system needs that were determined are as follows:

Health & Safety
- Additional and sufficient capacity to prevent overflows or discharge of untreated wastewaters.
- Less disruption to current operations.

System O&M
- Redundancy in unit operations.
- Easy operation and maintenance
- Easy access of mechanical and electrical mechanisms.
- Corrosion resistant structures and equipment.
- Flexible plant piping with ability to take any unit out of service for maintenance.

Growth
- Sufficient capacity to meet needs during the 25 year planning horizon including sufficient capacity and flexibility to promote growth in annexed areas,
- Ability to mitigate fluctuations in plant flow and effluent quality due to influx of storm water and industrial flows

DESCRIPTION OF ALTERNATIVES

The following section summarizes each alternative that was considered in the planning phase of this project. The alternatives are developed with the objective of meeting the projected design capacity of the WPCF for the year 2030 is 14 MGD. The projected design capacity for the years 2010, 2015 and 2020 will be 9.00 MGD and 10.50 MGD and 12.00 MGD, respectively. The above projection include domestic flows from projected population, future flows from the expansion of Advance Foods, two new Ethanol Plants and other industries which are unknown at this time. The options for Plant expansions will be phased in stages that provide flexibility during expansion. The alternatives were developed based on the premise that the existing WPCF with the exception of bio-solids processing facility will be decommissioned either in 2010 or in 2020 after utilizing its useful life. The existing renovated sludge processing facility capable of processing the sludge generated from a 10 MGD wastewater treatment facility will be expanded to 14 MGD as and when necessary based on the plant capacity of the given alternative. These alternatives will be presented with the major advantages and disadvantages listed for each.

Option 1: New 14 MGD treatment facility

This Option consists of building a new 14 MGD treatment plant by in the year 2010 that would cater to the projected ultimate flow for 2030. The bio-solids processing facility would be expanded from the current capacity of 10 MGD to 14 MGD in the year 2020. The advantages of this Option would be the total replacement of the existing wastewater treatment facility, a reliable treatment process, good growth capacity, general aesthetic improvements, ease of operation and maintenance, and no disruption to current plant operations. The disadvantages of this option would be a high capital construction cost, high land use, and high operation and maintenance cost.

Option 2: New 14 MGD treatment facility with an ability to treat industrial wastes directly without pretreatment

This Option consists of building a new 14 MGD treatment plant to treat wastewater with a high organic loading. This Option was developed with the purpose of receiving the industrial wastes within the City without significant pretreatment. Option 2 is identical to Option 1 with the exception of its design to treat the high strength wastewater. Under this Option, the existing bio-solids processing facility will be upgraded immediately as a result of increased bio-solids production from the high strength wastewater. The advantages of this Option will include the total replacement of the existing wastewater treatment facility, receiving industrial wastes without pretreatment leading to increased revenue to the City, good growth capacity, general aesthetic improvements and no disruption to current plant operations. Consequently the disadvantages of this option will include a higher capital construction cost than Option 1, higher land use, higher operation and maintenance costs, uncertainty in treated effluent quality, no control over the discharges by the industrial users and increased maintenance issues in collection system.

Option 3: New 12 MGD treatment facility with expansion to 14 MGD

This Option consists of building a new 12 MGD treatment plant in the year 2010 and expanding to 14 MGD in the year 2020 to meet the projected ultimate flow. The expansion to 14 MGD and upgrading of the existing bio-solids processing facility will occur in year 2020. The advantages of this Option will include the total replacement of the existing wastewater treatment facility, a reliable treatment process, good growth capacity, general aesthetic improvements, ease of operation and maintenance, and no disruption to current plant operations. The disadvantages of this Option include a high capital construction cost, high land use, and high operation and maintenance cost.

Option 4: Using existing treatment facility and building a new 7 MGD treatment facility with expansion to 14 MGD

This Option consists of building a new treatment plant in two stages, 7 MGD treatment facility in the year 2010 and expanding it to 14 MGD in the year 2020. Building a first stage 7 MGD plant will allow for the replacement of existing headworks and South Plant. The second stage expansion to 14 MGD plant will allow for the replacement of existing North Plant and BNR Plant. The advantages of this Option are less capital construction cost, and high utilization of the existing North and BNR Plants. Consequently the disadvantages of this option would be complexity in operations, possible disruption to current operations, renovations or replacement of certain treatment units in the North Plant, and high operation and maintenance cost.

Option 5: New 9 MGD treatment facility for domestic flows and a separate new 5 MGD treatment facility for industrial flows

This Option consists of building two new treatment plants at two different sites, the first, a new 9 MGD treatment facility in the year 2010 for treating domestic flows and a second a 5 MGD treatment facility in the year 2010 for treating industrial flows. The advantages of this Option include the total replacement of the existing wastewater treatment facility, good growth capacity, general aesthetic improvements, requires no expansion to the existing bio-solids processing facility, and no disruption to current plant operations. Consequently the disadvantages of this Option include high capital construction cost, high land use, high operation and maintenance cost, requirement of two separate collection systems, uncertainty in treated effluent quality, more operational skills, and increased maintenance issues in collection system.

Option 6: New 9 MGD treatment facility for domestic flows and a separate new 2.5 MGD treatment facility for industrial flows with expansion to 5 MGD

This Option is similar to Option 5 except that the 5 MGD treatment facility for industrial flows is expanded in two stages of 2.5 MGD (2.5 MGD each, in the year 2010 and 2020 respectively) treatment capacity each. The benefits and disadvantages of this Option would be same as Option 5 except that it has lower initial capital cost than Option 5.

EVALUATION METHODOLOGY

In general, the evaluation of alternatives is a two-fold process. The first is a qualitative analysis based on the factors listed below, which are considered to be important to the process system and the second is a quantitative analysis of the top few selected Options. The second analysis utilizes Present Worth Cost Analysis, to yield the most cost-effective, preferred alternative to meet the needs.

The factors used in the evaluation of qualitative analysis are listed below:

- Capital Costs
- Operation and Maintenance Costs
- Ease of Operation and Maintenance
- Reliability
- Expansion Potential
- Constructability
- Land Requirements
- Aesthetics

But in this evaluation, as an intermittent step, each of the top few selected Options were analyzed for two different processes namely, conventional activated sludge process, and sequential batch reactor process to determine the most reliable and cost effective alternative to meet the ultimate flow condition.

The Options developed in the previous sections were presented to the City staff consisting of the following members on August 2, 2006.

1. Robert Hitt, P.E. - Director of Development Services
2. James McClain - Public Utility Director
3. Barry Brummit - Pretreatment Director
4. Jason Brinley, P.E. - Engineering Administrator
5. Murali Katta - Project Engineer
6. Joyce Hight - Wastewater Plant Superintendent

After discussions on each of these Options, the City of Enid selected the following three (3) Options to proceed further with detailed analysis.

TABLE TM 3-1 : ***Top Selected Options for Detailed Analysis.***

Option	Description
1	New 14 MGD treatment facility
3	New 12 MGD treatment facility with expansion to 14 MGD
4	Using existing treatment facility and building new 7 MGD treatment facility with expansion to 14 MGD

PROCESS ALTERNATIVES

Each of the selected Options in **Table TM 3-1** were further divided in two Options based on the two chosen process types namely, conventional activated sludge process and sequential batch reactor process, and analyzed in detail for capital and operation and maintenance costs. Process selection is very important step in the design of wastewater treatment plant as it provides an opportunity to implement the treatment system that suits local environmental conditions, construction and operation costs, energy considerations, operator's skills, process flexibility, etc. In this study, a conventional activated sludge process and sequential batch reactor process were considered for the following reasons

Conventional activated sludge process

In a conventional activated sludge process, the primary-treated wastewater and acclimated micro-organisms (activated sludge or biomass) are aerated in a basin or tank. After a sufficient aeration period, the flocculent activated sludge solids are separated from the wastewater in a secondary clarifier. The clarified wastewater flows forward for further treatment or discharge. A portion of the clarifier underflow sludge is returned to the aeration basin for mixing with the primary- treated influent to the basin and the remaining sludge is wasted to the sludge handling portion of the treatment plant.

The City of Enid operational staff is familiar with this process as they have been operating the North and South Plants for many years. The North and South Plants use conventional activated sludge process. The benefits of this process were simple operation, smaller basin size, familiar and more reliable process. The disadvantages of this process will be high energy costs, requires more process treatment units, requires separate treatment units for nitrification, effluent quality is susceptible to variations in influent flow and quality, and high land use.

Sequencing batch reactor (SBR) process

A sequencing batch reactor process is a fill-and-draw activated-sludge treatment system. This process is identical to conventional activated sludge system, but the (SBR) reactor is a self contained system performing equalization, aeration and clarification in a single reactor. Although the reactor size is larger than the conventional activated sludge process reactor, it eliminates the use of primary clarifiers, secondary clarifiers and return sludge recirculation. This process is being increasingly used in recent years.

The major advantages of this process will be improved effluent quality, elimination of primary, secondary clarifiers and return sludge recirculation, elimination of short circuiting, ability to handle shock in hydraulic and organic loading and the ability to remove nutrients within the same basin.

PREFERRED ALTERNATIVES

The Options selected by the City of Enid as shown in **Table TM 3-1** were expanded to six alternatives, each Option using two different processes, conventional activated sludge and sequencing batch reactor processes. These Options are as follows.

Option 1A: New 14 MGD treatment facility using conventional activated sludge process

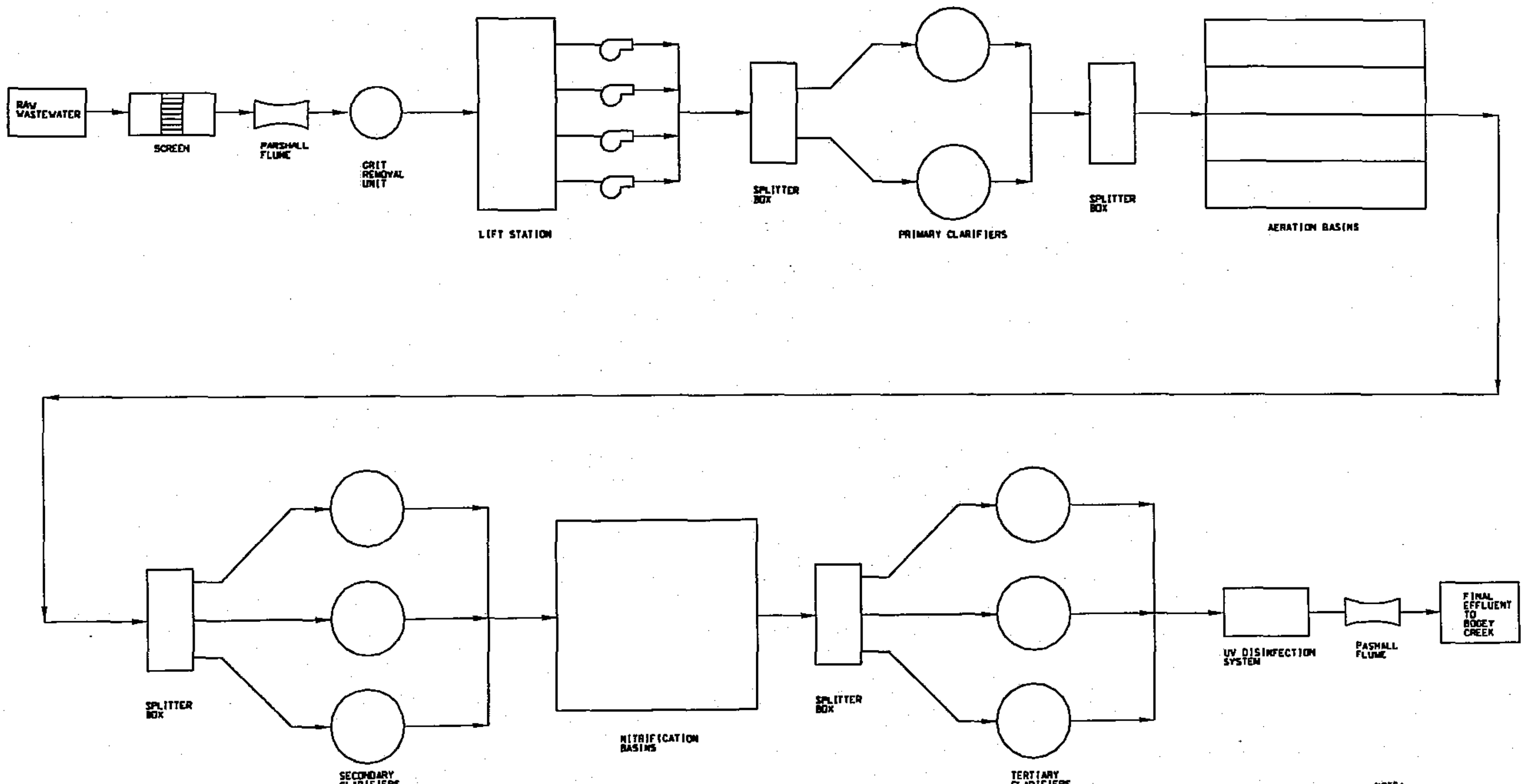
The process schematic for this Option is shown in **Figure TM 3-1**. This process is a two stage treatment process, first stage for BOD removal and the second stage for the removal of ammonia. The Option is designed to handle the projected ultimate design flow of 14 MGD, and replaces the existing WPCF facility in totality with the exception of the biosolids processing facility. The size of individual treatment units, its construction cost, and operation and maintenance cost is shown in **Table 1** and 7 iu **Appendix TM 3-1**.

Option 1B: New 14 MGD treatment facility using sequencing batch reactor process

The process schematic for this Option is shown in **Figure TM 3-2**. The designed capacity of this plant is the same as Option 1A except it uses SBR process. The BOD and ammonia removal are accomplished in several steps using the same basin/tank. The size of individual treatment units, its construction cost, and operation and maintenance cost is shown in **Table 2** and 7 in **Appendix TM 3-1**.

Option 3A: New 12 MGD treatment facility using conventional activated sludge process with expansion to 14 MGD

The process schematic for this Option is shown in **Figure TM 3-3**. This Option uses conventional activated sludge process. The preliminary treatment unit consisting of screen, grit removal, parshall flume and lift station, primary clarifier and UV disinfection system are designed for an ultimate design flow of 14 MGD and the remaining treatment units are designed for 12 MGD with the Option to expand to 14 MGD in the year 2020. This Option also replaces the existing WPCF facility in totality with the exception of bio-solids processing facility. The size of individual treatment units, its construction cost, and operation and maintenance cost for the staged expansion is shown in **Table 3** and **8** in **Appendix TM 3-1**.



NOTES:
FOR THE PURPOSE OF CLARITY, BIOSOLIDS PROCESSING FLOW CHART IS NOT SHOWN.

REVISION	DATE	SEALS

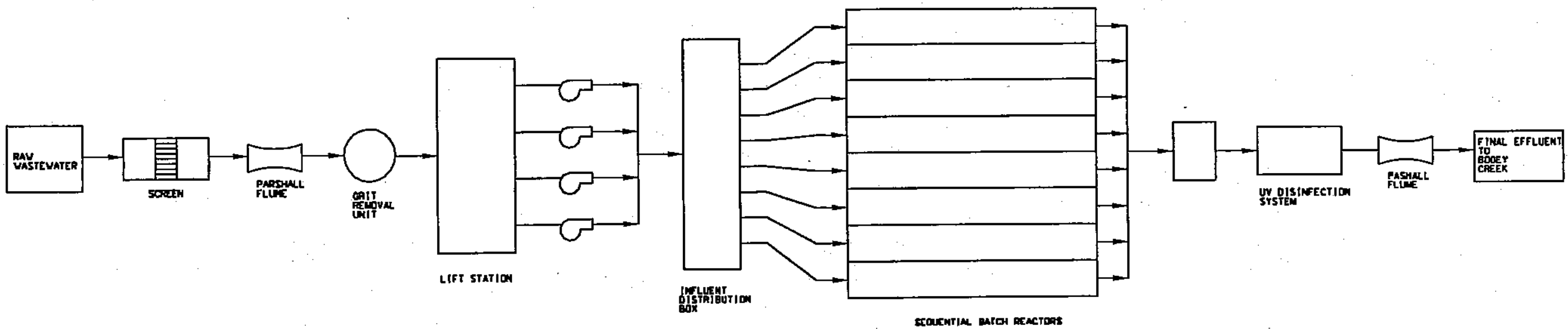
DRAWN: EA
CHECKED: VS
APPROVED: JAP
SCALE: AS SHOWN

PSA Dewberry
1350 South Boulder - Suite 500
Tulsa, Oklahoma 74119 - 3216
918.587.7283 - fax 918.587.0071

PROJECT TITLE
CITY OF ENID
WASTEWATER
FACILITY PLAN

PROJECT NO. 32158005 | DATE: 9-25-2006
SHEET TITLE
OPTION 1A:
14 MGD CONVENTIONAL ACTIVATED SLUDGE TREATMENT SYSTEM

FIGURE TM 3-1



NOTE:
FOR THE PURPOSE OF CLARITY, BIOSOLIDS PROCESSING FLOW CHART IS NOT SHOWN.

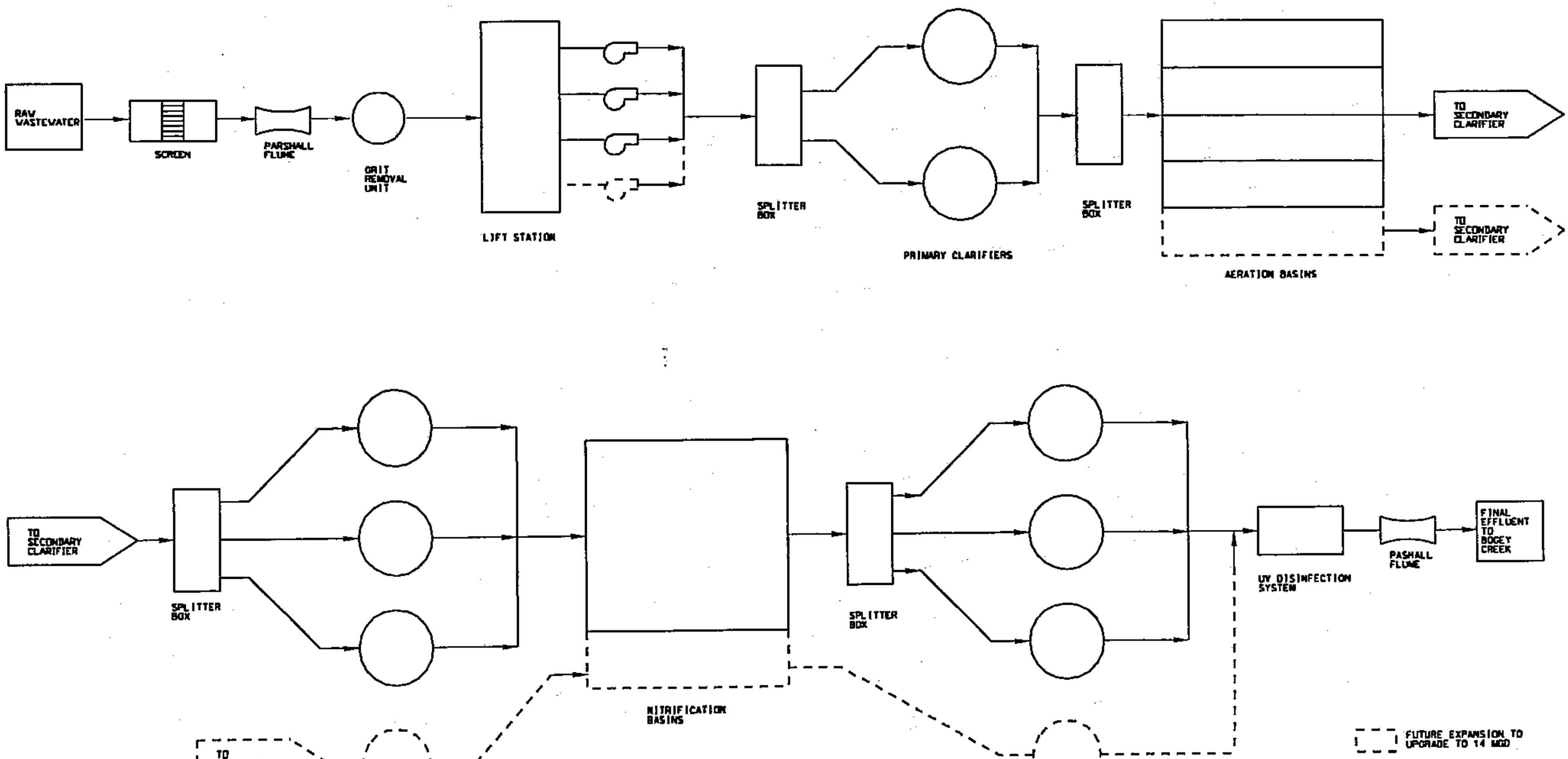
REVISION	DATE	SEALS			
			DRAWN: EA CHECKED: VS APPROVED: JAP SCALE: AS SHOWN	PSA Dewberry 1350 South Boulder - Suite 600 Tulsa, Oklahoma 74119-3216 918.587.7283 - fax 918.587.0071	PROJECT TITLE CITY OF ENID WASTEWATER FACILITY PLAN

PROJECT NO. 32158005 DATE: 9-25-2006

SHEET TITLE

OPTION 1B:
14 MGD SEQUENTIAL BATCH REACTOR (SBR) SYSTEM

FIGURE TM 3-2



NOTE:
FOR THE PURPOSE OF CLARITY, BIOSOLIDS PROCESSING FLOW CHART IS NOT SHOWN.

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PROJECT TITLE
CITY OF ENID
WASTEWATER
FACILITY PLAN

PROJECT NO. 32158005 | DATE: 9-25-2006
SHEET TITLE
OPTION 3A:
12 MGD CONVENTIONAL ACTIVATED SLUDGE
TREATMENT SYSTEM EXPANDED TO 14 MGD

FIGURE
TM 3-3

Option 3B: ***New 12 MGD treatment facility using sequencing batch reactor process with expansion to 14 MGD***

The process schematic for this Option is shown in **Figure TM 3-4**. The designed capacities and expansion phasing of this Option is the same as Option 3A except it uses SBR process. The size of individual treatment units, its construction cost, and operation and maintenance cost for the staged expansion is shown in **Table 4** and **8** in **Appendix TM 3-1**.

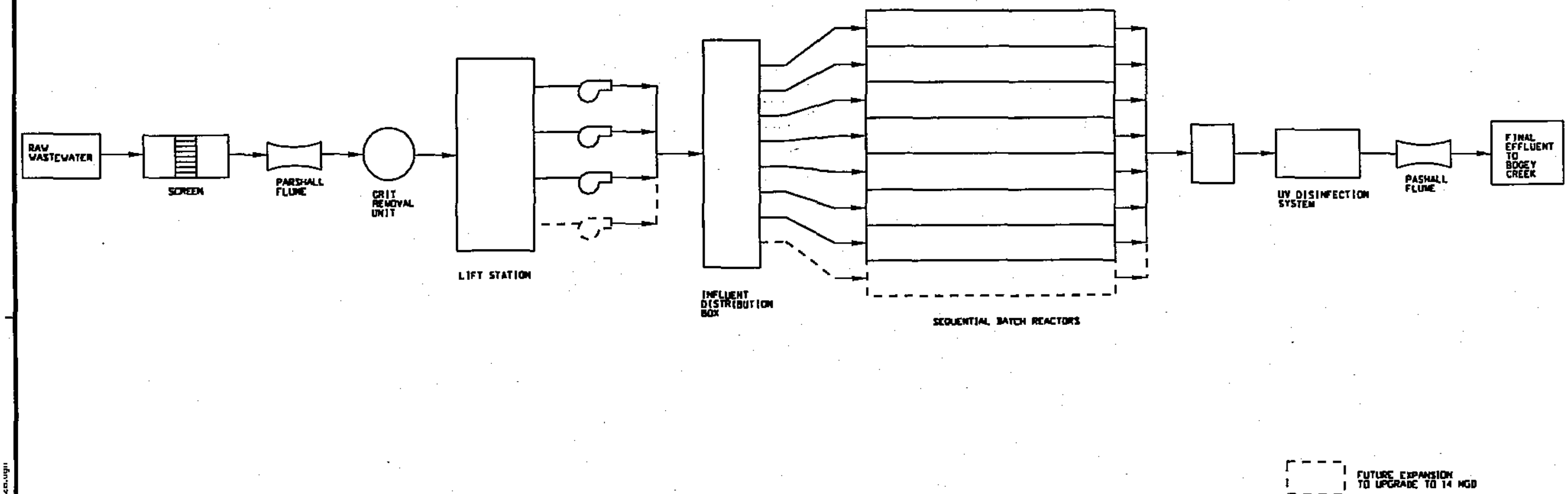
Option 4A: ***Using the existing treatment facility and building a new 7 MGD treatment facility using conventional activated sludge process with expansion to 14 MGD***

This Option uses conventional activated sludge process, and the process schematic for this Option is shown in **Figure TM 3-5.** The preliminary treatment unit consisting of screen, grit removal, parshall flume and lift station, and UV disinfection system are designed for ultimate design flow of 14 MGD and the remaining treatment units are designed for 7 MGD with the Option to expand to them to 14 MGD in the year 2020. This Option will still use the North Plant until 2020. As a result it will require some rehabilitation work to existing primary and secondary clarifiers in the North Plant and construction of new nitrification clarifiers at existing BNR system. The size of individual treatment units, its construction cost, and operation and maintenance cost for the staged expansion of this Option is shown in **Table 5** and **9** in **Appendix TM 3-1.**

Option 4B: ***Using the existing treatment facility and building a new 7 MGD treatment facility using sequencing batch reactor process with expansion to 14 MGD***

The process schematic for this Option is shown in **Figure TM 3-6**. The designed capacities and expansion phasing of this Option is the same as Option 3A except it uses SBR process. The size of individual treatment units, its construction cost, and operation and maintenance cost for the staged expansion is shown in **6** and **9** in **Appendix TM 3-1.**

Summary of capital cost and operation and maintenance cost for each of the above six Options is shown in **Table TM 3-2.**



NOTES:
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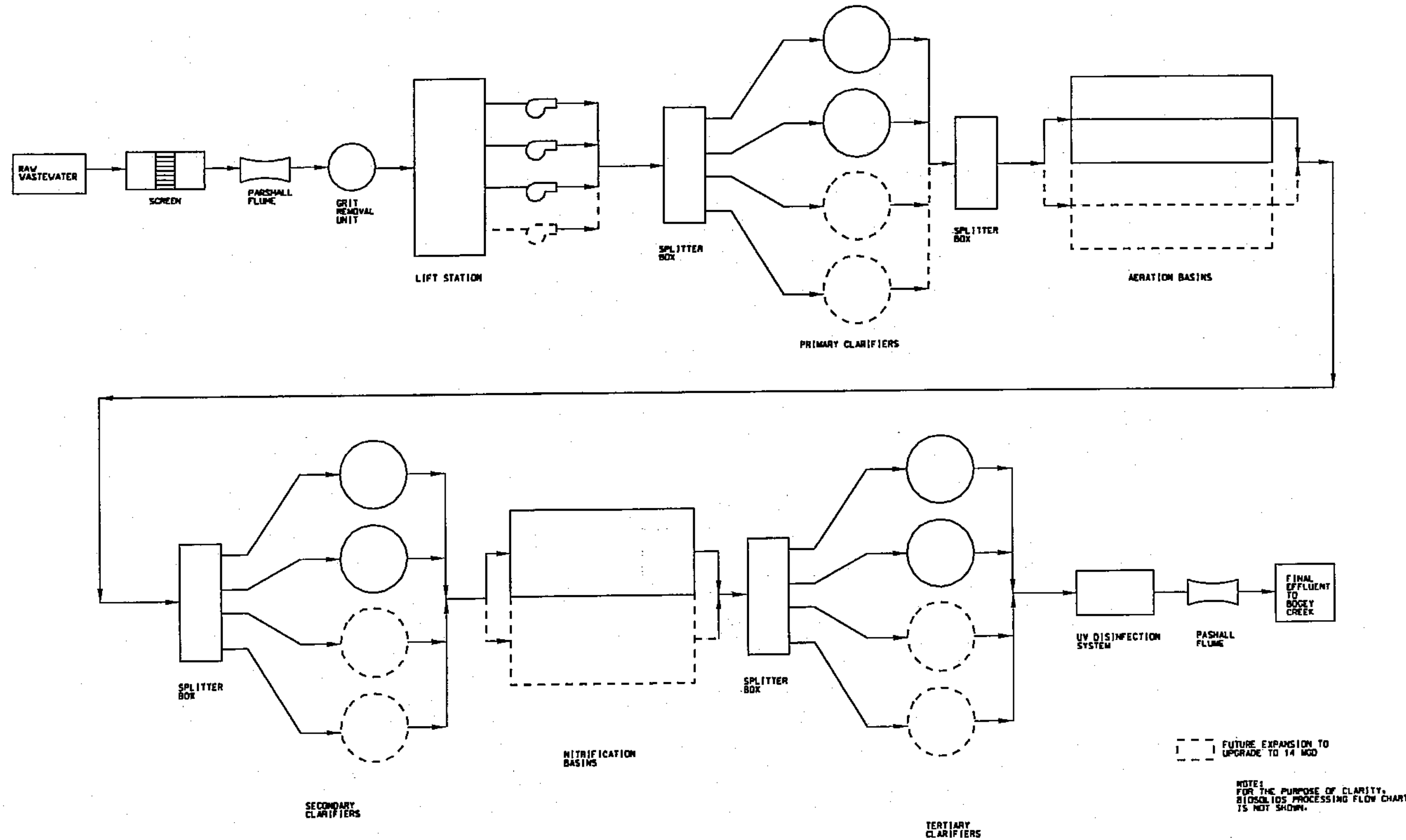
			DRAWN: EA CHECKED: VS APPROVED: JAP SCALE: AS SHOWN	PSA Dewberry 1350 South Boulder - Suite 800 Tulsa, Oklahoma 74119 - 3218 918.587.7283 - fax 918.587.0071	PROJECT TITLE CITY OF ENID WASTEWATER FACILITY PLAN	PROJECT NO. 32158005 DATE: 9-25-2006 SHEET TITLE OPTION 3B: 12 MGD SEQUENTIAL BATCH REACTOR (SBR) SYSTEM W/EXPANSION TO 14 MGD	FIGURE TM 3-4



NOTE:
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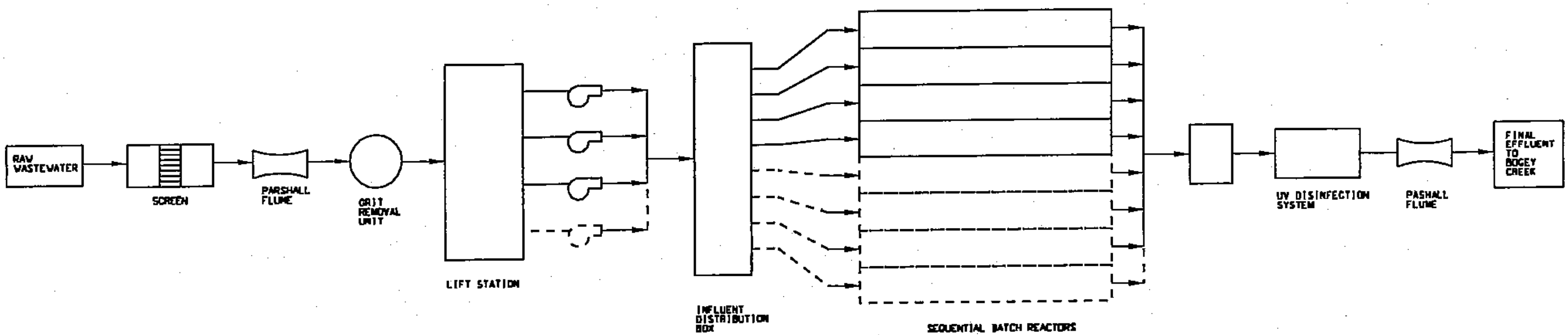
PROJECT NO. 32158005 | DATE: 9-25-2006

SHEET TITLE

OPTION 4A: USING EXISTING TREATMENT FACILITYAND BUILDING A NEW 7 MGD CONVENTIONAL ACTIVATED SLUDGE TREATMENT SYSTEM W/ EXPANSION TO 14 MGD

FIGURE TM 3-5

12/28/2006 Q:\32158005\CAD\CIVIL\ALT 3A.dgn



FUTURE EXPANSION TO UPGRADE TO 14 MGD

NOTE:
FOR THE PURPOSE OF CLARITY, BIOSOLIDS PROCESSING FLOW CHART IS NOT SHOWN.

REVISION	DATE

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PROJECT TITLE
CITY OF ENID
WASTEWATER
FACILITY PLAN

PROJECT NO. 32158005 | DATE: 9-25-2006
SHEET TITLE
OPTION 4B:
USING EXISTING TREATMENT FACILITY
AND BUILDING A NEW 7 MGD SEQUENTIAL
BATCH REACTOR (SBR) SYSTEM
W/ EXPANSION TO 14 MGD

FIGURE
TM 3-6

Q:\32158005\CAD\Cw\ALT 3B.dgn
12/28/2006

TABLE TM 3-2: ***Summary of capital and operation and maintenance cost***

OPTION	DESCRIPTION	CAPITAL COST		O & M COST	
		2010	2020	2010 - 2020	2020 - 2030
1A	14 MGD New Plant Conventional Activated Sludge Process	$ 48,316,100	$ 4,935,100	$ 1,717,680	$ 1,888,480
1B	14 MGD New Plant SBR Process	$ 46,580,700	$ 4,935,100	$ 1,442,030	$ 1,612,830
3A	12 MGD New Plant Conventional Activated Sludge Process W/ Expansion to 14 MGD	$ 42,796,500	$ 11,077,500	$ 1,514,290	$ 1,888,480
3B	12 MGD New Plant SBR Process W/ Expansion to 14 MGD	$ 42,121,600	$ 9,430,200	$ 1,289,790	$ 1,612,830
4A	Using Existing Treatment Facility and building new 7 MGD New Plant Conventional Activated Sludge Process W/ Expansion to 14 MGD	$ 33,039,300	$ 26,421,000	$ 1,627,910	$ 1,888,480
4B	Using Existing Treatment Facility and building new 7 MGD New Plant SBR Process W/Expansion to 14 MGD	$ 31,930,500	$ 24,026,400	$ 1,577,340	$ 1,612,830

From the capital and operations costs listed in **Table TM 3-2**, the Present Worth Cost for each Option was calculated. A summary of the Present Worth Costs can be seen below in **Table TM 3-3**. The following assumptions were used in the Present Worth Cost Analysis.

1. Present Worth Analysis was performed for the year 2006
2. Evaluation period used is 20 years, between years 2010 and 2030
3. Capital costs were expected to occur in two stages, year 2010 and 2020. Capital cost for the year 2020 includes additional expansion to meet the ultimate condition.
4. Annual operations and maintenance costs were divided in to two time periods, one for the period 2010-2020 and the other for the period 2020-2030 as the expansion at 2020 would increase the operation and maintenance cost.
5. Inflation factor of 4.5% per year was used for Present worth Analysis.

The detailed Present Worth Cost analysis is shown in **Table 10** in **Appendix TM 3-1**.

TABLE TM 3-3: *Summary of present worth cost*

Option	Description	Present Worth Cost
1 A	14 MGD New Plant Conventional Activated Sludge Process	$ 62,646,975
1 B	14 MGD New Plant SBR Process	$ 58,184,959
3 A	12 MGD New Plant Conventional Activated Sludge Process W/ Expansion to 14 MGD	$ 59,985,628
3 B	12 MGD New Plant SBR Process W/ Expansion to 14 MGD	$ 55,862,804
4 A	Using Existing Treatment Facility and Building a 7 MGD New Plant Conventional Activated Sludge Process W/ Expansion to 14 MGD	$ 60,842,593
4 B	Using Existing Treatment Facility and Building a 7 MGD New Plant SBR Process W/ Expansion to 14 MGD	$ 57,106,473

Normally the recommended alternative selection is based upon the Present Worth Cost Analysis described and summarized above. The Present Worth Cost information presented in **Table TM 3-3,** worth indicates that Option 3B has the lowest present worth cost among all of the alternatives evaluated. Therefore it is recommended that Option 3B be considered by the City of Enid for implementation. This Option is discussed in more detail in the following section.

RECOMMENDED ALTERNATIVE

The recommendations below are based on an extensive evaluation of the existing treatment units and the introduction of new treatment concepts. During this evaluation, the basis for selection was the cost effectiveness of the system process. Generally, the alternative with the lowest present worth cost was recommended. In this evaluation, *Option 3B* has the lowest present worth cost, and therefore fore it is recommended that *Option 3B* be considered by the City of Enid for implementation.

The proposed improvements under *Option 3B* will provide the City of Enid Water Pollution Control Facility with the following attributes:

- Replaces the existing WPCF facility in totality with the exception of the bio-solids processing facility;
- Less / no disruption to current plant operations while new facility is being built;
- Improved effluent quality;
- Elimination of primary, secondary clarifiers and return sludge recirculation, elimination of short circuiting;

- Ability to handle shock in hydraulic and organic loading;
- Ability to remove nutrients;
- Easy to expand and replicate the additional reactors;
- Less land requirements than other processes.

The improvements recommended under *Option 3B* consist of expanding the plant in two stages as follows:

Improvements at 2010:

- New headworks including screening, grit removal and flow measurement to handle ultimate peak flow of 28 MGD;
- New low lift pump station to handle ultimate peak flow of 28 MGD;
- SBR reactors to treat an average daily flow of 12 MGD;
- New sludge holding basins;
- Disinfection system;
- Effluent flow measurement structure;
- Influent/effluent outfall; site work, piping, electrical, instrumentation & controls;
- Decommissioning of the existing WPCF facility in totality except bio-solids processing facility.

Improvements at 2020:

- One additional SBR reactor to increase the design capacity of the SBR reactors from 12 MGD to 14 MGD of average daily flow;
- Expanding the capacity of the existing bio-solids processing facility from 10 MGD to 14 MGD by building two new aerobic digesters and additional dewatering system consisting of belt press, polymer dosing system, sludge conveyor, etc.;
- Sitework, piping, electrical, instrumentation & controls.

The site plan showing the improvements as recommended in *Option 3B* is shown in **Figure TM 3-7**. This site is located northwest of the North Plant and south of Market Road and was recommended in the previous facility plan as suitable land for expansion. This site appears to be outside the floodway, and will not disrupt the Facility's operation but still close to the existing facility.

TABLE TM 3-4: ***Capital construction cost for recommended alternative, Option 3B***

Unit Description	Capital Construction Cost	
	2010	**2020**
Mobilization	$ 773,900	$ 224,800
Sitework	$ 2,220,600	$ 680,600
Headworks		
Screening	$ 510,400	-
Grit Removal	$ 783,100	-
Parshall Flume	$ 240,500	-
Low Lift Pump Station	$ 1,383,900	-
SBR Reactors	$ 16,590,200	$ 2,370,100
Sludge Holding Basins	$ 1,174,100	-
Disinfection System	$ 1,975,300	-
Aerobic Digesters	-	$ 1,295,800
Dewatering System	-	$ 1,200,300
Electrical	$ 2,251,500	$ 608,800
Instrumentation & Controls	$ 1,187,700	$ 293,600
Piping	$ 2,560,000	$ 580,000
Influent / Effluent outfall	$ 750,000	-
SUB TOTAL	**$ 32,401,200**	**$ 7,254,000**
Non-Construction Cost (15%)	$ 4,860,200	$ 1,088,100
Contingency (15%)	$ 4,860,200	$ 1,088,100
TOTAL	**$ 42,121,600**	**$ 9,430,200**

The approximate capital construction cost to build all recommended improvements has been estimated to be $42,121,600 and $9,430,200 for the years 2010 and 2020, respectively. **Table TM 3-4** shows the breakdown of these estimated capital costs for the recommended improvements. The estimated construction costs are based on August 2006, Engineering News Record (ENR) construction cost index (7722).

The annual operation and maintenance cost for the years 2010-2020 and 2020-2030 are $1,289,790 and $1,612,830 respectively. A detailed break down of these estimated operation and maintenance cost is shown in **Table 8** in **Appendix TM 3-1**.

APPENDICES

APPENDIX TM 3-1

COST ANALYSIS WORKSHEETS

CITY OF ENID WASTEWATER FACILITY PLAN

TABLE 1

CAPITAL COST ESTIMATES

Sep-06

OPTION 1A: 14 MGD NEW PLANT, CONVENTIONAL ACTIVATED SLUDGE PROCESS

Unit Description	Unit Size/ Design Capacity	Number of Units	Estimated Cost in 2006 Dollars
Improvements at 2010			
Mobilization	-	-	860,800
Sitework	-	-	2,458,400
Headworks			
Screening	28 MGD	-	510,400
Grit Removal	28 MGD	-	783,100
Parshal Flume	28 MGD	-	240,500
Liftstation	28 MGD	-	1,383,900
Primary Clarifiers	90 ft. Dia	2	1,794,600
Aeration Basin	200' L x 50' W x 16.5' D	4	8,115,200
Secondary Clarifiers	100 ft. Dia	3	3,322,900
Nitrification Basin	14 MGD	-	4,643,300
Tertiary clarifiers	100 ft. Dia	3	3,322,900
Disinfection system	28 MGD	-	1,382,000
Electrical	-	-	2,519,600
Instrumentation & Controls	-	-	1,339,400
Piping	-	-	3,739,100
Influent / Effluent outfall	2300 LF, 36"	-	750,000
SUB TOTAL			**37,166,100**
Non-Construction Cost (15%)			5,575,000
Contingency (15%)			5,575,000
TOTAL			**48,316,100**
Improvements at 2020			
Mobilization	-	-	200,000
Sitework	-	-	300,000
Aerobic Digesters	60 ft. Dia	2	1,295,800
Dewatering System	4 MGD	-	1,200,300
Electrical	-	-	250,000
Instrumentation & Controls	-	-	150,000
Piping	-	-	400,000
SUB TOTAL			**3,796,100**
Non-Construction Cost (15%)			569,500
Contingency (15%)			569,500
TOTAL			**4,935,100**

CITY OF ENID WASTEWATER FACILITY PLAN

TABLE 2
Sep-06

CAPITAL COST ESTIMATES

OPTION 1B: 14 MGD NEW PLANT, SBR (SEQUENTIAL BATCH REACTOR) PROCESS

Unit Description	Unit Size/ Design Capacity	Number of Units	Estimated Cost in 2006 Dollars
Improvements at 2010			
Mobilization	-	-	860,800
Sitework	-	-	2,458,400
Headworks			
Screening	28 MGD	-	510,400
Grit Removal	28 MGD	-	783,100
Parshal Flume	28 MGD	-	240,500
Liftstation	28 MGD	-	1,383,900
SBR Reactors	140' L x 98' W x 22' D	8	18,960,200
Sludge Holding Basins	70' L x 35' W x 12' D	2	1,174,100
Disinfection System	40 MGD	-	1,975,300
Electrical	-	-	2,519,600
Instrumentation & Controls	-	-	1,339,400
Piping	-	-	2,875,600
Influent / Effluent outfall	2300 LF, 36"	-	750,000
SUB TOTAL			**35,831,300**
Non-Construction Cost (15%)			5,374,700
Contingency (15%)			5,374,700
TOTAL			**46,580,700**
Improvements at 2020			
Mobilization	-	-	200,000
Sitework	-	-	300,000
Aerobic Digesters	60 ft. Dia	2	1,295,800
Dewatering System	4 MGD	-	1,200,300
Electrical	-	-	250,000
Instrumentation & Controls	-	-	150,000
Piping	-	-	400,000
SUB TOTAL			**3,796,100**
Non-Construction Cost (15%)			569,500
Contingency (15%)			569,500
TOTAL			**4,935,100**

CITY OF ENID WASTEWATER FACILITY PLAN

TABLE 3
Sep-06

CAPITAL COST ESTIMATES

OPTION 3A: 12 MGD NEW PLANT, CONVENTIONAL ACTIVATED SLUDGE PROCESS WITH EXPANSION TO 14 MGD CAPACITY

Unit Description	Unit Size/ Design Capacity	Number of Units	Estimated Cost in 2006 Dollars
Improvements at 2010			
Mobilization	-	-	773,900
Sitework	-	-	2,220,600
Headworks			
Screening	28 MGD	-	510,400
Grit Removal	28 MGD	-	783,100
Parshal Flume	28 MGD	-	240,500
Liftstation	28 MGD	-	1,383,900
Primary Clarifiers	90 ft. Dia	2	1,794,600
Aeration Basin	180' L x 45' W x 17.20' D	4	6,852,200
Secondary Clarifiers	90 ft. Dia	3	2,691,900
Nitrification Basin	12 MGD	-	4,085,500
Tertiary clarifiers	90 ft. Dia	3	2,691,900
Disinfection System	28 MGD	-	1,382,000
Electrical	-	-	2,251,500
Instrumentation & Controls	-	-	1,187,700
Piping	-	-	3,320,600
Influent / Effluent outfall	2300 LF, 36"	-	750,000
SUB TOTAL			**32,920,300**
Non-Construction Cost (15%)			4,938,100
Contingency (15%)			4,938,100
TOTAL			**42,796,500**
Improvements at 2020			
Mobilization	-	-	224,800
Sitework	-	-	680,600
Aeration Basin	180' L x 30' W x 17.20' D	4	1,142,100
Secondary Clarifiers	80 ft. Dia	1	709,000
Nitrification Basin	2 MGD	-	821,400
Tertiary clarifiers	80 ft. Dia	1	709,000
Aerobic Digesters	60 ft. Dia	2	1,295,800
Dewatering System	4 MGD	-	1,200,300
Electrical	-	-	608,800
Instrumentation & Controls	-	-	293,600
Piping	-	-	835,700
SUB TOTAL			**8,521,100**
Non-Construction Cost (15%)			1,278,200
Contingency (15%)			1,278,200
TOTAL			**11,077,500**

CITY OF ENID WASTEWATER FACILITY PLAN

TABLE 4
Sep-06

CAPITAL COST ESTIMATES

OPTION 3B: 12 MGD NEW PLANT, SBR (SEQUENTIAL BATCH REACTOR) PROCESS WITH EXPANSION TO 14 MGD CAPACITY

Unit Description	Unit Size/ Design Capacity	Number of Units of Units	Estimated Cost in 2006 Dollars
Improvements at 2010			
Mobilization	-	-	773,900
Sitework	-	-	2,220,600
Headworks			
Screening	28 MGD	-	510,400
Grit Removal	28 MGD	-	783,100
Parshal Flume	28 MGD	-	240,500
Liftstation	28 MGD	-	1,383,900
SBR Reactors	140' L x 98' W x 22' D	7	16,590,200
Sludge Holding Basins	70' L x 35' W x 12' D	2	1,174,100
Disinfection System	40 MGD	-	1,975,300
Electrical	-	-	2,251,500
Instrumentation & Controls	-	-	1,187,700
Piping	-	-	2,560,000
Influent / Effluent outfall	2300 LF, 36"	-	750,000
SUB TOTAL			**32,401,200**
Non-Construction Cost (15%)			4,860,200
Contingency (15%)			4,860,200
TOTAL			**42,121,600**
Improvements at 2020			
Mobilization	-	-	224,800
Sitework	-	-	680,600
SBR Reactors	140' L x 98' W x 22' D	1	2,370,100
Aerobic Digesters	60 ft. Dia	2	1,295,800
Dewatering System	4 MGD	-	1,200,300
Electrical	-	-	608,800
Instrumentation & Controls	-	-	293,600
Piping	-	-	580,000
SUB TOTAL			**7,254,000**
Non-Construction Cost (15%)			1,088,100
Contingency (15%)			1,088,100
TOTAL			**9,430,200**

CITY OF ENID WASTEWATER FACILITY PLAN

TABLE 5
Sep-06

CAPITAL COST ESTIMATES

OPTION 4A: USING EXISTING TREATMENT FACILITY AND BUILDING A 7 MGD NEW PLANT, CONVENTIONAL ACTIVATED SLUDGE PROCESS WITH EXPANSION TO 14 MGD CAPACITY

Unit Description	Unit Size/ Design Capacity	Number of Units	Estimated Cost in 2006 Dollars
Improvements at 2010			
Mobilization	-	-	533,600
Sitework	-	-	1,555,900
Headworks			
Screening	28 MGD	-	510,400
Grit Removal	28 MGD	-	783,100
Parshal Flume	28 MGD	-	240,500
Liftstation	28 MGD	-	1,383,900
Primary Clarifiers	70 ft. Dia	2	1,085,700
Aeration Basin	150' L x 75' W x 15' D	2	4,149,900
Secondary Clarifiers	90 ft. Dia	2	1,794,600
Nitrification Basin	7 MGD	-	2,721,100
Tertiary clarifiers	90 ft. Dia	2	1,794,600
Disinfection System	28 MGD	-	882,000
Improvements to Existing WWTP	-	-	2,737,700
Electrical	-	-	1,519,000
Instrumentation & Controls	-	-	780,000
Piping	-	-	2,192,700
Influent / Effluent outfall	2300 LF, 36"	-	750,000
SUB TOTAL			**25,414,700**
Non-Construction Cost (15%)			3,812,300
Contingency (15%)			3,812,300
TOTAL			**33,039,300**
Improvements at 2020			
Mobilization	-	-	533,600
Sitework	-	-	1,555,900
Primary Clarifiers	70 ft. Dia	2	1,085,700
Aeration Basin	150' L x 75' W x 15' D	2	4,149,900
Secondary Clarifiers	90 ft. Dia	2	1,794,600
Nitrification Basin	7 MGD	-	1,921,700
Tertiary clarifiers	90 ft. Dia	2	1,794,600
Disinfection System	-	-	500,000
Aerobic Digesters	60 ft. Dia	2	1,295,800
Dewatering System	4 MGD	-	1,200,300
Electrical	-	-	1,519,000
Instrumentation & Controls	-	-	780,000
Piping	-	-	2,192,700
SUB TOTAL			**20,323,800**
Non-Construction Cost (15%)			3,048,600
Contingency (15%)			3,048,600
TOTAL			**26,421,000**

CITY OF ENID WASTEWATER FACILITY PLAN

TABLE 6
Sep-06

CAPITAL COST ESTIMATES

OPTION 4B: USING EXISTING TREATMENT FACILITY AND BUILDING A 7 MGD NEW PLANT, SBR (SEQUENTIAL BATCH REACTOR) PROCESS WITH EXPANSION TO 14 MGD CAPACITY

Unit Description	Unit Size/ Design Capacity	Number of Units	Estimated Cost in 2006 Dollars
Improvements at 2010			
Mobilization	-	-	533,600
Sitework	-	-	1,555,900
Headworks			
Screening	28 MGD	-	510,400
Grit Removal	28 MGD	-	783,100
Parshal Flume	28 MGD	-	240,500
Liftstation	28 MGD	-	1,383,900
SBR Reactors	140' L x 98' W x 22' D	4	9,480,100
Sludge Holding Basins	70' L x 35' W x 12' D	1	587,100
Disinfection System	40 MGD	-	1,975,300
Improvements to Existing WWTP	-	-	2,737,700
Electrical	-	-	1,519,000
Instrumentation & Controls	-	-	780,000
Piping	-	-	1,725,300
Influent / Effluent outfall	2300 LF, 36"	-	750,000
SUB TOTAL			**24,561,900**
Non-Construction Cost (15%)			3,684,300
Contingency (15%)			3,684,300
TOTAL			**31,930,500**
Improvements at 2020			
Mobilization	-	-	553,600
Sitework	-	-	1,555,900
SBR Reactors	140' L x 98' W x 22' D	4	9,480,100
Sludge Holding Basins	70' L x 35' W x 12' D	1	587,100
Aerobic Digesters	60 ft. Dia	2	1,295,800
Dewatering System	4 MGD	-	1,200,300
Electrical	-	-	1,519,000
Instrumentation & Controls	-	-	780,000
Piping	-	-	1,510,000
SUB TOTAL			**18,481,800**
Non-Construction Cost (15%)			2,772,300
Contingency (15%)			2,772,300
TOTAL			**24,026,400**

CITY OF ENID WASTEWATER FACILITY PLAN

TABLE 7

Operations & Maintenance Costs

September-06

Unit Component	Base Year Labor Rate ($/hr)	Annual Operations Costs: Operations Labor* (man-hours)	Operations Labor ($)	Maintenance Labor* (man-hours)	Maintenance Labor ($)	Additional Energy Costs ($)	Materials and Supply Costs** ($)	Total Annual Costs ($)
OPTION 1 A				**Between 2010 - 2020**				
Influent Pumping	$ 11.00	700	$ 7,700	600	$ 6,600	$ 122,400	$ 12,300	$ 149,000
Preliminary treatment	$ 11.00	2700	$ 29,700	1300	$ 14,300	$ -	$ 17,100	$ 61,100
Primary sedimentation	$ 11.00	1300	$ 14,300	700	$ 7,700	$ -	$ 9,800	$ 31,800
Activated sludge Process	$ 11.00	4300	$ 47,300	2800	$ 30,800	$ 424,200	$ 34,200	$ 536,500
Secondary Clarifiers	$ 11.00	1800	$ 19,800	1000	$ 11,000	$ -	$ 17,600	$ 48,400
Nitrification Basin	$ 11.00	3500	$ 38,500	2100	$ 23,100	$ 228,500	$ 34,200	$ 324,300
Tertiary clarifiers	$ 11.00	1800	$ 19,800	1000	$ 11,000	$ -	$ 17,600	$ 48,400
Desinfection	$ 11.00	140	$ 1,540	140	$ 1,540	$ 68,600	$ 18,000	$ 89,680
Digestion	$ 11.00	1800	$ 19,800	1300	$ 14,300	$ 130,600	$ 24,500	$ 189,200
Dewatering	$ 11.00	6000	$ 66,000	700	$ 7,700	$ -	$ 165,600	$ 239,300
							Total:	$ 1,717,680
OPTION 1A				**Between 2020 - 2030***				
Digestion	$ 11.00	1000	$ 11,000	600	$ 6,600	$ 22,900	$ 12,300	$ 52,800
Dewatering	$ 11.00	3000	$ 33,000	400	$ 4,400	$ -	$ 80,600	$ 118,000
							Total:	$ 1,888,480
OPTION 1B				**Between 2010 - 2020**				
Influent Pumping	$ 11.00	700	$ 7,700	600	$ 6,600	$ 122,400	$ 12,300	$ 149,000
Preliminary treatment	$ 11.00	2700	$ 29,700	1300	$ 14,300	$ -	$ 17,100	$ 61,100
Sequential Batch Reactor	$ 11.00	5500	$ 60,500	3600	$ 39,600	$ 548,200	$ 34,200	$ 682,500
Sludge Holding Basin	$ 11.00	1000	$ 11,000	550	$ 6,050	$ -	$ 14,200	$ 31,250
Desinfection	$ 11.00	140	$ 1,540	140	$ 1,540	$ 68,600	$ 18,000	$ 89,680
Digestion	$ 11.00	1800	$ 19,800	1300	$ 14,300	$ 130,600	$ 24,500	$ 189,200
Dewatering	$ 11.00	6000	$ 66,000	700	$ 7,700	$ -	$ 165,600	$ 239,300
							Total:	$ 1,442,030
OPTION 1B				**Between 2020 - 2030***				
Digestion	$ 11.00	1000	$ 11,000	600	$ 6,600	$ 22,900	$ 12,300	$ 52,800
Dewatering	$ 11.00	3000	$ 33,000	400	$ 4,400	$ -	$ 80,600	$ 118,000
							Total:	$ 1,612,830

* O&M Costs for the period 2020 - 2030 includes annual O&M costs estimated for the period 2010 - 2020 plus additional O&M costs resulting from expansion in 2020

CITY OF ENID WASTEWATER FACILITY PLAN — **TABLE 8**

Operations & Maintenance Costs — **September-06**

Unit Component	Base Year Labor Rate ($/hr)	Annual Operations Costs: Operations Labor* (man-hours)	Operations Labor ($)	Maintenance Labor* (man-hours)	Maintenance Labor ($)	Additional Energy Costs ($)	Materials and Supply Costs** ($)	Total Annual Costs ($)
OPTION 3A				**Between 2010 - 2020**				
Influent Pumping	$ 11.00	650	$ 7,150	550	$ 6,050	$ 81,600	$ 9,300	$ 104,100
Preliminary treatment	$ 11.00	2300	$ 25,300	1100	$ 12,100	$ -	$ 14,700	$ 52,100
Primary sedimentation	$ 11.00	1200	$ 13,200	650	$ 7,150	$ -	$ 10,000	$ 30,350
Activated sludge Process	$ 11.00	4000	$ 44,000	2500	$ 27,500	$ 359,000	$ 29,300	$ 459,800
Secondary Clarifiers	$ 11.00	1700	$ 18,700	850	$ 9,350	$ -	$ 13,200	$ 41,250
Nitrification Basin	$ 11.00	3000	$ 33,000	2000	$ 22,000	$ 195,800	$ 29,300	$ 280,100
Tertiary clarifiers	$ 11.00	1700	$ 18,700	850	$ 9,350	$ -	$ 13,200	$ 41,250
Desinfection	$ 11.00	120	$ 1,320	120	$ 1,320	$ 58,800	$ 15,400	$ 76,840
Digestion	$ 11.00	1800	$ 19,800	1300	$ 14,300	$ 130,600	$ 24,500	$ 189,200
Dewatering	$ 11.00	6000	$ 66,000	700	$ 7,700	$ -	$ 165,600	$ 239,300
							Total:	**$ 1,514,290**
OPTION 3A				**Between 2020 - 2030***				
							Total:	**$ 1,888,480**
OPTION 3B				**Between 2010 - 2020**				
Influent Pumping	$ 11.00	650	$ 7,150	550	$ 6,050	$ 81,600	$ 9,300	$ 104,100
Preliminary treatment	$ 11.00	2300	$ 25,300	1100	$ 12,100	$ -	$ 14,700	$ 52,100
Sequential Batch Reactor	$ 11.00	5000	$ 55,000	3000	$ 33,000	$ 479,700	$ 29,300	$ 597,000
Sludge Holding Basin	$ 11.00	1000	$ 11,000	550	$ 6,050	$ -	$ 14,200	$ 31,250
Desinfection	$ 11.00	120	$ 1,320	120	$ 1,320	$ 58,800	$ 15,400	$ 76,840
Digestion	$ 11.00	1800	$ 19,800	1300	$ 14,300	$ 130,600	$ 24,500	$ 189,200
Dewatering	$ 11.00	6000	$ 66,000	700	$ 7,700	$ -	$ 165,600	$ 239,300
							Total:	**$ 1,289,790**
OPTION 3B				**Between 2020 - 2030***				
							Total:	**$ 1,612,830**

* O&M Costs for the period 2020 - 2030 includes annual O&M costs estimated for the period 2010 - 2020 plus additional O&M costs resulting from expansion in 2020

CITY OF ENID WASTEWATER FACILITY PLAN

Operations & Maintenance Costs

TABLE 9

September-06

Unit Component	Base Year Labor Rate ($/hr)	Operations Labor* (man-hours)	Operations Labor ($)	Maintenance Labor* (man-hours)	Maintenance Labor ($)	Additional Energy Costs ($)	Materials and Supply Costs** ($)	Total Annual Costs ($)
				Annual Operations Costs				
OPTION 4A				Between 2010 - 2020				
Influent Pumping	$ 11.00	650	$ 7,150	550	$ 6,050	$ 81,600	$ 9,300	$ 104,100
Preliminary treatment	$ 11.00	2300	$ 25,300	1100	$ 12,100	$ -	$ 14,700	$ 52,100
Primary sedimentation	$ 11.00	1100	$ 12,100	600	$ 6,600	$ -	$ 10,800	$ 29,500
Activated sludge Process	$ 11.00	4500	$ 49,500	2900	$ 31,900	$ 339,400	$ 44,500	$ 465,300
Secondary Clarifiers	$ 11.00	1850	$ 20,350	990	$ 10,890	$ -	$ 17,400	$ 48,640
Nitrification Basin	$ 11.00	4100	$ 45,100	2800	$ 30,800	$ 244,800	$ 44,500	$ 365,200
Tertiary clarifiers	$ 11.00	2250	$ 24,750	1180	$ 12,980	$ -	$ 20,000	$ 57,730
Desinfection	$ 11.00	120	$ 1,320	120	$ 1,320	$ 58,800	$ 15,400	$ 76,840
Digestion	$ 11.00	1800	$ 19,800	1300	$ 14,300	$ 130,600	$ 24,500	$ 189,200
Dewatering	$ 11.00	6000	$ 66,000	700	$ 7,700	$ -	$ 165,600	$ 239,300
							Total:	$ 1,627,910
OPTION 4A				Between 2020 - 2030*				
							Total:	$ 1,888,480
OPTION 4B				Between 2010 - 2020				
Influent Pumping	$ 11.00	650	$ 7,150	550	$ 6,050	$ 81,600	$ 9,300	$ 104,100
Preliminary treatment	$ 11.00	2300	$ 25,300	1100	$ 12,100	$ -	$ 14,700	$ 52,100
Primary sedimentation	$ 11.00	650	$ 7,150	350	$ 3,850	$ -	$ 4,400	$ 15,400
Activated sludge Process	$ 11.00	2500	$ 27,500	1500	$ 16,500	$ 195,800	$ 20,000	$ 259,800
Secondary Clarifiers	$ 11.00	900	$ 9,900	500	$ 5,500	$ -	$ 7,400	$ 22,800
Nitrification Basin	$ 11.00	2600	$ 28,600	1700	$ 18,700	$ 130,600	$ 20,000	$ 197,900
Tertiary clarifiers	$ 11.00	1300	$ 14,300	700	$ 7,700	$ -	$ 10,800	$ 32,800
Sequential Batch Reactor	$ 11.00	3600	$ 39,600	2100	$ 23,100	$ 274,100	$ 24,500	$ 361,300
Sludge Holding Basin	$ 11.00	750	$ 8,250	350	$ 3,850	$ -	$ 13,700	$ 25,800
Desinfection	$ 11.00	120	$ 1,320	120	$ 1,320	$ 58,800	$ 15,400	$ 76,840
Digestion	$ 11.00	1800	$ 19,800	1300	$ 14,300	$ 130,600	$ 24,500	$ 189,200
Dewatering	$ 11.00	6000	$ 66,000	700	$ 7,700	$ -	$ 165,600	$ 239,300
							Total:	$ 1,577,340
OPTION 4B				Between 2020 - 2030*				
							Total:	$ 1,612,830

* O&M Costs for the period 2020 - 2030 includes annual O&M costs estimated for the period 2010 - 2020 plus additional O&M costs resulting from expansion in 2020

CITY OF ENID WASTEWATER FACILITY PLAN

TABLE 10
Sep-06

PRESENT WORTH COST ANALYSIS

OPTION	DESCRIPTION	CAPITAL COST		O & M COST		PRESENT WORTH COST AT 2006
		2010	2020	2010 - 2020	2020 - 2030	
1A	14 MGD New Plant Conventional Activated Sludge Process	$ 48,316,100	$ 4,935,100	$ 1,717,680	$ 1,888,480	**$ 62,646,975**
1B	14 MGD New Plant SBR Process	$ 46,580,700	$ 4,935,100	$ 1,442,030	$ 1,612,830	**$ 58,184,959**
3A	12 MGD New Plant Conventional Activated Sludge Process W/ Expansion to 14 MGD	$ 42,796,500	$ 11,077,500	$ 1,514,290	$ 1,888,480	**$ 59,985,628**
3B	12 MGD New Plant SBR Process W/ Expansion to 14 MGD	$ 42,121,600	$ 9,430,200	$ 1,289,790	$ 1,612,830	**$ 55,862,804**
4A	7 MGD New Plant Conventional Activated Sludge Process W/ Expansion to 14 MGD	$ 33,039,300	$ 26,421,000	$ 1,627,910	$ 1,888,480	**$ 60,842,593**
4B	7 MGD New Plant SBR Process W/ Expansion to 14 MGD	$ 31,930,500	$ 24,026,400	$ 1,577,340	$ 1,612,830	**$ 57,106,473**

APPENDICES

APPENDIX TM 1-1

RAW DATA FROM PLANT RECORDS

Historical Flow Peaking Data					
Year	Average Annual Flow (mgd)	Maximum Month Flow (mgd)	Maximum Day Flow (mgd)	Maximum Month Factor	Maximum Day Factor
1996	6.264	7.064	11.922	1.13	1.90
1997	7.396	7.866	8.846	1.06	1.20
1998	7.937	9.637	14.724	1.21	1.86
1999	9.439	12.780	15.407	1.35	1.63
2000	6.804	8.207	11.387	1.21	1.67
2001	6.384	7.250	8.362	1.14	1.31
2002	6.015	6.358	8.887	1.06	1.48
2003	5.912	6.401	7.380	1.08	1.25
2004	6.121	6.400	7.800	1.05	1.27
Average	6.919			**1.14**	**1.51**

Influent Wastewater Characteristics					
Year	Influent BOD$_5$ (mg/l)	Influent TSS (mg/l)	Influent NH_3 (mg/l)	Influent DO (mg/l)	Influent Alkalinity (mg/l)
1996	333	274	15.80	2.30	368
1997	245	257	14.60	1.20	359
1998	222	261	12.80	1.10	356
1999	196	227	11.10	1.00	354
2000	206	222	15.90	1.10	357
2001	268	283	16.67	-	-
2002	230	254	17.36	-	-
2003	220	248	18.30	-	-
2004	271	234	17.48	1.26	356
Mean	**243**	**251**	**15.56**	**1.34**	**359**
Std. Dev.	**42**	**21**	**2.4**	**0.54**	**5**

Per capita wastewater genaration rate			
Year	**Total Service population**	**Average Annual Flow (mgd)**	**Percapita rate gpcd**
1996	45,320	6.264	138
1997	45,190	7.396	164
1998	45,250	7.937	175
1999	45,200	9.439	209
2000	47,045	6.804	145
2001	46,590	6.384	137
2002	46,530	6.015	129
2003	46,480	5.912	127
2004	46,630	6.121	131

Sludge Production Records at the Existing Facility

SHEET	MONTH / YR	TOTAL SLUDGE GALLONS	TOTAL SLUDGE CF PER MONTH	TOTAL SLUDGE CF PER DAY
1	Jan-95	2590575	346334	11172
2	Feb-95	2790340	373040	13323
3	Mar-95	3041700	406644	13118
4	Apr-95	2887300	386003	12867
5	May-95	1794900	239960	7741
6	Jun-95	594000	79412	2647
7	Jul-95	1273545	170260	5492
8	Aug-95			
9	Sep-95			
10	Oct-95	1659812	221900	7158
11	Nov-95	1210972	161895	5396
12	Dec-95	1488050	198937	6417
13	Jan-96	1378331	184269	5944
14	Feb-96	1153731	154242	5509
15	Mar-96	1308950	174993	6734
16	Apr-96	1054483	140974	4699
17	May-96	1561451	208750	6734
18	Jun-96	1562531	208895	6963
19	Jul-96	1687081	225546	7276
20	Aug-96	13294371	1777322	57333
21	Sep-96	2175010	290777	9693
22	Oct-96	2191146	292934	9449
23	Nov-96	2706903	361885	12063
24	Dec-96	4016038	536903	17319
25	Jan-97	3080936	411890	13287
26	Feb-97	1947000	260294	9296
27	Mar-97	2112000	282353	9108
28	Apr-97	1503000	200936	6698
29	May-97	1321000	176604	5697
30	Jun-97	973000	130080	4336
31	Jul-97	971000	129813	4188
32	Aug-97	1009000	134893	4351
33	Sep-97	1017000	135963	4532
34	Oct-97	945000	126337	4075
35	Nov-97	872000	116578	3886
36	Dec-97	1157000	154679	4990
37	Jan-98	892000	119251	3847
38	Feb-98	660000	88235	3151
39	Mar-98	1196861	160008	5162
40	Apr-98	1903000	254412	8480
41	May-98	1226000	163904	5287
42	Jun-98	1228000	164171	5472
43	Jul-98	949000	126872	4093
44	Aug-98	1003500	134158	4328
45	Sep-98	714000	95455	3182
46	Oct-98	630000	84225	2717
47	Nov-98	512347	68496	2283
48	Dec-98	512347	68496	2210
49	Jan-99	921000	123128	3972
50	Feb-99	989495	132285	4724

51	Mar-99	582500	77874	2512
52	Apr-99	416384	55666	1856
53	May-99	416384	55666	1796
54	Jun-99	416384	55666	1856
55	Jul-99	571262	76372	2464
56	Aug-99	112452	15034	485
57	Sep-99	100381	13420	447
58	Oct-99	152188	20346	656
59	Nov-99			
60	Dec-99	349400	46711	1507
61	Jan-00	362932	48520	1565
62	Feb-00	326268	43619	1558
63	Mar-00	1172410	156739	5056
64	Apr-00	500448	66905	2230
65	May-00	500448	66905	2158
66	Jun-00	1480739	197960	6599
67	Jul-00	1280750	171223	5523
68	Aug-00	716337	95767	3089
69	Sep-00	775500	103676	3456
70	Oct-00	985500	131751	4250
71	Nov-00	945500	126404	4213
72	Dec-00	962000	128610	4149
73	Jan-01			
74	Feb-01	638865	85410	3050
75	Mar-01	989544	132292	4267
76	Apr-01	524446	70113	2337
77	May-01	664603	88851	2866
78	Jun-01	455591	60908	2030
	AVG.	***1,352,242***	***180,781***	**5,951**

Quantity of Solids Landfilled

Year	ton/year	lb/d
1996	1513	8290
1997	1679	9200
1998	1062	5819
1999	-	-
2000	1164	6378
2001	1284	7036
2002	1067	5847
2003	1188	6510
Average	1280	7011

APPENDIX TM 1-2

INFORMATION ABOUT INDUSTRIES

FLOWS, BOD5, TSS AT SIGNIFICANT INDUSTRIAL USERS 2004 AVERAGE

NO.	INDUSTRIAL USER	AVG DAILY FLOW (MGD)	AVG BOD5	BOD5 LBS	AVG TSS	TSS LBS
1	INTEGRIS HOSPITAL	0.052	294	127.5	99	42.9
2	LANDFILL LEACHATE	0.028	59	13.8	315	73.6
3	CHEM-CAN	0.01	5040	420.3	159	13.3
4	BROADWAY TEXACO	0.004	10	0.3	8	0.3
5	ADVANCE-E WILLOW	0.03	661	165.4	144	36.0
6	ADVANCE-RALEIGH RD	0.274	838	1915.0	499	1140.3
7	ADVANCE-PINE ST	0.079	1172	772.2	1047	689.8
8	ST MARY'S HOSPITAL	0.069	373	214.6	226	130.1
9	VANCE AFB	0.171	173	246.7	151	215.3
10	SEABOARD FARMS	0.005	642	26.8	254	10.6
11	RED CARPET LANDFILL	0.004	77	2.6	20	0.7
	TOTAL	0.726	9339	3905.2	2922	2352.8
	AVERAGE	0.066	849	355.0	266	213.9
	2004 AVG FLOW AT POTW	6.12	271		234	
	SIU PERCENT OF TOTAL FLOW	11.86				

September 13, 2005

Mr. Robert Hitt, P.E.
Director of Development Services
City of Enid
P.O. Box 1768
Enid, Oklahoma 73702

Re: City of Enid
Sanitary Sewer Master Plan Agreement
"Additional Organic Loading from Advance Foods and New Ethanol Plant"

Dear Mr. Hitt,

On Monday September 12, 2005, we were notified by your staff on the anticipated discharge from the proposed ethanol plant. As a result of this anticipated discharge and in addition to Advance Foods , we felt that it would be necessary to reevaluate the treatment capacity of the existing Water Pollution Control Facility.

Currently, the Influent flow and its BOD5 and TSS concentrations to the existing Water Pollution Control Facility average at 6.24 mgd, 280 mg/l and 226 mg/l, respectively. As you know both the North and South treatment plants were designed for an average BOD and TSS concentrations of 300 mg/l and 250 mg/l, respectively. In addition, our current evaluation of these two plants based on current ODEQ design standards has revealed that the North and South treatment plant are rated at 4.62 mgd and 3.23 mgd, respectively. Based on this information the total combined design capacity of the existing Water Pollution Control Facility for the City of Enid is about 19,641 pounds per day for BOD5 and 16, 367 pounds per day for TSS.

With the anticipated discharge limits proposed by Advance Foods of 0.5 mgd, 664 mg/l BOD and 382 mg/l TSS and the new ethanol plant flow of 0.12 mgd, 1000 mg/l BOD and 350 mg/l TSS, we have estimated that the influent flow and raw wastewater characteristics for BOD and TSS to the existing facility will increase to 6.853 mgd, 320 mg/l and 240 TSS, respectively. Under these conditions the projected loading to the existing Water Pollution Control Facility will be approximately 18,313 pounds per day for BOD and 13,689 pounds per day for TSS.

From the information shown above it appears that the existing facility has the capacity to handle the additional loading, since the projected loading is slightly lesser. However, the BOD5 concentration of the projected influent flow (320 mg/l) is greater than the designed BOD5 concentration (300 mg/l) for the existing facility. Operating under these conditions could impact the effluent quality of the treatment plant and possibly exceed the current NPDES permit.

In order to maintain the influent BOD5 and TSS concentrations to the existing facility within the original design parameters, the BOD5 and TSS discharge concentration from these two industries will have to set at 500 mg/l, each. However, Conversations with your staff have also, revealed that Advance Foods is anticipating doubling production in the next two years that will add an additional flow of 0.5 mgd to the existing facility which will worsen conditions and exceed the BOD5 design parameter and possibly impact the effluent quality of the existing facility. With and anticipated additional flow of 1.0 mgd from Advance Foods and 0.12 mgd from the new ethanol plant, the ultimate combined flow to the existing plant will average at 7.4 mgd. Under this scenario the existing facility will be operating at about 94% capacity of its current rated capacity.

Based on the anticipated additional loadings described above and the operation of the existing Water Pollution Control Facility with both the North and South plants and the use of the Biological nutrient removal train as an effluent polishing process, we recommend that the City's pretreatment program shall ensure that any future pretreatment discharge limit for BOD5 does not exceed 300 mg/l until further expansion to the treatment plant is evaluated and designed.

Should you have any questions, please feel free to contact me.

Very truly yours,

Dewberry Design Group Incorporated

Jose A. Pereira, P.E.
Associate

Cc: James McClain, Public Service Director City of Enid
Muralikumar Katta-Muddanna, Project Engineer City of Enid
Barry Brummit, Pretreatment Director City of Enid
Joyce Hight, Superintendent City of Enid
Vel Subramanian, Dewberry

APPENDIX TM 1-3

CITY OF ENID OPDES PERMIT

AUTHORIZATION TO DISCHARGE UNDER THE OKLAHOMA POLLUTANT DISCHARGE ELIMINATION SYSTEM

PART I.

In compliance with the Oklahoma Pollutant Discharge Elimination System Act (OPDES Act), Title 27A O.S., § 2-6-201 *et seq.* and the rules of the State of Oklahoma Department of Environmental Quality (DEQ) adopted there under (See OAC 252:605); the Federal Clean Water Act, Public Law 95-217 (33 U.S.C. 1251 *et seq.*), Section 402; and NPDES Regulations (40 CFR Parts 122, 124 and 403),

City of Enid
(State ID No. S-20931)
P.O. Box 1768
Enid, Oklahoma 73702

is hereby authorized to discharge treated wastewater from a facility located at approximately

NE¼ of SW¼ of NW¼ of Section 14
Township 22 North, Range 6 West, I.M.
Garfield County, State of Oklahoma

to receiving water: Boggy Creek, tributary to Skeleton Creek, tributary to the Cimarron River at a point located approximately

	Outfall 001	Outfall 002	
Latitude:	36° 23' 11.904" N	36° 23' 11.148" N	(GPS: NAD-27 CONUS)
Longitude:	97° 48' 58.968" W	97° 48' 49.787" W	(GPS: NAD-27 CONUS)

Planning Segment No. 620910 (Water body ID # 620910030250)

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, III and IV hereof.

This permit replaces and/or supersedes the previous permit modification issued on March 1, 2001

The issuance date of this permit is July 31, 2003

This permit shall become effective August 1, 2003

This permit and authorization to discharge shall expire at midnight, July 31, 3008

For the Oklahoma Department of Environmental Quality:

Edward Dihrberg

Edward Dihrberg, P.E., Manager
Municipal Permits Section
Water Quality Division

Carl D Parrott

for Jon L. Craig, Director
Water Quality Division

A. **Effluent Limitations**

During the period beginning the effective date and lasting through date of expiration the permittee is authorized to discharge treated wastewater in accordance with the following limitations:

1. **Conventional and Non-Conventional Pollutants**

Effluent Characteristics	Discharge Limitations			Monitoring Requirements	
	Mass (lbs/d)	Concentration (mg/l)		Measure-ment Frequency	Sample Type
	30-day Average	30-day Average	7-day Average		
Spring (April – May): Outfall 002 only					
Carbonaceous Biochemical Oxygen Demand - 5 Day ($CBOD_5$) [80082]	1417.8	20.0	30.0	3/week	12-hour composite
Total Suspended Solids (TSS) [00530]	2126.7	30.0	45.0	2/week	
Ammonia (NH3-N) [00610]	141.8	2.0	3.0	1/week	
Dissolved Oxygen (DO) [00300] [b] Minimum 6 mg/l				3/week	Grab
Summer (June – October): Outfall 002 only					
Carbonaceous Biochemical Oxygen Demand - 5 Day ($CBOD_5$) [80082]	1063.4	15.0	22.5	3/week	12-hour composite
Total Suspended Solids (TSS) [00530]	2126.7	30.0	45.0	2/week	
Ammonia (NH3-N) [00610]	141.8	2.0	3.0	1/week	
Dissolved Oxygen (DO) [00300] [b] Minimum 5 mg/l				3/week	Grab
Winter (November - March): Outfall 001 and/or Outfall 002					
Biochemical Oxygen Demand - 5 Day (BOD_5) [00310]	1417.8 [a]	20.0	30.0	3/week	12-hour composite
Total Suspended Solids (TSS) [00530]	2126.7 [a]	30.0	45.0	2/week	
Ammonia (NH3-N) [00610]	290.6 [a]	4.1	9.9 [Daily max]	3/week [c]	
Dissolved Oxygen (DO) [00300] [b] Minimum 5 mg/l				3/week	Grab

[a] The combined mass loading from each outfall may not exceed this value if both outfalls are used simultaneously.

[b] If simultaneously discharging from outfalls 001 and 002, grab samples will be taken from both outfalls, and the lower of the two dissolved oxygen values reported.

[c] If the highest daily maximum ammonia level reported during this season for the first year after the effective date of these limits is less than or equal to 1.5 times the monthly average limit (i.e., 1.5 × 4.1 = 6.15 mg/l), the monitoring frequency may be reduced to 1/week for that season. Otherwise, the monitoring frequency continues at 3/week for that season for the remaining term of the permit.

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

The pH shall not be less than 6.5 standard units nor greater than 9.0 standard units at any time. it shall be monitored by grab samples collected 3/week.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the discharge from the final treatment unit.

Flow (measured in million gallons per day) shall be monitored daily by totalized measurement and reported as a 30-day average and a daily maximum.

2. Whole Effluent Toxicity Reporting and Monitoring Requirements (Outfalls TX1, TX2).

During the period beginning the effective date of the permit and lasting through the expiration date, the permittee is authorized to discharge from Outfall TX1 and Outfall TX2 (functionally identical to Outfall 001 and Outfall 002). The discharge consists of biologically treated sanitary wastewater. Such discharges shall be limited and monitored by the permittee as specified below:

Whole Effluent Toxicity Reporting and Monitoring Requirements (Outfalls TX1 and TX2)

	Effluent Characteristic			Reporting Requirements [a]		Monitoring Requirements	
	Test	Critical Dilution	Parameter	30-day Avg Min	7-day Min	Testing Frequency [b]	Sample Type
Routine Testing	*Ceriodaphnia dubia*, 7-day chronic NOEC static renewal, freshwater	100%	Pass/Fail Survival [TLP3B]	---	Report	2/season for TX1 [e], and 1/quarter [f] for TX2	24-hr comp
			NOEC$_L$ Survival [TOP3B]	Report	Report		
			% Mortality at Critical Dilution [TJP3B]	Report	Report		
			Pass/Fail Reproduction [TGP3B]	---	Report		
			NOEC$_S$ Reproduction [TPP3B]	Report	Report		
			% Coeff of Variation [TQP3B]	Report	Report		
	Pimephales promelas (Fathead minnow), 7-day chronic NOEC static renewal, freshwater	100%	Pass/Fail Survival [TLP6C]	---	Report	2/season for TX1 [e], and 1/quarter [f] for TX2	24-hr comp
			NOEC$_L$ Survival [TOP6C]	Report	Report		
			% Mortality at Critical Dilution [TJP6C]	Report	Report		
			Pass/Fail Growth [TGP6C]	---	Report		
			NOEC$_S$ Growth [TPP6C]	Report	Report		
			% Coeff of Variation [TQP6C]	Report	Report		
Retesting	Retest #1 [22415] [c]			---	Report	As required [d]	24-hr comp
	Retest #2 [22416] [c]			---	Report		

a See Part II, Section A, Whole Effluent Toxicity Testing, for additional monitoring and reporting conditions.
b Reporting periods commence with the effective date of the permit. A valid WET test shall be reported for each species for each reporting period. Results of retests conducted pursuant to prior test failure shall not be submitted on DMRs in lieu of routine test results (see Part II, Section A, Item 2.a).
c Applies to either or both test species, according to results of test failure triggering monthly retests.
d Monthly retesting required only if the routine test for reporting period (for either species) fails.
e When discharging, no frequency reduction will be applied to TX1 for biomonitoring (November – March).
f The frequency of testing may be reduced to twice per year for TX2, if requested and if there are no lethal or sublethal failures in WET testing during the first two years of the permit. See the provision for WET testing monitoring frequency reduction after the first two years (Part II, Section A, Item 5).

Whole effluent toxicity reporting and monitoring requirements apply beginning the effective date of the permit.

WET testing summary reports: Reports of all WET testing initiated, regardless of whether such tests are carried to completion, shall follow the requirements of Part II, Section A, Item 4.

Whole effluent toxicity concurrent testing provision: Concurrent analysis of total ammonia and pH is required on all effluent samples, including static renewals, collected for Fathead minnow WET testing or retesting. Reporting of results shall be in accordance with the following requirements.

Concurrent Effluent Testing - Reporting Requirements

Effluent Characteristic	Concentration[a]			Monitoring Requirements	
	Daily Min	Montly Avg	Daily Max	Monitoring Frequency	Sample Type
Ammonia, total [STORET 00610]	Report [b]	Report [b]	Report [b]	2/season for TX1 [e], and 1/quarter [d] for TX2	24 hr composite
pH (std units) [STORET 00400]	Report [b]	---	Report [b]		Note[c]

[a] Concentration units are mg/l unless otherwise specified.
[b] Report only those effluent samples collected for Fathead minnow WET testing.
[c] Measured in each composite effluent sample, including static renewals, just prior to first use .
[d] The frequency of testing can be reduced to twice per year for TX2, if requested and if there are no lethal or sublethal failures in WET testing during the first two years of the permit.
[e] When discharging (November – March).

3. Priority Pollutants

a. Monitoring Requirements for Copper for Outfall 002 (period effective beginning eighteen months before the expiration date of the permit and to last one year).

During the period stated above, the permittee shall monitor for one year the effluent for copper and report the results as follows:

Effluent Characteristics	Discharge Limitations			Monitoring Requirements	
	Mass (lbs/day)	Concentration(ug/l)		Measurement Frequency	Sample Type
	Monthly Avg.	Monthly Avg.	Daily Maximum		
Copper, Total	Report	Report	Report	1/month	24-hr composite

If any individual test result is less than the minimum quantification level (MQL) of 10 ug/l for copper (monthly and/or daily maximum), a value of zero (0) may be used for the discharge monitoring report (DMR) calculations and reporting requirements.

b. Monitoring Requirements for Hardness (Outfall 999)

During the period beginning eighteen months before the expiration of the permit, the permittee shall monitor the upstream hardness for one year, and report the results as follows:

Upstream Characteristics	Upstream Monitoring			Monitoring Requirements	
	Mass (lbs/day)	Concentration(mg/l)		Measurement Frequency	Sample Type
	Monthly Avg.	Monthly Avg.	Daily Maximum		
Hardness	NA	NA	Report	1/month	Grab

B. Sanitary Sewer Overflows

Any bypass in the collection system [sanitary sewer overflow (SSO)] shall be reported in accordance with Part III.B.6. of this permit.

In addition, all reports shall be summarized and reported in tabular format with the Discharge Monitoring report (DMR) for the month in which the bypasses occurred.

PART II. OTHER PERMIT REQUIREMENTS

A. WHOLE EFFLUENT TOXICITY TESTING (7-DAY CHRONIC NOEC, STATIC RENEWAL, FRESHWATER)

1. SCOPE AND METHODOLOGY

a. The permittee shall test the effluent for toxicity in accordance with the provisions in this section. Applicability to multiple outfalls is described in Item 3.d.5 of this section. The permittee shall biomonitor for *Ceriodaphnia dubia* and *Pimephales promelas* in accordance with the WET testing frequencies prescribed in Part I. Intervals between test initiation dates shall be a function of the required testing frequency, as follows:

- Monthly retests: No less than 20 days and no more than 40 days.
- Quarterly: No less than 2 months and no more than 4 months.
- Semi-annually: No less than 4 months and no more than 8 months.

APPLICABLE TO OUTFALL(S):	001 and 002
REPORTED ON DMR AS OUTFALL(S):	TX1 and TX2
CRITICAL DILUTION:	100%
EFFLUENT DILUTION SERIES (ALL TESTS):	32%, 42%, 56%, 75%, and 100%
COMPOSITE SAMPLE TYPE:	Defined at Part I
TEST SPECIES/METHODS:	40 CFR 136

Ceriodaphnia dubia chronic static renewal 7-day survival and reproduction test, Method 1002.0, EPA/600/4-91/002 or the most recent update thereof. A minimum of ten (10) replicates consisting of one (1) organism each must be used in the control and in each effluent dilution of this test. This test should be terminated when 60% of the surviving females in the control produce three broods or at the end of eight days, whichever comes first. If these criteria are not met at the end of 8 days, the test must be repeated.

Pimephales promelas (Fathead minnow) chronic static renewal 7-day larval survival and growth test, Method 1000.0, EPA/600/4-91/002, or the most recent update thereof. A minimum of five (5) replicates with eight (8) organisms per replicate must be used in the control and in each effluent dilution of this test.

b. CHRONIC LETHAL EFFECT TEST FAILURE

The $NOEC_L$ (No Observed Lethal Effect Concentration) is defined as the greatest effluent dilution at and below which lethality that is statistically different from the control (0% effluent) at the 95% confidence level does not occur. Chronic lethal test failure (chronic

$NOEC_L$ test) is defined as a demonstration of a statistically significant lethal effect at test completion to a test species at or below the critical dilution.

c. CHRONIC SUBLETHAL EFFECT TEST FAILURE

The $NOEC_S$ (No Observed Sublethal Effect Concentration) is defined as the greatest effluent dilution at and below which sublethality (inhibited reproduction in the *Ceriodaphnia dubia* test or inhibited growth in the Fathead minnow test) that is statistically different from the control (0% effluent) at the 95% confidence level does not occur. Chronic sublethal test failure (chronic $NOEC_S$ test) is defined as a demonstration of a statistically significant sublethal effect at test completion to a test species at or below the critical dilution.

d. REOPENER CLAUSE

This permit may be reopened to require whole effluent toxicity limits, chemical specific effluent limits, additional testing, and/or other appropriate actions to address toxicity.

2. TESTING REQUIREMENTS DUE TO CHRONIC TEST FAILURE

Upon becoming aware of the failure of any test, the permittee shall notify the DEQ Water Quality Division Toxics Coordinator immediately, and in writing within 5 working days of the test failure, with a summary of the results of and any other pertinent circumstances associated with the failed test.

a. Whenever there is a lethal effect test failure for either species during routine testing, the frequency of testing for the affected species shall automatically increase to, or continue at, as appropriate, the WET testing frequency prescribed in Part I for the remaining life of the permit. In addition, two (2) additional monthly tests (retests) of the affected species are required. The two additional tests shall be conducted monthly during the next two consecutive months. The permittee shall not substitute either of the two additional tests for routine toxicity testing. Additional tests are not required for a sublethal effect test failure. A full laboratory report for the failed routine test and both additional tests, if required, shall be prepared and submitted to the DEQ in accordance with procedures outlined in Item 4 of this section.

b. PERSISTENT LETHALITY

(1) If either of the two additional tests result in an $NOEC_L$ value less than the critical dilution, persistent lethality is exhibited, and the permittee shall initiate a Toxicity Reduction Evaluation (TRE) as specified in Item 5 of this section. The TRE initiation date will be the test completion date of the first failed retest.

(2) The retesting requirements in Item 2.a are suspended upon submittal of the TRE Action Plan.

c. INTERMITTENT LETHALITY

If both additional tests result in an $NOEC_L$ value greater than or equal to the critical dilution, persistent lethality is not exhibited. However, if any routine test lethal effect failure occurs within 18 months of a prior lethal effect test failure, intermittent lethality is exhibited, and the permittee may be required by the DEQ to initiate a TRE, as described in Item 5 of this section, based on the severity and pattern of such lethal effect over time.

d. PERSISTENT SUBLETHALITY

Barring persistent lethality, if two consecutive routine tests result in a sublethal effect failure for a species, persistent sublethality is exhibited, and the permittee:

(1) Shall increase the frequency of testing for the affected species to, or continue at, as appropriate, the WET testing frequency prescribed in Part I for the remaining life of the permit; and

(2) May be required by the DEQ to initiate a TRE, as specified in Item 5 of this section, based on the severity and pattern of such sublethal effect over time.

3. REQUIRED TOXICITY TESTING CONDITIONS

a. Test Acceptance

The permittee shall repeat a test, including the control and all effluent dilutions, if the procedures and quality assurance requirements defined in the test methods or in this permit are not satisfied, including the following additional criteria:

(1) The toxicity test control (0% effluent) must have survival equal to or greater than 80%.

(2) The mean number of *Ceriodaphnia dubia* neonates produced per surviving female in the control (0% effluent) must be 15 or more.

(3) Sixty (60) percent of the surviving *Ceriodaphnia dubia* control females must produce three broods.

(4) The mean dry weight of surviving Fathead minnow larvae at the end of the 7 days in the control (0% effluent) must be 0.25 mg per larva or greater.

(5) The percent coefficient of variation between replicates shall be 40% or less in the control (0% effluent) for the young of surviving females in the *Ceriodaphnia dubia* reproduction test and for the growth and survival endpoints of the Fathead minnow test.

(6) The percent coefficient of variation between replicates shall be 40% or less in the critical dilution, unless significant lethal or sublethal effects are exhibited for the young of surviving females in the *Ceriodaphnia dubia* reproduction test and for the growth and survival endpoints of the Fathead minnow test.

(7) As documented at test termination, no more than forty (40) percent of the *Ceriodaphnia dubia* test organisms in the control (0% effluent) or any effluent dilution shall be male.

Test failure may not be construed or reported as invalid due to a coefficient of variation value of greater than 40% in the critical dilution. A repeat test shall be conducted within the reporting period of any test determined to be invalid.

b. Statistical Interpretation

(1) For the *Ceriodaphnia dubia* survival test, the statistical analyses used to determine if there is a significant difference between the control and the critical dilution shall be Fisher's Exact Test as described in EPA/600/4-91/002, or the most recent update thereof.

(2) For the *Ceriodaphnia dubia* reproduction test and the Fathead minnow larval survival and growth test the statistical analyses used to determine if there is a significant difference between the control and the critical dilution shall be in accordance with the methods for determining the No Observed Effect Concentration (NOEC) as described in EPA/600/4-91/002, or the most recent update thereof.

(3) If the conditions of test acceptability are met in Item 3.a above and the percent survival of the test organism is equal to or greater than 80% in the critical dilution concentration and all lower dilution concentrations, the test shall be considered to be a passing test, and the permittee shall report an $NOEC_L$ of not less than the critical dilution for the DMR reporting requirements found in Item 4 below.

c. Dilution Water

(1) Dilution water used in the toxicity tests will be receiving water collected as close to the point of discharge as possible but unaffected by the discharge. The permittee shall substitute synthetic dilution water of similar pH, hardness and alkalinity to the closest downstream perennial water where the toxicity test is conducted on an effluent discharge to a receiving stream classified as intermittent or to a receiving stream with no flow due to zero flow conditions.

(2) If the receiving water is unsatisfactory as a result of instream toxicity (fails to fulfill the test acceptance criteria of Item 3.a.), the permittee must submit the test results exhibiting receiving water toxicity with the full test report required in Item 4 below and may thereafter substitute synthetic dilution water for the receiving water in all subsequent tests provided the unacceptable receiving water test met the following stipulations:

(a) A synthetic dilution water control which fulfills the test acceptance requirements of Item 3.a. was run concurrently with the receiving water control;

(b) The test indicating receiving water toxicity was carried out to completion; and

(c) The synthetic dilution water had a pH, hardness and alkalinity similar to that of the receiving water or closest downstream perennial water not adversely affected by the discharge, provided the magnitude of these parameters will not cause toxicity in the synthetic dilution water.

d. Samples and Composites

(1) The permittee shall collect three flow-weighted 24-hour composite samples representative of the flows during normal operation from the outfall(s) listed at Item 1.a above. Unless otherwise specified in Part I of the permit, a 24-hour composite sample consists of a minimum of 12 effluent portions collected at equal time intervals

representative of a 24-hour operating day and combined proportional to flow or a sample continuously collected proportional to flow over a 24-hour operating day.

(2) The first composite effluent sample shall be used to initiate each test and must be collected so that its holding time (between collection of the last portion of the sample and test initiation) does not exceed 36 hours. Collection of the second and third composite effluent samples must be timed so as to permit an approximately equal use distribution of the three composite samples for daily static renewals. In no case shall the holding time of the second and third composite samples (between collection of the last portion of the sample and its first use) exceed 72 hours. All samples shall be chilled to 4 °C during collection, shipping and/or storage.

(3) The permittee shall collect the 24-hour composite samples such that the effluent samples are representative of any periodic episode of chlorination, biocide usage or other potentially toxic substance discharged on an intermittent basis.

(4) If the flow from the outfall(s) being tested ceases during the collection of effluent samples, the requirements for the minimum number of effluent samples, the minimum number of effluent portions and the sample holding time are waived during that sampling period. However, the permittee must collect an effluent composite sample volume during the period of discharge that is sufficient to complete the required toxicity tests with daily renewal of effluent. When possible, the effluent samples used for the toxicity tests shall be collected on separate days if the discharge occurs over multiple days. The effluent composite sample collection duration and the static renewal protocol associated with the abbreviated sample collection must be documented in the full test report required in Item 4 of this section.

(5) MULTIPLE OUTFALLS: If the provisions of this section are applicable to multiple outfalls, as specified in Part I of the permit, the permittee shall combine the composite effluent samples in proportion to the average flow from the outfalls listed in Item 1.a of this section for the day the sample was collected. The permittee shall perform the toxicity test on the flow-weighted composite of the outfall samples.

4. REPORTING

a. The permittee shall prepare a full report of the results of all tests conducted pursuant to this section in accordance with the Report Preparation Section of EPA/600/4-91/002, or the most current publication, for every valid or invalid toxicity test initiated, whether carried to completion or not. The permittee shall retain each full report pursuant to the records retention provisions of Part III of this permit. The permittee shall submit full test reports for all tests initiated, regardless of whether the tests are carried to completion, to the DEQ no later than the 15th day of the month following completion of the test, including any test which is considered invalid, is terminated early for any reason, or which indicates receiving water toxicity.

b. A valid test for each species (excluding retests) must be reported on the DMR for each reporting period specified in Part I of this permit unless the permittee is performing a TRE, which may increase the frequency of testing and reporting. A DMR must be submitted by the 15th day of the month following-completion of any valid test. The full report for the test (see Item 4.a above) shall be submitted along with the DMR. If a survival test failure is experienced for either test species, two copies of the blank DMR for the applicable reporting period shall be made in advance of completing and submitting the DMR so that the DMR copies may be used to report results of the required retests. If more than one valid test (excluding retests) is performed on a species during a reporting period, the permittee shall report the lowest survival test results as the 7-day minimum for each species tested, and the arithmetic average of the results of the survival tests shall be reported as the 30-day average minimum. The sublethal test results reported for each species on the DMR are determined in the same manner. If the permittee performs only one valid test (excluding retests) on a species during the reporting period, then the results of that test shall be reported as both the 7-day minimum and the 30-day average minimum on the DMR. The 30-day average minimum does not apply to the pass/fail parameters (TLP3B, TGP3B, TLP6C and TGP6C) in Item 4.c below.

If any test results in anomalous $NOEC_L$ or $NOEC_S$ findings (i.e., it indicates an interrupted dose response across the dilution series), the DEQ recommends that the permittee contact its DEQ toxicity coordinator for a technical review of the test results prior to submitting the full test report and DMR. A summary of all tests initiated during the reporting period, including invalid tests, repeat tests and retests, shall be attached to the reporting period DMR for DEQ review. A test is a <u>REPEAT</u> test if it is performed as a result of a previously invalid test. A test is a <u>RETEST</u> if it is performed as a result of a previously failed test. Each time a DMR is submitted, put the new submittal date in the lower right-hand corner of the DMR.

(1) The reporting period test summary attached to the DMR shall be organized as follows:

(a) Invalid tests (basis for test invalidity must be described)

(b) Valid tests (other than retests) initiated during current reporting period

(c) Valid retests for tests failed during previous reporting period (if not submitted in the previous reporting period test summary)

(d) Valid retests for tests failed during current reporting period

(2) The following information shall be listed in the reporting period test summary for each valid test in categories (b) through (d) in Item 4.b(1) above:

(a) Test species

(b) Date of test initiation at laboratory

(c) Results of all concurrent effluent analyses specified in Part I of this permit

(d) All test result parameters for the test species specified in Item 4.c below.

c. The permittee shall report the following results for all <u>VALID</u> toxicity tests (excluding retests) on the DMR(s) for that reporting period in accordance with Item 4.b above and Part III of this permit.

(1) *Ceriodaphnia dubia*

(a) Parameter TLP3B: If the *Ceriodaphnia dubia* $NOEC_L$ for survival is less than the critical dilution, report a "1"; otherwise, report a "0".

(b) Parameter TOP3B: Report the *Ceriodaphnia dubia* $NOEC_L$ value for survival.

(c) Parameter TJP3B: Report the *Ceriodaphnia dubia* percent mortality in the critical dilution at test completion.

(d) Parameter TGP3B: If the *Ceriodaphnia dubia* $NOEC_S$ for reproduction is less than the critical dilution, report a "1"; otherwise, report a "0".

(e) Parameter TPP3B: Report the *Ceriodaphnia dubia* $NOEC_S$ value for reproduction.

(f) Parameter TQP3B: Report the highest coefficient of variation (critical dilution or control) for *Ceriodaphnia dubia* reproduction.

(2) *Pimephales promelas* (Fathead minnow)

(a) Parameter TLP6C: If the Fathead minnow $NOEC_L$ for survival is less than the critical dilution, report a "1"; otherwise, report a "0".

(b) Parameter TOP6C: Report the Fathead minnow $NOEC_L$ value for survival.

(c) Parameter TJP6C: Report the Fathead minnow percent mortality in the critical dilution at test completion.

(d) Parameter TGP6C: If the Fathead minnow $NOEC_S$ for growth is less than the critical dilution, report a "1"; otherwise, report a "0".

(e) Parameter TPP6C: Report the Fathead minnow $NOEC_S$ value for growth.

(f) Parameter TQP6C: Report the highest coefficient of variation (critical dilution or control) for Fathead minnow survival and growth.

d. The permittee shall report the following results for all VALID toxicity retests on the DMR(s) for that reporting period.

(1) Retest #1 (STORET 22415): If the first monthly retest following failure of a routine test for either test species results in an $NOEC_L$ for survival less than the critical dilution, report a "1"; otherwise, report a "0".

(2) Retest #2 (STORET 22416): If the second monthly retest following failure of a routine test for either test species results in an $NOEC_L$ for survival less than the critical dilution, report a "1"; otherwise, report a "0".

Results of all retests shall be reported on a copy of the DMR for the reporting period (see Item 4.b above) in which the triggering routine test failure is experienced by no later than the 15th day of the month following completion of the retest. The full report for the retest (see Item 4.a above) shall be submitted along with the retest DMR. Even if a retest cannot be conducted before the end of the reporting period for which it is required (due to test initiation interval requirements), the retest results shall still be reported for the reporting period in which the triggering test failure is experienced. In this manner, both retests are reported for the same reporting period as the failed routine test. Each time a DMR is submitted, put the new submittal date in the lower right-hand corner of the DMR. If retesting is not required during a given reporting period, the permittee shall leave these DMR fields blank.

5. MONITORING FREQUENCY REDUCTION

a. The permittee may apply for a testing frequency reduction upon the successful completion of the first two years of testing for one or both test species with no lethal or sublethal effects demonstrated at or below the critical dilution. Certification in accordance with Item 5.b of this section shall be submitted at the time of such application for monitoring frequency reduction. If granted, the monitoring frequency may be reduced to not less than once per 6 months (once each during the periods June 1 through September 30 and December 1 through March 31) for either test species.

b. CERTIFICATION: The permittee must certify in writing that no lethal or sublethal test failures have occurred for the species for which the monitoring frequency reduction is being requested and that all tests meet all test acceptability criteria in Item 3.a. above. In addition, the permittee must provide a summary of all tests initiated during the period of certification including test initiation dates, species, test acceptability parameters, $NOEC_L$ values, percent mortality at the critical dilution, $NOEC_S$ values, and coefficients of variation for the controls and critical dilutions. If the certification is approvable, the DEQ will issue a letter of confirmation of the monitoring frequency reduction. A copy of the confirmation letter will be forwarded to the DEQ's Permit Compliance System unit to update the permit reporting requirements. The DEQ may deny the certification if it determines that, during the period for which the certification is submitted, there were errors in meeting test acceptability requirements, errors in statistical interpretation affecting test results reported on DMRs, late submissions of test reports or submissions of substantively incomplete test reports. If the certification is denied, the permittee shall continue biomonitoring of the affected test species at a frequency of once per quarter until the permit is reissued.

c. SUBLETHAL FAILURES DURING FIRST YEAR OF TESTING: If, during the first year of testing, only a sublethal effect is demonstrated to a test species, continued routine testing for that species is required for the remainder of the first year and, as necessary, into the following year(s) at the frequency prescribed in Part I until the effluent passes four consecutive routine tests for both lethal and sublethal test endpoints, at which time the permittee may apply for a monitoring frequency reduction in a manner consistent with Item 5.a above. Certification in accordance with Item 5.b of this section shall be submitted at the time of such application for monitoring frequency reduction. If granted, the monitoring frequency may be reduced in accordance with Item 5.a.

d. SURVIVAL FAILURES AFTER A MONITORING FREQUENCY REDUCTION: If any test fails the survival endpoint at any time after the granting of a monitoring frequency reduction, two monthly retests are required in accordance with Item 2 of this section (unless the permittee is performing a TRE) and the monitoring frequency for the affected test species shall be increased to the WET testing frequency prescribed in Part I until the permit is reissued.

e. This monitoring frequency reduction applies only until the expiration date of this permit, at which time the monitoring frequency for both test species reverts to the WET testing frequency prescribed in Part I until the permit is reissued.

6. TOXICITY REDUCTION EVALUATION (TRE)

a. Within ninety (90) days of confirming lethality in the retests for a test species, the permittee shall submit to the DEQ a Toxicity Reduction Evaluation (TRE) Action Plan and Schedule for conducting a TRE. The TRE Action Plan shall specify the approach and methodology to be used in performing the TRE. A Toxicity Reduction Evaluation is an investigation intended to determine those actions necessary to achieve compliance with water quality-based effluent limits by reducing an effluent's toxicity to an acceptable level. A TRE is defined as a step-wise process which combines toxicity testing and analyses of the physical and chemical characteristics of a toxic effluent to identify the constituents causing effluent toxicity and/or treatment methods which will reduce the effluent toxicity. The TRE Action Plan shall lead to the successful elimination of effluent toxicity at the critical dilution and include the following:

(1) Specific Activities. The plan shall detail the specific approach the permittee intends to utilize in conducting the TRE. The approach may include toxicity characterizations, identifications and confirmation activities, source evaluation, treatability studies, or alternative approaches. When the permittee conducts Toxicity Characterization Procedures the permittee shall perform multiple characterizations and follow the procedures specified in the documents "Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures" (EPA-600/6-91/003) and "Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I" (EPA-600/6-91/005F), or alternate procedures. When the permittee conducts Toxicity Identification Evaluations and Confirmations, the permittee shall perform multiple identifications and follow the methods specified in the documents "Methods for Aquatic Toxicity Identification Evaluations, Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity" (EPA/600/R-92/080) and "Methods for Aquatic Toxicity Identification Evaluations, Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity" (EPA/600/R-92/081), as appropriate.

The documents referenced above may be obtained through the National Technical Information Service (NTIS) by phone at (703) 487-4650, or by writing:

U.S. Department of Commerce
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

(2) Sampling Plan (e.g., locations, methods, holding times, chain of custody, preservation, etc.). The effluent sample volume collected for all tests shall be adequate to perform the toxicity test, toxicity characterization, identification and confirmation procedures, and conduct chemical specific analyses when a probable toxicant has been identified. Where the permittee has identified or suspects specific pollutant(s) and/or source(s) of effluent toxicity, the permittee shall conduct, concurrent with toxicity testing, chemical specific analyses for the identified and/or suspected pollutant(s) and/or source(s) of

effluent toxicity. Where lethality was demonstrated within 48 hours of test initiation, each composite sample shall be analyzed independently. Otherwise, the permittee may substitute a composite sample, comprised of equal portions of the individual composite samples, for the chemical specific analysis.

(3) Quality Assurance Plan (e.g., QA/QC implementation, corrective actions, etc.).

(4) Project Organization (e.g., project staff, project manager, consulting services, etc.).

b. The permittee shall initiate the TRE Action Plan within thirty (30) days of plan and schedule submittal. The permittee shall assume all risks for failure to achieve the required toxicity reduction.

c. The permittee shall submit to the DEQ a quarterly TRE Activities Report with the Discharge Monitoring Report in the months of (to be specified), containing information on toxicity reduction evaluation activities including:

(1) any data and/or substantiating documentation which identifies the pollutant(s) and/or source(s) of effluent toxicity;

(2) any studies/evaluations and results on the treatability of the facility's effluent toxicity; and

(3) any data which identifies effluent toxicity control mechanisms that will reduce effluent toxicity to the level necessary to meet no significant lethality at the critical dilution.

d. The permittee shall submit to the DEQ a Final Report on Toxicity Reduction Evaluation Activities no later than twenty-eight (28) months from confirming lethality in the retests, which provides information pertaining to the specific control mechanism selected that will, when implemented, result in reduction of effluent toxicity to no significant lethality at the critical dilution. The report will also provide a specific corrective action schedule for implementing the selected control mechanism.

e. Quarterly testing during the TRE is a minimum monitoring requirement. The DEQ recommends that permittees required to perform a TRE not rely on quarterly testing alone to ensure success in the TRE, and that additional tests be performed to capture toxic samples for identification of toxicants. Failure to identify the specific chemical compound causing toxicity test failure will normally result in a permit limit for whole effluent toxicity per federal regulations at 40 CFR 122.44(d)(1)(v).

B. SEWAGE SLUDGE REQUIREMENTS

The sludge produced at the facility is presently sent to the Enid Municipal Landfill located in the NE of Sections 29, Township 22-N, Range 6 W. I.M., Garfield County, Oklahoma..

Sewage sludge disposal practices shall comply with the federal regulations for landfills, sludge, and solid waste disposal established at 40 CFR Part 257, 503 and the DEQ rules governing Sludge Management (OAC 252:648) as applicable.

The permittee shall give 120 days prior notice to DEQ of any change planned in the sewage sludge disposal practice.

In addition, the permittee shall comply with other sludge requirements specified in Part IV of this permit.

The permittee is required to maintain all records relevant to sewage sludge disposal for the life of the permit. These records shall be made available to DEQ upon request.

C. POLLUTION PREVENTION REQUIREMENTS

1. The permittee shall institute a program within 12 months of the effective date of the permit (or continue on existing one) directed towards optimizing the efficiency and extending the useful life of the facility. The permittee shall consider the following items in the program:

   a. The influent loadings, flow and design capacity;
   b. The effluent quality and plant performance;
   c. The age and expected life of the wastewater treatment facility's equipment;
   d. Bypasses and overflows of the tributary sewerage system and treatment works;
   e. New developments at the facility;
   f. Operator certification and training plans and status;
   g. The financial status of the facility;
   h. Preventative maintenance programs and equipment conditions and;
   i. An overall evaluation of conditions at the facility.

2. The permittee shall prepare the following information on the sewage sludge generated by the facility.

   a. An annual quantitative tabulation of the ultimate disposition of all sewage sludge (including, but not limited to, the amount beneficially reused, landfilled, surface disposed, and incinerated).

   b. An assessment of technological processes and an economic analysis evaluating the potential for beneficial reuse of all sewage sludge not currently beneficially reused including a listing of any steps which would be required to achieve the sludge quality necessary to beneficially reuse the sludge.

   c. A description of, including the expected results and the anticipated timing for, all projects in process, in planning and/or being considered which are directed towards additional beneficial reuse of sewage sludge.

   d. An analysis of one composite sample of the sludge collected prior to ultimate re-use or disposal shall be performed for the pollutants listed in Part IV, Element 1, Section III, Table 3 of the permit.

   e. A listing of the specific steps (controls/changes) which would be necessary to achieve and sustain the quality of the sludge so that the pollutant concentrations in the sludge fall below the pollutant concentration criteria listed in Part IV, Element I, Section III, Table 3 of the permit.

   f. A listing of, and the anticipated timing for, all projects in process, in planning, and/or being considered which are directed towards meeting the sludge quality referenced in (c) above.

The permittee shall certify in writing, within three years of the effective date of the permit, that all pertinent information is available. This certification shall be submitted to:

Oklahoma Department of Environmental Quality
Water Quality Division
Wastewater Discharge Permit Section
P. O. Box 1677;
707 North Robinson Street
Oklahoma City, Oklahoma 73101-1677

D. CONTRIBUTING INDUSTRIES AND PRETREATMENT REQUIREMENTS

1. The permittee shall operate an industrial pretreatment program in accordance with Section 402(b)(8) of the Clean Water Act, the General Pretreatment Regulations (40 CFR Part 403) and the approved POTW pretreatment program submitted by the permittee. The pretreatment program was approved on October 15, 1984 and modified on July 15, 1994 and March 1, 2001. A Publicly Owned Treatment Works (POTW) facility is defined in 40 CFR 403.3(o) "as any devices and systems used in storage, treatment, recycling and reclamation of municipal sewage and industrial wastes of a liquid nature. It also includes sewers, pipes and other conveyances only if they convey wastewater to a POTW Treatment Plant. The term also means the municipality as defined in section 502(4) of the Act, which has jurisdiction over the Indirect Discharges to and from such treatment works." The POTW pretreatment program is hereby incorporated by reference and shall be implemented in a manner consistent with the following requirements:

   a. Industrial user information shall be updated at a frequency adequate to ensure that all IUs are properly characterized at all times;

   b. The frequency and nature of industrial user compliance monitoring activities by the permittee shall be commensurate with the character, consistency and volume of waste. However, in keeping with the requirements of 40 CFR 403.8 (f)(2)(v), the permittee must inspect and sample the effluent from each Significant Industrial User at least once a year. This is in addition to any industrial self-monitoring activities;

   c. The permittee shall enforce and obtain remedies for noncompliance by any industrial users with applicable pretreatment standards and requirements;

   d. The The permittee shall control through permit, order, or similar means, the contribution to the POTW by each Industrial User to ensure compliance with applicable Pretreatment Standards and requirements. In the case of Industrial Users identified as significant under 40 CFR 403.3(t), this control shall be achieved through permits or equivalent individual control mechanisms issued to each such user. Such control mechanisms must be enforceable and contain, at a minimum, the following conditions:

      (1). Statement of duration (in no case more than five years);

      (2). Statement of non-transferability without, at a minimum, prior notification to the POTW and provision of a copy of the existing control mechanism to the new owner or operator;

      (3). Effluent limits based on applicable general pretreatment standards, categorical pretreatment standards, local limits, and State and local law;

(4). Self-monitoring, sampling, reporting, notification and record keeping requirements, including an identification of the pollutants to be monitored, sampling location, sampling frequency, and sample type, based on the applicable general pretreatment standards in 40 CFR 403, categorical pretreatment standards, local limits, and State and local law; and

(5). Statement of applicable civil and criminal penalties for violation of pretreatment standards and requirements and any applicable compliance schedule. Such schedules may not extend the compliance date beyond federal deadlines.

e. The permittee shall evaluate, at least once every two years, whether each Significant Industrial User needs a plan to control slug discharges. If the POTW decides that a slug control plan is needed, the plan shall contain at least the minimum elements required in 40 CFR 403.8 (f)(2)(v);

f. The permittee shall provide adequate staff, equipment, and support capabilities to carry out all elements of the pretreatment program; and,

g. The approved program shall not be modified by the permittee without the prior approval of the DEQ.

2. The permittee shall establish and enforce specific limits to implement the provisions of 40 CFR Parts 403.5(a) and (b), as required by 40 CFR Part 403.5(c). Each POTW with an approved pretreatment program shall continue to develop these limits as necessary and effectively enforce such limits.

The permittee shall, within sixty days of the effective date of this permit, (1) submit a WRITTEN CERTIFICATION that a technical evaluation has been performed demonstrating that the existing technically based local limits (TBLL) are based on the current state water quality standards and are adequate to prevent pass through of pollutants, inhibition of or interference with the treatment facility, worker health and safety problems, and sludge contamination, OR (2) submit a WRITTEN NOTIFICATION that a technical evaluation revising the current TBLL and a draft sewer use ordinance which incorporates such revisions will be submitted within 12 months of the effective date of this permit.

All specific prohibitions or limits developed under this requirement are deemed to be conditions of this permit. The specific prohibitions set out in 40 CFR Part 403.5(b) shall be enforced by the permittee unless modified under this provision.

3. The permittee shall analyze the treatment facility influent and effluent for the presence of the toxic pollutants listed in 40 CFR 122 Appendix D (NPDES Application Testing Requirements) Table II at once per year and the toxic pollutants in Table III at least once every six months. If, based upon information available to the permittee there is reason to suspect the presence of any toxic or hazardous pollutant listed in Table V, or any other pollutant, known or suspected to adversely affect treatment plant operation, receiving water quality, or solids disposal procedures, analysis for those pollutants shall be performed at least once every six months on both the influent and the effluent.

The influent and effluent samples collected shall be composite samples consisting of at least 12 aliquots collected at approximately equal intervals over a representative 24 hour period and composited according to flow. Sampling and analytical procedures shall be in accordance with guidelines established in 40 CFR 136. The effluent samples shall be analyzed to a level as required in item 6 below. Where composite samples are inappropriate, due to sampling, holding time, or analytical constraints, at least 4 grab samples, taken at equal intervals over a representative 24 hour period, shall be taken.

4. The permittee shall prepare annually a list of Industrial Users which during the preceding twelve months were in significant noncompliance with applicable pretreatment requirements. For the purposes of this Part, significant noncompliance shall be determined based upon the more stringent of either criteria established at 40 CFR Part 403.8(f)(2)(vii) [rev. 7/24/90] or criteria established in the approved POTW pretreatment program. This list is to be published annually in the largest daily newspaper in the municipality during the month of December.

   In addition, during the month of December the permittee shall submit an updated status report to DEQ containing the following information:

   a. An updated list of all significant industrial users. For each industrial user listed the following information shall be included (Note: A sample table, which includes the requested information has been provided on Page 20 for your convenience):

      (1). Standard Industrial Classification (SIC) code and categorical determination;

      (2). Control document status. Whether the user has an effective control document, and the date such document was last issued, reissued, or modified, (indicate which industrial users were added to the system (or newly identified) within the previous 12 months);

      (3). A summary of all monitoring activities performed within the previous 12 months. The following information shall be reported:

         - total number of inspections performed;
         - total number of sampling visits made;

      (4). Status of compliance with both effluent limitations and reporting requirements. Compliance status shall be defined as follows:

         - Compliant (C) - no violations during the previous 12 month period;
         - Non-compliant (NC) - one or more violations during the previous 12 months but does not meet the criteria for significantly non-compliant industrial users;
         - Significant Noncompliance (SN) - in accordance with requirements described in d. above; and

      (5). For significantly noncompliant industrial users, indicate the nature of the violations, the type and number of actions taken (notice of violation, administrative order, criminal or civil suit, fines or penalties collected, etc.) and current compliance status. If ANY industrial user was on a schedule to attain compliance with effluent limits, indicate the date the schedule was issued and the date compliance is to be attained (Note: A sample table, which includes the requested information has been provided on Page 19 for your convenience);

b. A list of all significant industrial users whose authorization to discharge was terminated or revoked during the preceding 12 month period and the reason for termination;

c. A report on any interference, pass through, upset or POTW permit violations known or suspected to be caused by industrial contributors and actions taken by the permittee in response;

d. The results of all influent and effluent analyses performed pursuant to "item 3 above". These results and comparisons to the appropriate technically based local limit allowances and effluent water quality standards may be presented in tabular form as per the sample table provided on Page 18 for your convenience;

e. A copy of the newspaper publication of the significantly non-compliant industrial users giving the name of the newspaper and the date published;

5. The permittee shall provide adequate notice of the following:

a. Any new introduction of pollutants into the treatment works from an indirect discharger which would be subject to Sections 301 and 306 of the CWA and/or Sections 40 CFR 405-499 if it were directly discharging those pollutants; and

b. Any substantial change in the volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into the treatment works at the time of issuance of the permit.

Adequate notice shall include information on (i) the quality and quantity of effluent to be introduced into the treatment works, and (ii) any anticipated impact of the change on the quality or quantity of effluent to be discharged from the POTW.

6. All effluent monitoring conducted in accordance with "item 3 above" shall meet the Minimum Quantification Levels (MQLs) shown in the attached tables.

MINIMUM QUANTIFICATION LEVELS (MQLs)

METALS AND CYANIDE	(ug/L)	EPA METHOD
Antimony (Total)[1]	60	200.7
Arsenic (Total)[1]	10	206.2
Beryllium (Total)[1]	5	200.7
Cadmium (Total)[2]	1	213.2
Chromium (Total)[1]	10	200.7
Chromium (3+)[1]	10	200.7
Chromium (6+)[1]	10	200.7
Copper (Total)[2]	10	220.2
Lead (Total)[2]	5	239.2
Mercury (Total)[1]	0.2	245.1
Nickel (Total)[1] [Freshwater]	40	200.7
Nickel (Total)[2] [Marine]	5	249.2
Selenium (Total)[1]	5	270.2
Silver (Total)[2]	2	272.2
Thallium (Total)[1]	10	279.2
Zinc (Total)[1]	20	200.7
Cyanide (Total)[1]	10	335.2
DIOXIN		
1,7,8-Tetrachloro-dibenzo-p-dioxin (TCDD)[5]	.00001	1613
VOLATILE COMPOUNDS		
Acrolein[4]	50	624
Acrylonitrile[4]	50	624
Benzene[4]	10	624
Bromoform[5]	10	624
Carbon Tetrachloride[5]	10	624
Chlorobenzene[5]	10	624
Chlorodibromomethane[5]	10	624
Chloroethane[6]	50	624
2-Chloroethyl vinyl ether[4]	10	624
Chloroform[5]	10	624
Dichlorobromomethane[5]	10	624
1,1-Dichloroethane[5]	10	624
1,2-Dichloroethane[5]	10	624
1,1-Dichloroethylene[5]	10	624
1,2-Dichloropropane[5]	10	624
1,3-Dichloropropylene[5]	10	624
Ethylbenzene[5]	10	624
Methyl Bromide [Bromomethane][6]	50	624
Methyl Chloride [Chloromethane][6]	50	624
Methylene Chloride[5]	20	624

VOLATILE COMPOUNDS	(ug/L)	EPA METHOD
1,1,2,2-Tetrachloroethane[5]	10	624
Tetrachloroethylene[5]	10	624
Toluene[5]	10	624
1,2-trans-Dichloroethylene[5]	10	624
1,1,1-Trichloroethane[5]	10	624
1,1,2-Trichloroethane[5]	10	624
Trichloroethylene[5]	10	624
Vinyl Chloride[5]	10	624
ACID COMPOUNDS		
2-Chlorophenol[5]	10	625
2,4-Dichlorophenol[5]	10	625
2,4-Dimethylphenol[7]	10	625
4,6-Dinitro-o-Cresol [2 methyl 4,6-dinitrophenol[5]	50	625
2,4-Dinitrophenol[5]	50	625
2-Nitrophenol[5]	20	625
4-Nitrophenol[5]	50	625
p-Chloro-m-Cresol [4 chloro-3-methylphenol][6]	10	625
Pentachlorophenol[5]	50	625
Phenol[5]	10	625
2,4,6-Trichlorophenol[5]	10	625
BASE/NEUTRAL COMPOUNDS		
Acenaphthene[5]	10	625
Acenaphthylene[5]	10	625
Anthracene[5]	10	625
Benzidine[4]	50	625
Benzo(a)anthracenes[5]	10	625
Benzo(a)pyrene[5]	10	625
3,4-Benzofluoranthene[5]	10	625
Benzo(ghi)perylene[6]	20	625
Benzo(k)fluoranthene[5]	10	625
Bis(2-chloroethoxy) methane[5]	10	625
Bis(2-chloroethyl) ether[5]	10	625
Bis(2-chloroisopropyl) ether[5]	10	625
Bis(2-ethylhexyl) phthalate[5]	10	625
4-Bromophenyl phenyl ether[5]	10	625
Butyl benzyl phthalate[5]	10	625
2-Chloronapthalene[5]	10	625
4-Chlorophenyl phenyl ethers[5]	10	625
Chrysene[5]	10	625

MINIMUM QUANTIFICATION LEVELS (MQLs)

BASE/NUETRAL COMPOUNDS	(ug/L)	EPA METHOD
Dibenzo (a,h) anthracene[6]	20	625
1,2-Dichlorobenzene[5]	10	625
1,3-Dichlorobenzene[5]	10	625
1,4-Dichlorobenzene[5]	10	625
3,3'-Dichlorobenzidirn[6]	50	625
Diethyl Phthalate[5]	10	625
Dimethyl Phthalate[5]	10	625
Di-n-Butyl Phthalate[5]	10	625
2,4-Dinitrotoluene[5]	10	625
2,6-Dinitrotoluene[5]	10	625
Di-n-octyl Phthalate[5]	10	625
1,2-Diphenythydrazine[4]	20	625
Fluoranthene[5]	10	625
Fluorene[5]	10	625
Hexachlorobenzene[5]	10	625
Hexachlorobutadiene[5]	10	625
Hexachlorocyclopentadiene[5]	10	625
Hexachloroethane[6]	20	625
Indeno (1,2,3-cd) pyrene[6] (2,3-o-phenylene pyrene)	20	625
Isophorone[5]	10	625
Naphthalene[5]	10	625
Nitrobenzene[5]	10	625
N-nitrosodimethylamine[6]	50	625
N-nitrosodi-n-propylamine[6]	20	625
N-nitrosodiphenylamine[6]	20	625
Phenanthrene[5]	10	625
Pyrene[5]	10	625
1,2,4-Trichlorobenzene[5]	10	625
PESTICIDES		
Aldrin[7]	0.05	608
Alpha-BHC[7]	0.05	608
Bet&-BHC[7]	0.05	609
Gamma-BHC (Lindane)[7]	0.05	608
Delta-BHC[7]	0.05	608
Chlordane[7]	0.2	608
4,4'-DDT[7]	0.1	608
4,4'-DDE (p,p-DDX)[7]	0.1	608
4,4'-DDD (p,p-TDE)[7]	0.1	608
Dieldrin[7]	0.1	608
Alpha-endosulfan[7]	0.1	608
Beta-endosulfan[7]	0.1	608
Endosulfan sulfate[7]	0.1	608

PESTICIDES	(ug/L)	EPA METHOD
Endrin[7]	.1	609
Endrin aldehyde[7]	.1	609
Heptachlor[7]	.05	608
Heptachlor epoxide[7] (BHC-hexachlorocyclohexane)	.05	608
PCB-1242[7]	1.0	608
PCB-1254	1.0	608
PCB-1221	1.0	608
PCB-1232	1.0	608
PCB-1248	1.0	608
PCB-1260	1.0	609
PCB,1016	1.0	608
Toxaphene[7]	5.0	608

[1]Based on Contract Required Detection level (CRDL) developed pursuant to 40 CFR Part 300.430(b)(8)

[2] Method 213.2, 239.2, 220.2, 272.2

[3]Dioxin National Strategy

[4]No CRQL(Contract required Quantification Level developed pursuant to 40 CFR Part 300.430(b)(8)) established

[5]CRQL basis, equivalent to ML

[6]ML basis, higher than CRQL

[7]CRQL basis, no ML established

[8]CRQL basis, higher than ML

OKLAHOMA DEQ SAMPLE
POTW MONITORING RESULTS [1] SUMMARY TABLE
FOR THE (CA NAME) ANNUAL PRETREATMENT REPORT, (MONTH & YEAR)

POLLUTANT	Minimum Quantification Level (MQL)	Detection Level (DL) Concentration Used (mg/l or ug/l)	POTW Monitoring Results (Concentrations in mg/l unless otherwise noted)					Comparative Standards (Loadings in lbs/day; concentration in mg/l unless otherwise noted)		
	Concentration (mg/l or ug/l) [2]		Average Influent Concentration	POTW Average Flow (MGD)	Calculated Headworks Loading (lbs/d)	Maximum Effluent Concentration	Average Effluent Concentration	Maximum Allowable Headworks Loading or Concentration	Permit or OK Limits Concentrations Daily Maximum	Daily Maximum
Arsenic (Total										
Cadmium (Total										
Chromium (Total)										
Copper (Total)										
Lead (Total)										
Mercury (Total))										
Nickel (Total)										
Silver (Total))										
Zinc (Total										
Cyanide (Total)										
Other pollutants detected:										

1 [1] It is advised that the influent and effluent samples are collected considering flow detention time through each plant. Analytical MQLs should be used so that the data can also be used for Local Limits assessment and NPDES application purposes.

SIGNIFICANTLY NON-COMPLIANT USERS – ENFORCEMENT ACTIONS TAKEN

INDSUSTRIAL USER	NATURE OF VIOLATION		NUMBER OF ACTIONS TAKEN					PENALTIES COLLECTED	COMPLIANCE SCHEDULE		CURRENT STATUS	COMMENTS
	REPORTS	LIMITS	N.O.V.	A.O.	CIVIL	CRIMINAL	OTHER		DATE ISSUED	DATE DUE		

PRETREATMENT PROGRAM STATUS REPORT -- UPDATED SIGNIFICANT INDUSTRIAL USERS LIST

INDUSTRIAL USER	SIC CODE	CATEGORICAL DETERMINATION	CONTROL DOCUMENT		NEW USER	TIMES INSPECTED	TIMES SAMPLED	COMPLIANCE STATUS				
								REPORTS				EFFLUENT LIMITS
			Y/N	LAST ACTION				BMR	90-DAY	SEMI-ANNUAL	SELF-MONITORING	

PART III. STANDARD CONDITIONS FOR OPDES MUNICIPAL/DOMESTIC PERMIT

SECTION A. Definitions

In addition to the definitions included in the Oklahoma Pollutant Discharge Elimination System Act (OPDES Act), Title 27 O.S. Supp 1996, Section 2-6-201 et seq., and the rules of the State of Oklahoma Department of Environmental Quality (DEQ) adopted thereunder {See OAC 252:605}; the following definitions shall apply to this permit:

1. "Act" means the OPDES Act as amended.

2. "Applicable effluent standards and limitations" means all state and federal effluent standards and limitations to which a discharge is subject under the Act, including, but not limited to, effluent limitations, standards of performance, toxic effluent standards and prohibitions, and pretreatment standards.

3. "Applicable water quality standards" means all water quality standards to which a discharge is subject under the Act.

4. "Average limitations"

   a. "7-day average" (or weekly average), other than for coliform bacteria, is the arithmetic mean of the daily values for all effluent samples collected during a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The "7-day average" for coliform bacteria is the geometric mean of the values for all effluent samples collected during a calendar week.

   b. "30-day average" (or monthly average), other than for coliform bacteria, is the arithmetic mean of the daily values for all effluent samples collected during a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month. The "30-day average" for coliform bacteria is the geometric mean of the values for all effluent samples collected during a calendar month.

5. "Bypass" means the diversion, whether intentional or unintentional, of waste streams from any portion of the collection system or treatment facility.

6. "Daily discharge" means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in terms of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the sampling day. For pollutants with limitations expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the sampling day. "Daily discharge" determination of concentrations made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the "daily discharge" determination of concentration shall be the arithmetic average (weighted by flow value) of all samples collected during that sampling day.

7. "Daily maximum" discharge limitation means the highest allowable "daily discharge" during the calendar month.

8. "Environmental Protection Agency" (EPA) means the U.S. Environmental Protection Agency.

9. "Executive Director" means the Executive Director of the State of Oklahoma Department of Environmental Quality (DEQ) or his/her authorized representative(s).

11. "Industrial user" means a nondomestic discharger, as identified in 40 CFR Part 403, introducing pollutants to a publicly owned treatment works.

12. "Oklahoma Pollutant Discharge Elimination System" (OPDES) means the state program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under the Act.

13. "Oklahoma Department of Environmental Quality" also known as (DEQ), means the State of Oklahoma Department of Environmental Quality.

14. "OPDES Act" means the Oklahoma Pollutant Discharge Elimination System Act, Title 27 O.S. Supp. 1996, Section 2-6-201 et seq.

15. "Samples"

   a. For coliform bacteria, a sample consists of one effluent grab portion collected during a 24-hour period at peak loads.

   b. "Grab sample" means an individual sample collected in less than 15 minutes.

   c. "SBR (sequential batch reactor) sample and the various composite samples" are as defined in the OPDES Act, the Oklahoma Environmental Quality Code, rules transferred to or promulgated thereunder by DEQ.

   SBR Composite Sample:

   SBR Sample
   A minimum of three aliquots collected from the discharge of a reactor. The first aliquot must be collected no later than ¼ time, the second approximately ½ time, and the third no earlier than ¾ time from the initiation of a discharge cycle to the stoppage of the discharge cycle. The three aliquots shall consist of equal portions unless the rate of discharge from the reactor varies significantly during the cycle, in which case the measurement of the flow occurring at the time of their collection

Single Composite SBR Sample

One SBR sample collected from each reactor during one discharge cycle and composited proportional to the volume discharged from each of the reactors. The sample from at least one of the reactors shall represent the expected period of peak influent organic loading.

Two-Cycle Composite SBR Sample

One SBR sample collected from two consecutive discharge cycles of each reactor and composited proportional to the volume discharged during each cycle of each reactor. The sample from at least one cycle shall represent the expected period of peak influent organic loading.

Three-Cycle Composite SBR Sample

One SBR sample collected from three consecutive discharge cycles of each reactor and composted proportional to the volume discharged during each cycle of each reactor. The sample from at least one cycle shall represent the expected period of peak influent organic loading.

d. "24-hour composite sample" consists of a minimum of 12 effluent portions collected at equal time intervals over the 24-hour period and combined proportional to flow or a sample collected at frequent intervals proportional to flow over the 24-hour period.

e. "12-hour composite sample" consists of 12 effluent portions collected no closer together than one hour and composited according to flow. The daily sampling intervals shall include the highest flow periods.

f. "6-hour composite sample" consists of six effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.

g. "3-hour composite sample" consists of three effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.

16. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

17. "Sewage sludge" means the solids, residues and precipitates separated from or created in sewage by the unit processes of a publicly owned treatment works. Sewage as used in this definition means any wastes, including wastes from humans, households, commercial establishments, industries, and storm water runoff, that are discharged to or otherwise enter a publicly owned treatment works.

18. "Treatment works" means any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage and industrial wastes of a liquid nature to implement the Act, or necessary to recycle or reuse water at the most economical cost over the estimated life of the works, including intercepting sewers, sewage collection systems, pumping, power and other equipment, and their appurtenances, extension, improvement, remodeling, additions, and alterations thereof.

19. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

20. "MGD" means million gallons per day.

21. "mg/l" means milligrams per liter or parts per million (ppm).

22. "µg/l" means micrograms per liter or parts per billion (ppb).

SECTION B. Monitoring, Record Keeping, Reporting and Liabilities

1. Monitoring

a. Site and Frequency

All monitoring undertaken in compliance with the terms of this permit shall be conducted at the frequency and sample site specified in Part I, Section A of this permit and in accordance with the OPDES Act and the Oklahoma Environmental Quality Code. Grab or composite in Part III, Section B.5 below.

b. Representative Samples

Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

c. Averaging of Measurements

Calculations of all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Executive Director in the permit.

d. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report (DMR). Such increased monitoring frequency shall also be indicated on the DMR.

2. Testing Requirements

a. Methods

All sampling and analytical methods used to meet monitoring requirements specified above shall conform to the Act, 40 CFR Part 136, and DEQ rules and regulations.

b. Maintenance and Calibration

The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instruments at intervals frequent enough to ensure accuracy of measurements and shall maintain appropriate records of such activities.

c. Quality Control

An adequate analytical quality control program, including the analyses of sufficient standards, spikes, and duplicate samples to insure the accuracy to all required analytical results shall be maintained by the permittee or designated commercial laboratory.

3. Flow Measurements

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to insure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than 10% from true discharge rates throughout the range of expected discharge rates.

4. Records

a. Contents

Records of monitoring information shall include:

(1) The date, exact place, and time of sampling or measurements;
(2) The individual(s) who performed the sampling or measurements;
(3) The date(s) and time(s) analyses were performed;
(4) The individual(s) who performed the analyses;
(5) The analytical techniques or methods used; and
(6) The results of such analyses.

b. Retention

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report, or application. This period may be extended by request of the Executive Director at any time.

5. Discharge Monitoring Reports (DMRs)

All monitoring information required in Part I, Section A of this permit shall be included on DMRs (EPA form 3320-1). Reporting periods shall end on the last day of the month. The reports shall be prepared monthly. The original and one copy shall be submitted to the Oklahoma Department of Environmental Quality at the address shown below no later than the tenth (10th) day of the following month. A copy shall also be submitted simultaneously to the appropriate local DEQ office. All operating records and reports shall comply with the OPDES Act, the Oklahoma Environmental Quality Code, and the requirements of 40 CFR 122.41(j).

Water Quality Division
Oklahoma Department of Environmental Quality
P.O. Box 1677
Oklahoma City, OK 73101-1677

6. Noncompliance Reports

a. Twenty-Four Hour Reporting

(1) The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. The DEQ shall be notified by calling 1-800-256-2365 or 702-8290 (Oklahoma City Metropolitan Area). A written submission shall be provided within five (5) days of the time the permittee becomes aware of the circumstances. The report shall contain the following information:

(a) A description of the noncompliance and its cause;
(b) The period of noncompliance including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and,
(c) Steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

(2) The following shall be included as information which must be reported within 24 hours:

(a) Any unanticipated bypass which exceeds any effluent limitation in the permit;
(b) Any upset which exceeds any effluent limitation in the permit;
(c) Any violation of a maximum daily discharge limit for any of the pollutants listed by the Executive Director in Part I, Section A; and,
(d) Any bypass in the collection system [sanitary sewer overflow (SSO)].

(3) The Executive Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

b. Other Noncompliance

The permittee shall report all instances of noncompliance not reported under Part III, Sections B.5 and B.6.a or the reporting requirements of any Schedule of Compliance included in Part I, Section B at the time monitoring reports are submitted. The reports shall contain the information listed at Part III, Section B.6.a.

7. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under the Act.

8. Federal Penalties for Violations of Permit Conditions

Nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Any false or materially misleading representation or concealment of information required to be reported by the provisions of the permit, the Act, or applicable regulations, which avoids or effectively defeats the regulatory purpose of the permit may subject the Permittee to criminal enforcement pursuant to 18 U.S.C. Section 1001.

a. Criminal

(1) Negligent Violations

The Act provides that any person who negligently violates permit conditions implementing the Act is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than one (1) year, or both.

(2) Knowing Violations

The Act provides that any person who knowingly violates permit conditions implementing the Act is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than three (3) years, or both.

(3) Knowing Endangerment

The Act provides that any person who knowingly violates permit conditions implementing the Act and who knows at that time that he is placing another person in imminent danger of death or serious bodily injury is subject to a fine of not more than $250,000, or by imprisonment for not more than fifteen (15) years, or both.

(4) False Statements

The Act provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the Act or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under the Act, shall upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than two (2) years, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment shall be by a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four (4) years, or by both. (See Section 2-6-206 of the Act).

b. Civil Penalties

The Act provides that any person who violates a permit condition implementing the Act is subject to a civil penalty not to exceed $27,500 per day for each violation.

c. Administrative Penalties

The Act provides that any person who violates a permit condition implementing the Act is subject to an administrative penalty, as follows:

(1) Class I Penalty

Not to exceed $11,000 per violation nor shall the maximum amount exceed $27,500.

(2) Class II Penalty

Not to exceed $11,000 per day for each day during which the violation continues nor shall the maximum amount exceed $137,500.

9. State Penalties

a. Civil and Administrative

For any violation of the limitations and/or conditions of this permit, the State may assess a fine of up to $10,000 per day per violation.

b. Criminal

Violations of the terms of this permit constitute a misdemeanor under Oklahoma Statutes with various provisions for fines and jail terms.

ECTION C. Other Conditions

1. Permit Application

a. Timely Application

Upon timely application for a permit, any prior permit remains in effect until a new one is issued.

b. Date of Application

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application shall be submitted at least 180 days before the expiration date of this permit unless otherwise authorized by the Executive Director. He or she may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date. Continuation of expiring permits shall be governed by regulations promulgated at 40 CFR 122.6 and any subsequent amendments.

c. Relevant Facts

When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Executive Director, it shall promptly submit such facts or information.

2. Changes

a. Change in discharge

(1) Anticipated Noncompliance

The permittee shall give advance notice of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

(2) Municipal Permits

Any change in the facility discharge (including the introduction of any new source or significant discharge or significant changes in the quantity or quality of existing discharges to the treatment system that may result in new or increased discharges of pollutants) must be reported to the permitting authorities. In no case are any new connections, increased flows, or significant changes in influent quality permitted that will cause violations or add to existing violations of the effluent limitations specified herein.

(3) Other Permits

The permittee shall give notice to the Executive Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

(a) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or.

(b) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to all pollutants whether or not they are subject to effluent limitations in the permit.

b. Transfer of ownership or control

This permit is not transferable to any person except after notice to the Executive Director. The Executive Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as necessary under the Act.

3. Property Rights

This permit does not convey any property rights of any sort, or any exclusive privilege.

4. Duty to Comply

a. All authorized discharges shall comply with the rules of the DEQ, which are hereby incorporated by reference: the Act and OPDES Regulations, and all provisions, conditions, and requirements included in this permit.

b. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of applicable state and federal laws and the Act, the Oklahoma Environmental Quality Code and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

c. The permittee shall comply with effluent standards or prohibitions established under the Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

5. Duty to mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

6. Duty to halt or reduce activity

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

7. Duty to provide information

The permittee shall furnish within a reasonable time, any information which the Executive Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish, upon request, copies of records required to be kept by this permit.

8. Permit modification, suspension and revocation

After notice and opportunity for a hearing, as is required by law, this permit may be modified, suspended, revoked and reissued, or terminated during its term in accordance with 40 CFR 122.62 and 122.64; and Title 27 O.S. Supp. 1996, Section 2-6-201 et seq., and the rules of the State of Oklahoma Department of Environmental Quality (DEQ) adopted thereunder {See OAC 252:605}. The filing of a request for a permit modification or reissuance, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

9. Proper operation and maintenance

a. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by permittee as efficiently as possible and in a manner which will minimize upsets and discharges of excessive pollutants and will achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

b. The permittee shall provide an adequate operating staff which is duly qualified to carry out operation, maintenance and testing functions required to insure compliance with the conditions of this permit.

c. Collected screenings, slurries, sludges and other solids shall be disposed of in accordance with the Oklahoma Solid Waste Management Act and in such a manner as to prevent entry of those wastes (or runoff from the wastes) into waters of the state and in compliance with applicable rules of the DEQ.

10. Power Failure

The permittee is responsible for maintaining adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failures either by means of alternative power sources, standby generators, or retention of inadequately treated effluent.

11. Upsets and Bypasses

a. Upsets

(1) An upset constitutes an affirmative defense to an enforcement action brought for noncompliance with technology-based permit effluent limitations if the following requirements are met. A permittee who wishes to establish the affirmative defense of upset shall demonstrate through properly signed, contemporaneous operating logs, or other relevant evidence that:

(a) An upset occurred and that the permittee can identify the specific cause(s) of the upset;

(b) The permitted facility was at the time being properly operated;

(c) The permittee submitted notice of the upset as required in Part III, Section B.6 of this permit;

(d) The permittee complied with any remedial measures under Part III, Section C.5.

(2) Burden of Proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

b. Bypasses

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

(a) Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the reporting requirements of Part III, Sections C.11.b(1) and (2).

(b) Bypass exceeding limitations is prohibited, and the Executive Director may take enforcement action against a permittee for bypass, unless:

i. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

ii. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and,

iii. The permittee submitted notices required by Part III, Section B.6.

(c) The Executive Director may allow an anticipated bypass that exceeds limitations after considering its adverse effects, if he/she determines that it will meet the three conditions listed at Part III, Section C.11.b.(1)(b).

(2) Unanticipated bypass. The permittee shall, within 24 hours, submit notice of an unanticipated bypass as required in Part III, Section B.6.

12. Percent Removal

For publicly owned treatment works, the 30-day average (or monthly average) percent removal for Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS) shall not be less than 85 percent unless otherwise authorized by the permitting authority in accordance with 40 CFR 133.103. This requirement may be waived in permits containing mass loading limits for BOD and TSS.

13. Right of entry

The permittee shall allow the Executive Director, and/or his/her authorized representative(s), upon presentation of credentials and such other documents as may be required by the law to:

a. Enter upon the permittee's premises or other premises under the control of the permittee, where an effluent source is located or may be located or in which any records are required to be kept under the terms and conditions of this permit;

b. Have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit, or the Act or DEQ rules;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), maintenance, practices or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

14. Toxic Effluent Standards

Notwithstanding Section III.C.8 of this permit, if any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under the Act for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this permit, this permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition.

15. Signatory Requirements

All applications, reports, or information submitted to the Executive Director shall be signed and certified.

a. All permit applications shall be signed as follows:

(1) For a corporation - by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

(a) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation; or,

(b) The manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

(2) For a partnership or sole proprietorship - by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal, or other public agency - by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a federal agency includes:

(a) The chief executive officer of the agency, or

(b) A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

b. All reports required by the permit and other information requested by the Executive Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described above;

(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. A duly authorized representative may thus be either a named individual or an individual occupying a named position; and,

(3) The written authorization is submitted to the Executive Director.

c. Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

16. Confidentiality

Except for applications, effluent data, permits, and other data specified in 40 CFR 122.7, any information submitted pursuant to this permit may be claimed as confidential by the submitter. The Executive Director will rule upon such claim in accordance with the Act. If no claim is made at the time of submission, information may be made available to the public without further notice.

Part IV
SEWAGE SLUDGE REQUIREMENTS
PERMIT
INSTRUCTIONS TO PERMITTEES

Select only those Elements and Sections which apply to your sludge reuse or disposal practice.

If your facility utilizes more than one type of disposal or reuse method (for example, Element 1 and Element 2 apply) or the quality of your sludge varies (for example, Section II and Section III of Element 1 apply) use a separate Discharge Monitoring Report (DMR) for each Section that is applicable.

The sludge DMRs shall be due by February 19th of each year and shall cover the previous January through December time period.

The sludge conditions do not apply to wastewater treatment lagoons where sludge is not wasted for final reuse/disposal. If the sludge is not removed, the permittee shall indicate on the DMR "No Discharge."

ELEMENT 1 - LAND APPLICATION

ELEMENT 2 - MUNICIPAL SOLID WASTE LANDFILL DISPOSAL

ELEMENT 1 - LAND APPLICATION

SECTION I. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE LAND APPLICATION

A. **General Requirements**

1. The permittee shall handle and dispose of sewage sludge in accordance with the Oklahoma Pollutant Discharge Elimination System (OPDES) Act (hereafter "the Act") and all other applicable federal and state regulations to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants which may be present in the sludge.

2. If requirements for sludge management practices or pollutant criteria become more stringent than the sludge pollutant limits or acceptable management practices in this permit, or control a pollutant not listed in this permit, this permit may be modified or revoked and reissued to conform to the requirements promulgated under the Act. If new limits for molybdenum are promulgated prior to permit expiration, then those limits shall become directly enforceable.

3. In all cases, if the person (permit holder) who prepares the sewage sludge supplies the sewage sludge to another person for land application use or to the owner or lease holder of the land, the permit holder shall provide necessary information to the parties who receive the sludge to assure compliance with these regulations.

4. The permittee shall give prior notice to the Director, Water Quality Division, State of Oklahoma Department of Environmental Quality (DEQ), 707 North Robinson, Oklahoma City, Oklahoma 73101-1677 of any planned changes in the sewage sludge disposal practice, in accordance with 40 CFR 122.41(l)(1)(iii). These changes may justify the application of permit conditions that are different from or absent in the existing permit. Change in the sludge use or disposal practice may be cause for modification of the permit in accordance with 40 CFR 122.62(a)(1).

B. **Testing Requirements**

1. Sewage sludge shall be tested once during the life of the permit within one year from the effective date of the permit in accordance with the method specified at 40 CFR Part 268, Appendix I [Toxicity Characteristic Leaching Procedure (TCLP)] or other approved methods. Sludge shall be tested after final treatment prior to leaving the publicly owned treatment works (POTW) site. Sewage sludge determined to be a hazardous waste in accordance with 40 CFR Part 261, shall be handled according to Resource Conservation and Recovery Act (RCRA) standards for the disposal of hazardous waste in accordance with 40 CFR Part 262. The disposal of sewage sludge determined to be a hazardous waste, in other than a certified hazardous waste disposal facility shall be prohibited. The DEQ, Waste Management Division at 405-702-5100, shall be notified of test failure within 24 hours. A written report shall be provided to this division within 7 days after failing the TCLP. The report will contain test results, certification that unauthorized disposal has not occurred and a summary of alternative disposal plans that comply with RCRA standards for the disposal of hazardous waste. The report shall be addressed to the Director, Waste Management Division, DEQ, 707 N. Robinson, Oklahoma City, Oklahoma 73101-1677 and a copy sent to the Director, Water Quality Division, DEQ, at the same address.

2. Sewage sludge shall not be applied to the land if the concentration of the pollutants exceeds the pollutant concentration criteria in Table 1. The frequency of testing for pollutants in Table 1 is found in Element 1, Section I.C.

TABLE I

Pollutant	Ceiling Concentration (milligrams per kilogram)*
Arsenic	75
Cadmium	85
Copper	4300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
PCBs	49
Selenium	100
Zinc	7500

* Dry weight basis

3. Pathogen Control

All sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site shall be treated by either the Class A or Class B pathogen requirements. Sewage sludge that is applied to a lawn or home garden shall be treated by the Class A pathogen requirements. Sewage sludge that is sold or given away in a bag shall be treated by the Class A pathogen requirements.

Class A Sludge Requirements:

a. Six alternatives are available to demonstrate compliance with Class A sewage sludge. All 6 options require either the density of fecal coliform in the sewage sludge be less than 1000 Most Probable Number (MPN) per gram of total solids (dry weight basis), or the density of *Salmonella sp.* bacteria in the sewage sludge be less than three MPN per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed; at the time the sewage sludge is prepared for sale or given away in a bag or other container for application to the land. Below are the additional requirements necessary to meet the definition of a Class A sludge.

Alternative 1 - The temperature of the sewage sludge that is used or disposed shall be maintained at a specific value for a period of time. See 40 CFR 503.32(a)(3)(ii) and OAC 252:648 for specific information.

Alternative 2 - The pH of the sewage sludge that is used or disposed shall be raised to above 12 and shall remain above 12 for 72 hours.

The temperature of the sewage sludge shall be above 52 degrees Celsius for 12 hours or longer during the period that the pH of the sewage sludge is above 12.

At the end of the 72 hour period during which the pH of the sewage sludge is above 12, the sewage sludge shall be air dried to achieve a percent solids in the sewage sludge greater than 50 percent.

Alternative 3 - The sewage sludge shall be analyzed for enteric viruses prior to pathogen treatment. The limit for enteric viruses is one Plaque-forming Unit per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 40 CFR 503.32(a)(5)(ii) for specific information. The sewage sludge shall be analyzed for viable helminth ova prior to pathogen treatment. The limit for viable helminth ova is less than one per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 40 CFR 503.32(a)(5)(iii) and OAC 252:648 for specific information.

Alternative 4 - The density of enteric viruses in the sewage sludge shall be less than one Plaque-forming Unit per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed or at the time the sludge is prepared for sale or given away in a bag or other container for application to the land.

The density of viable helminth ova in the sewage sludge shall be less than one per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed or at the time the sewage sludge is prepared for sale or given away in a bag or other container for application to the land.

Alternative 5 - Sewage sludge shall be treated by one of the Processes to Further Reduce Pathogens (PFRP) described in 40 CFR 503 Appendix B. PFRPs include composting, heat drying, heat treatment, and thermophilic aerobic digestion.

Alternative 6 - Sewage sludge shall be treated by a process that is equivalent to a PFRP, if individually approved by the Pathogen Equivalency Committee representing the DEQ.

Class B Sludge Requirements:

b. Three alternatives are available to demonstrate compliance with Class B sewage sludge.

Alternative 1 - (i) Seven separate random samples representative of the sewage sludge shall be collected for one monitoring episode at the time the sewage sludge is used or disposed.

(ii) The geometric mean of the density of fecal coliform in the samples collected shall be less than either 2,000,000 MPN per gram of total solids (dry weight basis) or 2,000,000 Colony Forming Units per gram of total solids (dry weight basis).

Alternative 2 - Sewage sludge shall be treated in one of the Processes to Significantly Reduce Pathogens (PSRP) described in 40 CFR 503 Appendix B.

Alternative 3 - Sewage sludge shall be treated in a process that is equivalent to a PSRP, if individually approved by the Pathogen Equivalency Committee representing the DEQ.

In addition, the following site restrictions must be met if Class B sludge is land applied:

i. Food crops with harvested parts that touch the sewage sludge/soil mixture and are totally above the land surface shall not be harvested for 14 months after application of sewage sludge.

ii. Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of sewage sludge when the sewage sludge remains on the land surface for 4 months or longer prior to incorporation into the soil.

iii. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of sewage sludge when the sewage sludge remains on the land surface for less than 4 months prior to incorporation into the soil.

iv. Food crops, feed crops, and fiber crops shall not be harvested for 30 days after application of sewage sludge.

v. Animals shall not be allowed to graze on the land for 30 days after application of sewage sludge.

vi. Turf grown on land where sewage sludge is applied shall not be harvested for 1 year after application of the sewage sludge when the harvested turf is placed on either land with a high potential for public exposure or a lawn, unless otherwise specified by the permitting authority.

vii. Public access to land with a high potential for public exposure shall be restricted for 1 year after application of sewage sludge.

viii. Public access to land with a low potential for public exposure shall be restricted for 30 days after application of sewage sludge.

4. Vector Attraction Reduction Requirements

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site shall be treated by one of the following alternatives 1 through 10 for Vector Attraction Reduction. If bulk sewage sludge is applied to a home garden, or bagged sewage sludge is applied to the land, only Alternatives 1 through 8 shall be used.

Alternative 1 - The mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38 percent.

Alternative 2 - If Alternative 1 cannot be met for an anaerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30 and 37 degrees Celsius. Volatile solids must be reduced by less than 17 percent to demonstrate compliance.

Alternative 3 - If Alternative 1 cannot be met for an aerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge with a percent solids of two percent or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20 degrees Celsius. Volatile solids must be reduced by less than 15 percent to demonstrate compliance.

Alternative 4 - The specific oxygen uptake rate (SOUR) for sewage sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20 degrees Celsius.

Alternative 5 - Sewage sludge shall be treated in an aerobic process for 14 days or longer. During that time, the temperature of the sewage sludge shall be higher than 40 degrees Celsius and the average temperature of the sewage sludge shall be higher than 45 degrees Celsius.

Alternative 6 - The pH of sewage sludge shall be raised to 12 or higher by alkali addition and, without the addition of more alkali, shall remain at 12 or higher for two hours and then at 11.5 or higher for an additional 22 hours.

Alternative 7 - The percent solids of sewage sludge that does not contain unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 75 percent based on the moisture content and total solids prior to mixing with other materials. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 8 - The percent solids of sewage sludge that contains unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90 percent based on the moisture content and total solids prior to mixing with other materials. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 9 - (i) Sewage sludge shall be injected below the surface of the land.

(ii) No significant amount of the sewage sludge shall be present on the land surface within one hour after the sewage sludge is injected.

(iii) When sewage sludge that is injected below the surface of the land is Class A with respect to pathogens, the sewage sludge shall be injected below the land surface within eight hours after being discharged from the pathogen treatment process.

Alternative 10 - (i) Sewage sludge applied to the land surface or placed on a surface disposal site shall be incorporated into the soil within six hours after application to or placement on the land.

(ii) When sewage sludge that is incorporated into the soil is Class A with respect to pathogens, the sewage sludge shall be applied to or placed on the land within eight hours after being discharged from the pathogen treatment process.

C. **Monitoring Requirements**

1. Toxicity Characteristic Leaching Procedure (TCLP) Test performed within one year from the effective date of the permit. — Once/Permit Life

2. PCBs — Once/Year

3. All other pollutants shall be monitored at the frequency shown below:

Amount of sewage sludge* (metric tons per 365 day period)	Frequency
0 ≤ Sludge < 290	Once/Year
290 ≤ Sludge < 1,500	Once/Quarter
1,500 ≤ Sludge < 15,000	Once/Two Months
15,000 ≤ Sludge	Once/Month

*Either the amount of bulk sewage sludge applied to the land or the amount of sewage sludge received by a person who prepares sewage sludge that is sold or given away in a bag or other container for application to the land (dry weight basis).

Representative samples of sewage sludge shall be collected and analyzed in accordance with the methods referenced in 40 CFR 503.8(b) and OAC 252:648.

SECTION II. REQUIREMENTS SPECIFIC TO BULK SEWAGE SLUDGE FOR APPLICATION TO THE LAND MEETING CLASS A or B PATHOGEN REDUCTION AND THE CUMULATIVE LOADING RATES IN TABLE 2, OR CLASS B PATHOGEN REDUCTION AND THE POLLUTANT CONCENTRATIONS IN TABLE 3

For those permittees meeting Class A or B pathogen reduction requirements and that meet the cumulative loading rates in Table 2 below, or the Class B pathogen reduction requirements and contain concentrations of pollutants below those listed in Table 3 found in Element 1, Section III, the following conditions apply:

1. Pollutant Limits:

TABLE 2

Pollutant	Cumulative Pollutant Loading Rate (kilograms per hectare)
Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Molybdenum	Report
Nickel	420
Selenium	100
Zinc	2800

2. Pathogen Control

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, a reclamation site, or lawn or home garden shall be treated by either Class A or Class B pathogen reduction requirements as defined above in Element 1, Section I.B.3.

3. Management Practices

a. Bulk sewage sludge shall not be applied to agricultural land, forest, a public contact site, or a reclamation site that is flooded, frozen, or snow-covered so that the bulk sewage sludge enters a wetland or other waters of the state, as defined in 40 CFR 122.2, except as provided in a permit issued pursuant to the Act.

b. Bulk sewage sludge shall not be applied within 100 feet of a water of the state.

c. Bulk sewage sludge shall be applied at or below the agronomic rate in accordance with recommendations from the following references:

i. STANDARDS 1992, Standards, Engineering Practices and Data, 39th Edition (1992) American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, MI 49085-9659.

ii. National Engineering Handbook Part 651, Agricultural Waste Management Field Handbook (1992), P.O. Box 2890, Washington, D.C. 20013.

iii. Recommendations of local extension services or Soil Conservation Services.

iv. Recommendations of a major university's Agronomic Department.

d. An information sheet shall be provided to the person who receives bulk sewage sludge that is sold or given away. The information sheet shall contain the following information:

i. The name and address of the person who prepared the sewage sludge that is sold or given away in a bag or other container for application to the land.

ii. A statement that application of the sewage sludge to the land is prohibited except in accordance with the instructions on the label or information sheet.

iii. The annual whole sludge application rate for the sewage sludge that does not cause any of the cumulative pollutant loading rates in Table 2 above to be exceeded, unless the pollutant concentrations in Table 3 found in Element 1, Section III below are met.

4. Notification requirements

a. If bulk sewage sludge is applied to land in a state other than the state in which the sludge is prepared, written notice shall be provided prior to the initial land application to the permitting authority for the state in which the bulk sewage sludge is proposed to be applied. The notice shall include:

i. The location, by either street address or latitude and longitude, of each land application site.

ii. The approximate time period bulk sewage sludge will be applied to the site.

iii. The name, address, telephone number, and Oklahoma Pollutant Discharge Elimination System or National Pollutant Discharge Elimination System, whichever is applicable, permit number (if appropriate) for the person who prepares the bulk sewage sludge.

iv. The name, address, telephone number, and Oklahoma Pollutant Discharge Elimination System or National Pollutant Discharge Elimination System, whichever is applicable, permit number (if appropriate) for the person who will apply the bulk sewage sludge.

b. The permittee shall give 60 days prior notice to the DEQ of any change planned in the sewage sludge practice. Any change shall include any planned physical alterations or additions to the permitted treatment works, changes in the permittee's sludge use or disposal practice, and also alterations, additions, or deletions of disposal sites. These changes may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional disposal sites not reported during the permit application process or absent in the existing permit. Change in the sludge use or disposal practice may be cause for modification of the permit in accordance with 40 CFR 122.62(a)(1).

c. The permittee shall provide the location of all existing sludge disposal/use sites to the State Historical Commission within 90 days of the effective date of this permit. In addition, the permittee shall provide the location of any new disposal/use site to the State Historical Commission prior to use of the site.

The permittee shall within 30 days after notification by the State Historical Commission that a specific sludge disposal/use area will adversely effect a National Historic Site, cease use of such area.

5. Recordkeeping Requirements - The sludge documents will be retained on site at the same location as other OPDES records.

The person who prepares bulk sewage sludge or a sewage sludge material shall develop the following information and shall retain the information for five years. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for recordkeeping found in 40 CFR 503.17 and OAC 252:648 for persons who land apply.

a. The concentration (mg/Kg) in the sludge of each pollutant listed in Table 3 found in Element 1, Section III and the applicable pollutant concentration criteria (mg/Kg), or the applicable cumulative pollutant loading rate and the applicable cumulative pollutant loading rate limit (kg/ha) listed in Table 2 above.

b. A description of how the pathogen reduction requirements are met (including site restrictions for Class B sludges, if applicable).

c. A description of how the vector attraction reduction requirements are met.

d. A description of how the management practices listed above in Section II.3 are being met.

e. The recommended agronomic loading rate from the references listed in Section II.3.c above, as well as the actual agronomic loading rate shall be retained.

f. A description of how the site restrictions in 40 CFR 503.32(b)(5) and OAC 252:648 are met for each site on which Class B bulk sewage sludge is applied.

g. The following certification statement:

"I certify, under penalty of law, that the management practices in 40 CFR 503.14 have been met for each site on which bulk sewage sludge is applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices have been met. I am aware that there are significant penalties for false certification including fine and imprisonment."

h. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment. See 40 CFR 503.17(a)(4)(i)(B) or 40 CFR 503.17(a)(5)(i)(B) as applicable to the permittees sludge treatment activities.

i. The permittee shall maintain information that describes future geographical areas where sludge may be land applied.

j. The permittee shall maintain information identifying site selection criteria regarding land application sites not identified at the time of permit application submission.

k. The permittee shall maintain information regarding how future land application sites will be managed.

The person who prepares bulk sewage sludge or a sewage sludge material shall develop the following information and shall retain the information indefinitely. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for recordkeeping found in 40 CFR 503.17 and OAC 252:648 for persons who land apply.

i. The location, by either street address or latitude and longitude, of each site on which sludge is applied.

ii. The number of hectares in each site on which bulk sludge is applied.

iii. The date and time sludge is applied to each site.

iv. The cumulative amount of each pollutant in kilograms/hectare listed in Table 2 applied to each site.

v. The total amount of sludge applied to each site in metric tons.

vi. The following certification statement:

"I certify, under penalty of law, that the requirements to obtain information in 40 CFR 503.12(e)(2) have been met for each site on which bulk sewage sludge is applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the requirements to obtain information have been met. I am aware that there are significant penalties for false certification including fine and imprisonment."

vii. A description of how the requirements to obtain information in 40 CFR 503.12(e)(2) and OAC 252:648 are met.

6. Reporting Requirements - The permittee shall report annually on the DMR the following information:

a. Pollutant Table (2 or 3) appropriate for permittee's land application practices.

b. The frequency of monitoring listed in Element 1, Section I.C which applies to the permittee.

c. Toxicity Characteristic Leaching Procedure (TCLP) results (Pass/Fail).

d. The concentration (mg/Kg) in the sludge of each pollutant listed in Table 1 (defined as a monthly average) as well as the applicable pollutant concentration criteria (mg/Kg) listed in Table 3 found in Element 1, Section III, or the applicable pollutant loading rate limit (kg/ha) listed in Table 2 above if it exceeds 90% of the limit.

e. Level of pathogen reduction achieved (Class A or Class B).

f. Alternative used as listed in Section I.B.3.(a. or b.). Alternatives describe how the pathogen reduction requirements are met. If Class B sludge, include information on how site restrictions were met in the DMR comment section or attach a separate sheet to the DMR.

g. Vector attraction reduction alternative used as listed in Section I.B.4.

h. Annual sludge production in dry metric tons/year.

i. Amount of sludge land applied in dry metric tons/year.

j. Amount of sludge transported interstate in dry metric tons/year.

k. The certification statement listed in 40 CFR 503.17(a)(4)(i)(B) or 40 CFR 503.17(a)(5)(i)(B) whichever applies to the permittees sludge treatment activities shall be attached to the DMR.

l. When the amount of any pollutant applied to the land exceeds 90% of the cumulative pollutant loading rate for that pollutant, as described in Table 2, the permittee shall report the following information as an attachment to the DMR.

i. The location, by either street address or latitude and longitude.

ii. The number of hectares in each site on which bulk sewage sludge is applied.

iii. The date and time bulk sewage sludge is applied to each site..

iv. The cumulative amount of each pollutant (i.e., kilograms/hectare) listed in Table 2 in the bulk sewage sludge applied to each site.

v. The amount of sewage sludge (i.e., metric tons) applied to each site.

vi. The following certification statement:

"I certify, under penalty of law, that the requirements to obtain information in 40 CFR 503.12(e)(2) have been met for each site on which bulk sewage sludge is applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the requirements to obtain information have been met. I am aware that there are significant penalties for false certification including fine and imprisonment."

vii. A description of how the requirements to obtain information in 40 CFR 503.12(e)(2) and OAC 252:648 are met.

SECTION III. REQUIREMENTS SPECIFIC TO BULK OR BAGGED SEWAGE SLUDGE MEETING POLLUTANT CONCENTRATIONS IN TABLE 3 AND CLASS A PATHOGEN REDUCTION REQUIREMENTS

For those permittees with sludge that contains concentrations of pollutants below those pollutant limits listed in Table 3 for bulk or bagged (containerized) sewage sludge and also meet the Class A pathogen reduction requirements, the following conditions apply (Note: All bagged sewage sludge must be treated by Class A pathogen reduction requirements.):

1 Pollutant limits - The concentration of the pollutants in the municipal sewage sludge is at or below the values listed.

TABLE 3

Monthly Average Concentration
(milligrams per kilogram)*

Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Molybdenum	Report
Nickel	420
Selenium	36
Zinc	2800

* Dry weight basis

2. Pathogen Control

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, a reclamation site, or lawn or home garden shall be treated by the Class A pathogen reduction requirements as defined above in Element I, Section I.B.3. All bagged sewage sludge must be treated by Class A pathogen reduction requirements.

3. Management Practices - None.

4. Notification Requirements - None.

5. Recordkeeping Requirements - The permittee shall develop the following information and shall retain the information for five years. The sludge documents will be retained on site at the same location as other OPDES records.

a. The concentration (mg/Kg) in the sludge of each pollutant listed in Table 3 and the applicable pollutant concentration criteria listed in Table 3.

b. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment. See 40 CFR 503.17(a)(1)(ii) or 40 CFR 503.17(a)(3)(i)(B), and OAC 252:648 whichever applies to the permittees sludge treatment activities.

c. A description of how the Class A pathogen reduction requirements are met.

d. A description of how the vector attraction reduction requirements are met.

6. Reporting Requirements - The permittee shall report annually on the DMR the following information:

a. Pollutant Table 3 appropriate for permittee's land application practices.

b. The frequency of monitoring listed in Element 1, Section I.C which applies to the permittee.

c. Toxicity Characteristic Leaching Procedure (TCLP) results. (Pass/Fail).

d. The concentration (mg/Kg) in the sludge of each pollutant listed in Table 1 (defined as a monthly average) found in Element 1, Section I. In addition, the applicable pollutant concentration criteria listed in Table 3 should be included on the DMR.

e. Pathogen reduction Alternative used for Class A bagged or bulk sludge as listed in Section I.B.3.a.

f. Vector attraction reduction Alternative used as listed in Section I.B.4.

g. Annual sludge production in dry metric tons/year.

h. Amount of sludge land applied in dry metric tons/year.

i. Amount of sludge transported interstate in dry metric tons/year.

j. The certification statement listed in 40 CFR 503.17(a)(1)(ii) or 40 CFR 503.17(a)(3)(i)(B), and OAC 252:648 whichever applies to the permittees sludge treatment activities, shall be attached to the DMR.

SECTION IV. REQUIREMENTS SPECIFIC TO SLUDGE SOLD OR GIVEN AWAY IN A BAG OR OTHER CONTAINER FOR APPLICATION TO THE LAND THAT DOES NOT MEET THE POLLUTANT CONCENTRATIONS in Table 3

1. Pollutant Limits

TABLE 4

Pollutant	Annual Pollutant Loading Rate (kilograms per hectare per 365 day period)

Arsenic	2.0
Cadmium	1.9
Copper	75.0
Lead	15.0
Mercury	0.85
Molybdenum	Report
Nickel	21.0
Selenium	5.0
Zinc	140.0

2. Pathogen Control

All sewage sludge that is sold or given away in a bag or other container for application to the land shall be treated by the Class A pathogen requirements as defined in Section I.B.3.a.

3. Management Practices

Either a label shall be affixed to the bag or other container in which sewage sludge that is sold or given away for application to the land, or an information sheet shall be provided to the person who receives sewage sludge sold or given away in another container for application to the land. The label or information sheet shall contain the following information:

a. The name and address of the person who prepared the sewage sludge that is sold or given away in a bag or other container for application to the land.

b. A statement that application of the sewage sludge to the land is prohibited except in accordance with the instructions on the label or information sheet.

c. The annual whole sludge application rate for the sewage sludge that will not cause any of the annual pollutant loading rates in Table 4 above to be exceeded.

4. Notification Requirements - None.

5. Recordkeeping Requirements - The sludge documents will be retained on site at the same location as other OPDES records.

The person who prepares sewage sludge or a sewage sludge material shall develop the following information and shall retain the information for five years.

a. The concentration in the sludge of each pollutant listed above in found in Element 1, Section I, Table 1.

b. The following certification statement found in 40 CFR 503.17(a)(6)(iii).

"I certify, under penalty of law, that the management practices in 40 CFR 503.14(e), the Class A pathogen requirement in 40 CFR 503.32(a), and the vector attraction reduction requirement in (insert vector attraction reduction option) have been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices, pathogen requirements, and vector attraction reduction requirements have been met. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment".

c. A description of how the Class A pathogen reduction requirements are met.

d. A description of how the vector attraction reduction requirements are met.

e. The annual whole sludge application rate for the sewage sludge that does not cause the annual pollutant loading rates in Table 4 to be exceeded. See Appendix A to 40 CFR Part 503 - Procedure to Determine the Annual Whole Sludge Application Rate for a Sewage Sludge.

6. Reporting Requirements - The permittee shall report annually on the DMR the following information:

a. Pollutant listed in, Table 4 as appropriate for permittee's land application practices.

b. The frequency of monitoring listed in Element 1, Section I.C which applies to the permittee.

c. Toxicity Characteristic Leaching Procedure (TCLP) results (Pass/Fail).

d. The concentration (mg/Kg) in the sludge of each pollutant listed above in Table 1 (defined as a monthly average) found in Element 1, Section I.

e. Class A pathogen reduction Alternative used as listed in Section I.B.3.a. Alternatives describe how the pathogen reduction requirements are met.

f. Vector attraction reduction Alternative used as listed in Section I.B.4.

g. Annual sludge production in dry metric tons/year.

h. Amount of sludge land applied in dry metric tons/year.

i. Amount of sludge transported interstate in dry metric tons/year.

j. The following certification statement found in 40 CFR 503.17(a)(6)(iii) shall be attached to the DMR.

"I certify, under penalty of law, that the management practice in 40 CFR 503.14(e), the Class A pathogen requirement in 40 CFR 503.32(a), and the vector attraction reduction requirement (insert appropriate option) have been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel gather and evaluate the information used to determine that the management practice, pathogen requirements, and vector attraction reduction requirements have been met. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

ELEMENT 2 - MUNICIPAL SOLID WASTE LANDFILL DISPOSAL

SECTION I. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE DISPOSED IN A MUNICIPAL SOLID WASTE LANDFILL

1. The permittee shall handle and dispose of sewage sludge in accordance with the Act and all other applicable federal and state regulations to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present. The permittee shall ensure that the sewage sludge meets the requirements in 40 CFR Part 258 concerning the quality of the sludge disposed in the municipal solid waste landfill (MSWLF) unit.

2. If requirements for sludge management practices or pollutant criteria become more stringent than the sludge pollutant limits or acceptable management practices in this permit, or control a pollutant not listed in this permit, this permit may be modified or revoked and reissued to conform to the requirements promulgated under the Act.

3. If the permittee generates sewage sludge and supplies that sewage sludge to the owner or operator of a MSWLF for disposal, the permittee shall provide to the owner or operator of the MSWLF appropriate information needed to be in compliance with the provisions of this permit.

4. The permittee shall give prior notice to the Director, Water Quality Division, DEQ, 707 N. Robinson, Oklahoma City, Oklahoma 73101-1677, of any planned changes in the sewage sludge disposal practice, in accordance with 40 CFR 122.41(l)(1)(iii). These changes may justify the application of permit conditions that are different from or absent in the existing permit. Change in the sludge use or disposal practice may be cause for modification of the permit in accordance with 40 CFR 122.62(a)(1).

5. The permittee shall provide the location of all existing sludge disposal/use sites to the State Historical Commission within 90 days of the effective date of this permit. In addition, the permittee shall provide the location of any new disposal/use site to the State Historical Commission prior to use of the site.

The permittee shall within 30 days after notification by the State Historical Commission that a specific sludge disposal/use area will adversely affect a National Historic Site, cease use of such area.

6. Sewage sludge shall be tested once during the life of the permit within one year from the effective date of the permit in accordance with the method specified at 40 CFR Part 268, Appendix I [Toxicity Characteristic Leaching Procedure (TCLP)] or other approved methods. Sludge shall be tested after final treatment prior to leaving the POTW site. Sewage sludge determined to be a hazardous waste in accordance with 40 CFR Part 261, shall be handled according to RCRA standards for the disposal of hazardous waste in accordance with 40 CFR Part 262. The disposal of sewage sludge determined to be a hazardous waste, in other than a certified hazardous waste disposal facility shall be prohibited. The DEQ, Waste Management Division at (405) 271-5338, shall be notified of test failure within 24 hours. A written report shall be provided to this office within 7 days after failing the TCLP. The report will contain test results, certification that unauthorized disposal has not occurred and a summary of alternative disposal plans that comply with RCRA standards for the disposal of hazardous waste. The report shall be addressed to the Director, Waste Management Division, DEQ, 707 N. Robinson, Oklahoma City, Oklahoma 73101-1677, and a copy sent to the Director, Water Quality Division, DEQ, at the same address.

7. Sewage sludge shall be tested as needed, or at a minimum, once/year in accordance with the method 9095 (Paint Filter Liquids Test) as described in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods" (EPA Pub. No. SW-846).

8. Recordkeeping requirements - The permittee shall develop the following information and shall retain the information for five years.

   a. The description, including procedures followed, and results of the Paint Filter Tests performed.

   b. The description, including procedures followed, and results of the TCLP Test.

9. Reporting requirements - The permittee shall report annually on the Discharge Monitoring Report the following information:

   a. Results of the Toxicity Characteristic Leaching Procedure Test conducted on the sludge to be disposed (Pass/Fail).

   b. Annual sludge production in dry metric tons/year.

   c. Amount of sludge disposed in a municipal solid waste landfill in dry metric tons/year.

   d. Amount of sludge transported interstate in dry metric tons/year.

   e. A certification that sewage sludge meets the requirements in 40 CFR Part 258 concerning the quality of the sludge disposed in a municipal solid waste landfill unit shall be attached to the DMR.

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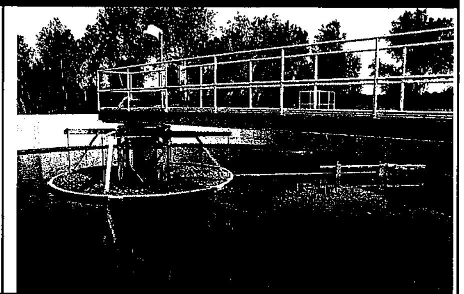
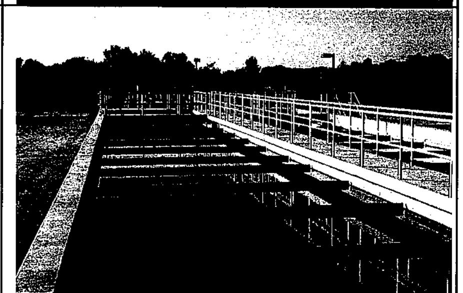
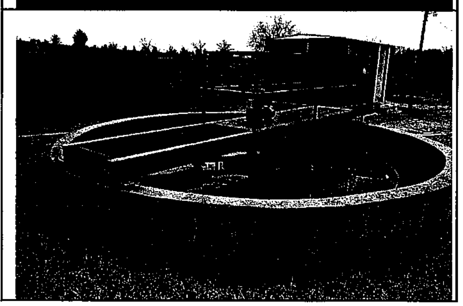
APPENDIX TM 1-4

TEMPLATE FOR CONDITION RATING

FACILITY INSPECTIONS

Condition Assessment Ratings

Condition Rating	Percent of Useful Life Remaining	General Description of Condition	Photo Examples
New	100-90	✓ Newly built to recently built ✓ No wear ✓ Operates as designed ✓ No maintenance needed	
Excellent	90-75	✓ Recently built ✓ Little to no appreciable wear ✓ Operates as designed ✓ Normal maintenance	
Good	75-55	✓ Within first half of useful life ✓ Slight wear ✓ Operates as designed ✓ Normal to slight maintenance needed	
Fair	55-35	✓ At or beyond first half of useful life ✓ Slight to significant wear ✓ Normally operates as designed ✓ Slight to supplementary maintenance needed	

Condition Rating	Percent of Useful Life Remaining	General Description of Condition	Photo Examples
Poor	35-15	✓ Beyond first half of useful life to at the end of useful life ✓ Significant to major wear ✓ Operates as designed with additional to significant maintenance ✓ Significant to burdensome maintenance necessary	
Replace	15-0	✓ Beyond useful life in need of replacement ✓ Major wear ✓ Will not operate as designed without significant and constant maintenance, is inoperable or abandoned ✓ Significant to burdensome constant maintenance necessary	

APPENDIX TM 1-5

NITRIFICATION CLARIFIER OPERATIONAL ISSUES

Memorandum

To: Robert Hitt; Jim McClain, Muralikumar, Joyce Hight,

From: Jose Pereira

Date: September 19, 2005

Re: Nitrification Clarifiers – Handling capacity & operational issues - S-0505A

During a site visit on 08/31/05 to the City of Enid Water Pollution Control Facility, the facility staff indicated that when flows exceed 7 mgd there is high solids carryover in the final effluent, although the design capacity of the final clarifiers in the nitrification plant were designed to handle 8.5 mgd. This technical memorandum offers our comments/recommendation on the operation of the nitrification plant following our inspection of the nitrification plant and review of as-built plans.

As you know, the nitrification plant was originally designed to handle average and peak flows of 8.5 mgd and 21 mgd, respectively at an average BOD_5 of 30 mg/l and TSS of 20 mg/l. The nitrification plant is equipped with four rectangular clarifiers, each 30' wide by 120' long by 12' SWD. These rectangular clarifiers are equipped with traveling bridge mechanisms for the collection and removal of settled sludge and effluent troughs with V- notch weirs to distribute the flow uniformly and improve the effluent quality. Our calculations show that the surface overflow rates at average and peak flows are 590gpd/ft^2 and 1,458gpd/ft^2. respectively. The weir loading rates at average and peak flows are estimated to be 5,902 gpd/ft and 14,583 gpd/ft respectively, which are within recommended design criteria (10,000 gpd/ft at average flow and 15,000 gpd/ft at peak flow). However, during our visual inspection of the traveling bridge clarifiers, we noticed few operational issues that could possibly impair the effluent quality, particularly during high flow conditions. These Observations are as follow:

a. The nitrification plant rectangular clarifier effluent troughs are not leveled, which affects the V-notch weirs elevation. The elevation of the V-notch weirs at the east end of the clarifiers is lower than the west end. As a result, there is no overflow on the V- notch weirs located at the west end of the clarifier troughs and most of the flow occurs through the east end creating more undercurrent and turbulence. This is confirmed by the operators when the flow exceeds 7 mgd the v-notch weirs at the east end of the clarifier troughs become submerged. The V-notch weir submergence does not reflect under designed of the weirs but instead overcharge due to the unleveled surface.

b. The traveling bridge mechanism used for sludge collection has a supporting truss extending all the way down in to the clarifier bottom. The traveling bridge also has too many moving parts for its operation and the movement of the bridge on the rail is not smooth and at times, creating a jerk sudden movement possibly due to wear and tear on the traveling parts as result of the equipment age. The truss/other parts on the traveling bridge, and agitation due to the sudden jerk movement could possibly create an under current wave that could stir the settled/settling solids in the clarifier through out the basin and impact the effluent quality, particularly during the high flow conditions.

In summary, it is our opinion that if the plant is operated within the design range and if the above operational deficiencies are corrected, as well as other manufacturer recommendations to fine tune its operation, we anticipate that the final clarifiers could see a major improvement and handle the flow as originally designed. However, additional information and evaluation will be required before final conclusions are recommended.

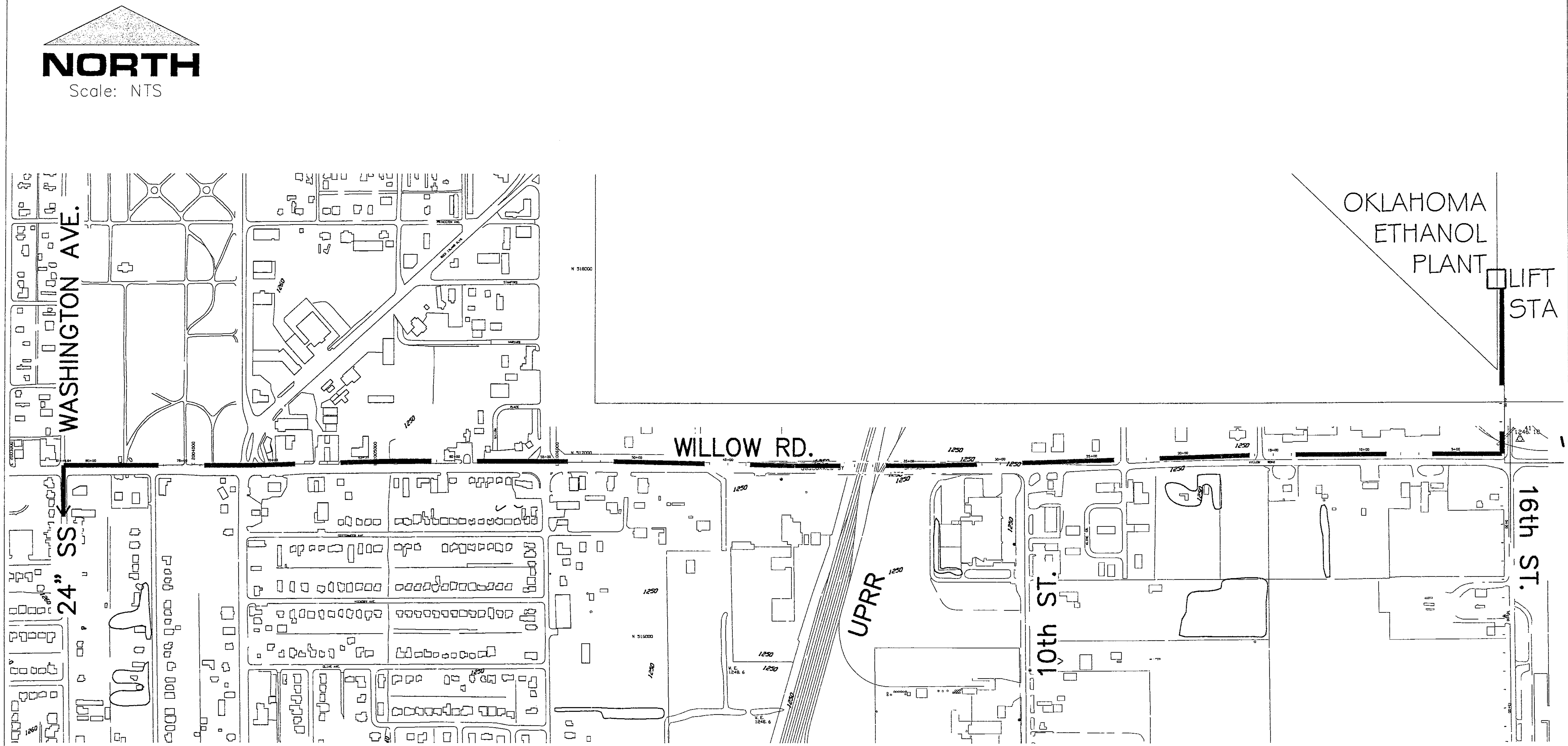
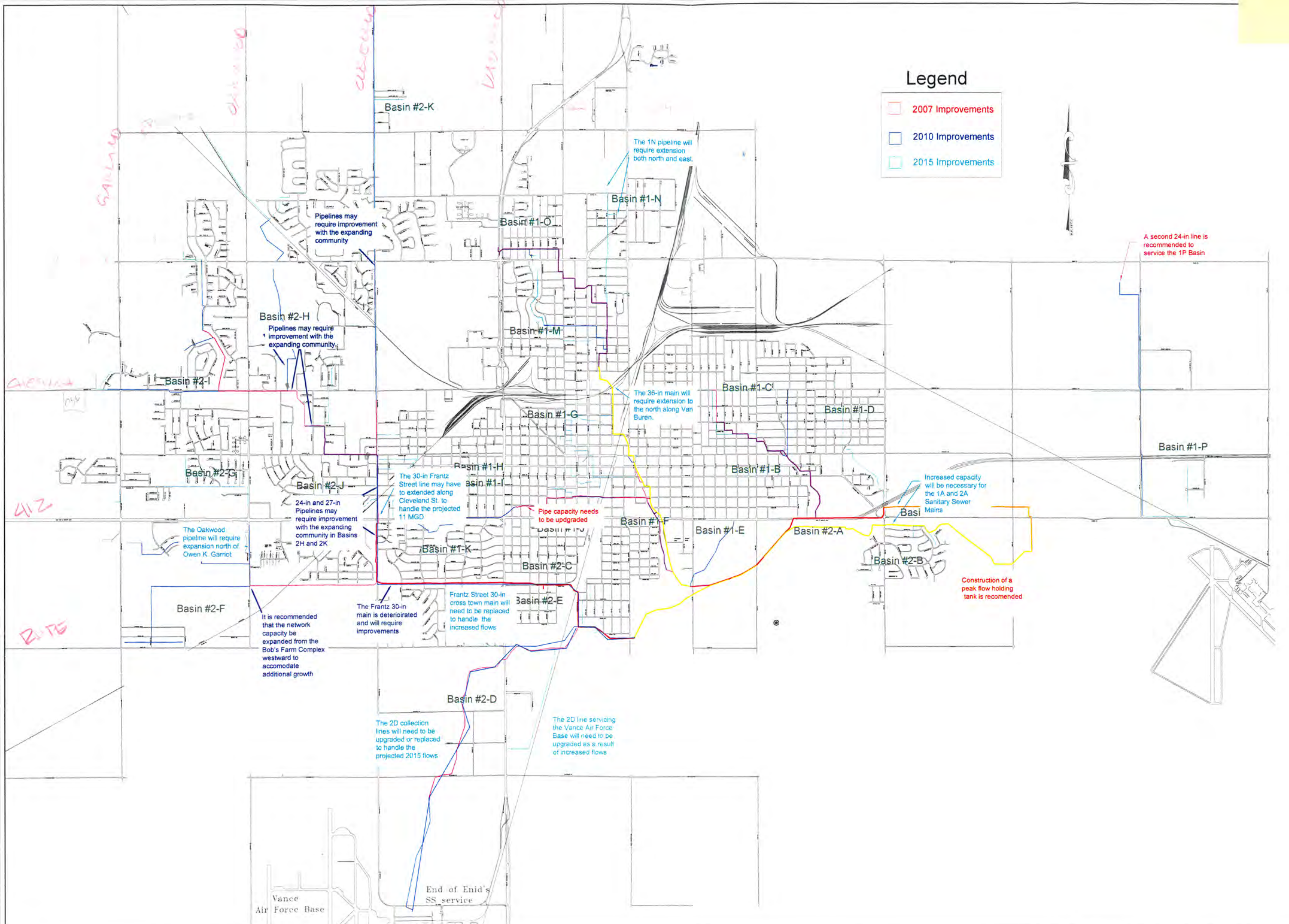


FIG. 3

PLAN VIEW
WASHINGTON AVENUE OPTION 1

ENVIROTECH

06169



Dewberry

Figure 5 - Capital Improvement Map

Enid Sanitary Sewer Monitoring

City of Enid

ENVIROTECH
ENGINEERING & CONSULTING, INC.

2500 North 11th Street -, Enid, Oklahoma 73701
Phone (580) 234-8780, Fax (580) 237-4302
C.A. #1960 - Expiration Date: 6-30-2008
www.envirotechconsulting.com

Date:	August 2008
Scale:	1"= 1250
Designed by:	J. Voss
Drawn by:	J. Voss
Checked By:	J.Stallings
Project No.	05.123

TABLE 4.
PIPELINES AND ASSOCIATED FLOW DATA AND CAPACITIES

Name	Basin	Location	Actual Peak (gpm)	Model Flow (gpm)	Capacity (gpm)	Pipe Full (gpm)
North Main	1-A	West 16TH	1,700	3,495	4,560	5,050
NOC	1-B 1-C	NOC	930	875	3,980	4,360
		19TH & Randolph	65	71	1,150	1,260
30TH Street	1-D	30TH & Garriott	140	135	670	740
Downtown	1-F Fed by 1-G and 1-H	2ND & Randolph	14	16	330	420
		Pasttimes	78	77	760	970
		3RD & Main	110	130	510	650
	1G2	5TH & Randolph	225	220	460	590
	1-I Fed by 1-J and 1-K	Indian & Oklahoma	300	280	540	660
		Integris Pavilion	775	744	2,090	2,290
North Enid	1-N	4TH & Beech	275	295	360	460
		3RD & Beech	300	320	360	460
N. Van Buren	1-O	N. Van Buren	330	356	3,940	4,330
54TH Street	1-P	54TH Street Lift	1,200	1,210	1,300	1,420
Brookside	2-B	BS Trunk Line	1,750	2,470	10,160	11,150
		BS Res.	20	N/A	320	440
South Main	2-C	East 16TH Street	1,650	1,450	14,180	15,550
		West 16TH Street	1,700	2,373	9,220	10,120
S. Van Buren	2-D	S. Van Buren	240	245	1,800	1,980
Frantz Main	2-E	Jeff & Frantz	1,850	2,200	20,140	22,090
Oakwood Mall	2-G	Mall	920	890	1,670	1,830
		Indian Oaks	650	758	670	740
Cleveland	2-H	Randolph & McKinley	500	512	2,110	2,310
	2-I	Lisa Lane	143	130	1,000	1,100
	2-K	Cleveland & Chestnut	240	270	650	710

DW

4.2.2 Wet Flow Condition Analysis. During precipitation events, flows in the sanitary sewer pipelines greatly increase due to Inflow and Infiltration (I/I). According to the wet condition model, the capacity of most pipelines is sufficient to accommodate the

Engineering Calculations (I/I Study)

Engineering Notes:

Problem: Determine amount of I/I in each Sewer Basin

Assumption: The maximum allowable inflow/infiltration for a sewer operating within "normal" limits is 200 gallons/mile/day/in-diameter

Step 1:	TM 2-1	From the flow data gathered from the city sewers, determine average and peak daily flows as well as peak storm water flows. Correlate the storm flows with their individual storm Flow data was divided into yearly quarters and analyzed for peak flows. Flow data was analyzed on a 15 minute basis to determine flow profile and base flow for each monitoring point. Some conditions were taken into account, such as line back ups, surcharging, and seasonal flows.
Step 2:	TM 2-2	Calculate the Municipal sewer inflows Utilizing typical inflows from municipal sources, inflows in the various sub-basins were calculated throughout the city.
Step 3:	TM 2-3	Determine the US SCS curve numbers, % impervious, and conductivity for each sub-basin. Caculated utilizing TR-55 techniques through observation
Step 4:	TM 2-3	Determine the length*in-diameter of the sewer pipe and area of each sub-basin. Calculated by observation.
Step 5:	TM 2-4	Determine the rainfall for the 100-year storm and the individual storms in Enid Data obtained from TR-55 and weatherunderground.com in combination with the City of Enid raingauges
Step 6:	TM 2-5	Determine the hydrograph of the infiltration/inflow The SWMM model is divides the I/I hydrograph into Start Tern Response (ST), Median Term Response (MT), and Long Term Reponses (LT). Within each hydrograph is a ratio of the flow (R) Proportional to the Response Term, a Time to the Peak (T), and (K) the Step 4a Find Proportionality between each response From the CN values, a Proportionality curve was generated for each response time Step 2b Determine the T and K factors The conductivity of the soil divided by the depth of soil/manhole was used to calculate the T factor. In general the K factor is approximately 2:1 for a typical curve (Twice the lag time to initial concentration)
Step 7:	TM 2-5	Determine the sewer area necessary to provide a 200 gal/mil/day/in-dia flow. Step 5a: Find the amount of inflow required to provide the 200 g/m/d/in for the sub-basin. The 200 g/m/d/in term was multiplied by the observed length*dia term in Step 3. Step 5b: Find the relationship between sewer inflow area and required inflow The relationship between inflow and the sewer basin inflow area term is liner with a 0 y-intercept for a given CN value and MH depth. Step 5c: Find the relationship between CN and sewer inflow Since the inflow relationship is liner with a y-intercept = 0, the slopes of the CN values for each manhole depth were fit to a inflow*area vs. CN graph. Step 5d: Determine the sewer inflow area. The CN value was inputted into the graphical relationship in 5c and an area*inflow value was found. The factor was divided by the necessary inflow rate determined in Step 5a, and an area value was determined on a 5-ft depth basis (5, 10, 15, 20, and 25-ft deep sewers). The values were interpolated against the actual sewer depth and the inflow area term was determined for an infiltration value of 200 gallon/mile/in-diameter/day.
Step 8:	TM 2-6	SWMM Model and Output The SWMM model was developed from the above data. The input/final output report appear in Appendix F.

TM 2-1.

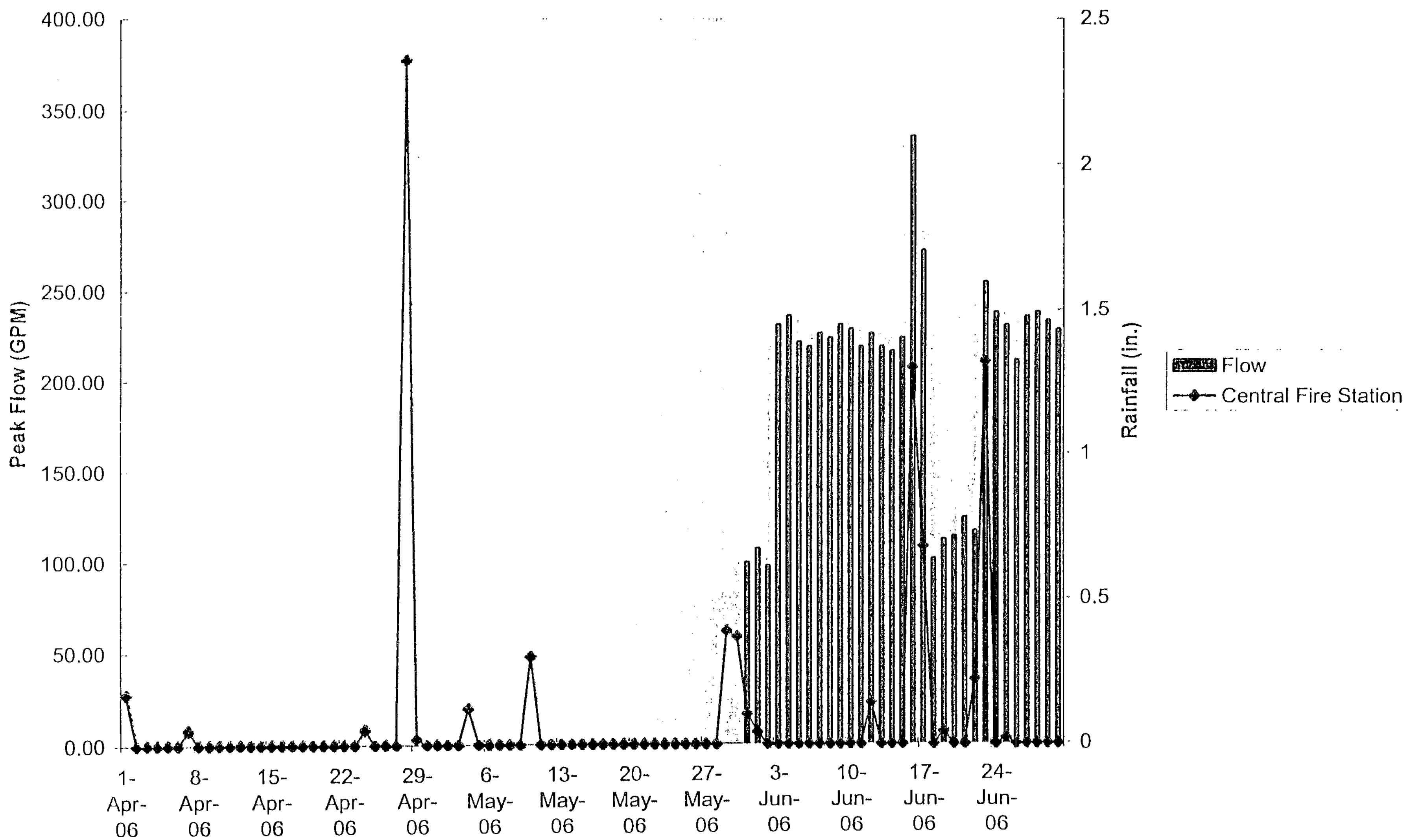
FLOW METERS

Basin Inflow and Infiltration Study

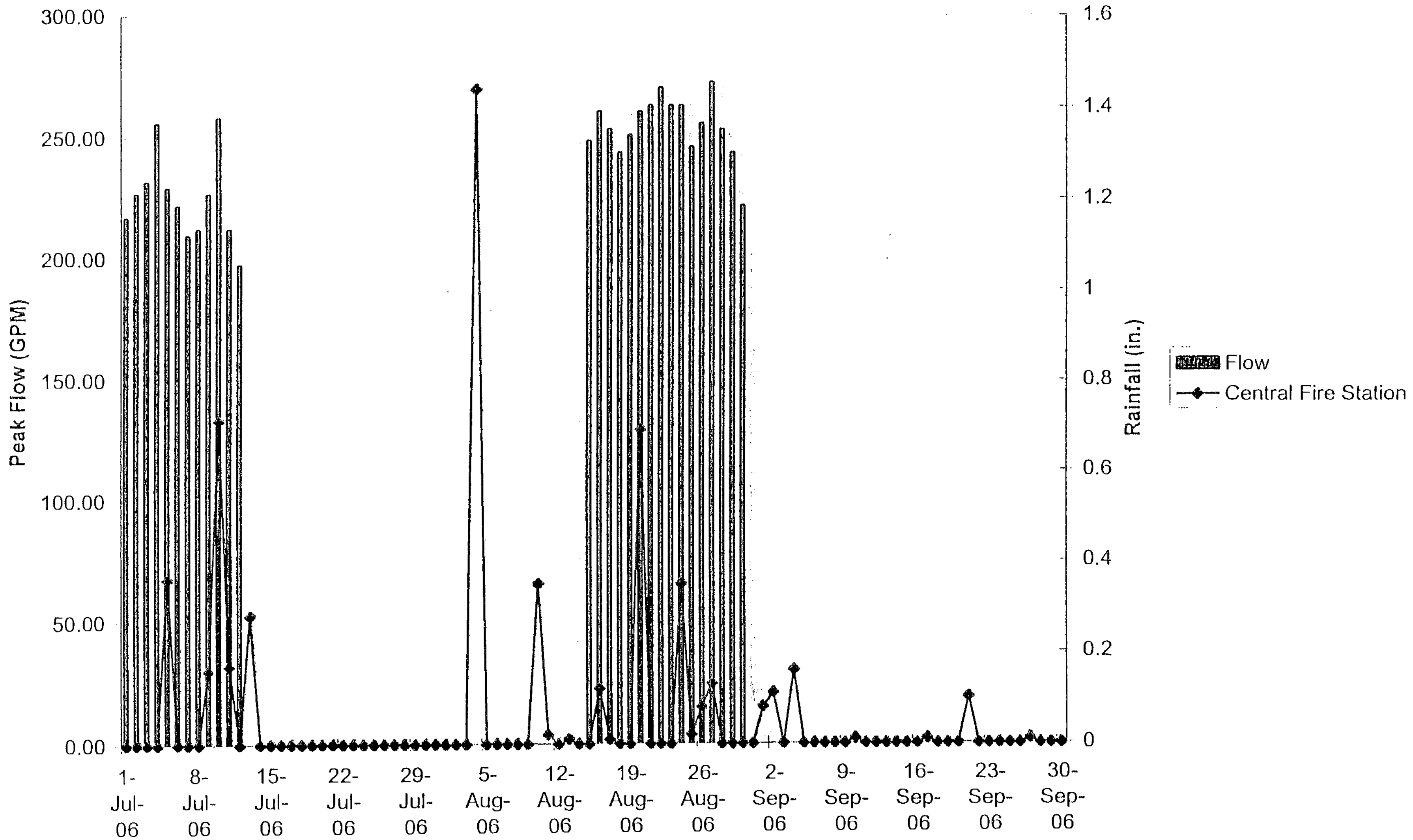
Name	Basin	Location	Metered Flow		Model Flow	
			Base Flow	Peak Flow	Base Flow	Peak Flow
			gpm	gpm	gpm	gpm
North Main	1-A	West 16th	550	1700	1352	3495
NOC	1-B and 1-C	NOC	280	930	350	875
		19th & Randolph	15	65	30	71
30th St	1-D	30th and Garriott	65	140	56	135
Down Town	1-F Fed by 1-G and 1-H	2nd & Randolph	2	14	7	16
		Pasttimes	31	78	32	77
		3rd and Main	40	110	53	130
	1G2	5th & Randolph	60	225	50	220
	1-I (Fed by 1-J and 1-	Ind.&Okla	150	300	167	280
		Integris Pav	363	775	330	744
North Enid	1-N	4th and Beech	70	275	123	295
		3rd and Beech	85	300	166	320
N. Van Buren	1-O	N. Van Buren	NA	330	148	356
54th Street	1-P	54th St. Lift	274	1200	504	1210
Brookside	2-B	BS Trunk Line	500	1750	1377	2470
		Brookside Res	2	20	NA	NA
South Main	2-C	East 16th St	440	1650	390	1450
		West 16th	550	1700	1258	2373
S. Van	2-D	S. Van Buren	40	240	101	245
Frantz Main	2-E	Jeff. & Frantz	650	1850	1050	2200
Oakwood Mall	2-G	Mall	330	920	278	890
		Indian Oaks	200	650	300	758
Cleveland	2-H	Rand & Mck	100	500	219	512
	2-I	Lisa Lane	35	143	53	130
	2-K	Cleve & Chest	120	240	111	270

DOWNTOWN

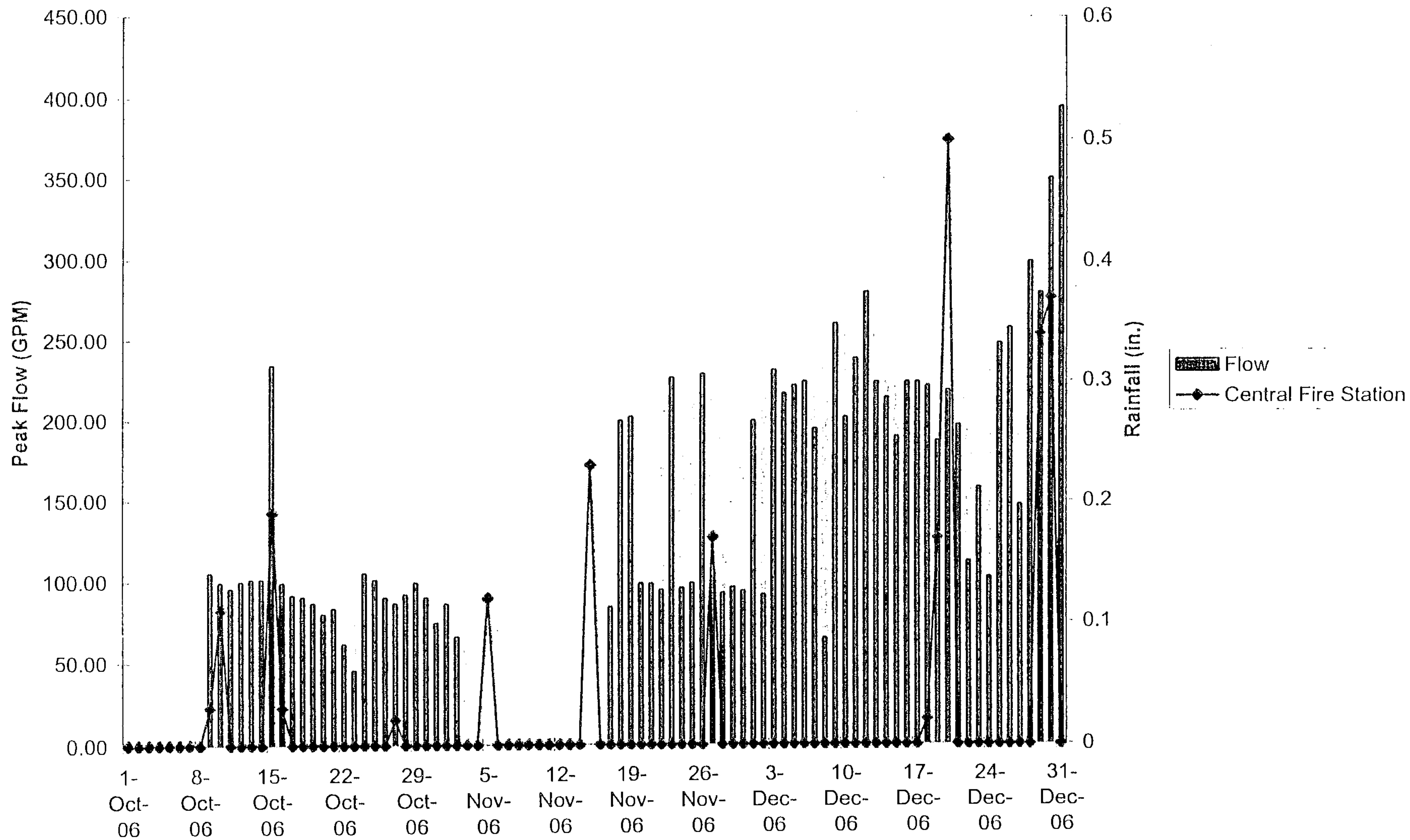
5th and Randolph - 2006 2nd Quarter

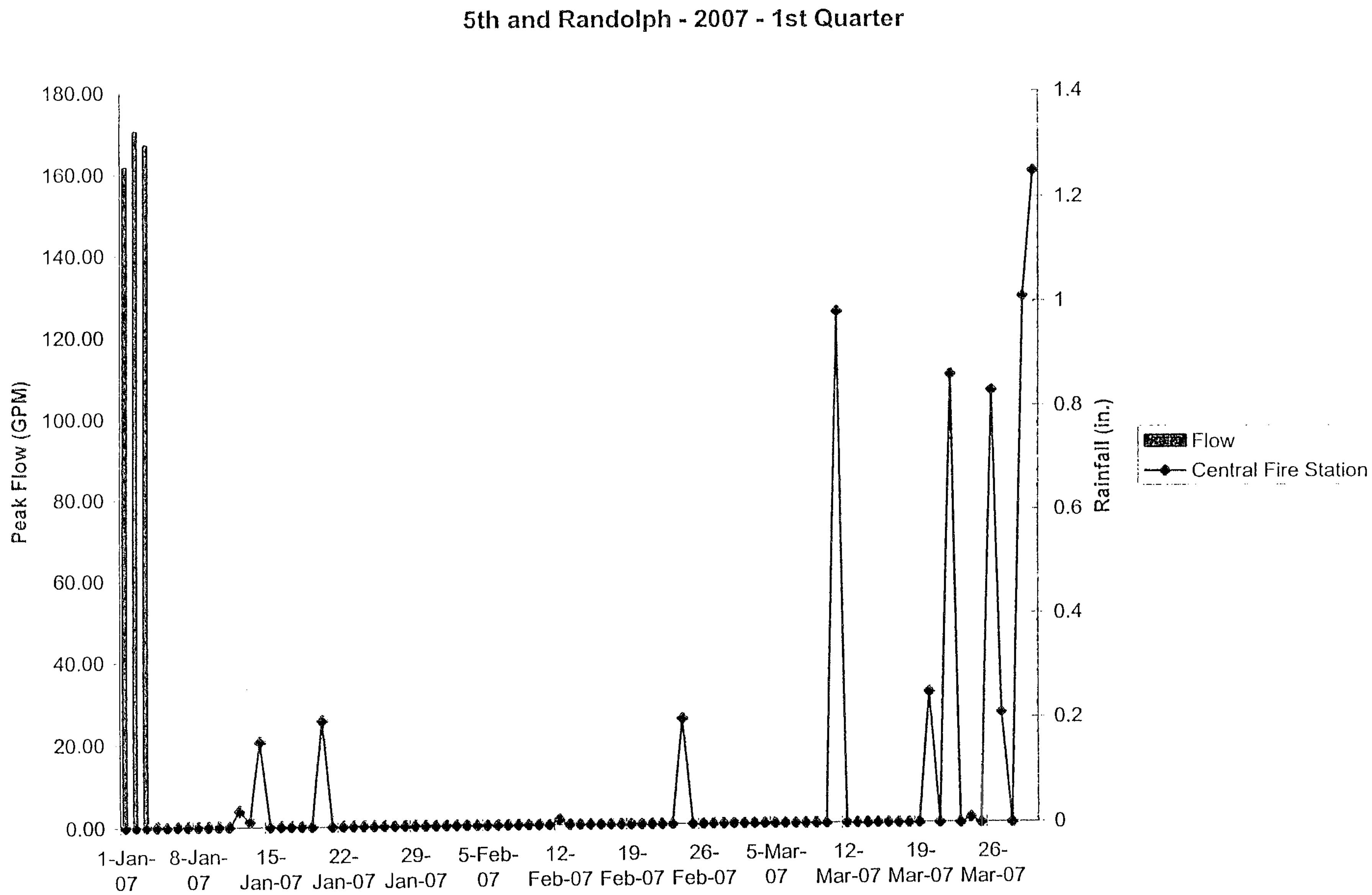


5th and Randolph - 2006 - 3rd Quiarter

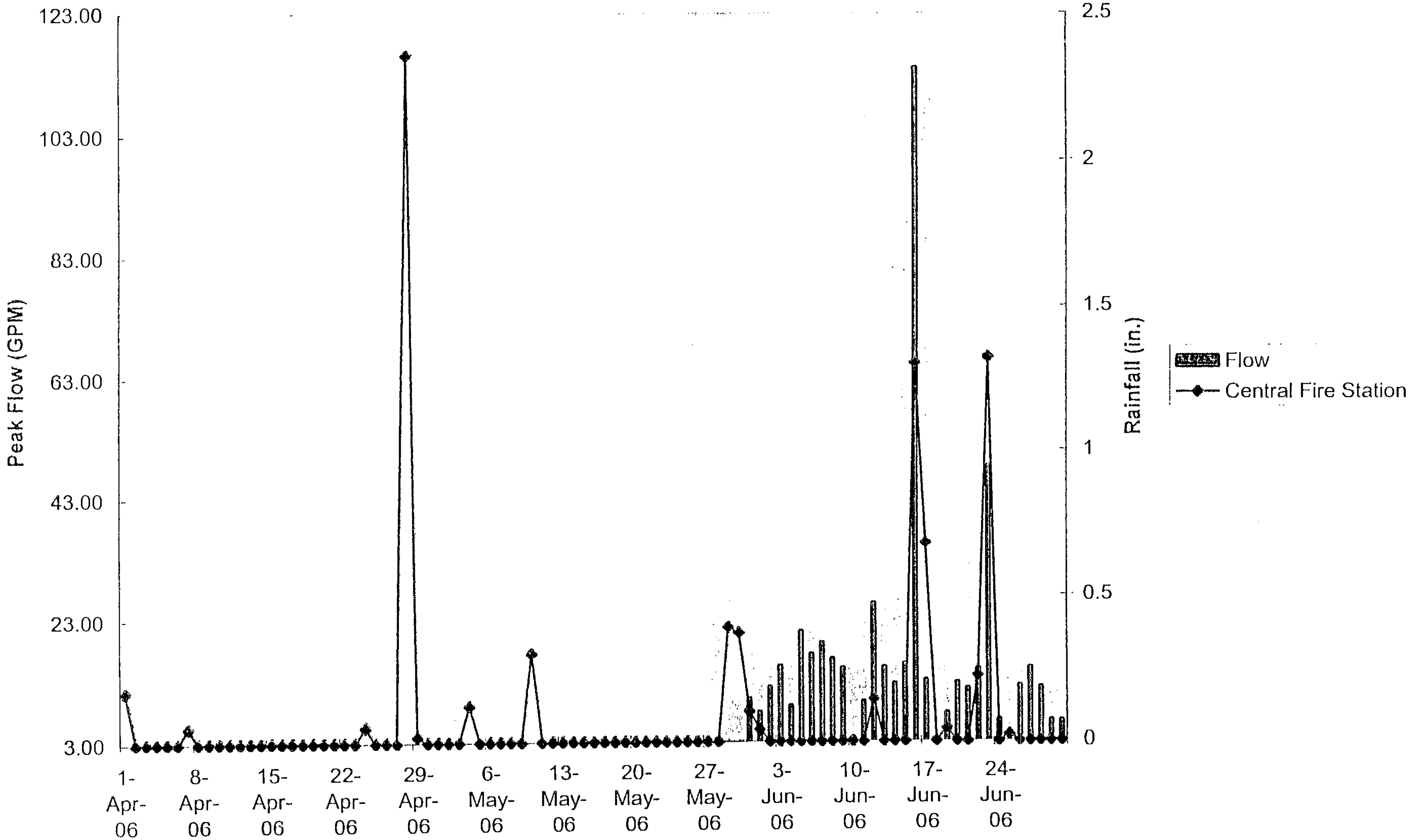


5th and Randolph - 2006 - 4th Quarter




5th and Randolph - 2007 - 1st Quarter
Peak Flow (GPM)
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Rainfall (in.)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1-Jan-07
8-Jan-07
15-Jan-07
22-Jan-07
29-Jan-07
5-Feb-07
12-Feb-07
19-Feb-07
26-Feb-07
5-Mar-07
12-Mar-07
19-Mar-07
26-Mar-07
Flow
Central Fire Station

2nd and Randolph - 2006 - 2nd Quarter



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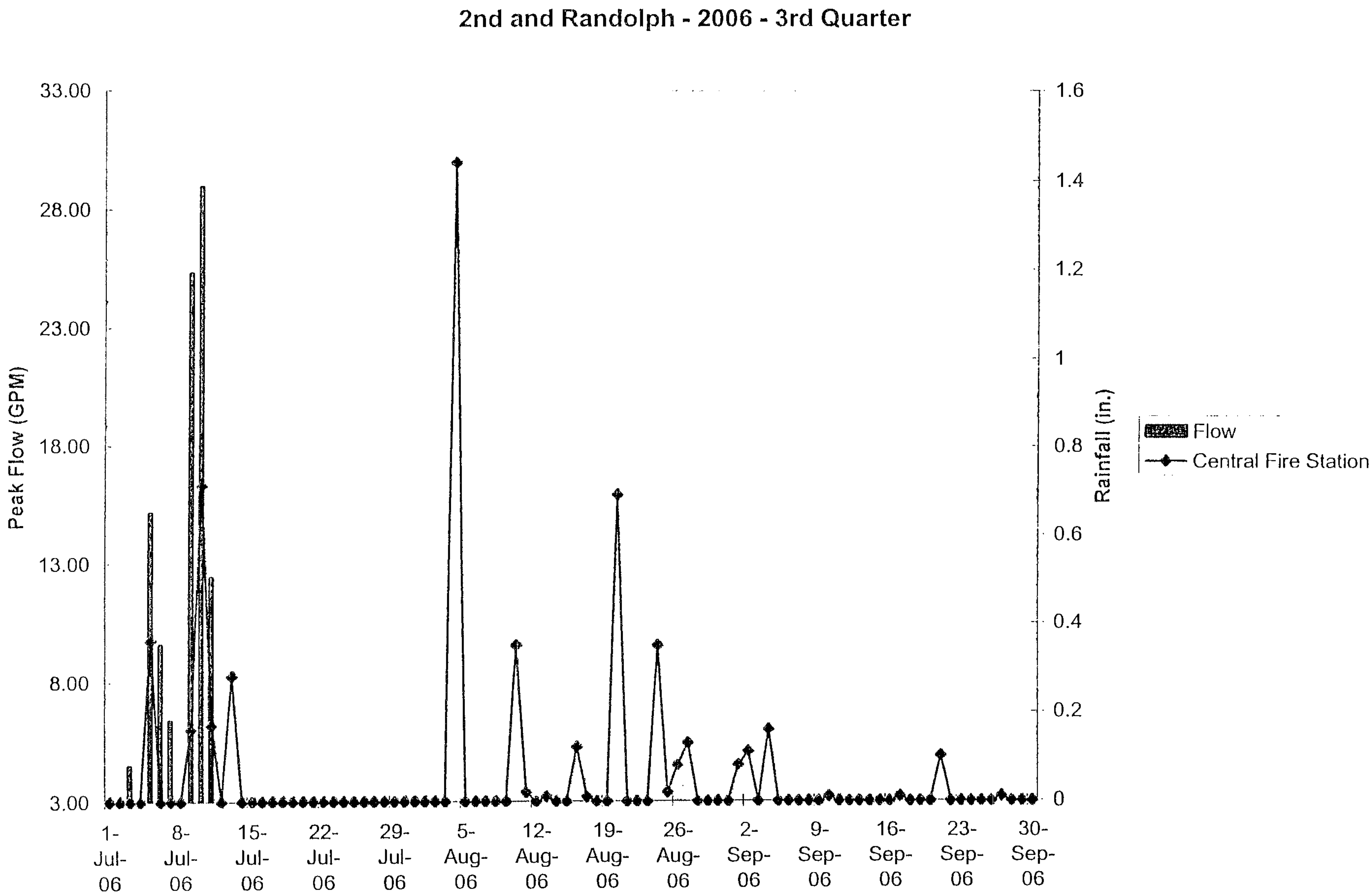
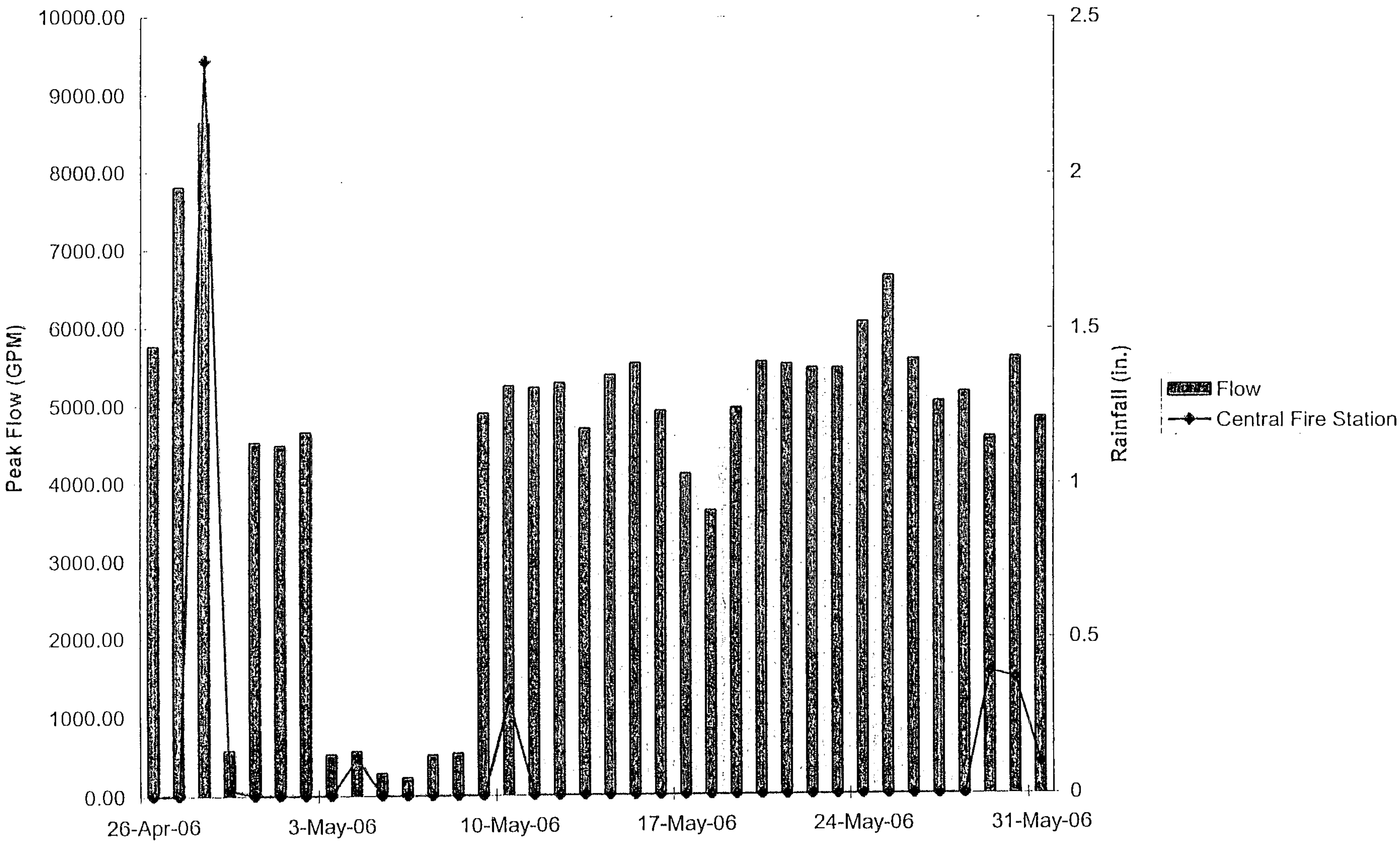
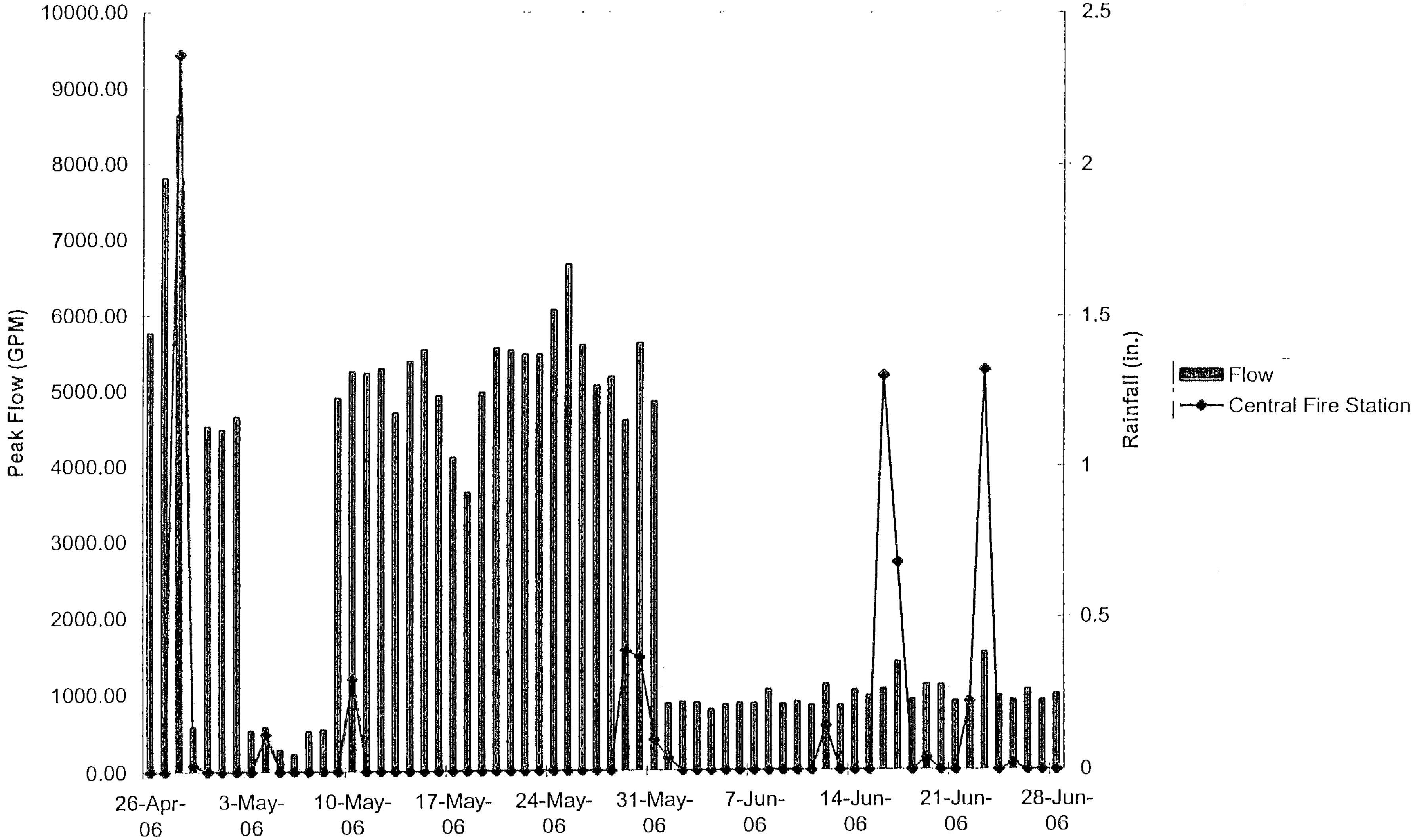
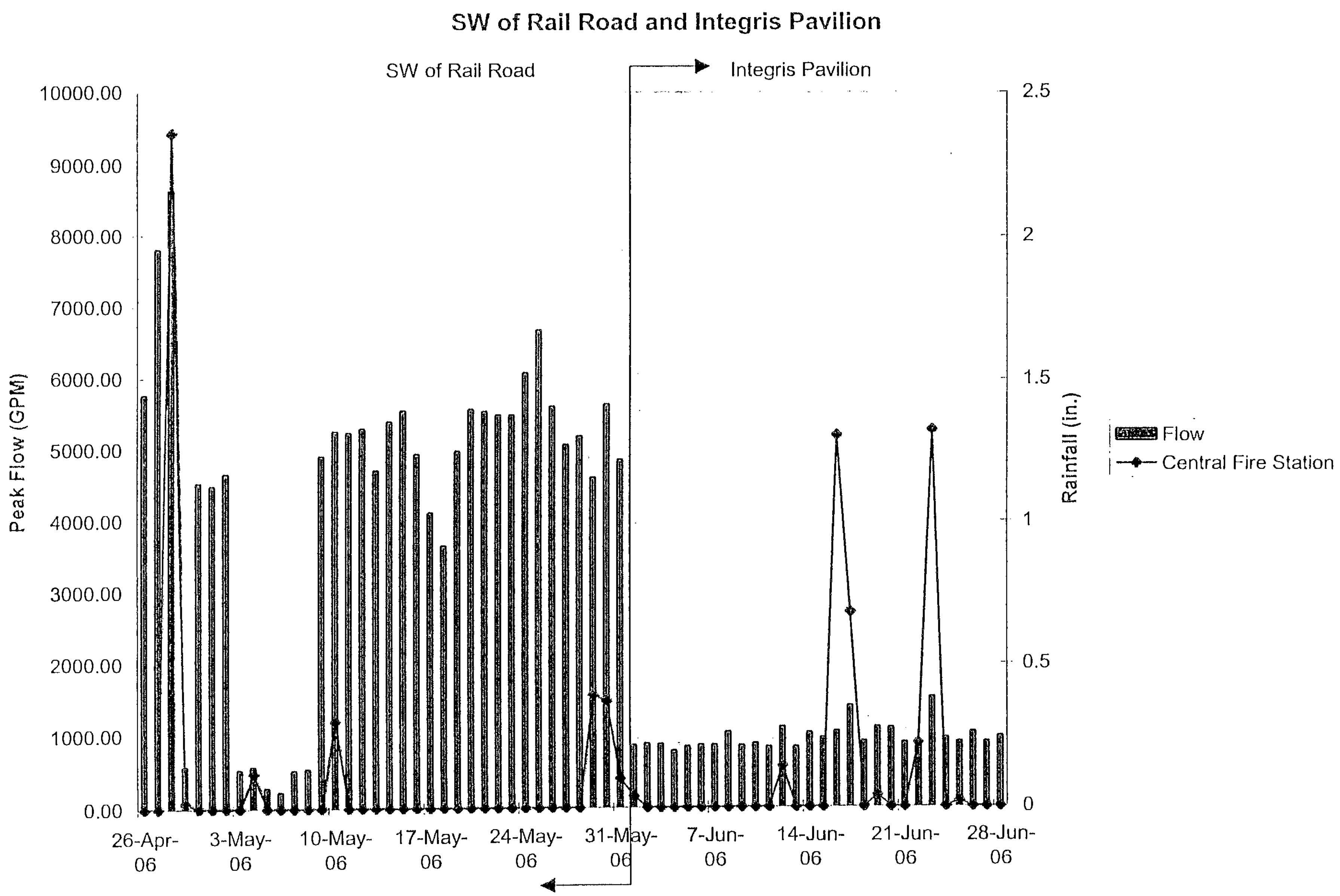

2nd and Randolph - 2006 - 3rd Quarter
Peak Flow (GPM)
33.00
28.00
23.00
18.00
13.00
8.00
3.00
Rainfall (in.)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1-Jul-06
8-Jul-06
15-Jul-06
22-Jul-06
29-Jul-06
5-Aug-06
12-Aug-06
19-Aug-06
26-Aug-06
2-Sep-06
9-Sep-06
16-Sep-06
23-Sep-06
30-Sep-06
Flow
Central Fire Station

SW of RailRoad

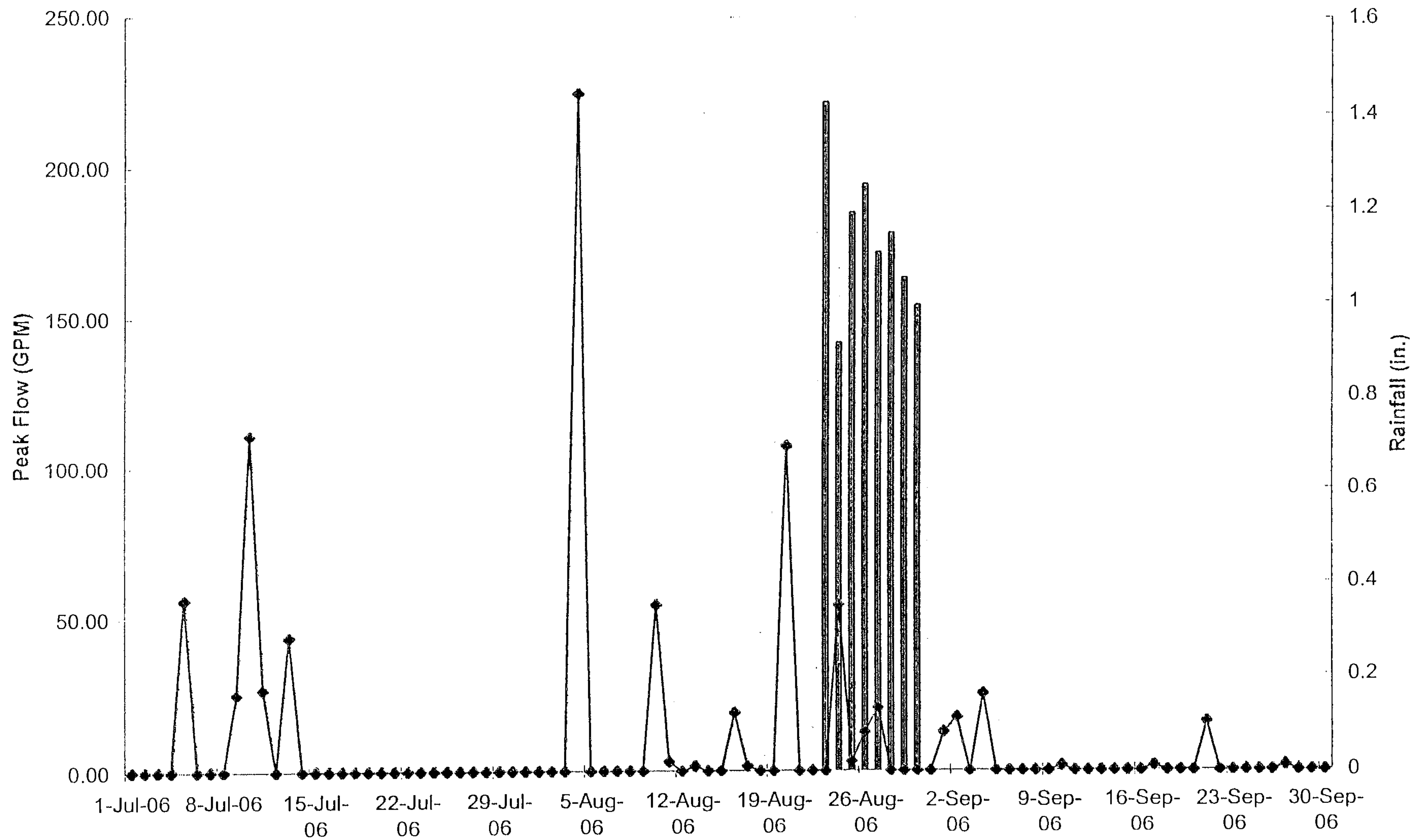


Integris Pavilion

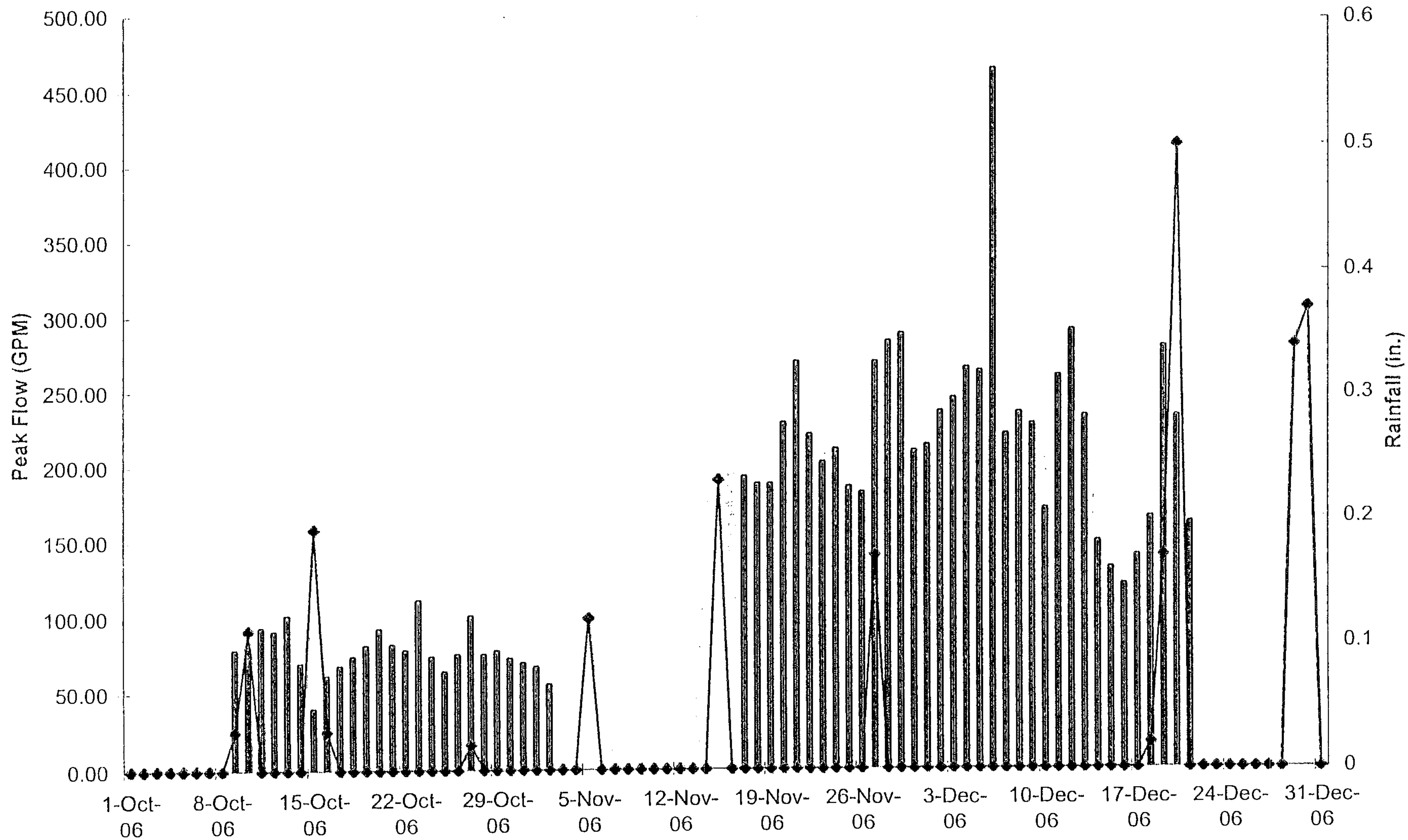


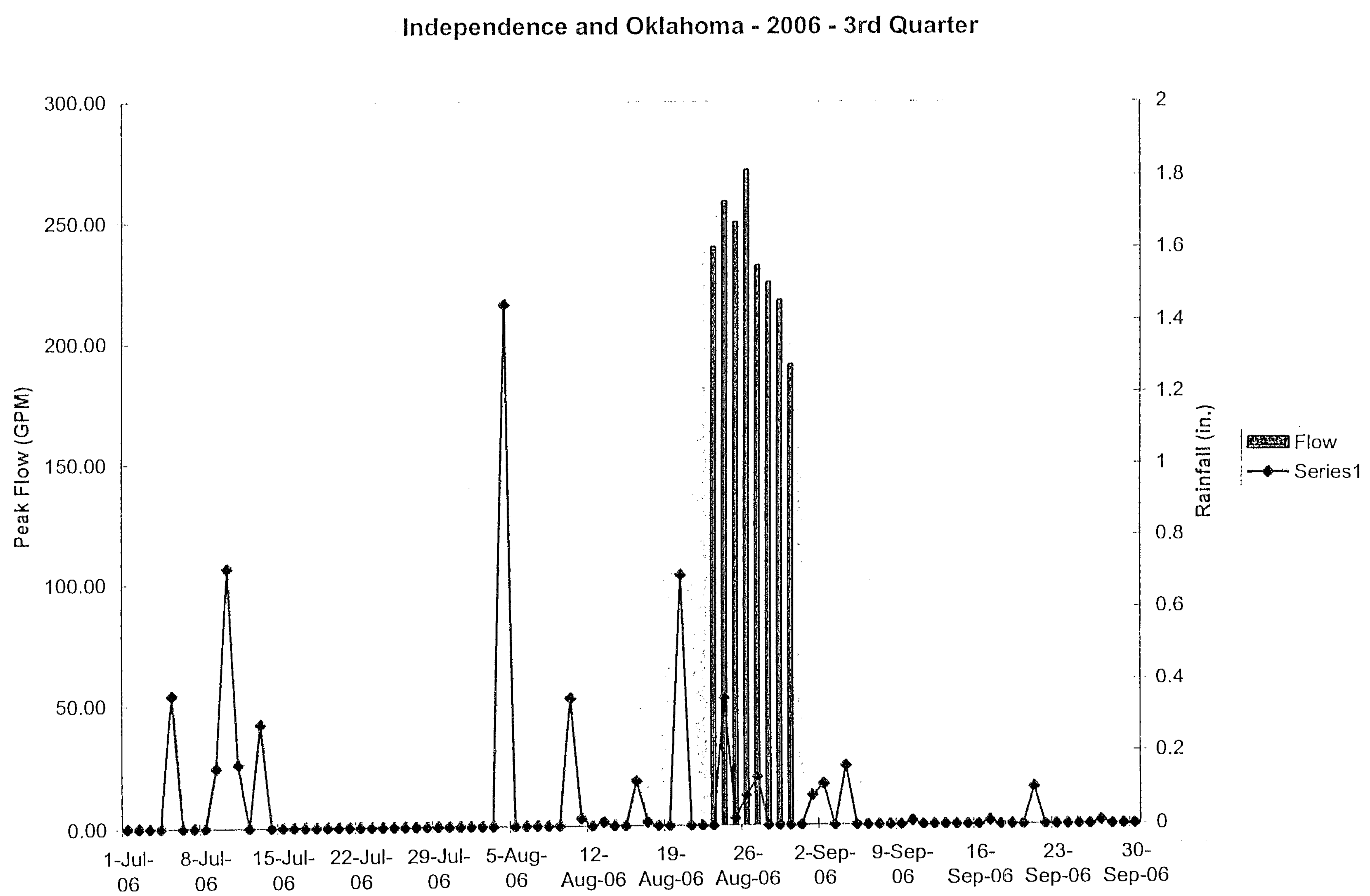

SW of Rail Road and Integris Pavilion
SW of Rail Road
Integris Pavilion
Peak Flow (GPM)
10000.00
9000.00
8000.00
7000.00
6000.00
5000.00
4000.00
3000.00
2000.00
1000.00
0.00
Rainfall (in.)
2.5
2
1.5
1
0.5
0
26-Apr-06
3-May-06
10-May-06
17-May-06
24-May-06
31-May-06
7-Jun-06
14-Jun-06
21-Jun-06
28-Jun-06
Flow
Central Fire Station

Past Times - 2006 - 3rd Quarter

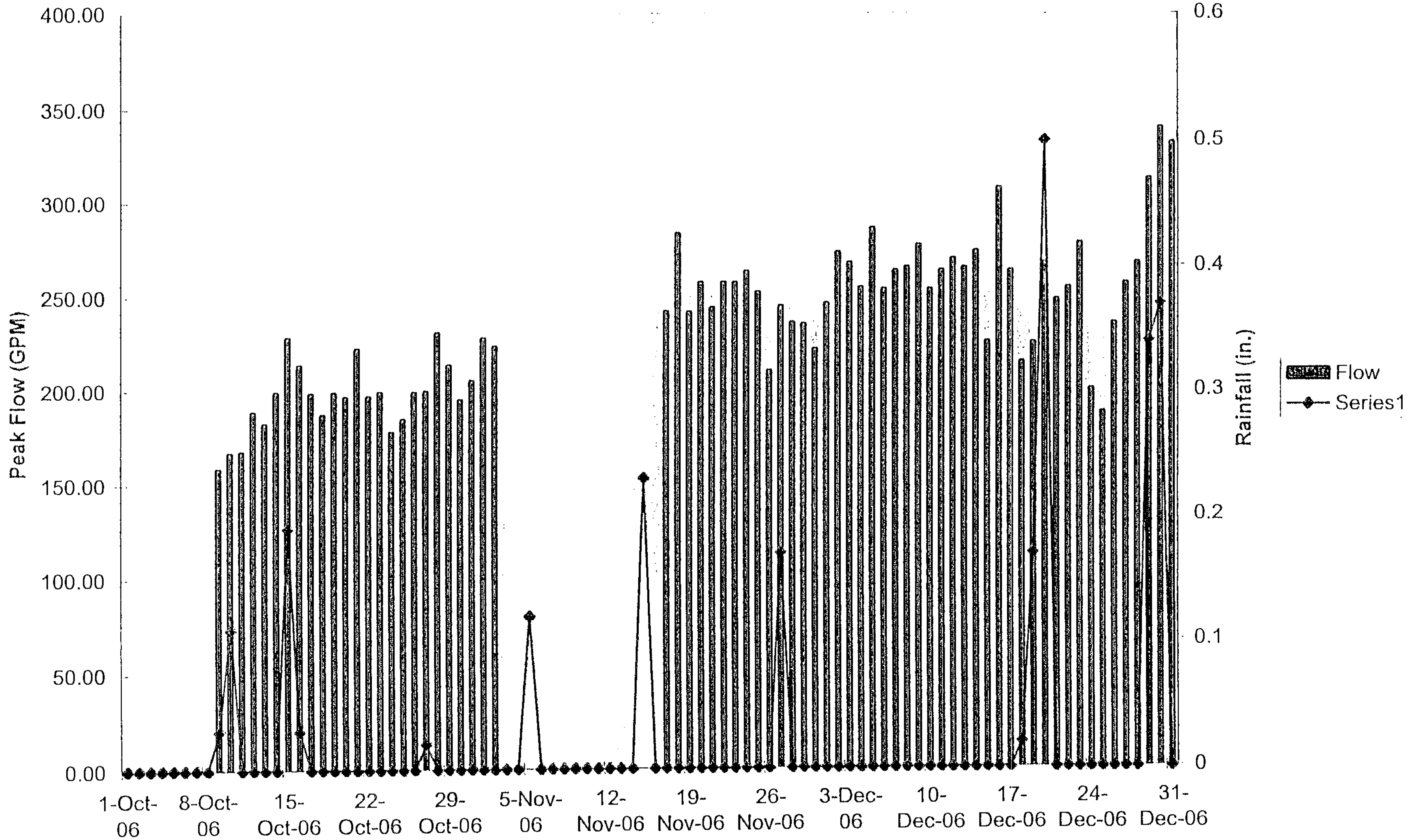


Past Times - 2006 - 4th Quarter

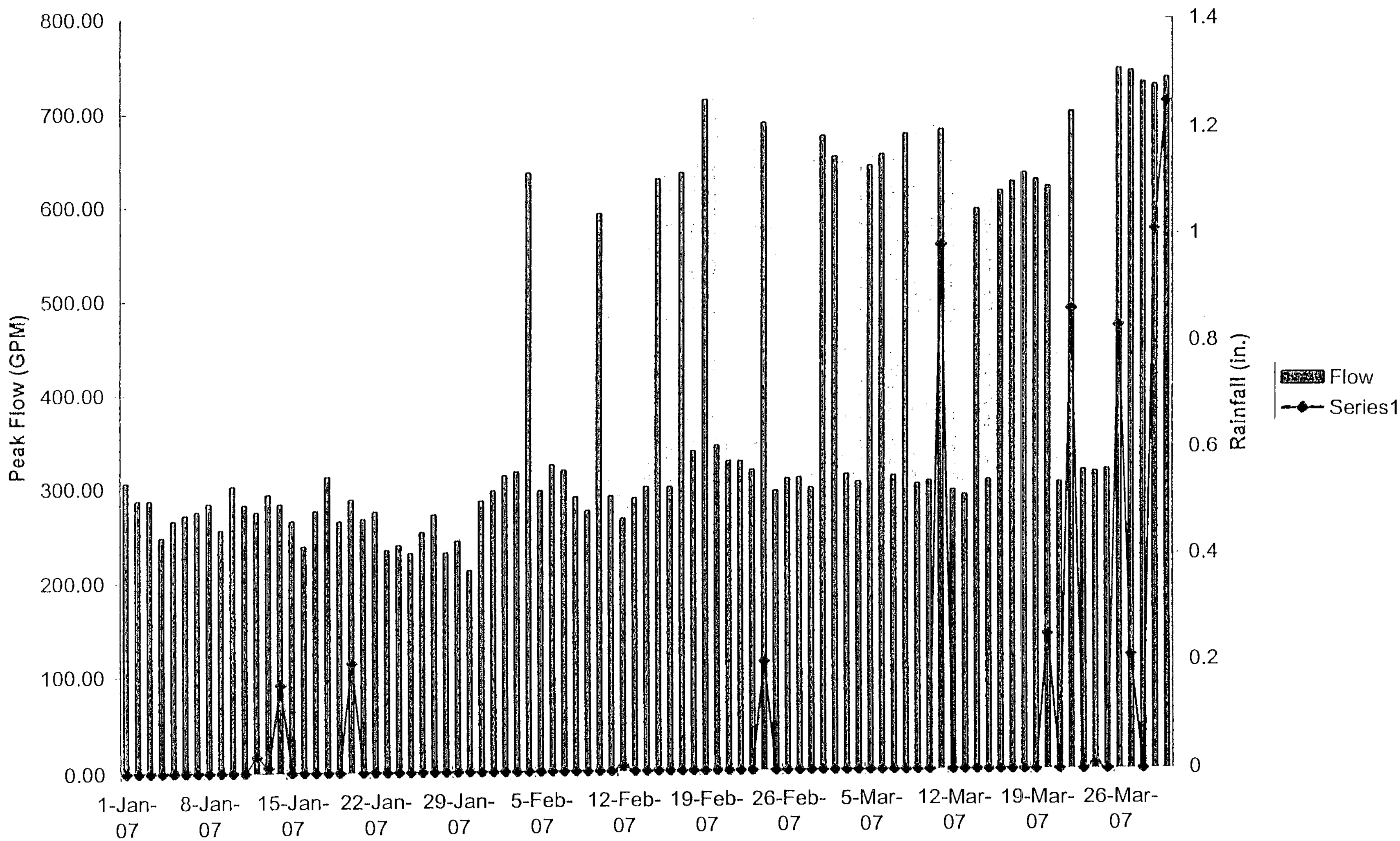



Independence and Oklahoma - 2006 - 3rd Quarter
Peak Flow (GPM)
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Rainfall (in.)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1-Jul-06
8-Jul-06
15-Jul-06
22-Jul-06
29-Jul-06
5-Aug-06
12-Aug-06
19-Aug-06
26-Aug-06
2-Sep-06
9-Sep-06
16-Sep-06
23-Sep-06
30-Sep-06
Flow
Series1

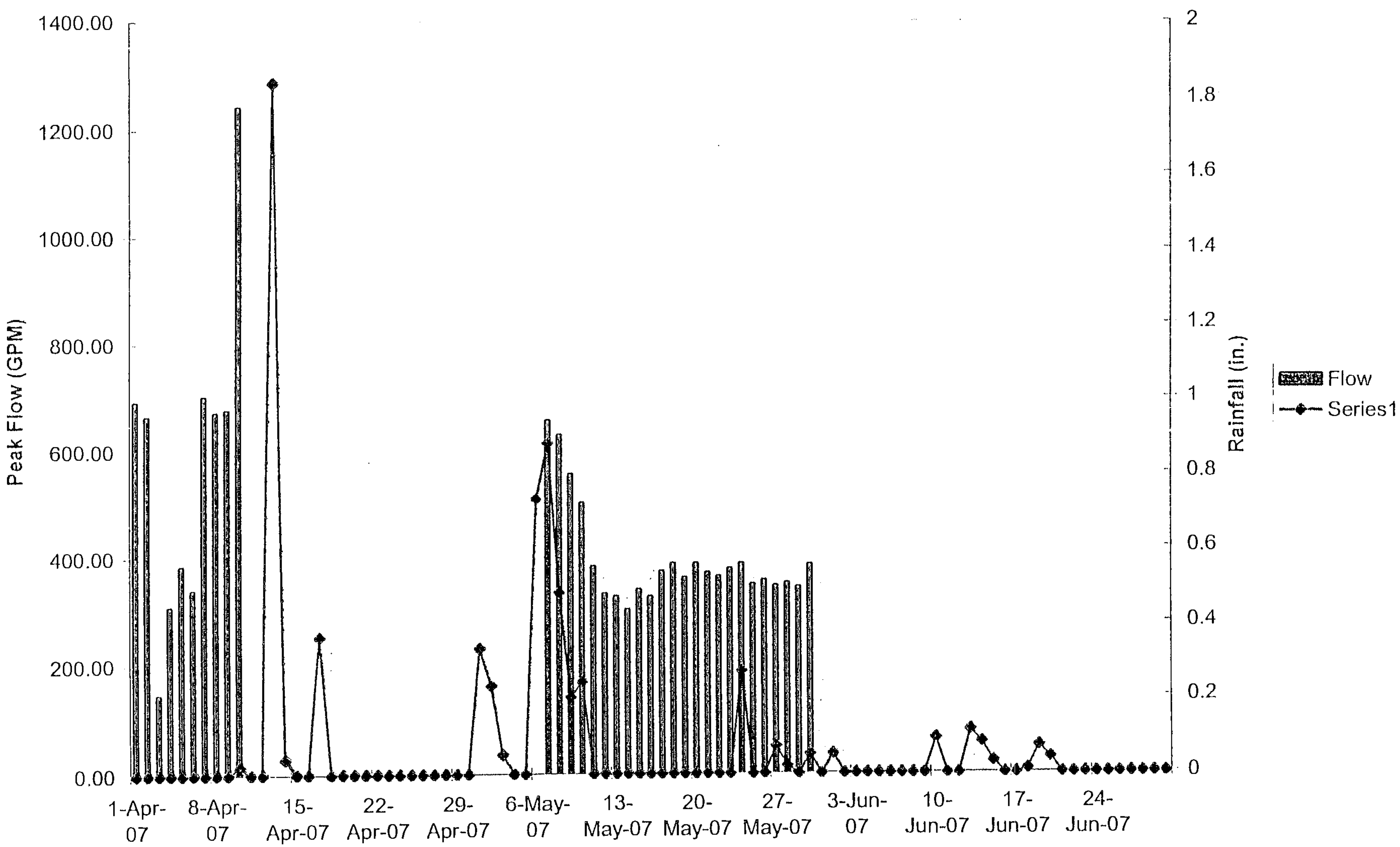
Independence and Oklahoma - 2006 - 4th Quarter



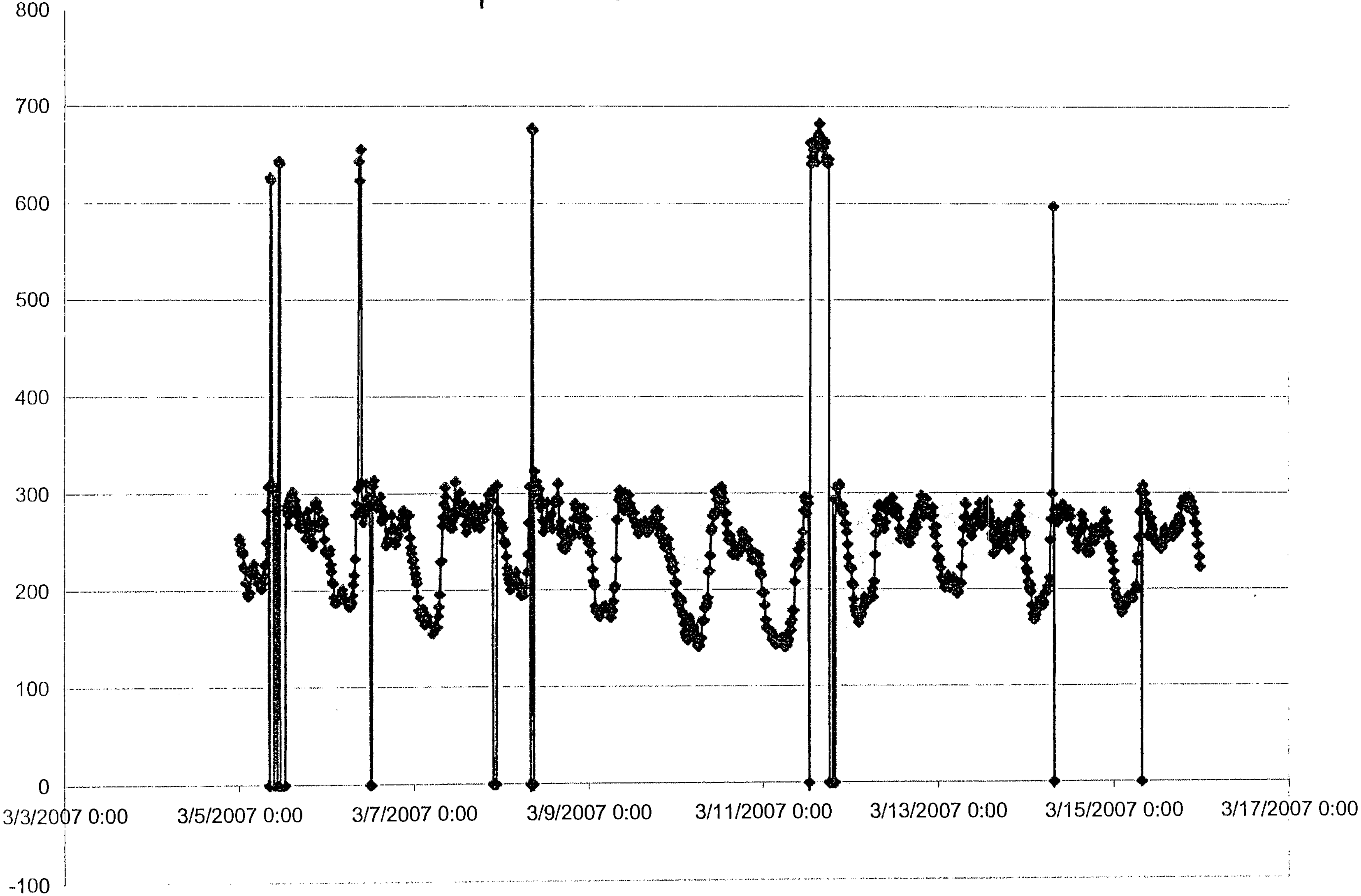
Independence and Oklahoma - 2007 - 1st Quarter



Independence and Oklahoma - 2007 - 2nd Quarter

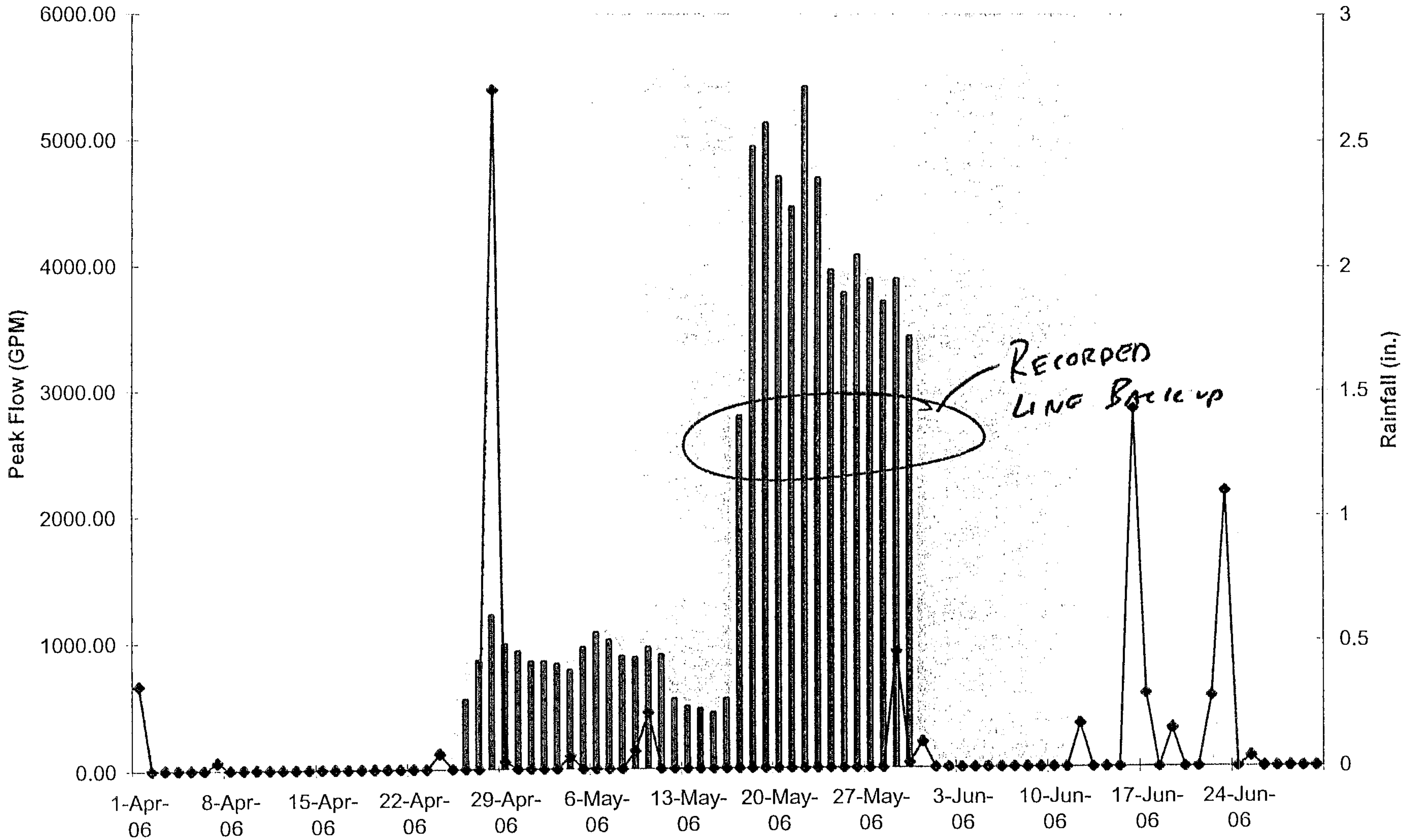


Ind. & Oklahoma

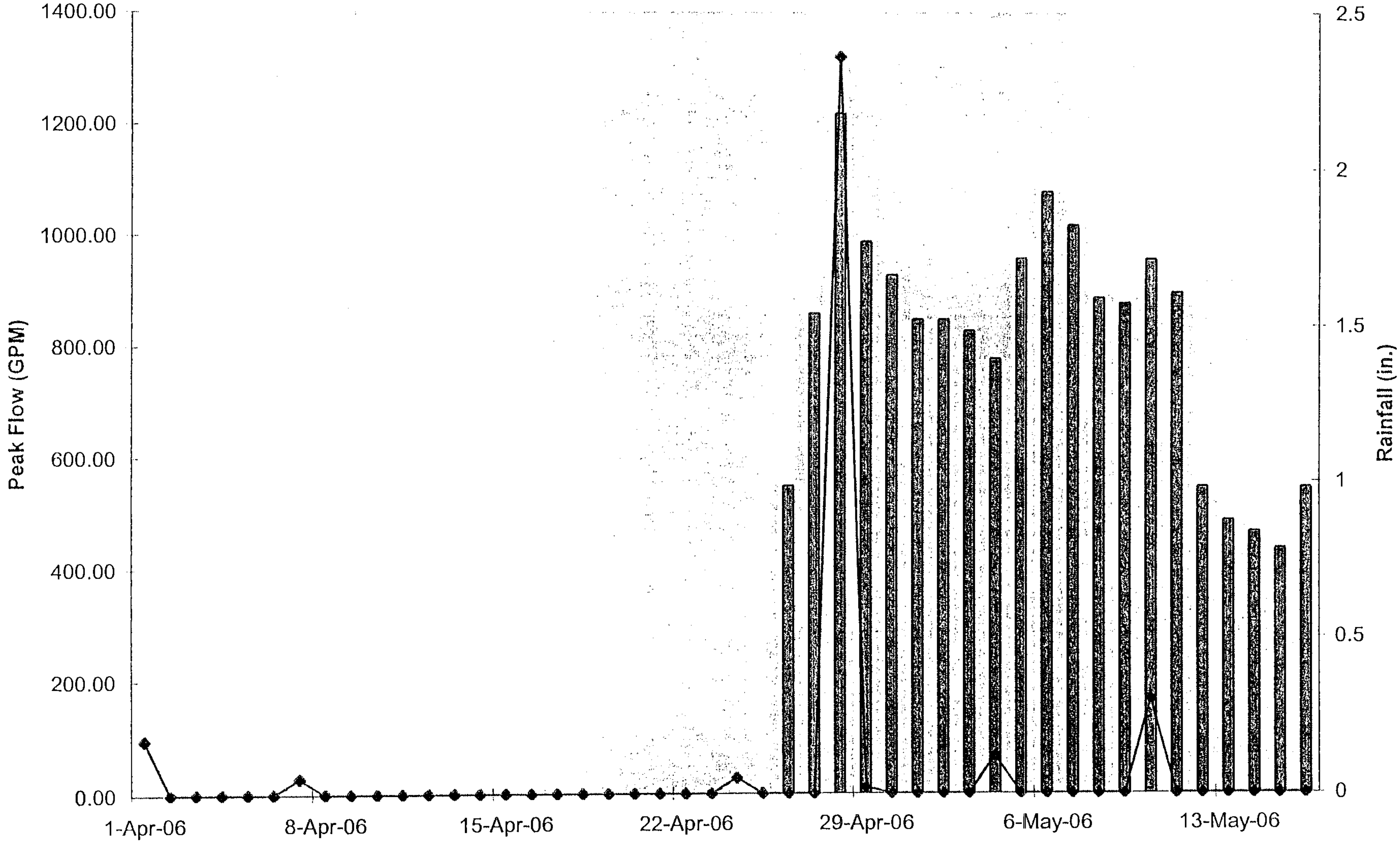


EAST SIDE

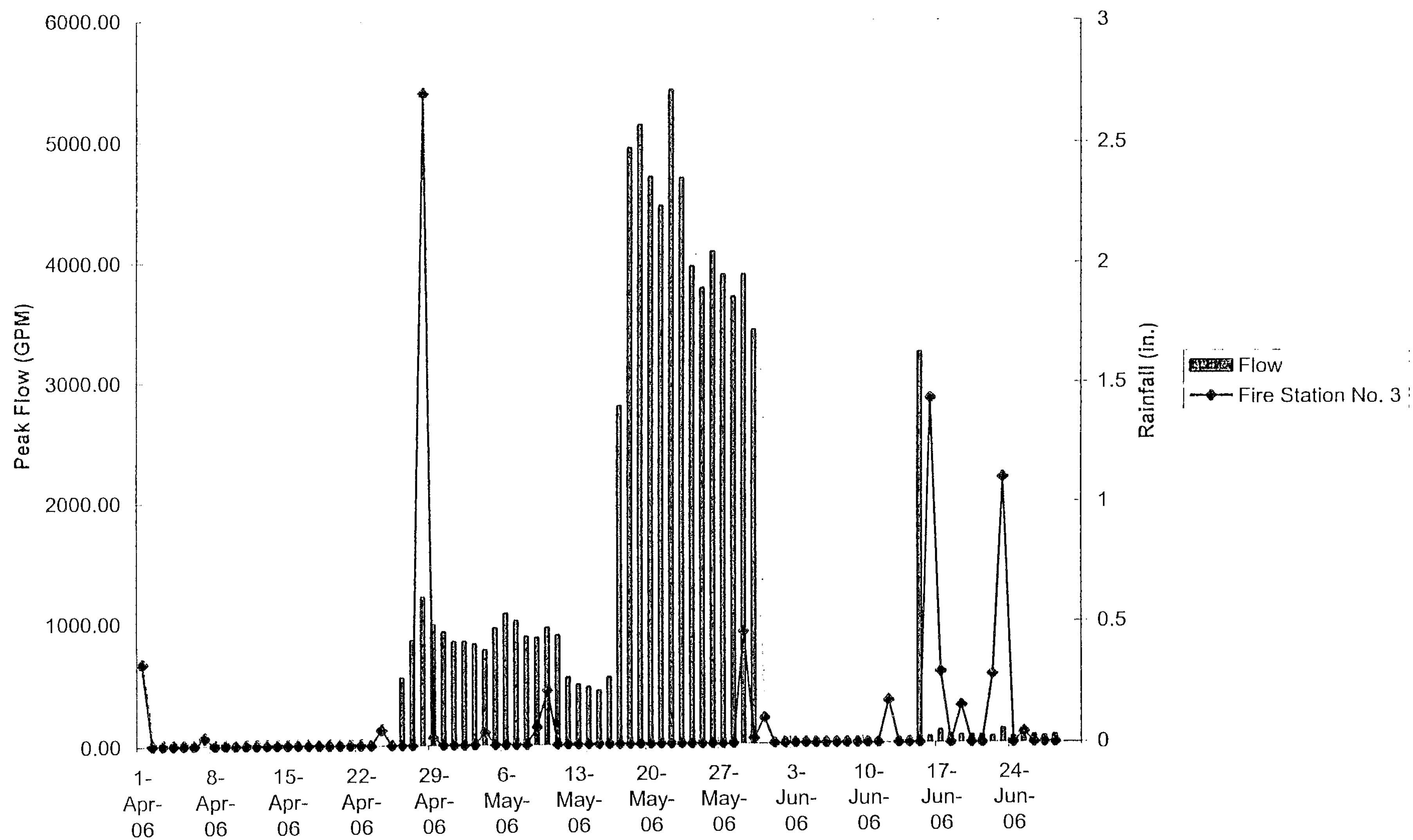
NOC - 2006 - 2nd Quarter



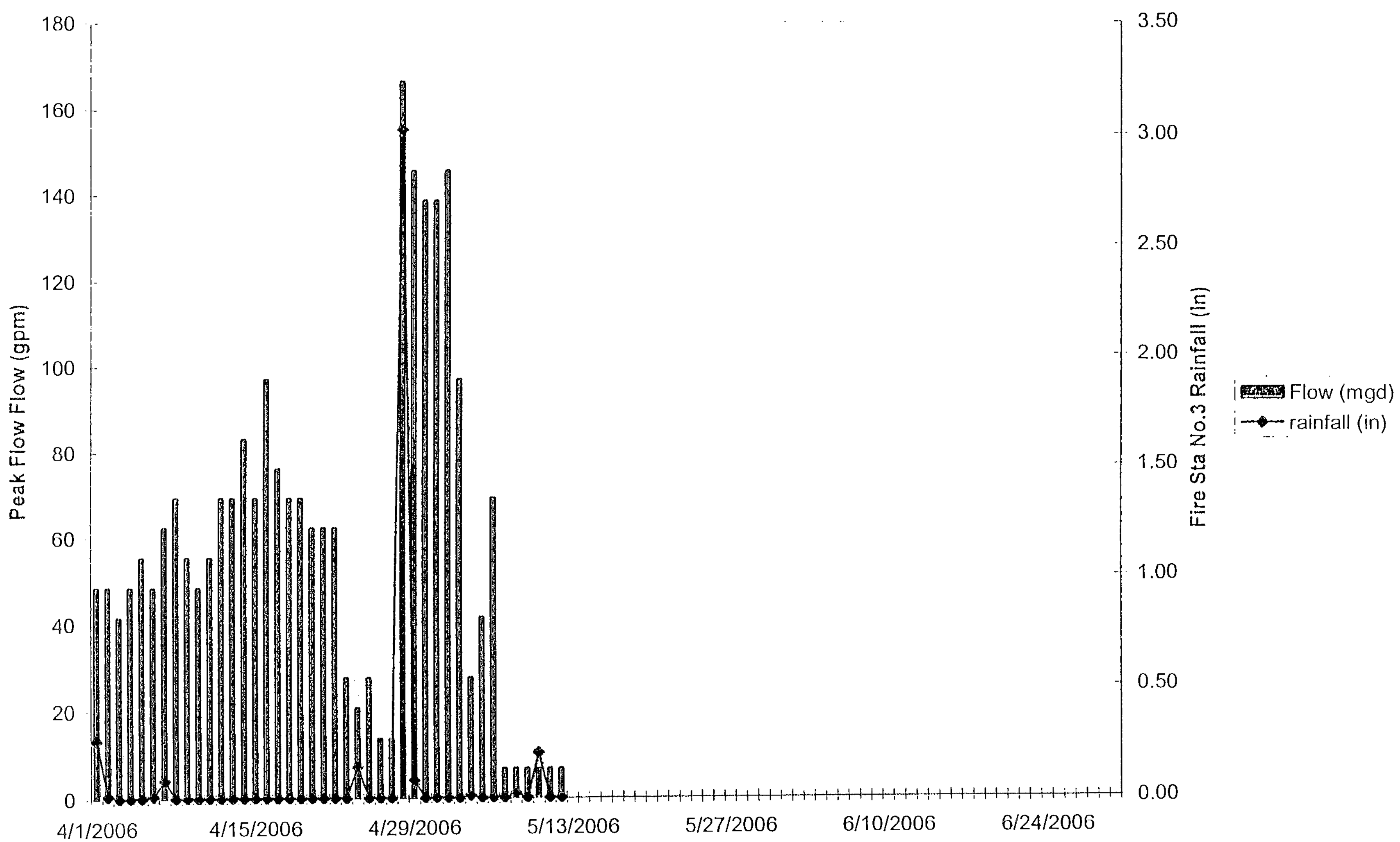
NOC - 2006 - 2nd Quarter



19th and Randolph - 2006 - 2nd Quarter

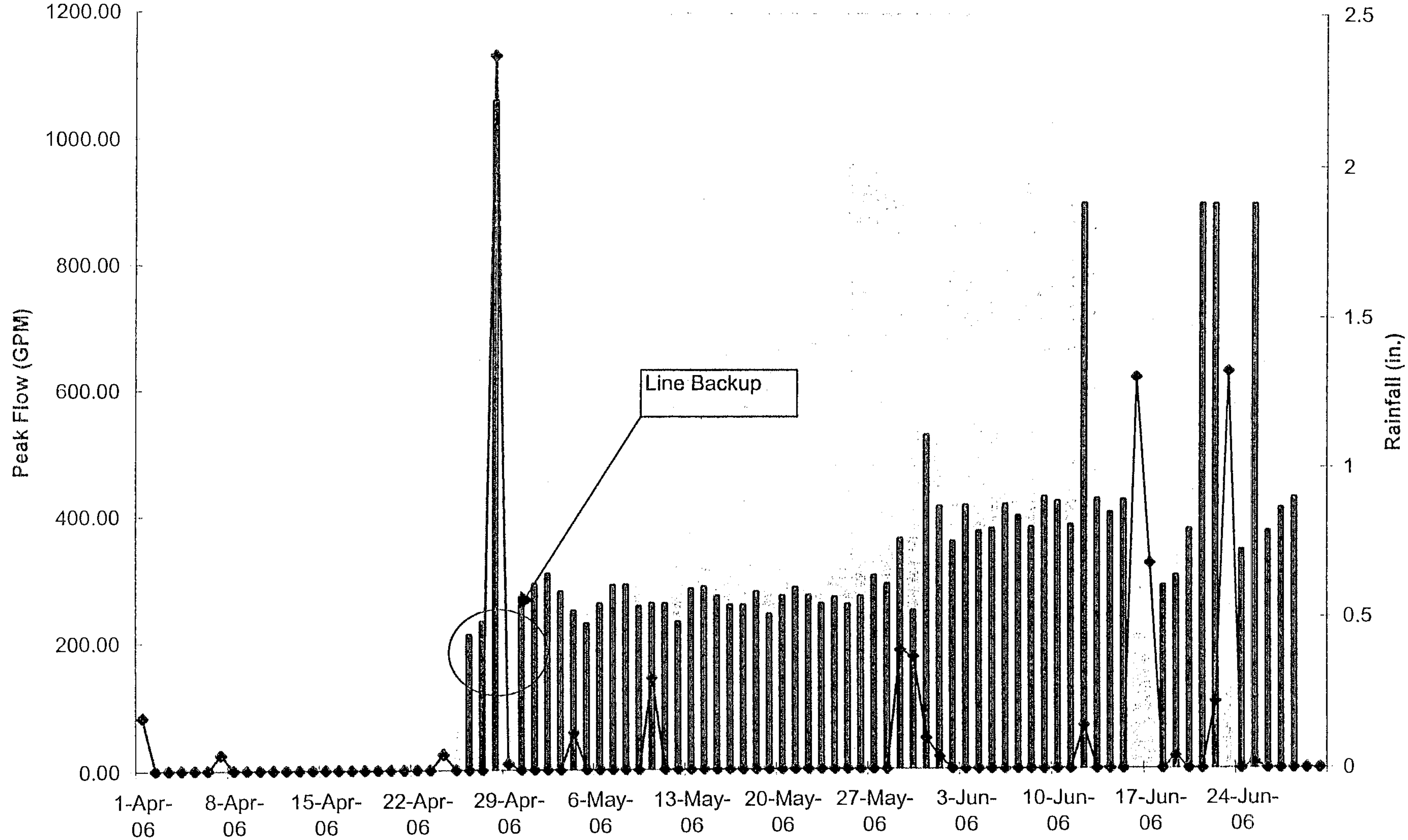


30th and Garriott

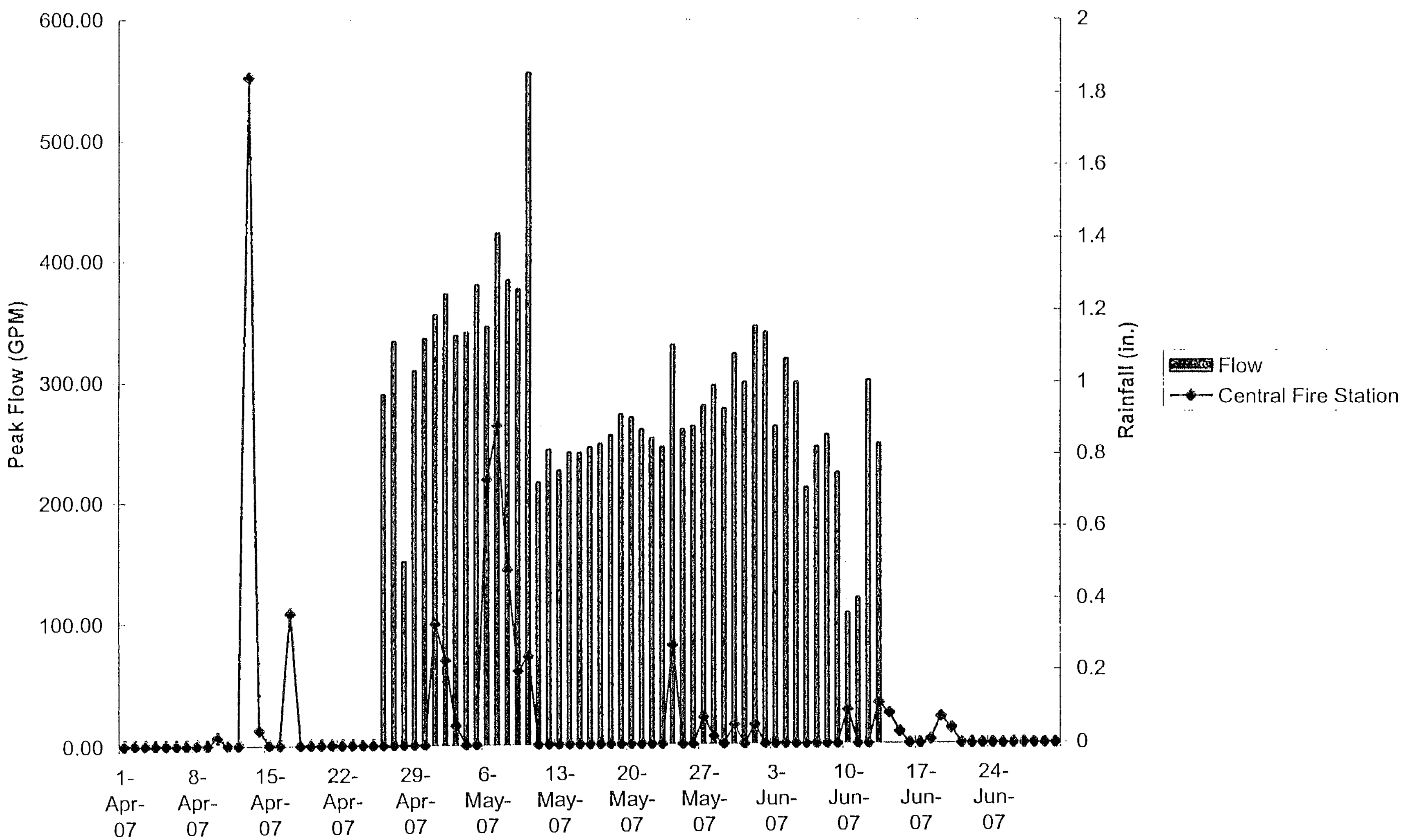


NORTH SIDE

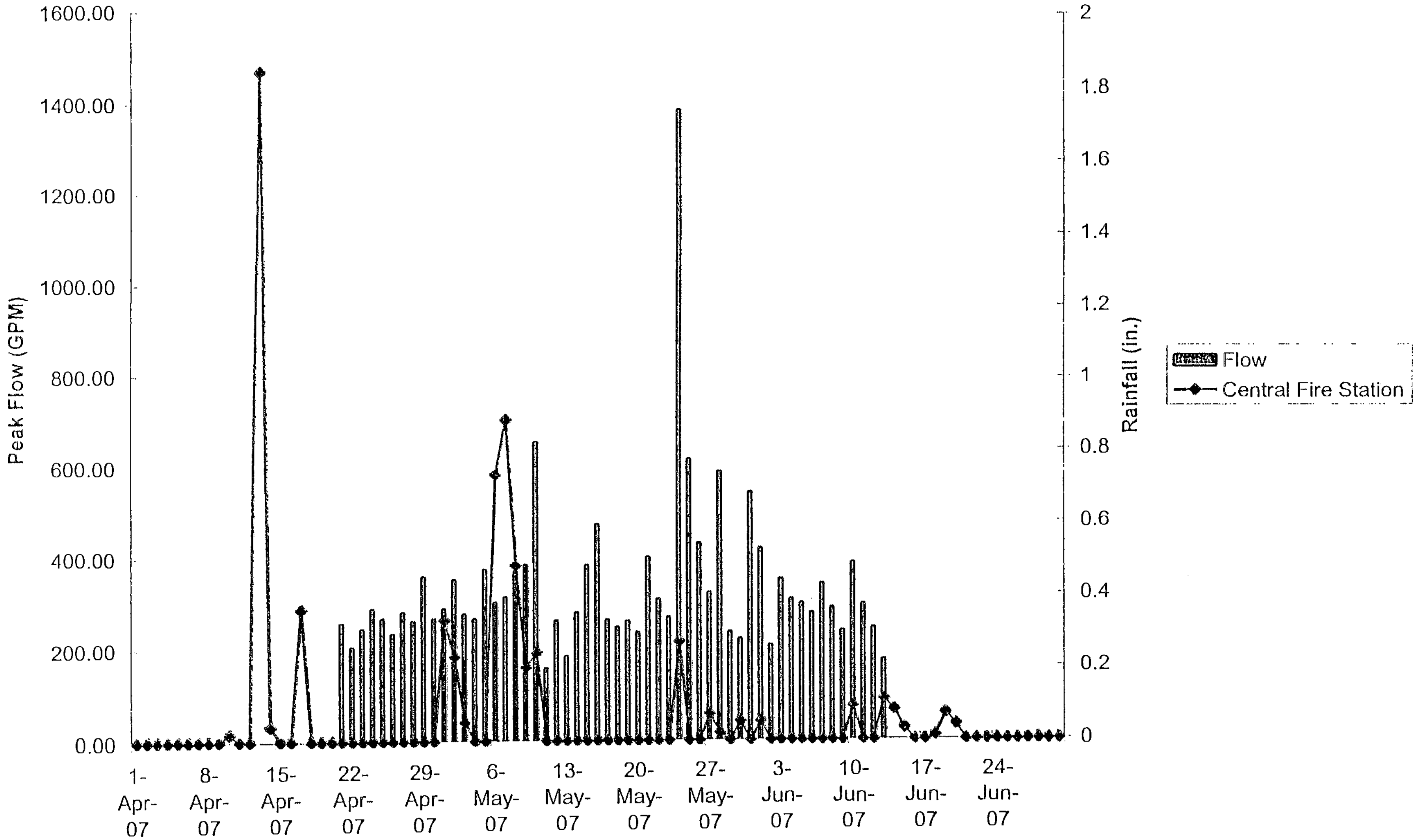
3rd and Beech. - 2006 - 2nd Quarter



4th and Beech

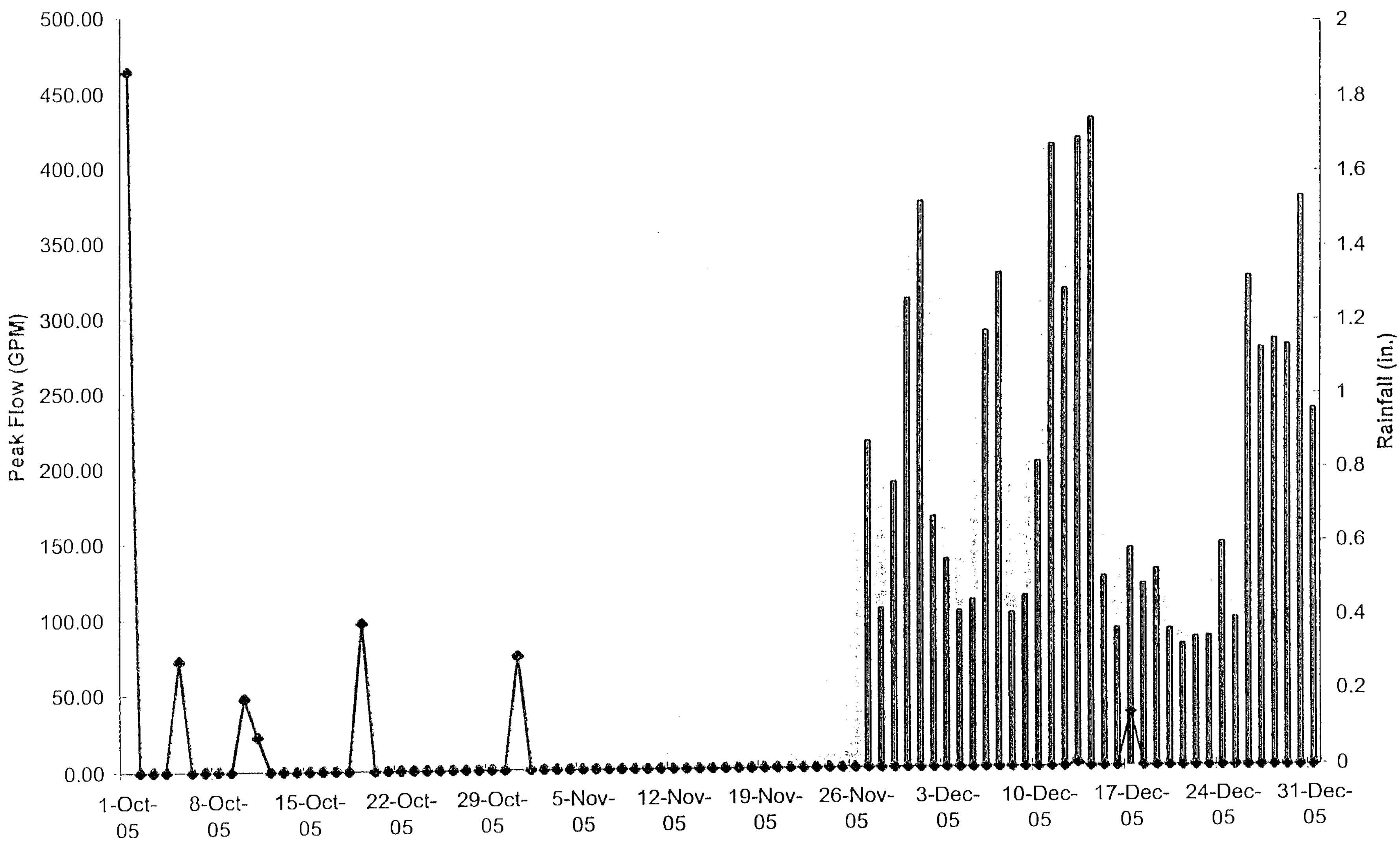


North Van Buren - 2007 - 2nd Quarter

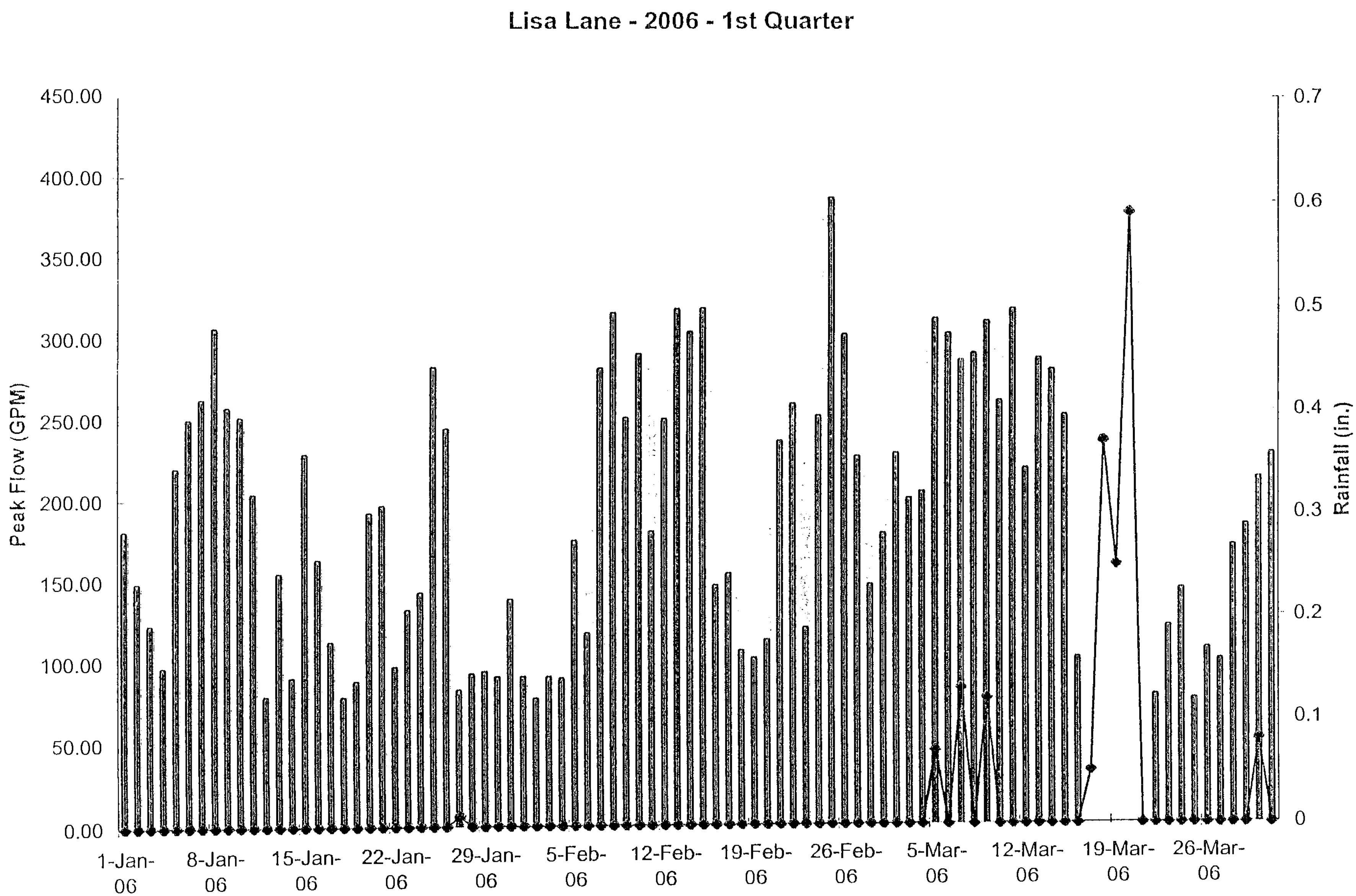


NORTHWEST

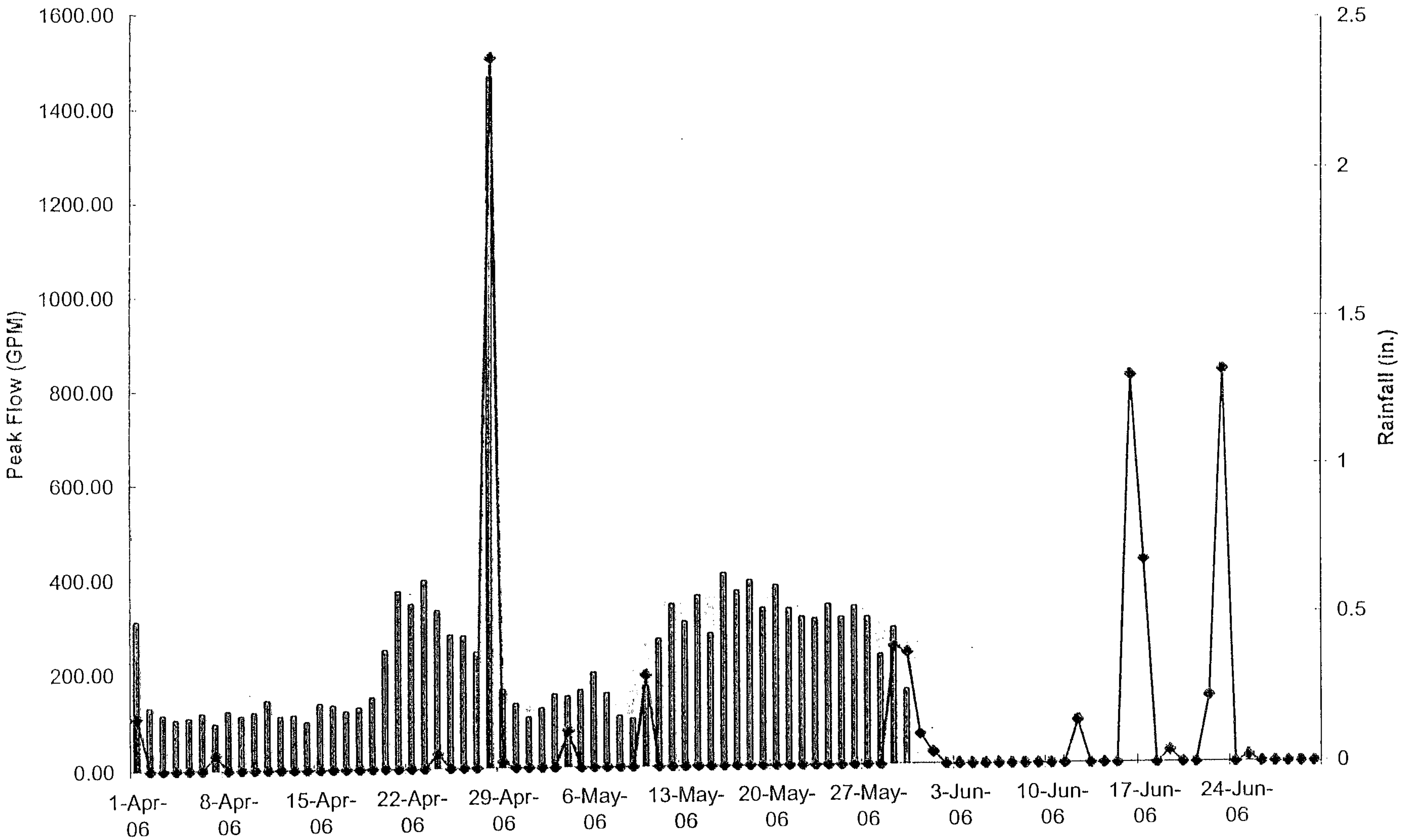
Lisa Lane - 2005 - 4th Quarter



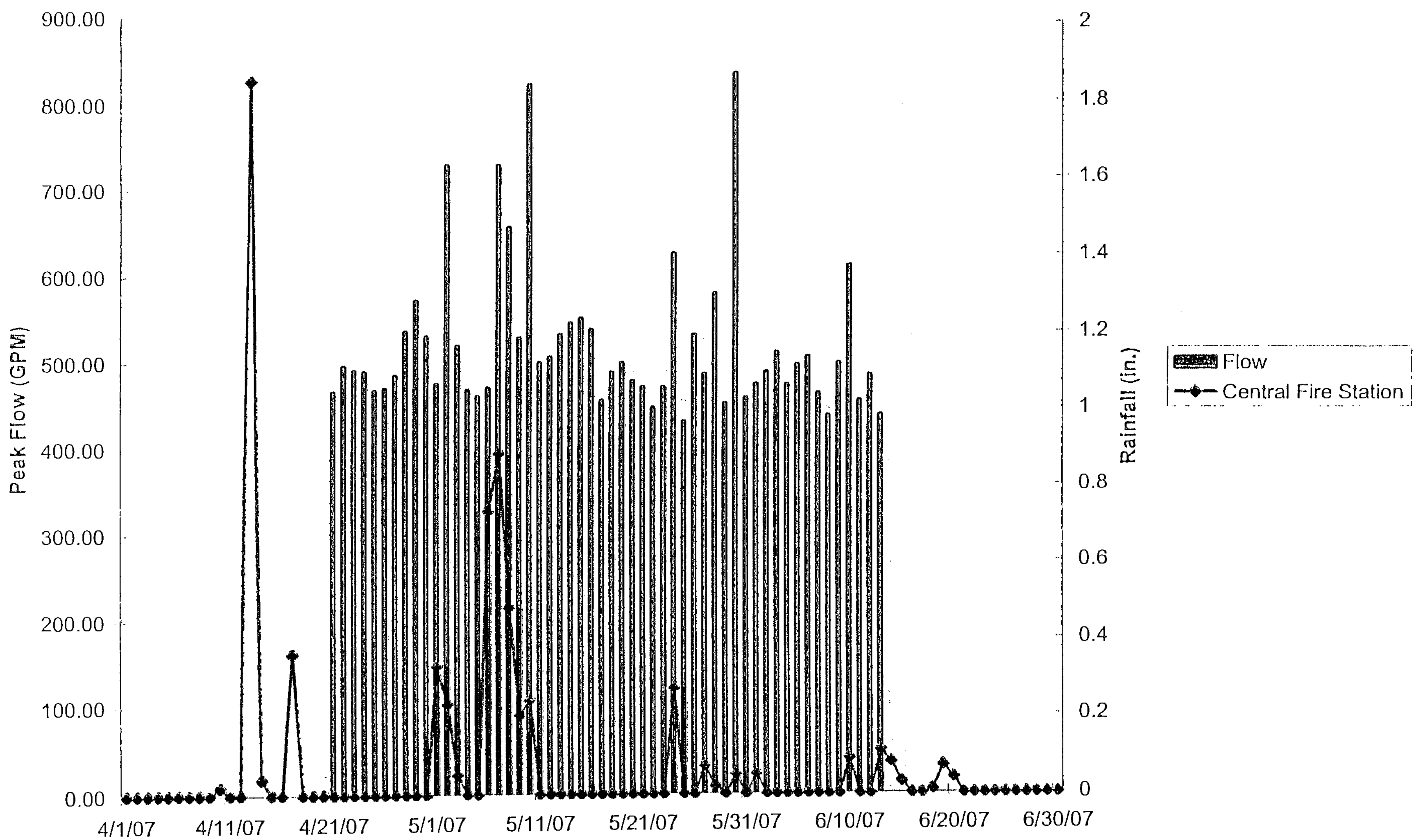
Lisa_Lane 06 - 1st Quarter

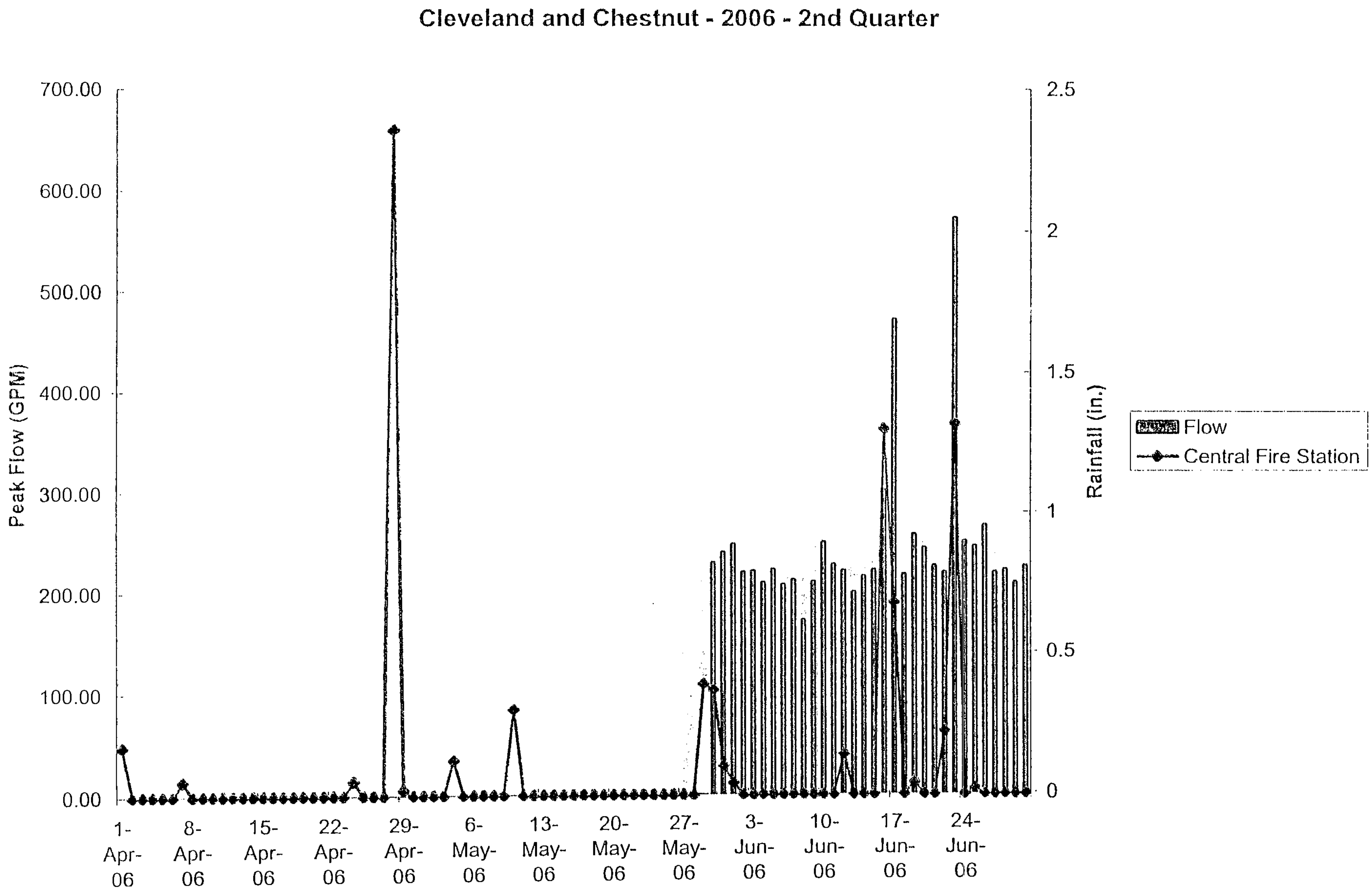


Lisa Lane - 2006 - 2nd Quarter

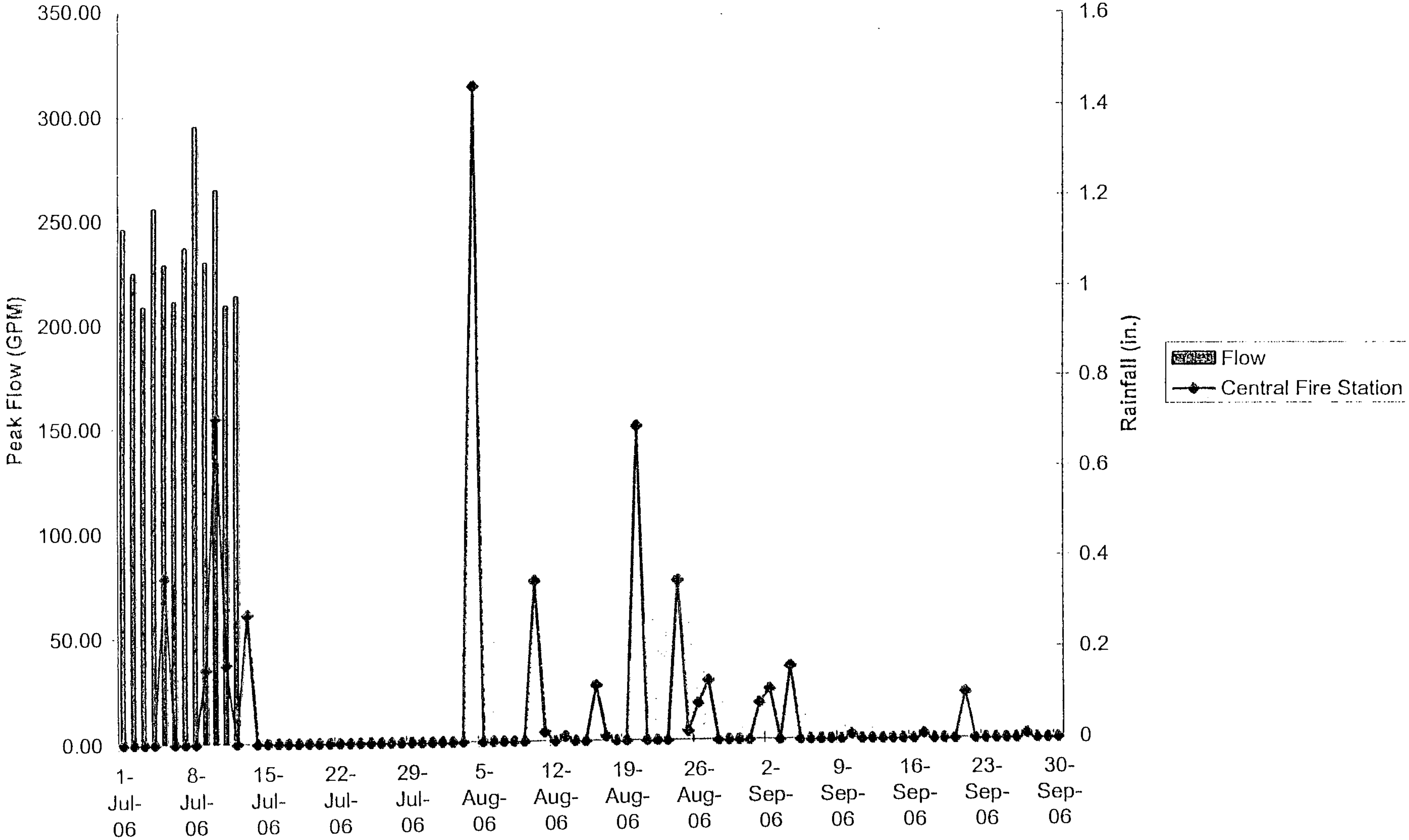


McKinley and Randolph - 2007 - 2nd Quarter



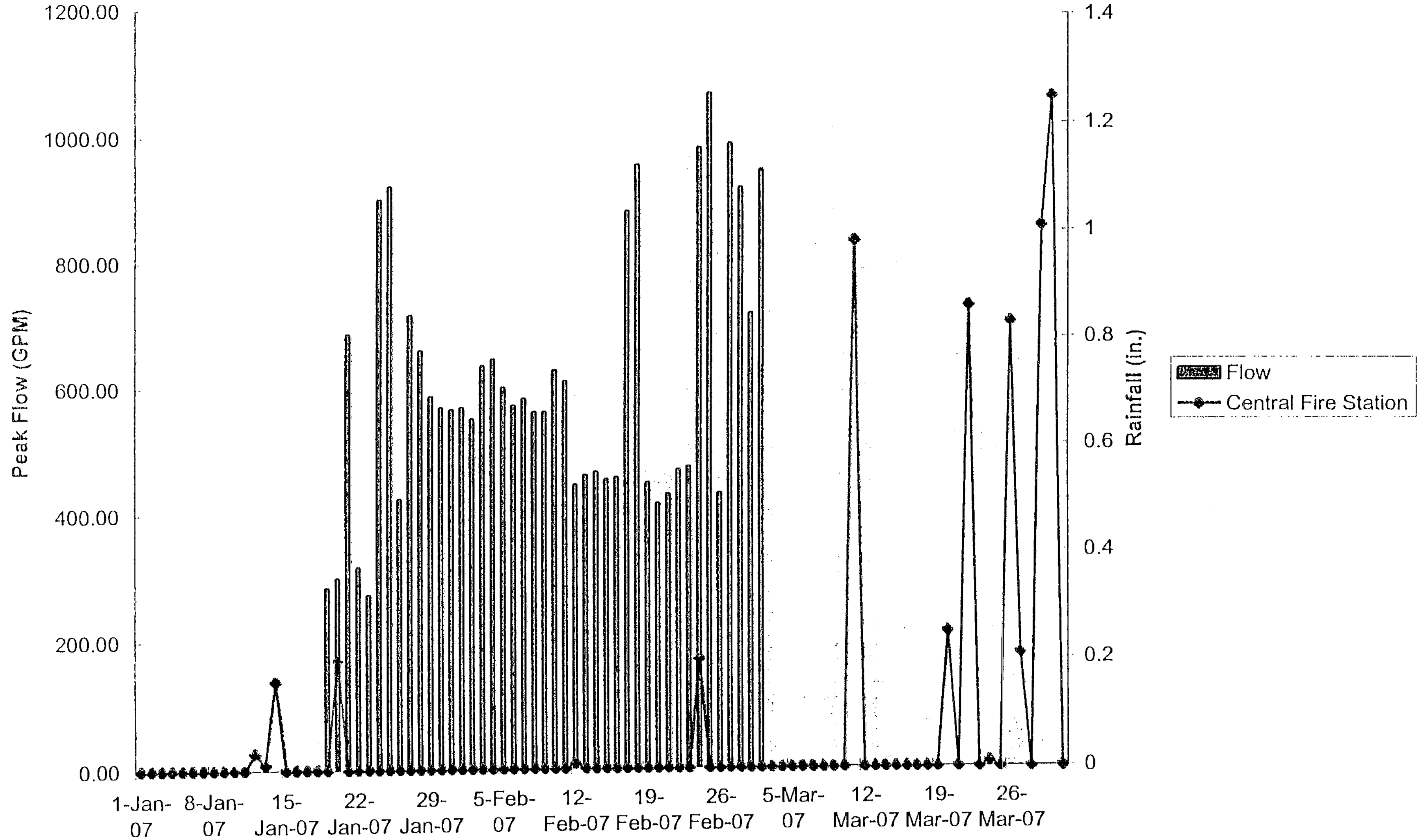

Cleveland and Chestnut - 2006 - 2nd Quarter
Peak Flow (GPM)
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Rainfall (in.)
2.5
2
1.5
1
0.5
0
1-Apr-06
8-Apr-06
15-Apr-06
22-Apr-06
29-Apr-06
6-May-06
13-May-06
20-May-06
27-May-06
3-Jun-06
10-Jun-06
17-Jun-06
24-Jun-06
Flow
Central Fire Station

Cleveland and Chestnut - 2006 - 3rd Quarter

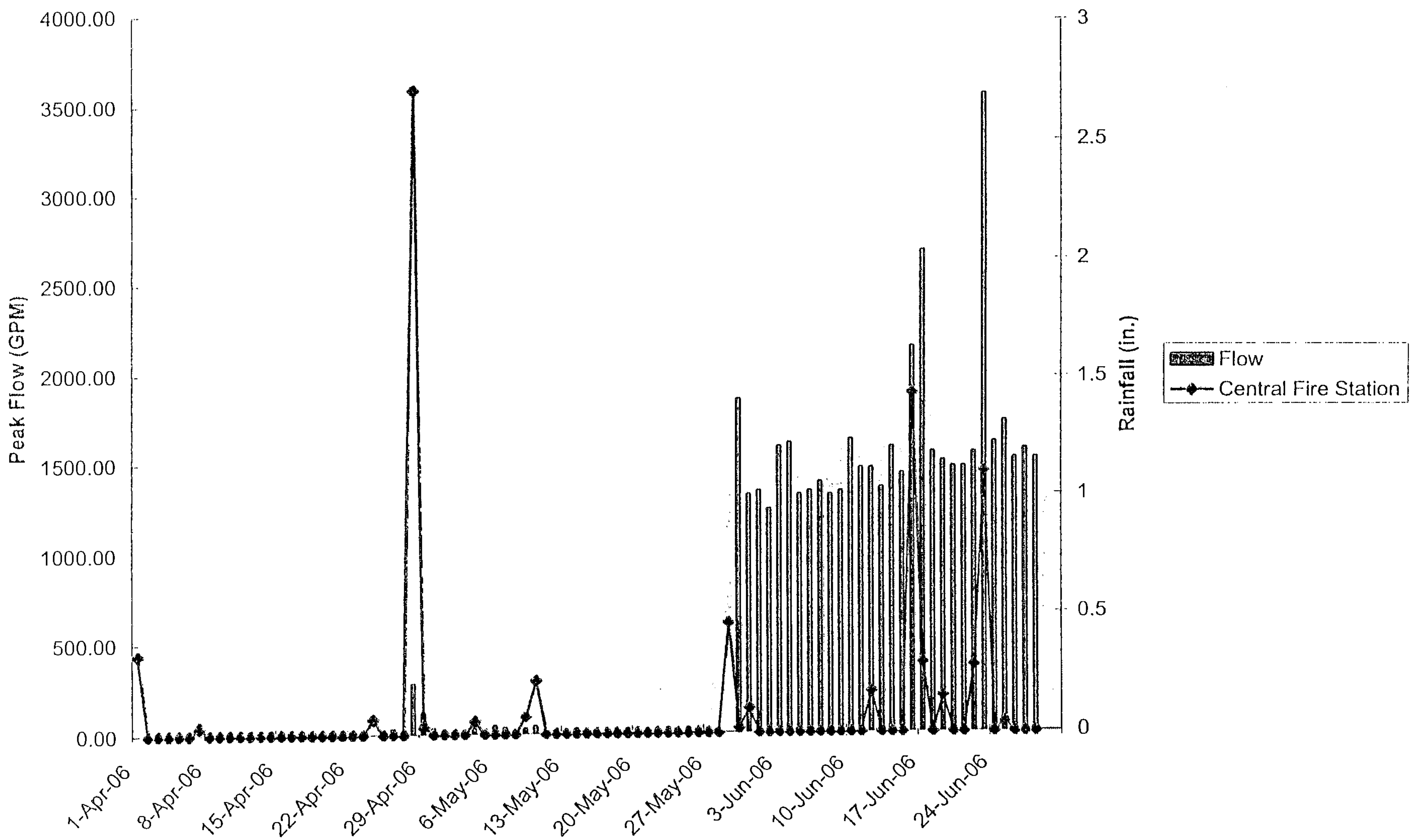


WEST SIDE

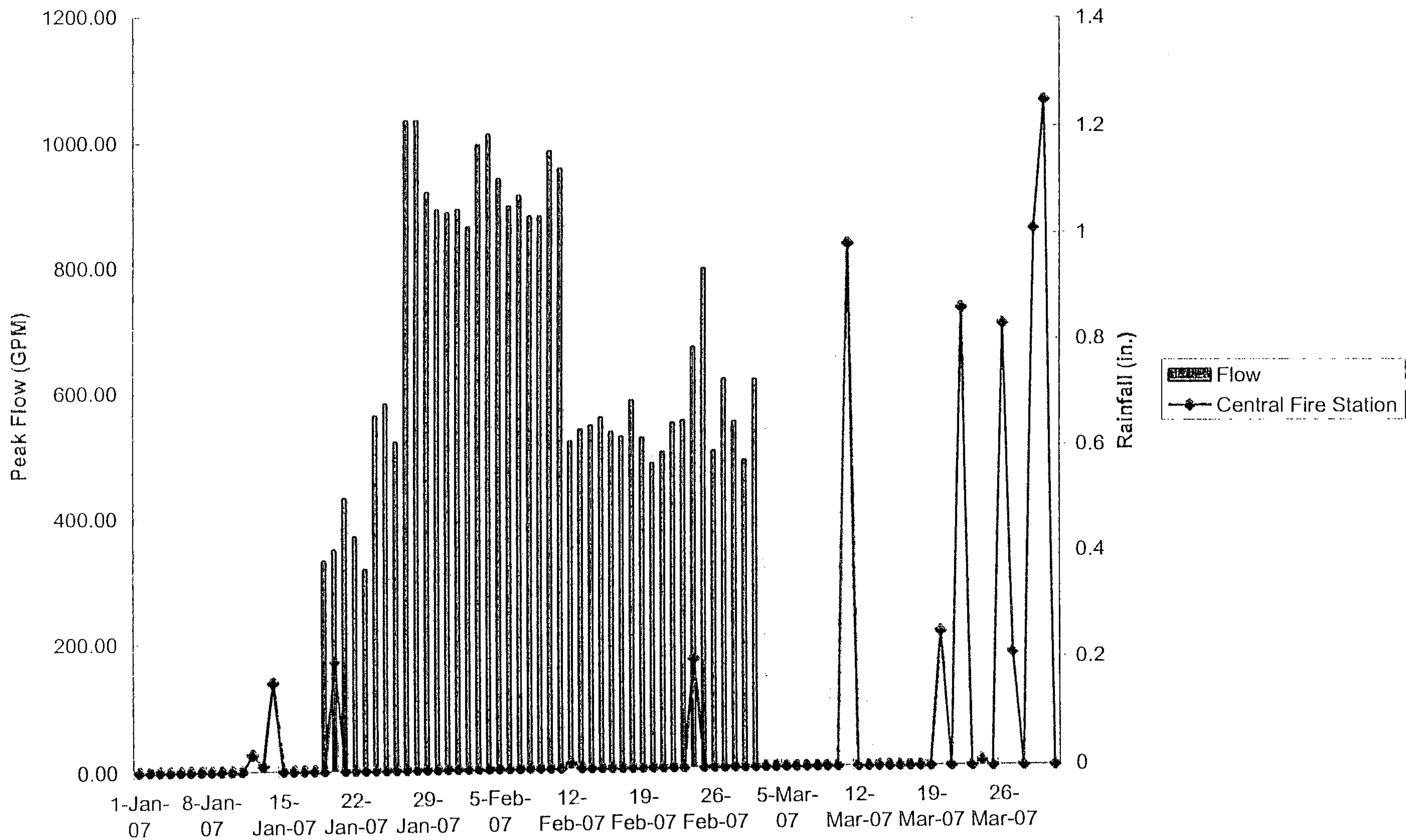
Indian Oaks - 2007 - 1st Quarter



Oakwood Mall and Channel - 2006 - 2nd Quarter

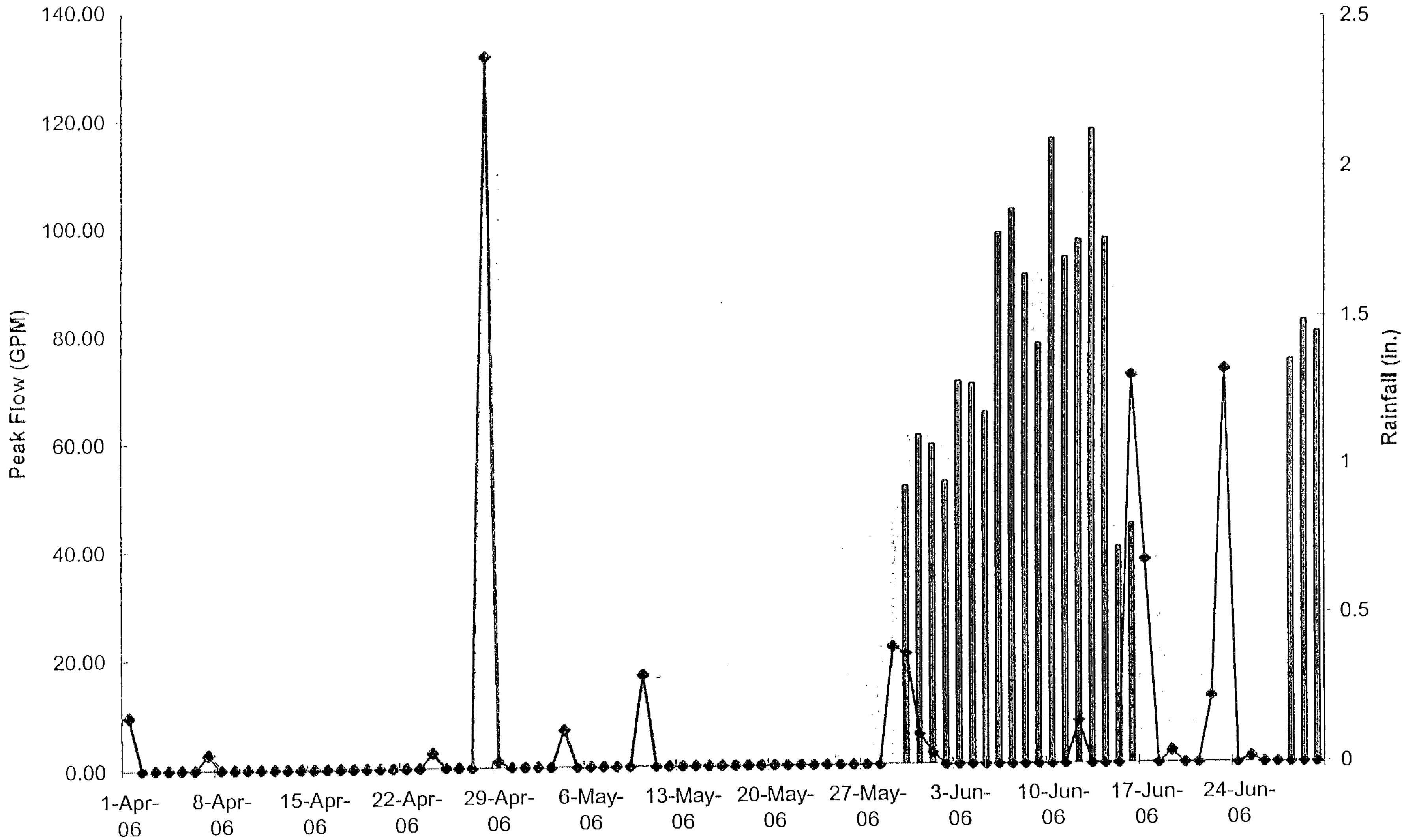


Mall - 2007 - 1st Quarter

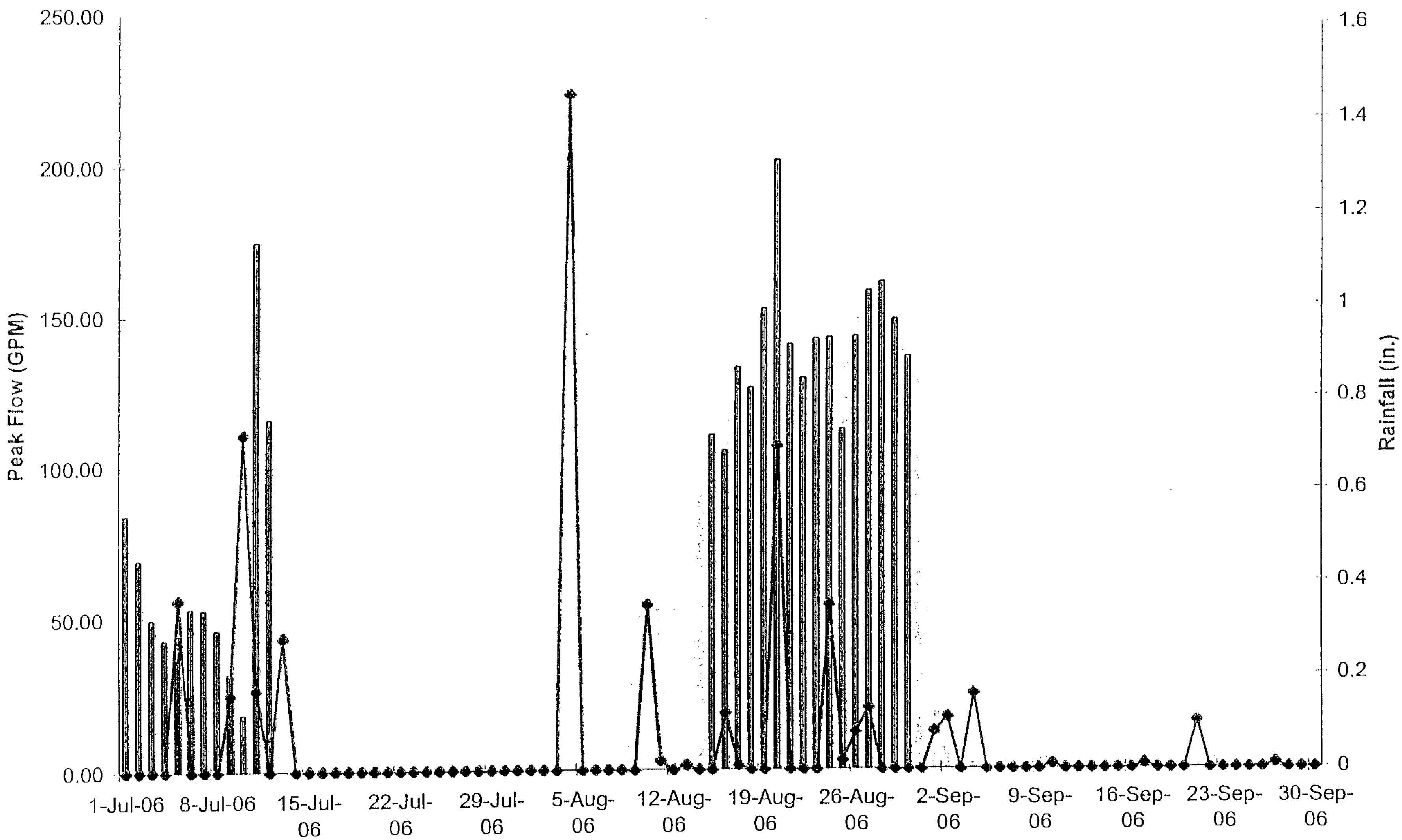


SOUTH SIDE

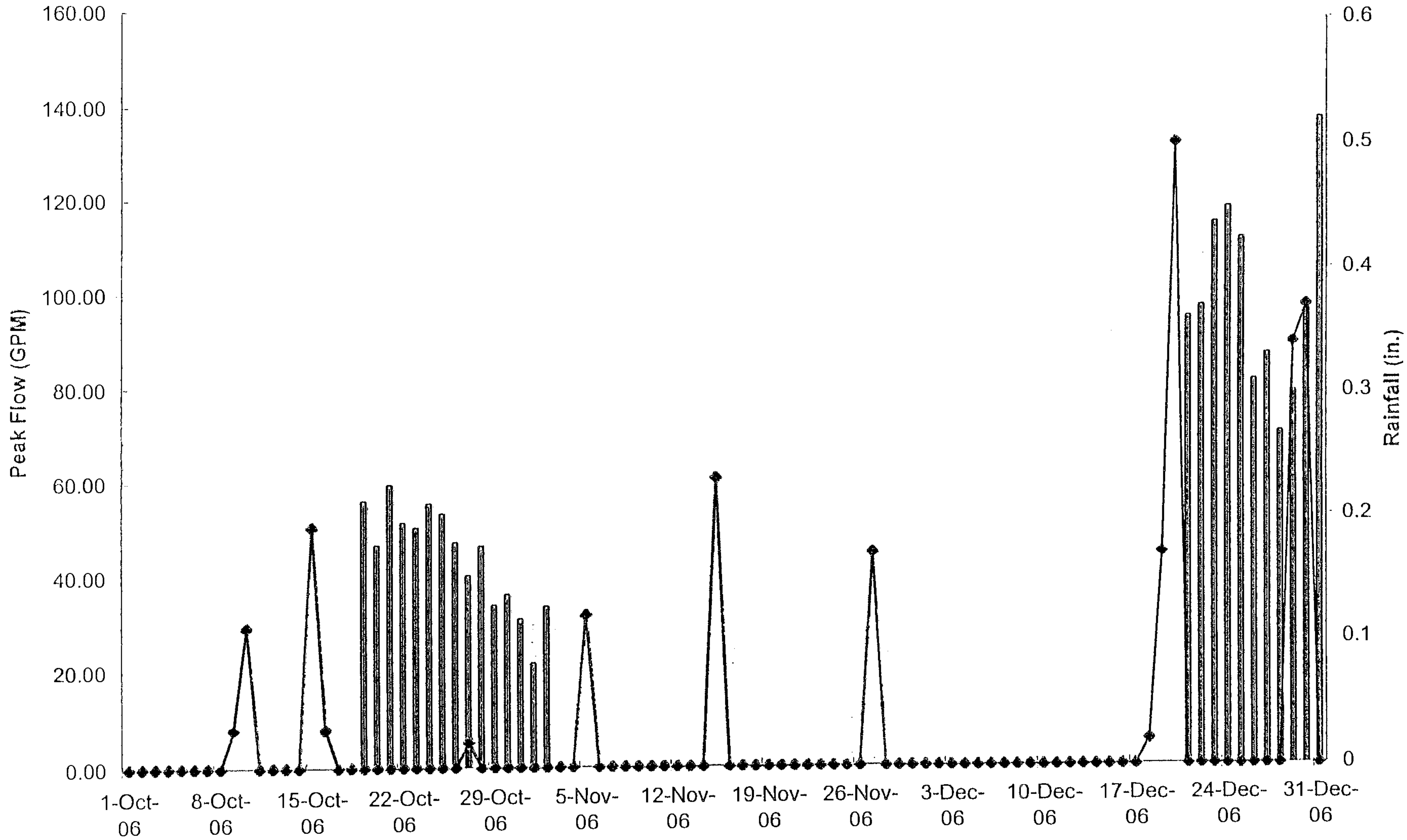
East 16th - 2006 - 2nd Quarter



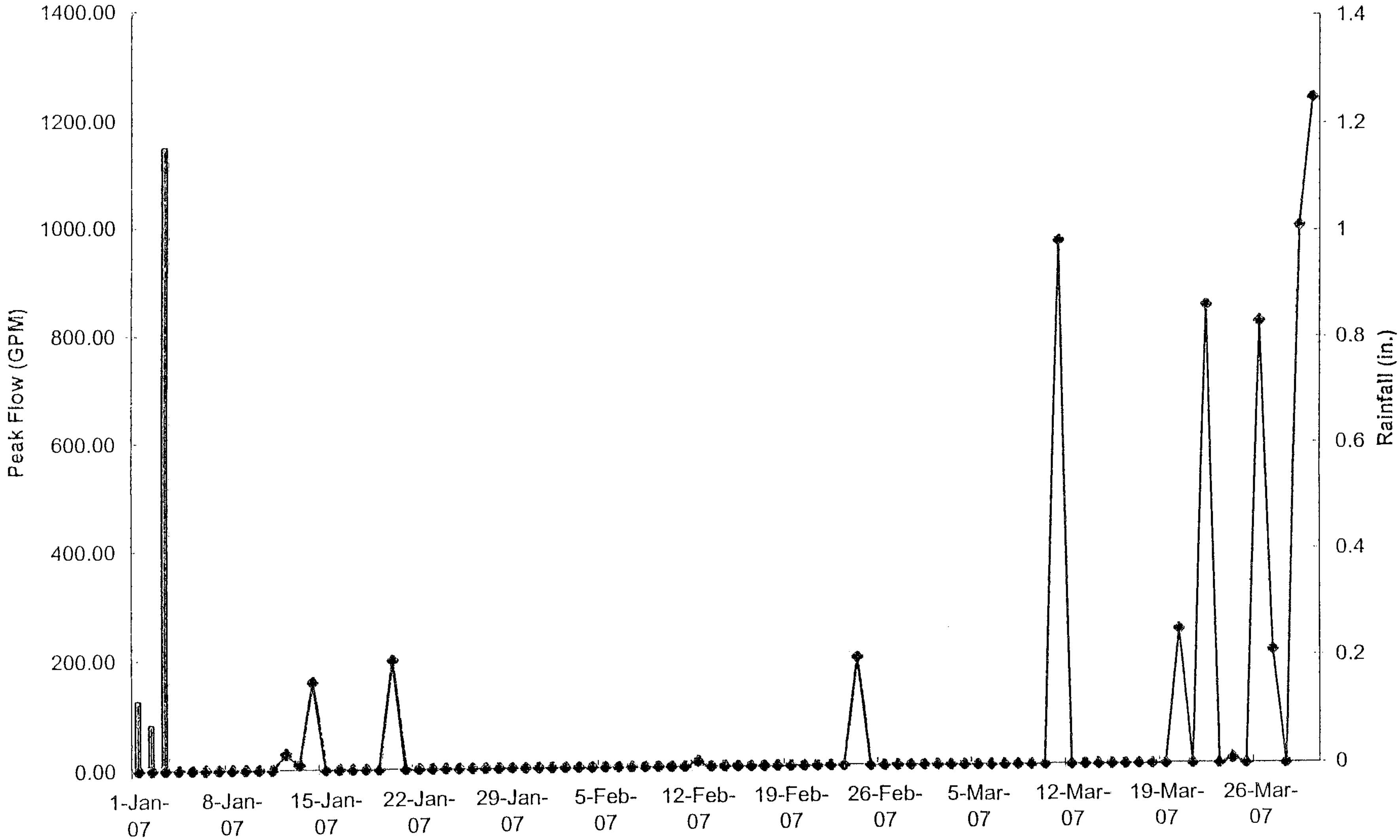
East 16th - 2006 - 3rd Quarter



East 16th - 2006 - 4th Quarter

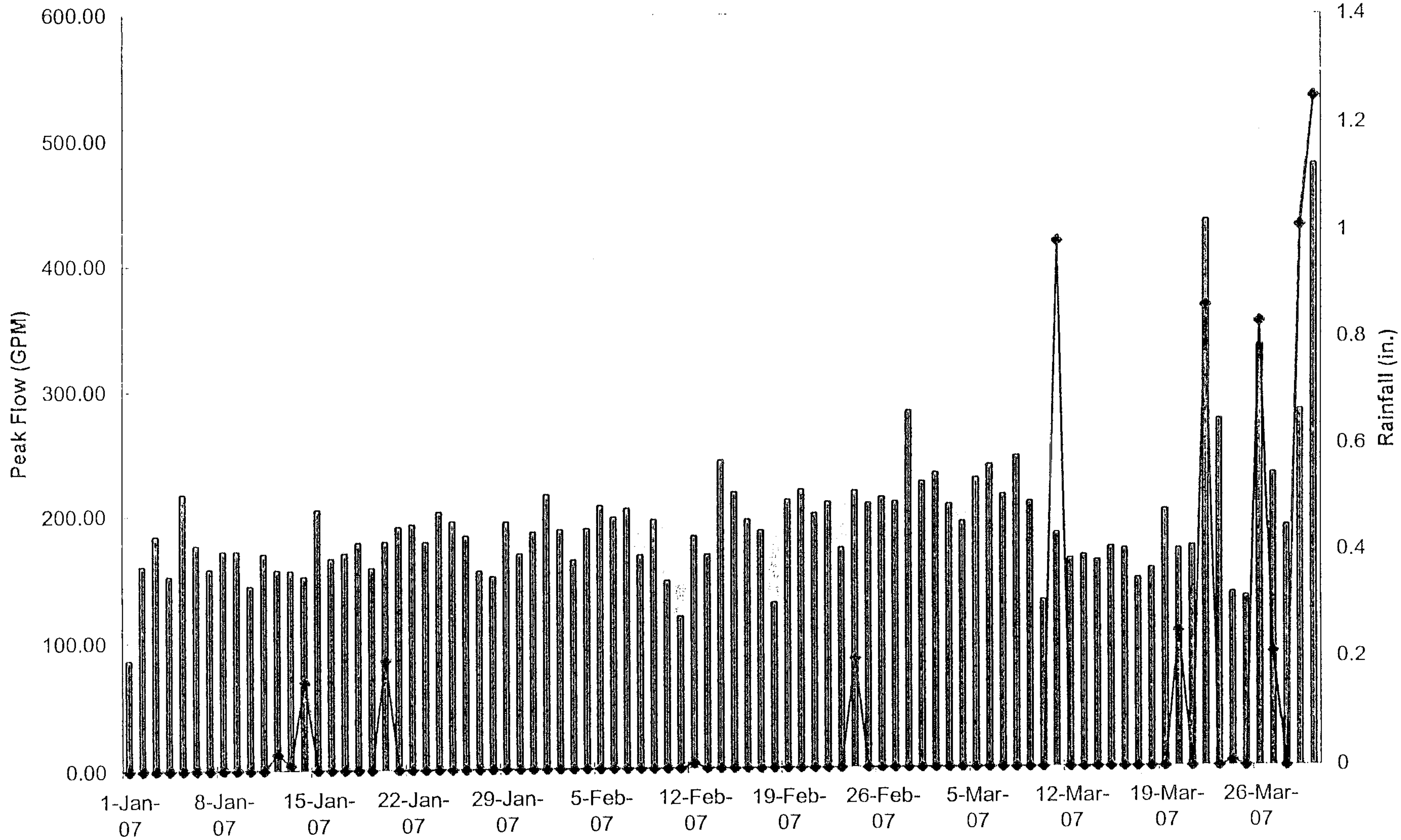


East 16th - 2007 - 1st Quarter

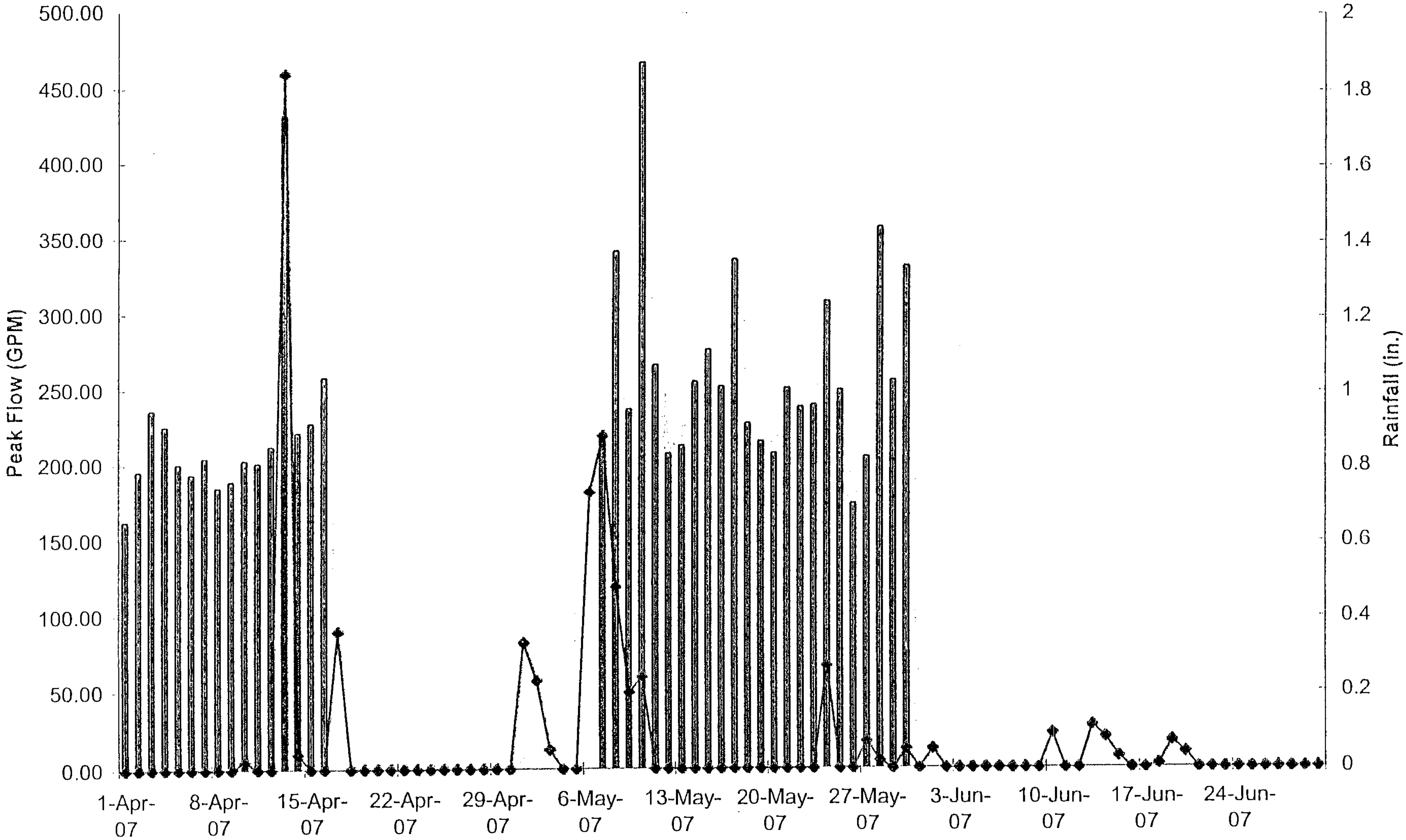



S. Van Buren - 2006 - 4th Quarter
Peak Flow (GPM)
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Rainfall (in.)
0.6
0.5
0.4
0.3
0.2
0.1
0
1-Oct-06
8-Oct-06
15-Oct-06
22-Oct-06
29-Oct-06
5-Nov-06
12-Nov-06
19-Nov-06
26-Nov-06
3-Dec-06
10-Dec-06
17-Dec-06
24-Dec-06
31-Dec-06

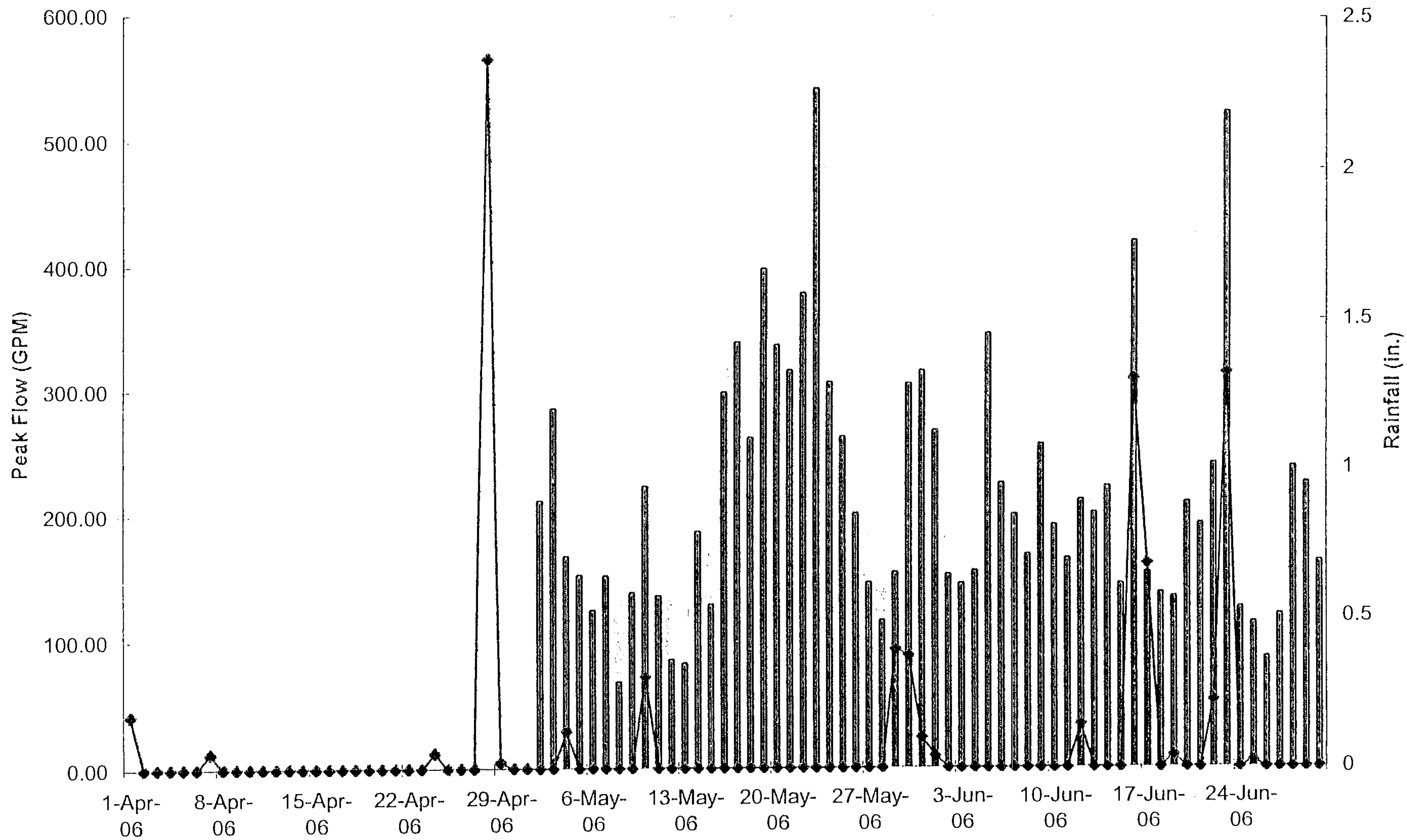
South Van Buren - 2007 - 1st Quarter



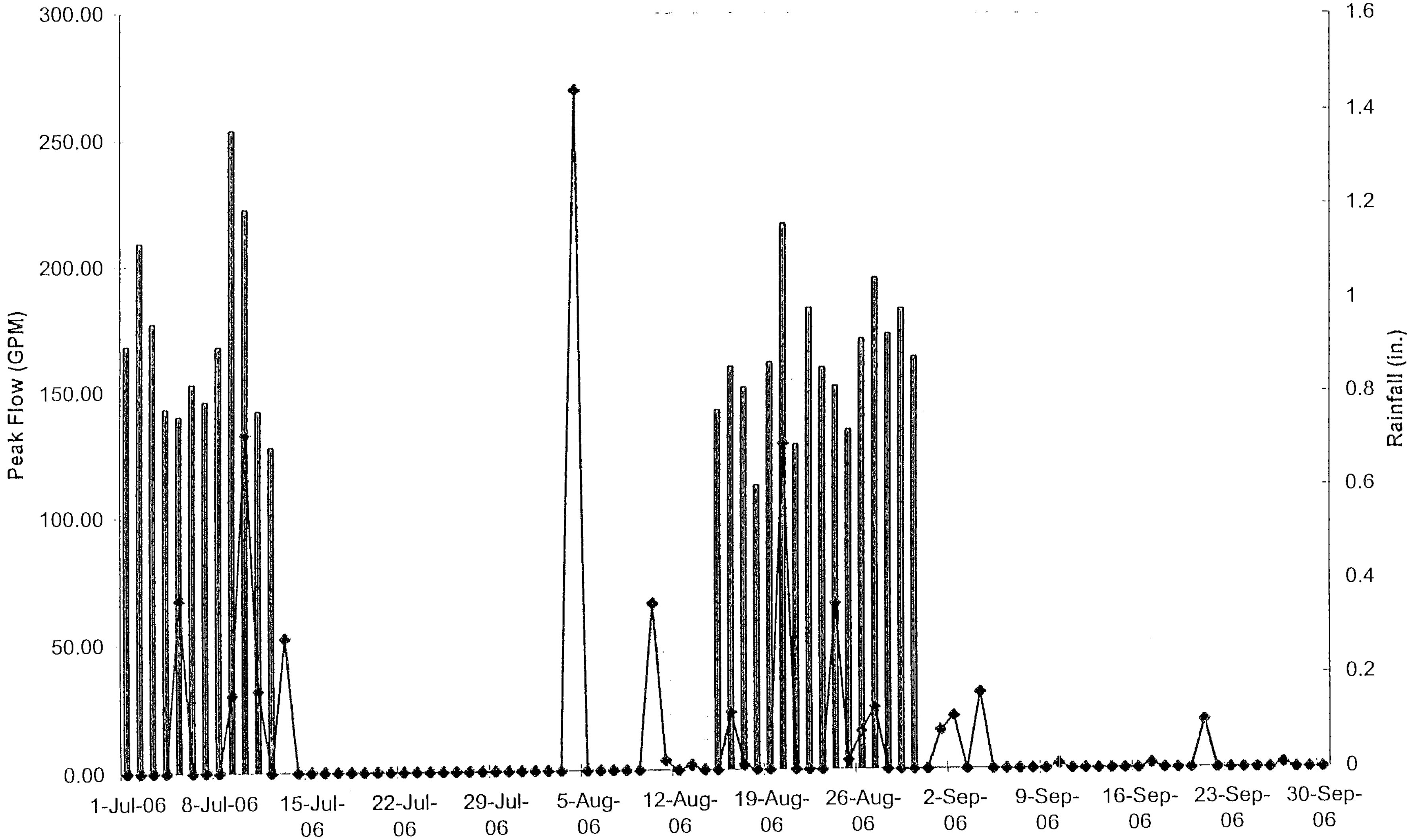
South Van Buren - 2007 - 2nd Quarter



West 16th - 2006 - 2nd Quarter

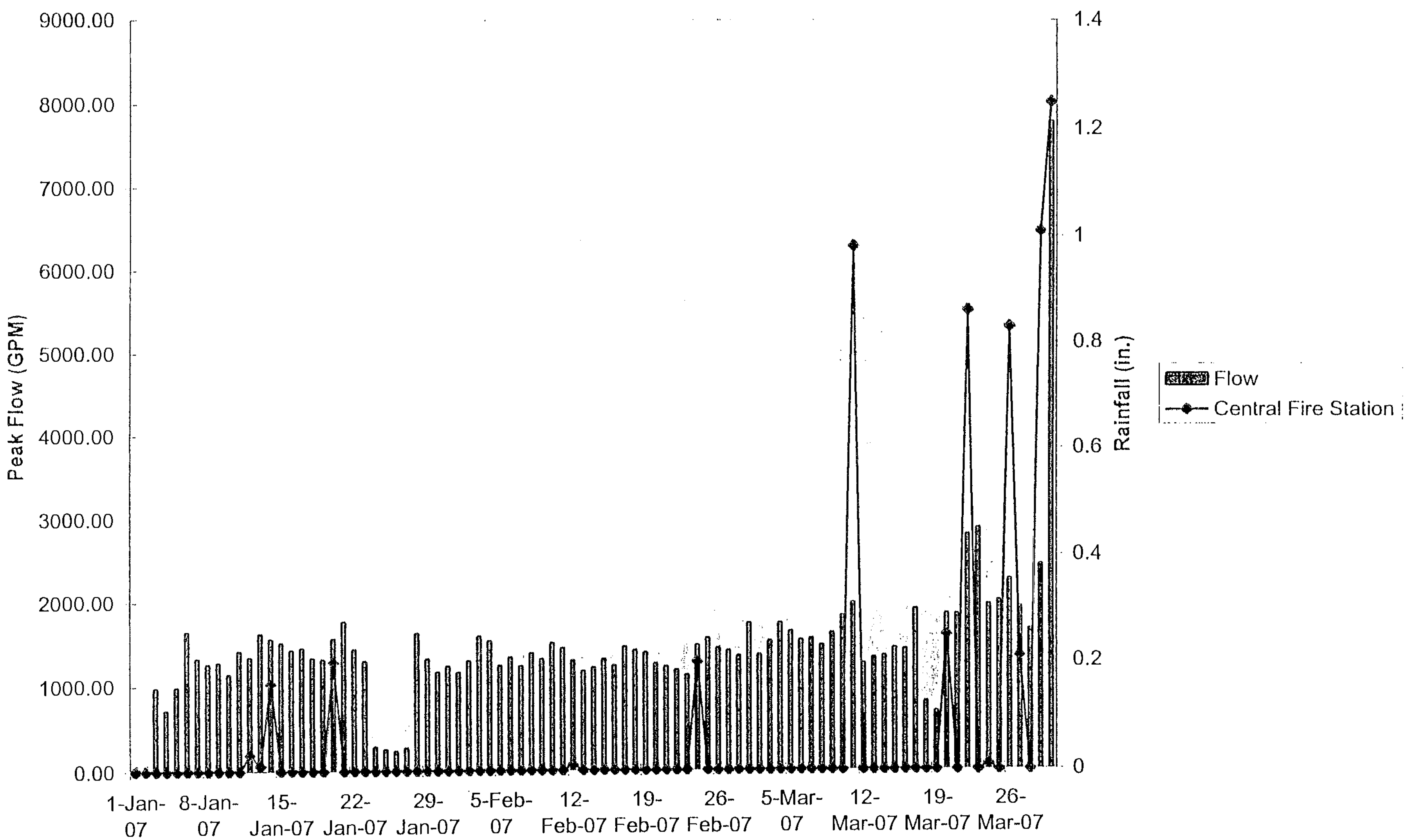


West 16th - 2006 - 3rd Quarter

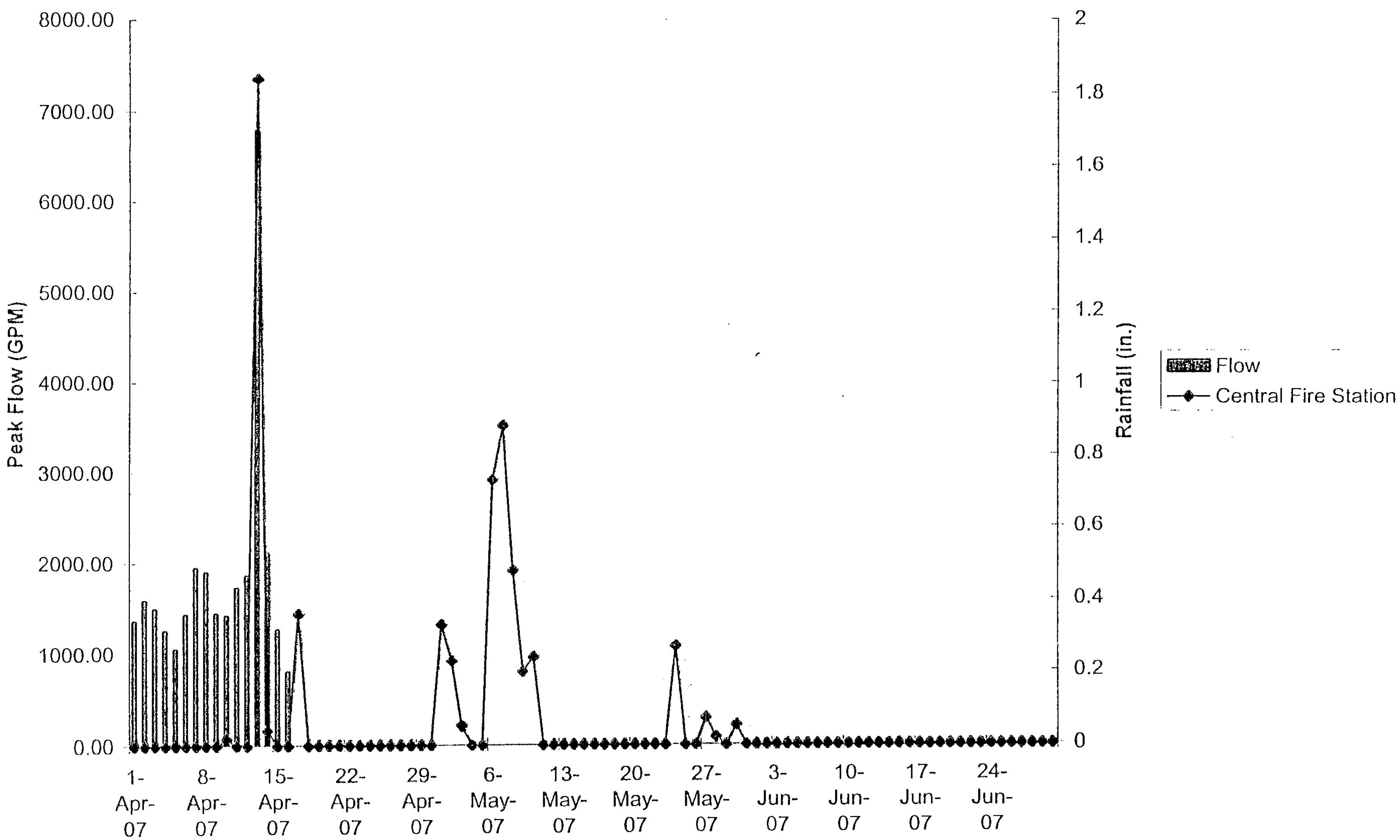


SOUTHEAST

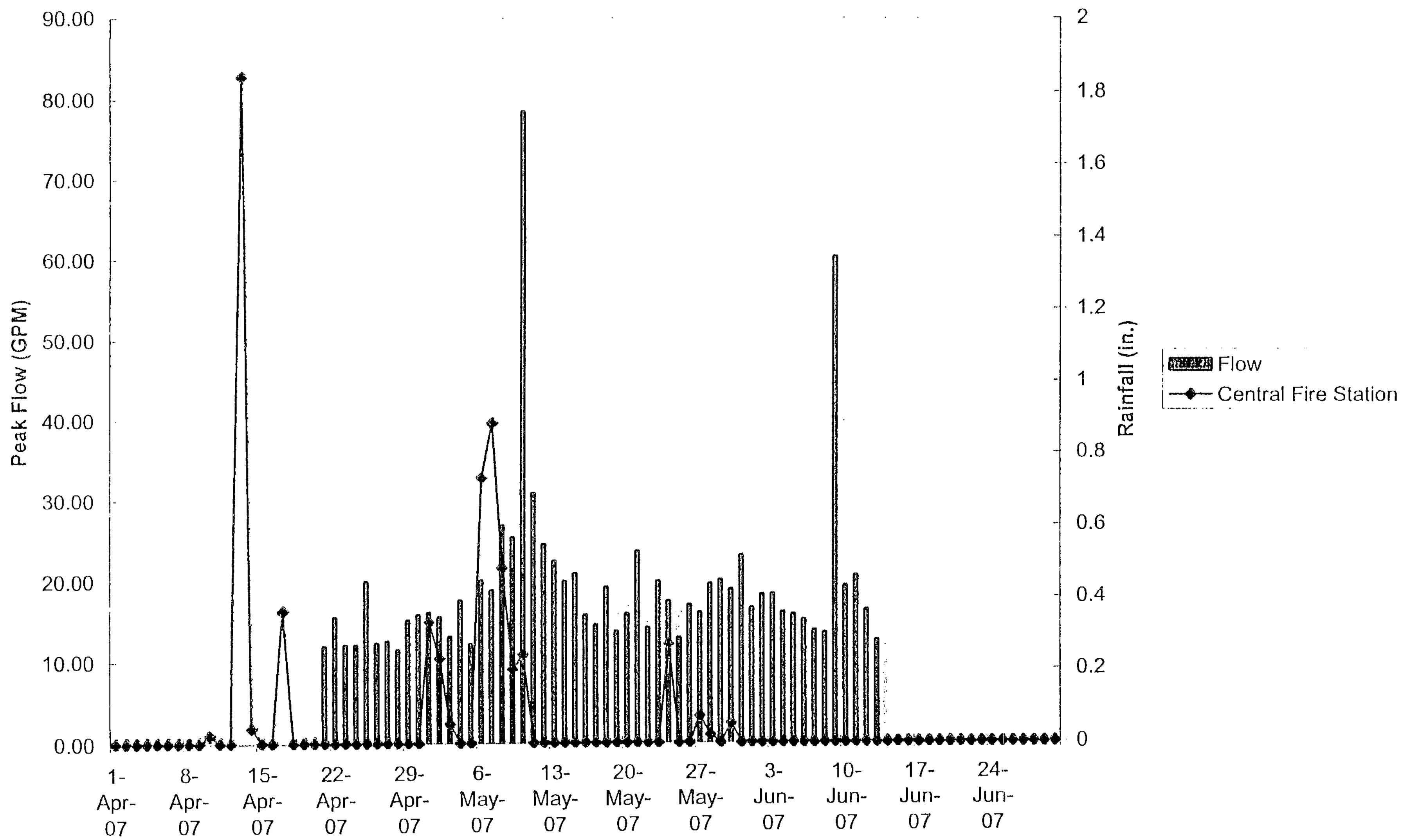
Brookside - 2007 - 1st Quarter

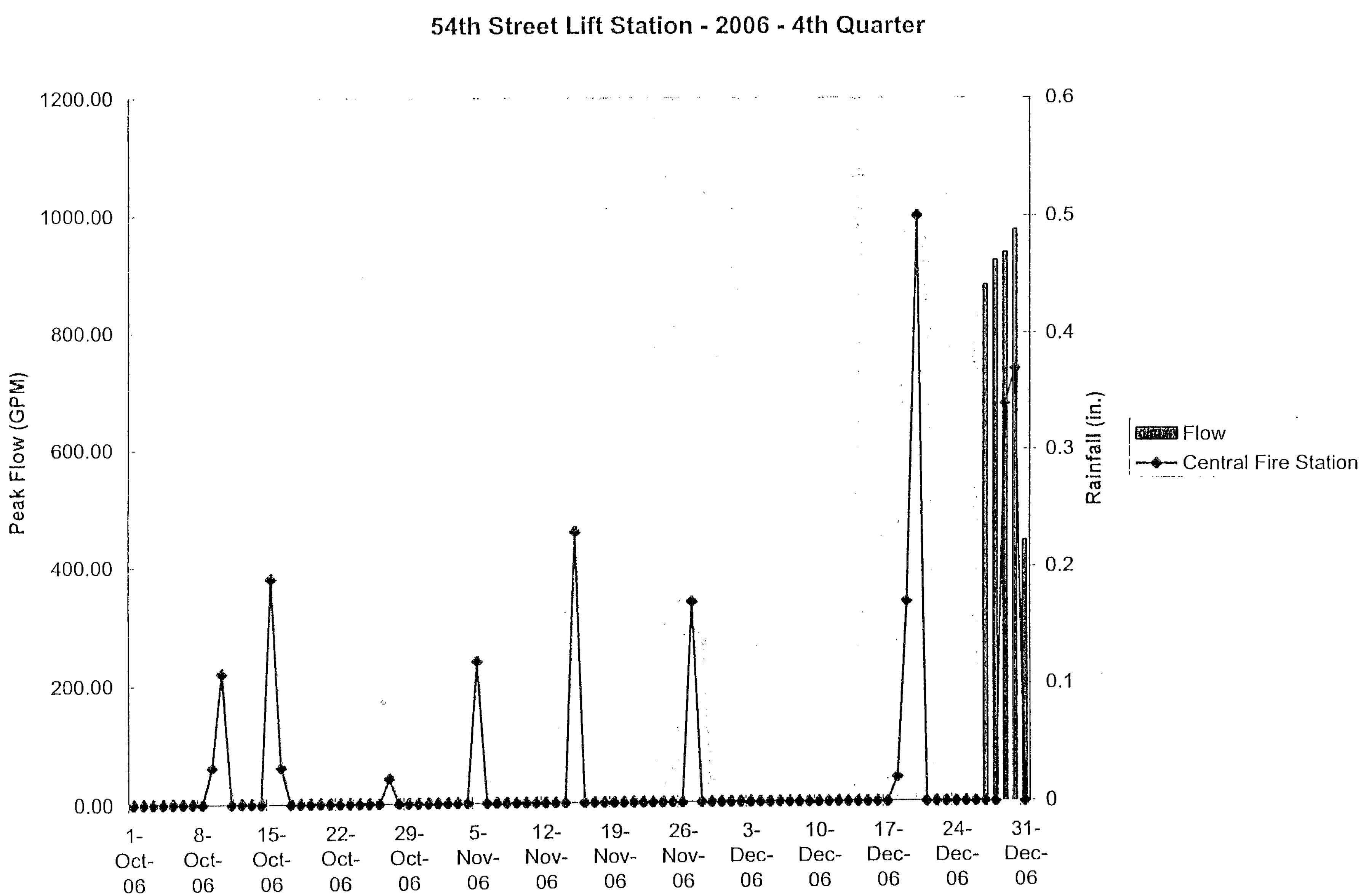


Brookside - 2007 - 2nd Quarter



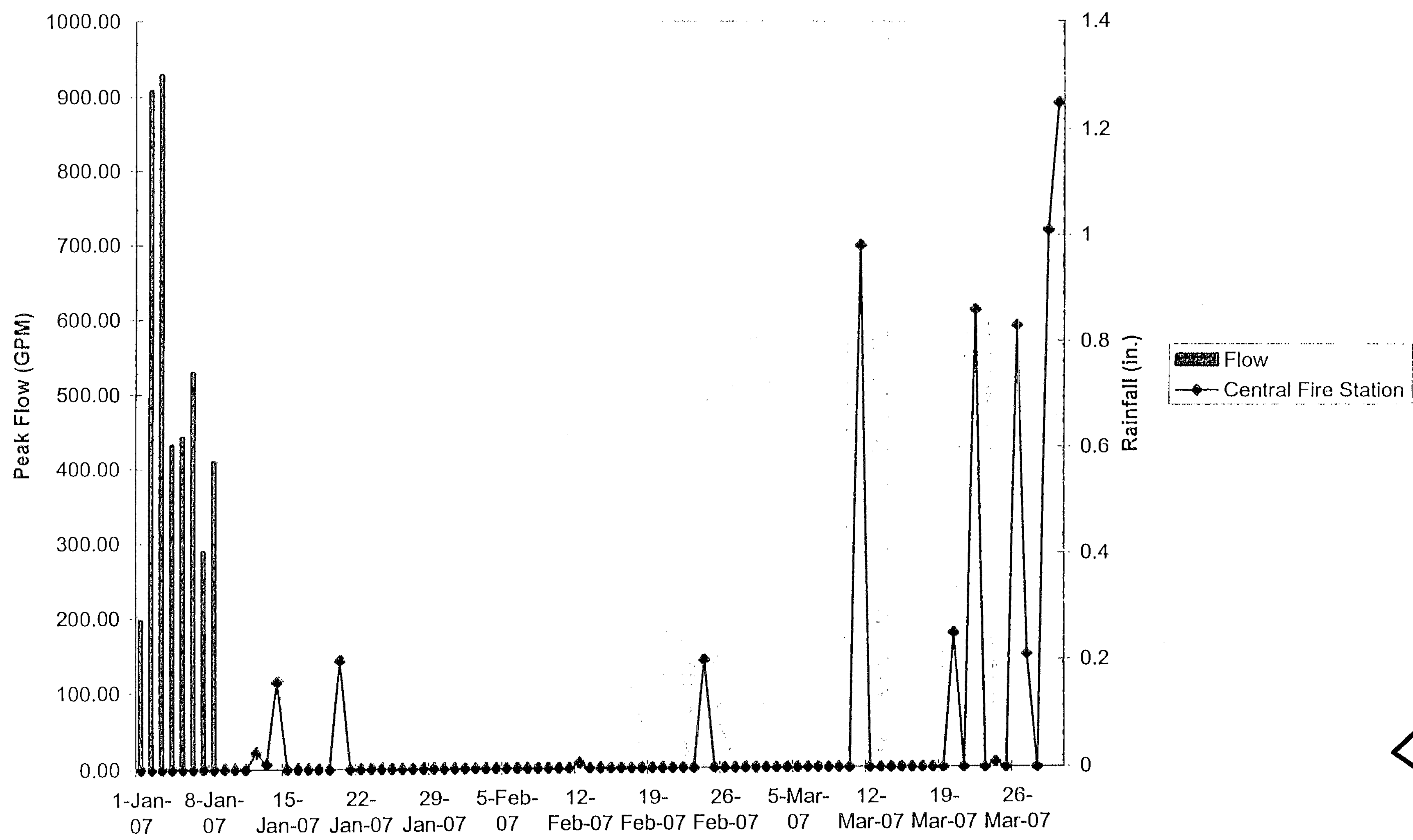
Brookside Residential - 2007 - 2nd Quarter

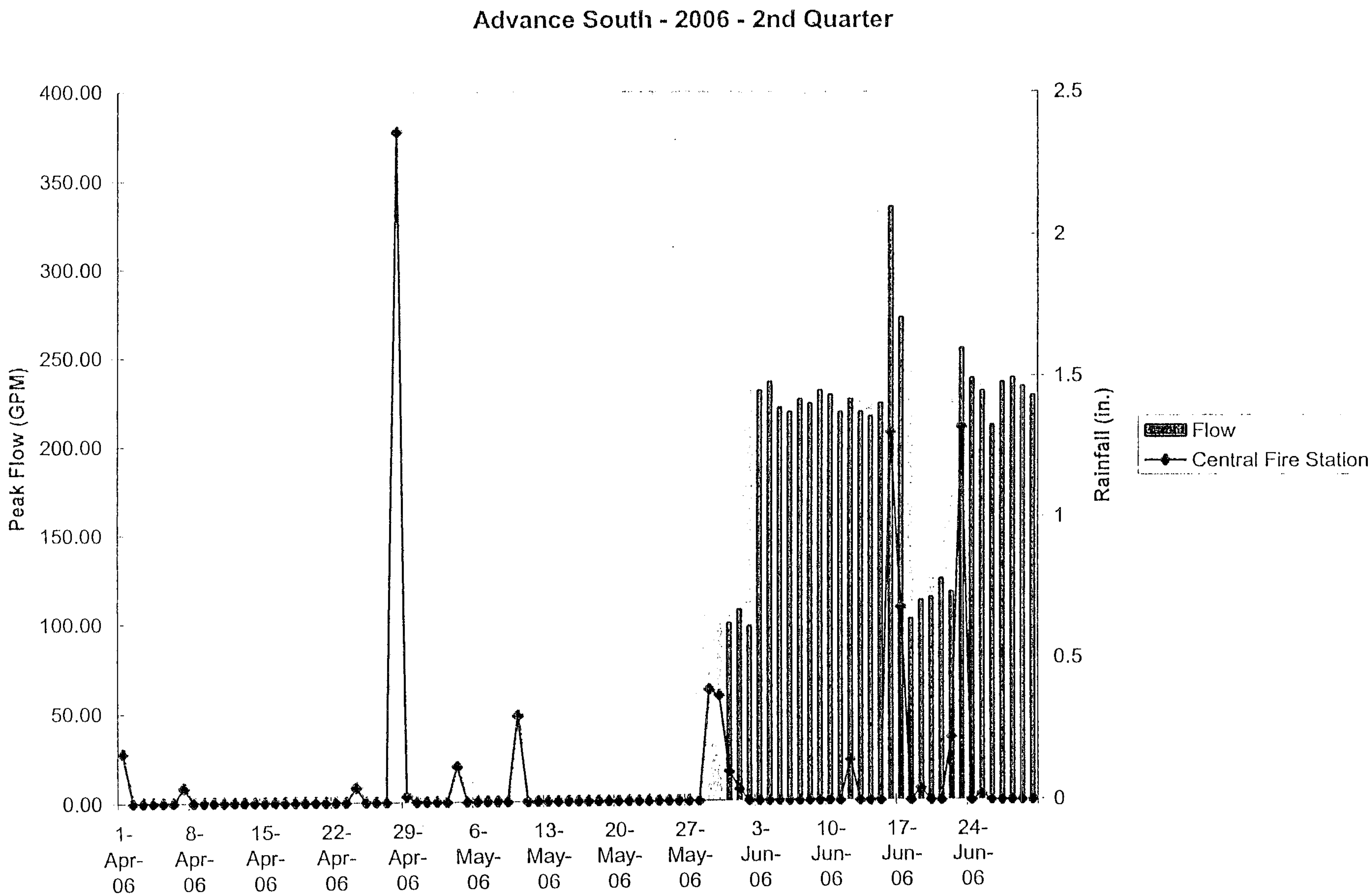




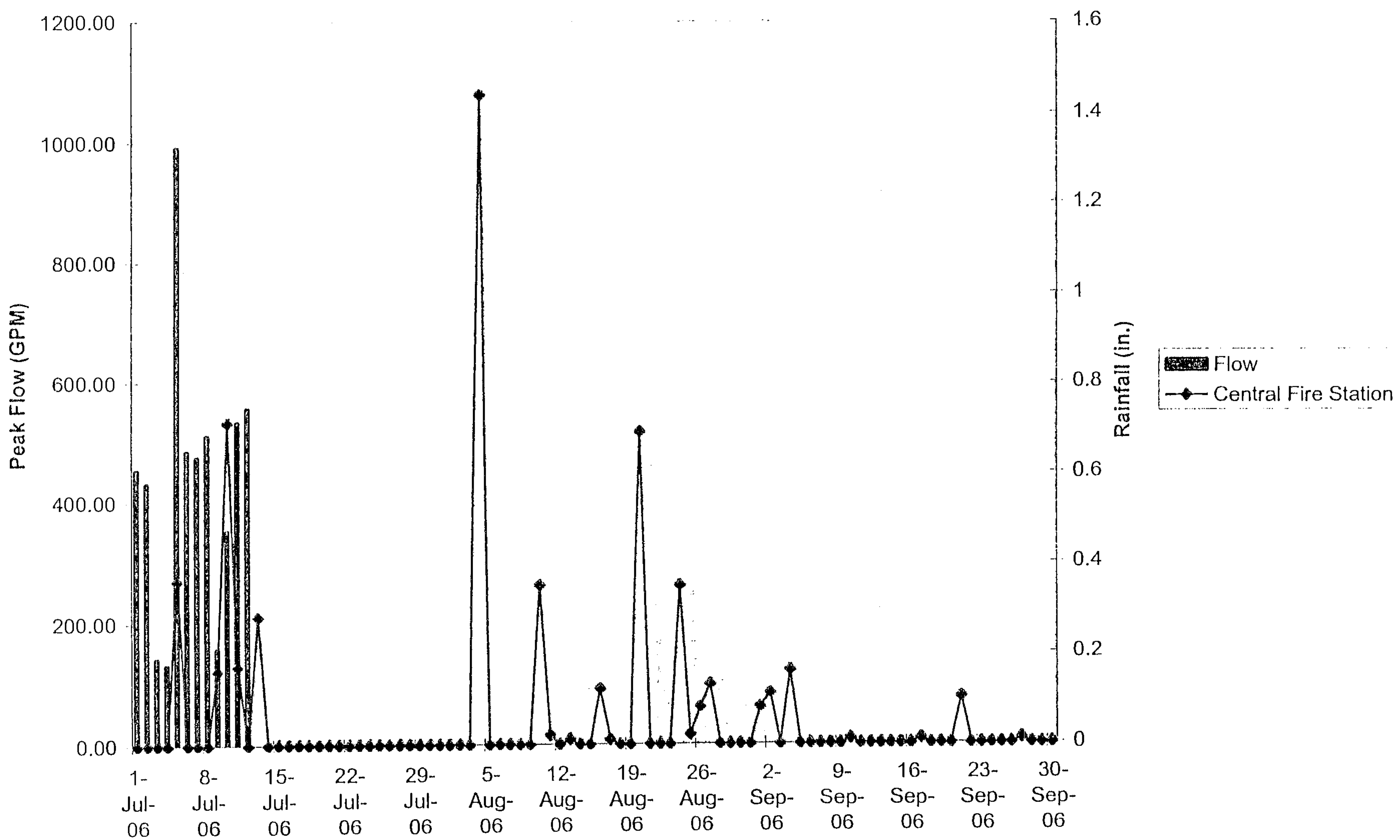
54th Street Lift Station - 2006 - 4th Quarter
Peak Flow (GPM)
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
Rainfall (in.)
0.6
0.5
0.4
0.3
0.2
0.1
0
1-Oct-06
8-Oct-06
15-Oct-06
22-Oct-06
29-Oct-06
5-Nov-06
12-Nov-06
19-Nov-06
26-Nov-06
3-Dec-06
10-Dec-06
17-Dec-06
24-Dec-06
31-Dec-06
Flow
Central Fire Station

54th Street Lift Station - 2007 - 1st Quarter




Advance South - 2006 - 2nd Quarter
Peak Flow (GPM)
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Rainfall (in.)
2.5
2
1.5
1
0.5
0
1-Apr-06
8-Apr-06
15-Apr-06
22-Apr-06
29-Apr-06
6-May-06
13-May-06
20-May-06
27-May-06
3-Jun-06
10-Jun-06
17-Jun-06
24-Jun-06
Flow
Central Fire Station

Advance South - 2006 - 3rd Quarter



TM 2-2

SANITARY SEWER INFLOWS

ENVIROTECH
ENGINEERING & CONSULTING, INC.

BASIN 1

Sanitary Sewer Municipal Inflows

Basin 1

Some Average Values	gpd
Group Living (per person)	100
Housing (2 bedroom)	225
Housing (Multiple)	300
Commercial (Laundry)	4000
Commercial (Food)	1000
Commercial (Stores)	500
Commercail (Office)	85
Industrial (High)	4000
Industrial (Low)	400
Recreation	100

gpm to cfs
448.83

% Base Flow
5%

% Dry Flow
38%

Dry Multiplier
33%

*Note Peak is 1/3 of average

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
(1D)023	13125		800		13925	0.021548	0.021548	9.67152	0.484	3.49
(1D)022	4725				4725	0.007312	0.02886	12.95324	0.164	1.18
(1D)021	9875	2000	2000		13875	0.021471	0.050331	22.59003	0.482	3.48
(1D)020	11025	9000			20025	0.030988	0.081319	36.49827	0.695	5.02
(1D)018	7875	1000			8875	0.013734	0.095052	42.66234	0.308	2.23
(1D)017	7875	500			8375	0.01296	0.108012	48.47915	0.291	2.1
(1D)016	6300				6300	0.009749	0.117761	52.85477	0.219	1.58
(1D)015	4725				4725	0.007312	0.125073	56.13649	0.164	1.18
(1D)014	2362.5				2362.5	0.003656	0.128729	57.77735	0.082	0.59
(1D)012	14700				14700	0.022748	0.151476	67.98714	0.51	3.69
(1D)005	4200	2000			6200	0.009594	0.161071	72.29331	0.215	1.55
(1D)001	2700				2700	0.004178	0.165249	74.16858	0.094	0.68
(1A)017*					0	0	0.165249	74.16858		
								0		
(1C)182	10125				10125	0.015668	0.015668	7.032254	0.352	2.54
(1C)181	3375				3375	0.005223	0.020891	9.376339	0.117	0.85
(1C)180A	3375				3375	0.005223	0.026113	11.72042	0.117	0.85
(1C)180	3375				3375	0.005223	0.031336	14.06451	0.117	0.85
(1C)179	4500				4500	0.006964	0.038299	17.18996	0.156	1.13
(1C)178	21375				21375	0.033077	0.071376	32.03583	0.742	5.36
(1C)177	5625				5625	0.008704	0.080081	35.94263	0.195	1.41
(1C)176	3375				3375	0.005223	0.085303	38.28672	0.117	0.85
(1C)002	9450				9450	0.014623	0.099927	44.85016	0.328	2.37
(1C)001*					0	0	0.099927	44.85016		
								0		

Sanitary Sewer Municipal Inflows

Basin 1

Some Average Values	gpd	gpm to cfs
Group Living (per person)	100	448.83
Housing (2 bedroom)	225	
Housing (Multiple)	300	% Base Flow
Commercial (Laundry)	4000	5%
Commercial (Food)	1000	
Commercial (Stores)	500	% Dry Flow
Commercail (Office)	85	38%
Industrial (High)	4000	
Industrial (Low)	400	Dry Multiplier
Recreation	100	33%

*Note Peak is 1/3 of average

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
(1C)028	10800				10800	0.016713	0.016713	7.501071	0.375	2.71
(1C)027	5400				5400	0.008356	0.025069	11.25161	0.188	1.35
(1C)026	12000				12000	0.018569	0.043638	19.58613	0.417	3.01
(1C)024	7200				7200	0.011142	0.05478	24.58685	0.25	1.81
(1C)022	5400				5400	0.008356	0.063136	28.33738	0.188	1.35
(1C)020	6000				6000	0.009285	0.072421	32.50464	0.208	1.5
(1C)019	2400				2400	0.003714	0.076135	34.17155	0.083	0.6
(1C)016*					0	0	0.076135	34.17155		
								0		
(1C)021B	40800	42000			82800	0.128129	0.128129	57.50821	2.875	20.76
(1C)016A	1200				1200	0.001857	0.129986	58.34167	0.042	0.3
(1C)016*					0	0	0.129986	58.34167		
								0		
(1C)016	2400				2400	0.003714	0.209835	94.18012	0.083	0.6
(1C)015D	32400	22000			54400	0.084181	0.294016	131.9633	1.889	13.64
(1C)015A	9600	13000			22600	0.034972	0.328989	147.66	0.785	5.67
(1C)001B		9000			9000	0.013927	0.342916	153.9109	0.313	2.26
(1C)001*					0	0	0.342916	153.9109		
								0		
(1C)041	4800				4800	0.007428	0.350344	157.2447	0.167	1.2
(1C)007	7200				7200	0.011142	0.361485	162.2454	0.25	1.81
(1C)006	1500				1500	0.002321	0.363806	163.2872	0.052	0.38
(1C)004	3600				3600	0.005571	0.369377	165.7876	0.125	0.9
(1C)003	2400	8000			10400	0.016094	0.385471	173.0108	0.361	2.61
(1C)001*					0	0	0.385471	173.0108		

Sanitary Sewer Municipal Inflows

Some Average Values	gpd
Group Living (per person)	100
Housing (2 bedroom)	225
Housing (Multiple)	300
Commercial (Laundry)	4000
Commercial (Food)	1000
Commercial (Stores)	500
Commercail (Office)	85
Industrial (High)	4000
Industrial (Low)	400
Recreation	100

gpm to cfs
448.83

% Base Flow
5%

% Dry Flow
38%

*Note Peak is 1/3 of average

Dry Multiplier
33%

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
								0		
(1C)001		6000			6000	0.009285	0.837598	375.9391	0.208	1.5
(1B)014	52200	65500			117700	0.182135	1.019733	457.6869	4.087	29.51
(1B)010	3000	49000			52000	0.080468	1.100201	493.8032	1.806	13.04
(1B)009	16800	83000			99800	0.154436	1.254637	563.1186	3.466	25.02
(1B)005	4400	88100			92500	0.143139	1.397776	627.3639	3.212	23.19
(1B)001	0	0			0	0	1.397776	627.3639		
(1A)024A*					0	0	1.397776	627.3639		
								0		
(1N)025	19200		120000		139200	0.215406	0.215406	96.68048	4.834	34.9
(1N)022	4800	400		1500	6700	0.010368	0.225773	101.3339	0.233	1.68
(1N)021	4800	1800			6600	0.010213	0.235987	105.9179	0.229	1.65
(1N)020		3200			3200	0.004952	0.240939	108.1404	0.111	0.8
(1N)018		200	80000		80200	0.124106	0.365044	163.8428	2.785	20.11
(1N)015		500	1500		2000	0.003095	0.368139	165.2319	0.069	0.5
(1N)014	4800	3000			7800	0.01207	0.380209	170.6494	0.271	1.96
(1N)013	9600				9600	0.014856	0.395065	177.317	0.333	2.41
(1N)011	9600				9600	0.014856	0.40992	183.9846	0.333	2.41
(1N)009	6000				6000	0.009285	0.419205	188.1519	0.208	1.5
(1N)008	3300				3300	0.005107	0.424312	190.4439	0.115	0.83
(1N)007*					0	0	0.424312	190.4439		
								0		
(1N)047	22200	5425	202000		229625	0.355334	0.355334	159.4846	7.974	57.57
(1N)007*					0	0	0.355334	159.4846		
								0		

Sanitary Sewer Municipal Inflows

Some Average Values	gpd
Group Living (per person)	100
Housing (2 bedroom)	225
Housing (Multiple)	300
Commercial (Laundry)	4000
Commercial (Food)	1000
Commercial (Stores)	500
Commercail (Office)	85
Industrial (High)	4000
Industrial (Low)	400
Recreation	100

gpm to cfs
448.83

% Base Flow
5%

% Dry Flow
38%

Dry Multiplier
33%

*Note Peak is 1/3 of average

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
(1O)157	61400	28000	36000		125400	0.194051	0.194051	87.09577	4.355	31.44
(1O)308*					0	0	0.194051	87.09577		
								0		
(1O)309	62500	28850	60000		151350	0.234207	0.234207	105.1192	5.256	37.95
(1O)308*					0	0	0.234207	105.1192		
								0		
(1O)308					0	0	0.428258	192.215		
(1O)306A		1850			1850	0.002863	0.431121	193.4999	0.064	0.46
(1O)306	10800	3000			13800	0.021355	0.452475	203.0846	0.479	3.46
(1O)305	3600				3600	0.005571	0.458046	205.5849	0.125	0.9
(1O)305A	54000				54000	0.083563	0.541609	243.0903	1.875	13.54
(1O)072	12600	500			13100	0.020272	0.56188	252.1888	0.455	3.28
(1O)303	2100				2100	0.00325	0.56513	253.6473	0.073	0.53
(1O)302	11400				11400	0.017641	0.582771	261.5651	0.396	2.86
(1O)300	12000	1000			13000	0.020117	0.602888	270.5942	0.451	3.26
(1M)286A	5625				5625	0.008704	0.611592	274.501	0.195	1.41
(1N)110	2250	800			3050	0.00472	0.616312	276.6194	0.106	0.76
(1N)007*					0	0	0.616312	276.6194		
								0		
(1N)007	2250				2250	0.003482	1.39944	628.1105	0.078	0.56
(1N)006	4500	2500			7000	0.010832	1.410272	632.9724	0.243	1.76
(1N)005	2700	2425			5125	0.007931	1.418203	636.5319	0.178	1.28
(1N)004	4000	500			4500	0.006964	1.425166	639.6573	0.156	1.13
(1M)283	1350				1350	0.002089	1.427255	640.595	0.047	0.34
(1M)281B	18000		10000		28000	0.043329	1.470584	660.0422	0.972	7.02

Sanitary Sewer Municipal Inflows

Some Average Values	gpd
Group Living (per person)	100
Housing (2 bedroom)	225
Housing (Multiple)	300
Commercial (Laundry)	4000
Commercial (Food)	1000
Commercial (Stores)	500
Commercail (Office)	85
Industrial (High)	4000
Industrial (Low)	400
Recreation	100

gpm to cfs
448.83

% Base Flow
5%

% Dry Flow
38%

Dry Multiplier
33%

*Note Peak is 1/3 of average

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
(1M)281*					0	0	1.470584	660.0422		
								0		
(1O)005A	12000	7350			19350	0.029943	0.029943	13.43942	0.672	4.85
(1O)004	5400	800			6200	0.009594	0.039537	17.74559	0.215	1.55
(1O)002	6300				6300	0.009749	0.049286	22.12122	0.219	1.58
(1O)001	6000				6000	0.009285	0.058571	26.28848	0.208	1.5
(1M)022	4500				4500	0.006964	0.065535	29.41392	0.156	1.13
(1M)020	13500	15000	13600		42100	0.065148	0.130682	58.65421	1.462	10.56
(1M)012*					0	0	0.130682	58.65421		
								0		
(1M)133	6750	4000			10750	0.016635	0.016635	7.466344	0.373	2.7
(1M)132	6300				6300	0.009749	0.026384	11.84197	0.219	1.58
(1M)131	5850				5850	0.009053	0.035437	15.90505	0.203	1.47
(1M)129	2700				2700	0.004178	0.039615	17.78032	0.094	0.68
(1M)128	5175				5175	0.008008	0.047623	21.37458	0.18	1.3
(1M)123	1800				1800	0.002785	0.050408	22.62476	0.063	0.45
(1M)119	900				900	0.001393	0.051801	23.24985	0.031	0.23
(1M)094	32175	3000	8000		43175	0.066811	0.118612	53.23677	1.499	10.83
(1M)093	14400	4000			18400	0.028473	0.147085	66.01637	0.639	4.61
(1M)092	5700	4000			9700	0.01501	0.162096	72.75345	0.337	2.43
(1M)041	12375	6000			18375	0.028434	0.19053	85.51569	0.638	4.61
(1M)039	4000	2000			6000	0.009285	0.199815	89.68295	0.208	1.5
(1M)012*					0	0	0.199815	89.68295		
								0		
(1M)012					0	0	0.330497	148.3372		

Sanitary Sewer Municipal Inflows

Basin 1

Some Average Values	gpd
Group Living (per person)	100
Housing (2 bedroom)	225
Housing (Multiple)	300
Commercial (Laundry)	4000
Commercial (Food)	1000
Commercial (Stores)	500
Commercail (Office)	85
Industrial (High)	4000
Industrial (Low)	400
Recreation	100

gpm to cfs
448.83

% Base Flow
5%

% Dry Flow
38%

Dry Multiplier
33%

*Note Peak is 1/3 of average

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
(1M)037	2700				2700	0.004178	0.334676	150.2124	0.094	0.68
(1M)035	2100				2100	0.00325	0.337925	151.671	0.073	0.53
(1M)281*					0	0	0.337925	151.671		
								0		
(1M)281					0	0	1.808509	811.7132		
(1M)278	9000				9000	0.013927	1.822436	817.9641	0.313	2.26
(1M)003	9000	1255	1200		11455	0.017726	1.840162	825.92	0.398	2.87
(1G)012	2700		1600		4300	0.006654	1.846816	828.9066	0.149	1.08
(1G)010	2025	170	800		2995	0.004635	1.851451	830.9867	0.104	0.75
(1G)009E*					0	0	1.851451	830.9867		
								0		
(1G)047	58500	28000			86500	0.133855	0.133855	60.07803	3.004	21.69
(1G)045		12000			12000	0.018569	0.152424	68.41255	0.417	3.01
(1G)020	73350	3500	6000		82850	0.128207	0.280631	125.9555	2.877	20.77
(1G)162	900	3000			3900	0.006035	0.286666	128.6642	0.135	0.98
(1G)009E*					0	0	0.286666	128.6642		
								0		
(1G)009E					0	0	2.138117	959.651		
(1G)009C			2400		2400	0.003714	2.141831	961.3179	0.083	0.6
(1G)009B*					0	0	2.141831	961.3179		
								0		
(1G)018	19000	6000	6000		31000	0.047971	0.047971	21.53085	1.077	7.77
(1G)016	1800	11000			12800	0.019807	0.067778	30.42101	0.445	3.21
(1G)014		1500			1500	0.002321	0.0701	31.46283	0.052	0.38
(1G)009B*					0	0	0.0701	31.46283		

Sanitary Sewer Municipal Inflows

Some Average Values	gpd
Group Living (per person)	100
Housing (2 bedroom)	225
Housing (Multiple)	300
Commercial (Laundry)	4000
Commercial (Food)	1000
Commercial (Stores)	500
Commercail (Office)	85
Industrial (High)	4000
Industrial (Low)	400
Recreation	100

gpm to cfs
448.83

% Base Flow
5%

% Dry Flow
38%

Dry Multiplier
33%

*Note Peak is 1/3 of average

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
								0		
(1G)009B					0	0	2.21193	992.7807		
(1G)009A		3500			3500	0.005416	2.217346	995.2116	0.122	0.88
(1G)008C		4000			4000	0.00619	2.223536	997.9898	0.139	1
(1G)008A	675				675	0.001045	2.224581	998.4586	0.023	0.17
(1G)005			3600		3600	0.005571	2.230152	1000.959	0.125	0.9
(1G)003	201600	10000	800	98560	310960	0.481196	2.711348	1216.934	10.799	77.97
(1G)002	6840	5500	400		12740	0.019715	2.731062	1225.783	0.442	3.19
(1G)001			1600		1600	0.002476	2.733538	1226.894	0.056	0.4
(1F)017*					0	0	2.733538	1226.894		
								0		
(1F)030		9250			9250	0.014314	0.014314	6.424529	0.321	2.32
(1F)028		1700			1700	0.002631	0.016945	7.605253	0.059	0.43
(1F)027		1700			1700	0.002631	0.019575	8.785977	0.059	0.43
(1F)026A		4250			4250	0.006577	0.026152	11.73779	0.148	1.07
(1F)025		2125			2125	0.003288	0.02944	13.21369	0.074	0.53
(1F)023*					0	0	0.02944	13.21369		
								0		
(1H)045	28800	17850			46650	0.072189	0.072189	32.40046	1.62	11.7
(1H)044		1700			1700	0.002631	0.074819	33.58119	0.059	0.43
(1H)043		5950			5950	0.009207	0.084027	37.71372	0.207	1.49
(1H)038		5100			5100	0.007892	0.091919	41.25589	0.177	1.28
(1H)001			8000		8000	0.01238	0.104298	46.81224	0.278	2.01
(1F)023*					0	0	0.104298	46.81224		
								0		

Sanitary Sewer Municipal Inflows

Some Average Values	gpd
Group Living (per person)	100
Housing (2 bedroom)	225
Housing (Multiple)	300
Commercial (Laundry)	4000
Commercial (Food)	1000
Commercial (Stores)	500
Commercail (Office)	85
Industrial (High)	4000
Industrial (Low)	400
Recreation	100

gpm to cfs
448.83

% Base Flow
5%

% Dry Flow
38%

Dry Multiplier
33%

*Note Peak is 1/3 of average

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
(1F)023					0	0	0.133739	60.02593		
(1F)021		1700	12000		13700	0.0212	0.154939	69.54118	0.476	3.43
(1F)018		850			850	0.001315	0.156254	70.13154	0.03	0.21
(1F)017G		1020			1020	0.001578	0.157833	70.83998	0.035	0.26
(1F)017F*					0	0	0.157833	70.83998		
								0		
(1F)017F					0	0	2.891371	1297.734		
(1F)017C	5400	2550			7950	0.012302	2.903673	1303.256	0.276	1.99
(1F)017A	10237.5	2540			12777.5	0.019773	2.923446	1312.13	0.444	3.2
(1J)014*					0	0	2.923446	1312.13		
								0		
(1K)011	160200	2000			162200	0.250997	0.250997	112.655	5.633	40.67
(1K)010	3600				3600	0.005571	0.256568	115.1553	0.125	0.9
(1K)009	5400				5400	0.008356	0.264924	118.9059	0.188	1.35
(1K)008A	8100				8100	0.012534	0.277458	124.5317	0.281	2.03
(1K)008	2475				2475	0.00383	0.281288	126.2507	0.086	0.62
(1K)007	1350				1350	0.002089	0.283377	127.1883	0.047	0.34
(1K)006	3600				3600	0.005571	0.288948	129.6887	0.125	0.9
(1K)005	8700	850		500	10050	0.015552	0.3045	136.6688	0.349	2.52
(1K)004	8400	8400			16800	0.025997	0.330497	148.3372	0.583	4.21
(1K)002A	7200				7200	0.011142	0.341639	153.3379	0.25	1.81
(1K)001	2400				2400	0.003714	0.345353	155.0048	0.083	0.6
(1J)053	3900	4050			7950	0.012302	0.357655	160.5264	0.276	1.99
(1J)050*					0	0	0.357655	160.5264		
								0		

Sanitary Sewer Municipal Inflows

Basin 1

Some Average Values	gpd
Group Living (per person)	100
Housing (2 bedroom)	225
Housing (Multiple)	300
Commercial (Laundry)	4000
Commercial (Food)	1000
Commercial (Stores)	500
Commercail (Office)	85
Industrial (High)	4000
Industrial (Low)	400
Recreation	100

gpm to cfs
448.83

% Base Flow
5%

% Dry Flow
38%

Dry Multiplier
33%

*Note Peak is 1/3 of average

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
(1H)011	54900	20875			75775	0.117258	0.117258	52.62904	2.631	19
(1H)009		1000			1000	0.001547	0.118806	53.32359	0.035	0.25
(1J)050*					0	0	0.118806	53.32359		
								0		
(1J)050	36000	43875	8000	200	88075	0.136292	0.612753	275.0219	3.059	22.08
(1J)046	44550	500			45050	0.069713	0.682466	306.3111	1.564	11.3
(1J)044	154800	20000			174800	0.270495	0.952961	427.7173	6.07	43.83
(1J)014*					0	0	0.952961	427.7173		
								0		
(1J)014					0	0	3.876406	1739.847		
(1J)011	13500	500			14000	0.021664	3.898071	1749.571	0.486	3.51
(1J)006	15000	6000		400	21400	0.033116	3.931186	1764.434	0.743	5.37
(1J)003	600				600	0.000928	3.932115	1764.851	0.021	0.15
(1J)002*					0	0	3.932115	1764.851		
								0		
(1F)016		17250			17250	0.026694	0.026694	11.98088	0.599	4.33
(1F)013		11000		100	11100	0.017177	0.04387	19.69031	0.385	2.78
(1F)011	1800	500			2300	0.003559	0.047429	21.28776	0.08	0.58
(1F)010	2250				2250	0.003482	0.050911	22.85049	0.078	0.56
(1F)009	1800				1800	0.002785	0.053697	24.10066	0.063	0.45
(1F)008	1350				1350	0.002089	0.055786	25.0383	0.047	0.34
(1F)006	13500	500	800		14800	0.022902	0.078688	35.31754	0.514	3.71
(1F)004	3375				3375	0.005223	0.083911	37.66163	0.117	0.85
(1F)003	5625				5625	0.008704	0.092615	41.56844	0.195	1.41
(1F)001	13800				13800	0.021355	0.11397	51.15314	0.479	3.46

Sanitary Sewer Municipal Inflows

Some Average Values	gpd
Group Living (per person)	100
Housing (2 bedroom)	225
Housing (Multiple)	300
Commercial (Laundry)	4000
Commercial (Food)	1000
Commercial (Stores)	500
Commercail (Office)	85
Industrial (High)	4000
Industrial (Low)	400
Recreation	100

gpm to cfs	% Base Flow	% Dry Flow	Dry Multiplier
448.83	5%	38%	33%

*Note Peak is 1/3 of average

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
(1J)002*					0	0	0.11397	51.15314		
								0		
(1J)002					0	0	4.046085	1816.004		
(1A)042			4275		4275	0.006615	4.0527	1818.973	0.148	1.07
(1A)041*					0	0	4.0527	1818.973		
								0		
(1E)009	21037.5				21037.5	0.032555	0.032555	14.61146	0.731	5.27
(1E)005	1800				1800	0.002785	0.03534	15.86164	0.063	0.45
(1E)001					0	0	0.03534	15.86164		
(1A)041*					0	0	0.03534	15.86164		
								0		
(1A)041					0	0	4.08804	1834.835		
(1A)034					0	0	4.08804	1834.835		
(1A)027	28800				28800	0.044567	4.132607	1854.838	1	7.22
(1A)026	7200				7200	0.011142	4.143748	1859.839	0.25	1.81
(1A)024A*					0	0	4.143748	1859.839		
								0		
(1A)024A					0	0	5.541525	2487.202		
(1A)023				100	100	0.000155	5.541679	2487.272	0.003	0.03
(1A)017*					0	0	5.541679	2487.272		
								0		
(1A)017					0	0	5.706928	2561.441		
(1A)015		5000			5000	0.007737	5.714665	2564.913	0.174	1.25
(1A)014	3000				3000	0.004642	5.719308	2566.997	0.104	0.75
(1A)007	1200				1200	0.001857	5.721165	2567.83	0.042	0.3

Sanitary Sewer Municipal Inflows

Basin 1

Some Average Values	gpd
Group Living (per person)	100
Housing (2 bedroom)	225
Housing (Multiple)	300
Commercial (Laundry)	4000
Commercial (Food)	1000
Commercial (Stores)	500
Commercail (Office)	85
Industrial (High)	4000
Industrial (Low)	400
Recreation	100

gpm to cfs	% Base Flow	% Dry Flow	Dry Multiplier
448.83	5%	38%	33%

*Note Peak is 1/3 of average

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
(1A)004	2250	1000	800		4050	0.006267	5.727432	2570.643	0.141	1.02
(1A)001		1500			1500	0.002321	5.729753	2571.685	0.052	0.38
(1A)000					0	0	5.729753	2571.685		
End										

BASIN 2

Sanitary Sewer Municipal Inflows

Basin 2

Some Average Values	gpd		gpm to cfs
Group Living (per person)	100		448.83
Housing (2 bedroom)	225		
Housing (Multiple)	300		% Base Flow
Commercial (Laundry)	4000		5%
Commercial (Food)	1000		
Commercial (Stores)	500		% Dry Flow
Commercail (Office)	85		38%
Industrial (High)	4000		
Industrial (Low)	400		
Recreation	100		

GPM — PEAK DRY GPM — FULLY DEVELOPED

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow (GPM)	Dry Flow (PEAK DRY GPM)
(2I)029	19500				19500	0.030175	0.030175	13.5436	0.677	4.89
(2I)028	37500	6000		300	43800	0.067778	0.097954	43.96461	1.521	10.98
(2I)025A	18000				18000	0.027854	0.125808	56.4664	0.625	4.51
(2I)021B	24000	2000			26000	0.040234	0.166042	74.52453	0.903	6.52
(2I)020	5400				5400	0.008356	0.174398	78.27507	0.188	1.35
(2I)017A	4800				4800	0.007428	0.181826	81.60888	0.167	1.2
(2I)014	19200				19200	0.029711	0.211537	94.94412	0.667	4.81
(2I)011	5100				5100	0.007892	0.219429	98.48629	0.177	1.28
(2I)009	2700				2700	0.004178	0.223607	100.3616	0.094	0.68
(2I)008	20400				20400	0.031568	0.255175	114.5302	0.708	5.12
(2I)005*					0	0	0.255175	114.5302		
(2I)059	36000	11250	5600		52850	0.081783	0.081783	36.70663	1.835	13.25
(2I)055	20000	8000			28000	0.043329	0.125112	56.15385	0.972	7.02
(2I)051	13200	1000		3200	17400	0.026926	0.152037	68.23891	0.604	4.36
(2I)049	9000	10000			19000	0.029402	0.181439	81.43524	0.66	4.76
(2I)005*					0	0	0.181439	81.43524		
(2I)005					0	0	0.436614	195.9655		
(2I)003	3900				3900	0.006035	0.442649	198.6742	0.135	0.98
(2I)002	9900	500			10400	0.016094	0.458743	205.8975	0.361	2.61
(2I)001	24300	5400			29700	0.045959	0.504702	226.5254	1.031	7.45
(2H)002	9000	1500			10500	0.016248	0.52095	233.8181	0.365	2.63
(2H)021*					0	0	0.52095	233.8181		
								0		

Sanitary Sewer Municipal Inflows

Basin 2

Some Average Values	gpd
Group Living (per person)	100
Housing (2 bedroom)	225
Housing (Multiple)	300
Commercial (Laundry)	4000
Commercial (Food)	1000
Commercial (Stores)	500
Commercail (Office)	85
Industrial (High)	4000
Industrial (Low)	400
Recreation	100

gpm to cfs
448.83

% Base Flow
5%

% Dry Flow
38%

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
(2H)289	39000				39000	0.060351	0.060351	27.0872	1.354	9.78
(2H)286	10800				10800	0.016713	0.077063	34.58827	0.375	2.71
(2H)285	6300				6300	0.009749	0.086812	38.9639	0.219	1.58
(2H)053*					0	0	0.086812	38.9639		
(2H)058	2400		12000		14400	0.022283	0.022283	10.00143	0.5	3.61
(2H)057	3600				3600	0.005571	0.027854	12.50179	0.125	0.9
(2H)054A	3000				3000	0.004642	0.032497	14.58542	0.104	0.75
(2H)053*					0	0	0.032497	14.58542		
(2H)053					0	0	0.119309	53.54932		
(2H)049	4500				4500	0.006964	0.067314	30.21265	0.156	1.13
(2H)036		2500			2500	0.003869	0.071183	31.94901	0.087	0.63
(2H)032	6000				6000	0.009285	0.080468	36.11627	0.208	1.5
(2H)030	9000				9000	0.013927	0.094395	42.36716	0.313	2.26
(2H)026	1500				1500	0.002321	0.096716	43.40898	0.052	0.38
(2H)021*					0	0	0.096716	43.40898		
								0		
(2H)021	900				900	0.001393	0.619059	277.8522	0.031	0.23
(2H)020	900				900	0.001393	0.620452	278.4773	0.031	0.23
(2H)019	3000				3000	0.004642	0.625094	280.5609	0.104	0.75
(2H)017A	4800				4800	0.007428	0.632522	283.8947	0.167	1.2
(2H)016	2400				2400	0.003714	0.636236	285.5616	0.083	0.6
(2H)014	2100				2100	0.00325	0.639485	287.0202	0.073	0.53
(2H)013	4800	2000			6800	0.010523	0.650008	291.7431	0.236	1.71

Sanitary Sewer Municipal Inflows

Basin 2

Some Average Values	gpd
Group Living (per person)	100
Housing (2 bedroom)	225
Housing (Multiple)	300
Commercial (Laundry)	4000
Commercial (Food)	1000
Commercial (Stores)	500
Commercail (Office)	85
Industrial (High)	4000
Industrial (Low)	400
Recreation	100

gpm to cfs
448.83

% Base Flow
5%

% Dry Flow
38%

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
(2H)012	54600				54600	0.084491	0.734499	329.6651	1.896	13.69
(2H)007	14175	500			14675	0.022709	0.757208	339.8576	0.51	3.68
(2J)018*					0	0	0.757208	339.8576		
								0		
(2K)037	18300	42500			60800	0.094085	0.094085	42.22825	2.111	15.24
(2K)033A	1500				1500	0.002321	0.096406	43.27007	0.052	0.38
(2K)033	5850				5850	0.009053	0.105459	47.33315	0.203	1.47
(2K)032	2250				2250	0.003482	0.108941	48.89587	0.078	0.56
(2K)029	40800				40800	0.063136	0.172077	77.23325	1.417	10.23
(2K)027	600				600	0.000928	0.173005	77.64998	0.021	0.15
(2K)025	24825				24825	0.038416	0.211421	94.89203	0.862	6.22
(2K)024A	19200				19200	0.029711	0.241132	108.2273	0.667	4.81
(2K)022	2400				2400	0.003714	0.244846	109.8942	0.083	0.6
(2K)021	2700				2700	0.004178	0.249024	111.7694	0.094	0.68
(2K)019	8400				8400	0.012999	0.262023	117.6036	0.292	2.11
(2K)018	1800				1800	0.002785	0.264808	118.8538	0.063	0.45
(2K)017	1200				1200	0.001857	0.266665	119.6872	0.042	0.3
(2K)016	1800				1800	0.002785	0.26945	120.9374	0.063	0.45
(2K)014	30000				30000	0.046424	0.315874	141.7737	1.042	7.52
(2K)013	6300				6300	0.009749	0.325623	146.1493	0.219	1.58
(2K)011		2500			2500	0.003869	0.329492	147.8857	0.087	0.63
(2K)003	1800				1800	0.002785	0.332277	149.1359	0.063	0.45
(2K)002	30000				30000	0.046424	0.378701	169.9722	1.042	7.52
(2K)001	42000				42000	0.064993	0.443694	199.143	1.459	10.53
(2J)018*					0	0	0.443694	199.143		

Sanitary Sewer Municipal Inflows

Basin 2

Some Average Values	gpd
Group Living (per person)	100
Housing (2 bedroom)	225
Housing (Multiple)	300
Commercial (Laundry)	4000
Commercial (Food)	1000
Commercial (Stores)	500
Commercail (Office)	85
Industrial (High)	4000
Industrial (Low)	400
Recreation	100

gpm to cfs
448.83

% Base Flow
5%

% Dry Flow
38%

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
								0		
(2J)018					0	0	1.200901	539.0006		
(2J)011	22500	5000			27500	0.042555	1.243456	558.1005	0.955	6.9
(2J)010*					0	0	1.243456	558.1005		
								0		
(2J)026	73200	4500			77700	0.120237	0.120237	53.96604	2.698	19.48
(2J)025*					0	0	0.120237	53.96604		
								0		
(2J)060	50400				50400	0.077992	0.077992	35.005	1.75	12.64
(2J)056	8400				8400	0.012999	0.09099	40.83917	0.292	2.11
(2J)054	8100				8100	0.012534	0.103525	46.46497	0.281	2.03
(2J)053	8100	3000			11100	0.017177	0.120701	54.1744	0.385	2.78
(2J)050	4200				4200	0.006499	0.127201	57.09149	0.146	1.05
(2J)048	11100				11100	0.017177	0.144377	64.80092	0.385	2.78
(2J)047	7200	12500			19700	0.030485	0.174862	78.48343	0.684	4.94
(2J)046	4500				4500	0.006964	0.181826	81.60888	0.156	1.13
(2J)045	3300				3300	0.005107	0.186932	83.90087	0.115	0.83
(2J)044	5400	500			5900	0.00913	0.196062	87.99868	0.205	1.48
(2J)043	6000				6000	0.009285	0.205347	92.16594	0.208	1.5
(2J)040	4800	500			5300	0.008202	0.213549	95.84702	0.184	1.33
(2J)025*					0	0	0.213549	95.84702		
								0		
(2J)025					0	0	0.333786	149.8131		
(2J)021		4765			4765	0.007374	0.341159	153.1226	0.165	1.19
(2J)020		21415			21415	0.033139	0.374298	167.9962	0.744	5.37

Sanitary Sewer Municipal Inflows

Some Average Values	gpd
Group Living (per person)	100
Housing (2 bedroom)	225
Housing (Multiple)	300
Commercial (Laundry)	4000
Commercial (Food)	1000
Commercial (Stores)	500
Commercail (Office)	85
Industrial (High)	4000
Industrial (Low)	400
Recreation	100

gpm to cfs
448.83

% Base Flow
5%

% Dry Flow
38%

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
(2J)010*					0	0	0.374298	167.9962		
								0		
(2J)010					0	0	1.617755	726.0968		
(2F)009*					0	0	1.617755	726.0968		
								0		
(2G)359	71700	15000			86700	0.134164	0.134164	60.21693	3.011	21.74
(2G)025*					0	0	0.134164	60.21693		
								0		
(2G)026	56100				56100	0.086812	0.086812	38.9639	1.948	14.07
(2G)025*					0	0	0.086812	38.9639		
								0		
(2G)025					0	0	0.220976	99.18083		
(2G)023	4500				4500	0.006964	0.22794	102.3063	0.156	1.13
(2G)022	4800				4800	0.007428	0.235368	105.6401	0.167	1.2
(2G)021	3000				3000	0.004642	0.24001	107.7237	0.104	0.75
(2G)020	3000				3000	0.004642	0.244652	109.8074	0.104	0.75
(2G)019	32400				32400	0.050138	0.29479	132.3106	1.125	8.12
(2G)018	21600				21600	0.033425	0.328215	147.3127	0.75	5.42
(2G)016	84000				84000	0.129986	0.458201	205.6544	2.917	21.06
(2G)015	7800				7800	0.01207	0.470271	211.0718	0.271	1.96
(2G)013A		22000			22000	0.034044	0.504315	226.3518	0.764	5.52
(2G)011		7500			7500	0.011606	0.515921	231.5609	0.26	1.88
(2G)009		3000			3000	0.004642	0.520563	233.6445	0.104	0.75
(2G)007		36500			36500	0.056482	0.577045	258.9953	1.268	9.15
(2G)006		11550			11550	0.017873	0.594919	267.0173	0.401	2.9

Sanitary Sewer Municipal Inflows

Some Average Values	gpd
Group Living (per person)	100
Housing (2 bedroom)	225
Housing (Multiple)	300
Commercial (Laundry)	4000
Commercial (Food)	1000
Commercial (Stores)	500
Commercail (Office)	85
Industrial (High)	4000
Industrial (Low)	400
Recreation	100

gpm to cfs
448.83
% Base Flow
5%
% Dry Flow
38%

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
(2G)004		43200			43200	0.06685	0.661769	297.0216	1.5	10.83
(2G)002A*					0	0	0.661769	297.0216		
								0		
(2G)045	22500	171907			194407	0.300836	0.300836	135.0241	6.751	48.74
(2G)002A*					0	0	0.300836	135.0241		
								0		
(2G)002A					0	0	0.962604	432.0457		
(2G)002	32500				32500	0.050292	1.012897	454.6184	1.129	8.15
(2F)022*					0	0	1.012897	454.6184		
								0		
(2F)033	27000	40500			67500	0.104453	0.104453	46.8817	2.344	16.92
(2F)023	9300				9300	0.014391	0.118844	53.34095	0.323	2.33
(2F)022*					0	0	0.118844	53.34095		
								0		
(2F)022					0	0	1.131741	507.9594		
(2F)017	12300				12300	0.019034	1.150775	516.5022	0.427	3.08
(2F)009*					0	0	1.150775	516.5022		
								0		
(2F)009					0	0	2.768529	1242.599		
(2F)005	114225				114225	0.176758	2.945287	1321.933	3.967	28.64
(2F)004	39000				39000	0.060351	3.005638	1349.02	1.354	9.78
(2E)043	103500				103500	0.160161	3.165799	1420.906	3.594	25.95
(2E)003	63150	8000			71150	0.110101	3.275901	1470.323	2.471	17.84
(2E)002					0	0	3.275901	1470.323		
(2A)063*					0	0	3.275901	1470.323		

Sanitary Sewer Municipal Inflows

Some Average Values	gpd
Group Living (per person)	100
Housing (2 bedroom)	225
Housing (Multiple)	300
Commercial (Laundry)	4000
Commercial (Food)	1000
Commercial (Stores)	500
Commercail (Office)	85
Industrial (High)	4000
Industrial (Low)	400
Recreation	100

gpm to cfs
448.83

% Base Flow
5%

% Dry Flow
38%

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
								0		
(2D)013	119325				119325	0.18465	0.18465	82.87642	4.144	29.92
(2D)012				200	200	0.000309	0.184959	83.01533	0.007	0.05
(2D)011	4275				4275	0.006615	0.191575	85.9845	0.148	1.07
(2D)009		5200			5200	0.008047	0.199622	89.59613	0.181	1.3
(2D)006			16500		16500	0.025533	0.225155	101.0561	0.573	4.14
(2D)003*					0	0	0.225155	101.0561		
								0		
(2D)046A	25500	7475	121200		154175	0.238579	0.238579	107.0813	5.354	38.66
(2D)046		2000			2000	0.003095	0.241674	108.4704	0.069	0.5
(2D)045		4000			4000	0.00619	0.247863	111.2485	0.139	1
(2D)244*					0	0	0.247863	111.2485		
								0		
(2D)267	70000	52500	54000		176500	0.273126	0.273126	122.587	6.129	44.25
(2D)263	9000	5000			14000	0.021664	0.29479	132.3106	0.486	3.51
(2D)244*					0	0	0.273126	122.587		
								0		
(2D)244					0	0	0.520989	233.8355		
(2A)063*					0	0	0.520989	233.8355		
								0		
(2A)063					0	0	3.79689	1704.158		
(2A)043					0	0	3.79689	1704.158		
(2A)034		800			800	0.001238	3.798128	1704.714	0.028	0.2
(2A)020	129725				129725	0.200743	3.998871	1794.813	4.505	32.53
(2A)015	6750				6750	0.010445	4.009316	1799.501	0.234	1.69

Sanitary Sewer Municipal Inflows

Some Average Values	gpd		gpm to cfs
Group Living (per person)	100		448.83
Housing (2 bedroom)	225		
Housing (Multiple)	300		% Base Flow
Commercial (Laundry)	4000		5%
Commercial (Food)	1000		
Commercial (Stores)	500		% Dry Flow
Commercail (Office)	85		38%
Industrial (High)	4000		
Industrial (Low)	400		
Recreation	100		

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
(2A)001*					0	0	4.009316	1799.501		
(1P)024			40000		40000	0.061898	0.061898	27.78175	1.389	10.03
(1P)017*					0	0	0.061898	27.78175		
(1P)018			560000		560000	0.866574	0.866574	388.9444	19.447	140.41
(1P)017*					0	0	0.866574	388.9444		
(1P)073		850	4000		4850	0.007505	0.007505	3.368537	0.168	1.22
(1P)017*					0	0	0.007505	3.368537		
(1P)079			4425		4425	0.006847	0.006847	3.073356	0.154	1.11
(1P)017*					0	0	0.006847	3.073356		
(1P)017		1020	6000		7020	0.010863	0.953688	428.0438	0.244	1.76
(1P)011			4000		4000	0.00619	0.959878	430.822	0.139	1
(1P)008			320000		320000	0.495185	1.455063	653.0759	11.113	80.23
(1P)003*					0	0	1.455063	653.0759		
								0		
(1P)065			8000		8000	0.01238	0.01238	5.556349	0.278	2.01
(1P)043			40000		40000	0.061898	0.074278	33.3381	1.389	10.03
(1P)003*					0	0	0.074278	33.3381		
								0		
(1P)003					0	0	1.529341	686.414		
(2A)001*					0	0	1.529341	686.414		

Sanitary Sewer Municipal Inflows

Some Average Values	gpd		gpm to cfs
Group Living (per person)	100		448.83
Housing (2 bedroom)	225		
Housing (Multiple)	300		% Base Flow
Commercial (Laundry)	4000		5%
Commercial (Food)	1000		
Commercial (Stores)	500		% Dry Flow
Commercail (Office)	85		38%
Industrial (High)	4000		
Industrial (Low)	400		
Recreation	100		

Man Hole	Housing	Commercial	Industrial	Recreation	Total	Sum cfs	Total cfs	Total gpm	Base Flow	Dry Flow
								0		
(2A)001					0	0	5.538657	2485.915		

TM 2-3

SUB-BASIN CALCULATIONS

ENVIROTECH
ENGINEERING & CONSULTING, INC.

SCS CN CALCULATIONS

Sani[illegible]y Sewer Basin CN Values

CN Values - Existing Conditions		CN	Cond	Dry
A	Impervious Areas (Soil A,B,C,D) =	98	0.00	7.84
B	Commercial and Business (Soil D) =	95	0.01	7.54
C	Commercial and Business (Soil C) =	94	0.01	7.43
D	Commercial and Business (Soil B) =	92	0.02	7.23
E	Commercial and Business (Soil A) =	89	0.03	6.92
F	Residential 1/4 Acre Lots (Soil D) =	87	0.04	6.72
G	Residential Estate (Soil D) =	85	0.06	6.52
H	Small Grain Contoured Good (Soil D) =	84	0.06	6.41
I	Herbaceious Open Space / Pasture - Fair (Soil D) =	83	0.07	6.31
J	Residential 1/4 Acre Lots (Soil C) =	83	0.07	6.31
K	Residential Estate (Soil C) =	81	0.09	6.11
L	Pasture - Fair (Soil C) =	76	0.14	5.6
M	Residential (Soil B) =	75	0.15	5.5
N	Residential Estate (Soil B) =	70	0.21	4.99
O	Pasture - Fair (Soil B) =	69	0.23	4.88
P	Residential 1/4 Acre Lots (Soil A) =	61	0.34	4.07
Q	Small Grain St Good (Soil A) =	60	0.35	3.97
R	Residential Estate (Soil A) =	57	0.39	3.66
S	Residential 1/2 Acre (Soil A) =	54	0.44	3.35
T	Pasture - Open Space - Fair (Soil A) =	49	0.52	2.84

Basin	Area	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	Imp	Weighted Average	Comp CN
	acres	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*%*	*Acre*CN*	*CN*
Basin 1																								
Basin1A1	131.1				31.1											100						10%	9761	74.5
Basin1A2	128.8			10	105					4						9.75						85%	11605	90.1
Basin1A3	94.48				7									60		27.5						75%	7040	74.5
Basin1B1	38														31	7						40%	2653	69.8
Basin1B2	51.57				36.6											15						65%	4399	85.3
Basin1B3	134.3				30						90					14						65%	11196	83.4
Basin1B4	66.24		12				10				40					4.2						65%	5620	84.8
Basin1C1	83.53		5		5		35			5	30					3.53						60%	7129	85.3
Basin1C1A	66.82		15				41.8			10												60%	5893	88.2
Basin1C1B	69.72						60			9.72												55%	6027	86.4
Basin1C1C	89.15						70			19.2												50%	7679	86.1
Basin1C1D	76.49						55			21.5												35%	6569	85.9
Basin1C2	59.5						50			9.5												65%	5139	86.4
Basin1C3	67		7				50			10												60%	5845	87.2
Basin1C4	62.19						55			7.19												60%	5382	86.5
Basin1D1	56.18		15		5					5				10	15	5.18						35%	4457	79.3
Basin1D2	50.46				2		10			2				30		6.46						55%	3916	77.6
Basin1D3	108.2		20				80			8.2												60%	9541	88.2

San[illegible]y Sewer Basin CN Values

CN Values - Existing Conditions

		CN	Cond	Dry
A	Impervious Areas (Soil A,B,C,D) =	98	0.00	7.84
B	Commercial and Business (Soil D) =	95	0.01	7.54
C	Commercial and Business (Soil C) =	94	0.01	7.43
D	Commercial and Business (Soil B) =	92	0.02	7.23
E	Commercial and Business (Soil A) =	89	0.03	6.92
F	Residential 1/4 Acre Lots (Soil D) =	87	0.04	6.72
G	Residential Estate (Soil D) =	85	0.06	6.52
H	Small Grain Contoured Good (Soil D) =	84	0.06	6.41
I	Herbaceious Open Space / Pasture - Fair (Soil D) =	83	0.07	6.31
J	Residential 1/4 Acre Lots (Soil C) =	83	0.07	6.31
K	Residential Estate (Soil C) =	81	0.09	6.11
L	Pasture - Fair (Soil C) =	76	0.14	5.6
M	Residential (Soil B) =	75	0.15	5.5
N	Residential Estate (Soil B) =	70	0.21	4.99
O	Pasture - Fair (Soil B) =	69	0.23	4.88
P	Residential 1/4 Acre Lots (Soil A) =	61	0.34	4.07
Q	Small Grain St Good (Soil A) =	60	0.35	3.97
R	Residential Estate (Soil A) =	57	0.39	3.66
S	Residential 1/2 Acre (Soil A) =	54	0.44	3.35
T	Pasture - Open Space - Fair (Soil A) =	49	0.52	2.84

Basin	Area	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	Imp	Weighted Average	Comp CN
	acres	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*%*	*Acre*CN*	*CN*
Basin1D4	95.17						82.2			13												50%	8228	86.5
Basin1E1	44.37												34.4		10							10%	3312	74.6
Basin1E2	55.58														7.58	48						55%	3843	69.1
Basin1F1	193.5				35									129		30						40%	14928	77.1
Basin1F2	52.03				20									10		22						20%	4110	79.0
Basin1F3	90.99				35									40		16						50%	7323	80.5
Basin1F4	71.78				20									46.8		5						60%	5694	79.3
Basin1F5	71.35				65											6.35						85%	6418	90.0
Basin1G1	46.72				35									9		2.72						80%	4083	87.4
Basin1G2	179.9						50							120		9.9						60%	14033	78.0
Basin1G3	93.49		5		60									20		8.49						60%	8081	86.4
Basin1G4	143.5		40		25		40			4.5				30		4						65%	12480	87.0
Basin1G5	173.2		70				80			23.2												55%	15536	89.7
Basin1G6	73.99		5				65			3.99												55%	6461	87.3
Basin1G7	97.06		10				75			12.1												50%	8476	87.3
Basin1G8	77.69		40							37.7												35%	6929	89.2
Basin1H1	165.3		50		35		80.3															70%	14956	90.5
Basin1I1	137.9		40		20		77.9															70%	12417	90.1
Basin1J1	145.3				90									50		5.3						75%	12396	85.3

Sanitary Sewer Basin CN Values

CN Values - Existing Conditions		CN	Cond	Dry
A	Impervious Areas (Soil A,B,C,D) =	98	0.00	7.84
B	Commercial and Business (Soil D) =	95	0.01	7.54
C	Commercial and Business (Soil C) =	94	0.01	7.43
D	Commercial and Business (Soil B) =	92	0.02	7.23
E	Commercial and Business (Soil A) =	89	0.03	6.92
F	Residential 1/4 Acre Lots (Soil D) =	87	0.04	6.72
G	Residential Estate (Soil D) =	85	0.06	6.52
H	Small Grain Contoured Good (Soil D) =	84	0.06	6.41
I	Herbaceious Open Space / Pasture - Fair (Soil D) =	83	0.07	6.31
J	Residential 1/4 Acre Lots (Soil C) =	83	0.07	6.31
K	Residential Estate (Soil C) =	81	0.09	6.11
L	Pasture - Fair (Soil C) =	76	0.14	5.6
M	Residential (Soil B) =	75	0.15	5.5
N	Residential Estate (Soil B) =	70	0.21	4.99
O	Pasture - Fair (Soil B) =	69	0.23	4.88
P	Residential 1/4 Acre Lots (Soil A) =	61	0.34	4.07
Q	Small Grain St Good (Soil A) =	60	0.35	3.97
R	Residential Estate (Soil A) =	57	0.39	3.66
S	Residential 1/2 Acre (Soil A) =	54	0.44	3.35
T	Pasture - Open Space - Fair (Soil A) =	49	0.52	2.84

Basin	Area	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	Imp	Weighted Average	Comp CN
	acres	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*%*	*Acre*CN*	*CN*
Basin1J2	42.03				22									15		5.03						65%	3496	83.2
Basin1K1	70.39				5										60	5.39						60%	5032	71.5
Basin1K2	70.33														50	20.3						40%	4903	69.7
Basin1K3	170.8		22		15		63.8							40		30						50%	14091	82.5
Basin1K4	84.05				10										65	9.05						60%	6094	72.5
Basin1M1	59.94		15				23.9			20												30%	5168	86.2
Basin1M2	58.49		23.5				20			15												50%	5217	89.2
Basin1M3	89.58		25				54.6			10												55%	7953	88.8
Basin1M4	85.1		10				65			10.1												55%	7443	87.5
Basin1M5	172.6		62.6							110												30%	15077	87.4
Basin1M6	61.75		31.8				30															70%	5626	91.1
Basin1N1	88.52		18.5				65			5												50%	7829	88.4
Basin1N2	72.03		25				40			7.03												60%	6438	89.4
Basin1N3	55.41				30		10			15.4												35%	4909	88.6
Basin1N4	155.9			30							40		85.9									20%	12668	81.3
Basin1N5	25.71		3				20			2.71												50%	2250	87.5
Basin1N6	185		40	10	5					35	60			35								55%	15710	84.9
Basin1N7	219.4		85							134												20%	19230	87.7
Basin1N8	26.64		5				15			6.64												60%	2331	87.5

Sanitary Sewer Basin CN Values

CN Values - Existing Conditions		CN	Cond	Dry
A	Impervious Areas (Soil A,B,C,D) =	98	0.00	7.84
B	Commercial and Business (Soil D) =	95	0.01	7.54
C	Commercial and Business (Soil C) =	94	0.01	7.43
D	Commercial and Business (Soil B) =	92	0.02	7.23
E	Commercial and Business (Soil A) =	89	0.03	6.92
F	Residential 1/4 Acre Lots (Soil D) =	87	0.04	6.72
G	Residential Estate (Soil D) =	85	0.06	6.52
H	Small Grain Contoured Good (Soil D) =	84	0.06	6.41
I	Herbaceious Open Space / Pasture - Fair (Soil D) =	83	0.07	6.31
J	Residential 1/4 Acre Lots (Soil C) =	83	0.07	6.31
K	Residential Estate (Soil C) =	81	0.09	6.11
L	Pasture - Fair (Soil C) =	76	0.14	5.6
M	Residential (Soil B) =	75	0.15	5.5
N	Residential Estate (Soil B) =	70	0.21	4.99
O	Pasture - Fair (Soil B) =	69	0.23	4.88
P	Residential 1/4 Acre Lots (Soil A) =	61	0.34	4.07
Q	Small Grain St Good (Soil A) =	60	0.35	3.97
R	Residential Estate (Soil A) =	57	0.39	3.66
S	Residential 1/2 Acre (Soil A) =	54	0.44	3.35
T	Pasture - Open Space - Fair (Soil A) =	49	0.52	2.84

Basin	Area	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	Imp	Weighted Average	Comp CN
	acres	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*%*	*Acre*CN*	*CN*
Basin1O1	249.7		39.8	17	10		123			12.5	7		24		16.5							55%	21589	86.5
Basin1O2	79.92		35			35														5	25	20%	7935	99.3
Basin1O3	111.7					15													90		6.7	60%	6793	60.8
Basin1O4	174					20				20		14							65	38	17	35%	11164	64.1
Basin1O5	75.94		45	7						11.3			6.3								10	55%	6840	90.1
Basin1P1	291.6		115							177												20%	25583	87.7
Basin1P2	76.39		35							21.4						20						25%	6480	84.8
Basin1P3	180.6		35							100						45.6						20%	14771	81.8
Basin 2																								
Basin2A1	55.28						3							2		50.3						7%	3880	70.2
Basin2A2	160.4									35.4						125						2%	11564	72.1
Basin2B1	63.53						63.5															55%	5527	87.0
Basin2B2	65.39						65.4															60%	5689	87.0
Basin2B3	119.5						120															60%	10397	87.0
Basin2C1	72.7													65		7.7						45%	5406	74.4
Basin2C2	32.43													20		12.4						35%	2358	72.7
Basin2C3	114.7				15									82		17.7						55%	8751	76.3
Basin2D1	34.78												34.8									1%	2643	76.0
Basin2D2	315.1		7					75		17.1					216							60%	23579	74.8

Sanitary Sewer Basin CN Values

CN Values - Existing Conditions		CN	Cond	Dry
A	Impervious Areas (Soil A,B,C,D) =	98	0.00	7.84
B	Commercial and Business (Soil D) =	95	0.01	7.54
C	Commercial and Business (Soil C) =	94	0.01	7.43
D	Commercial and Business (Soil B) =	92	0.02	7.23
E	Commercial and Business (Soil A) =	89	0.03	6.92
F	Residential 1/4 Acre Lots (Soil D) =	87	0.04	6.72
G	Residential Estate (Soil D) =	85	0.06	6.52
H	Small Grain Contoured Good (Soil D) =	84	0.06	6.41
I	Herbaceious Open Space / Pasture - Fair (Soil D) =	83	0.07	6.31
J	Residential 1/4 Acre Lots (Soil C) =	83	0.07	6.31
K	Residential Estate (Soil C) =	81	0.09	6.11
L	Pasture - Fair (Soil C) =	76	0.14	5.6
M	Residential (Soil B) =	75	0.15	5.5
N	Residential Estate (Soil B) =	70	0.21	4.99
O	Pasture - Fair (Soil B) =	69	0.23	4.88
P	Residential 1/4 Acre Lots (Soil A) =	61	0.34	4.07
Q	Small Grain St Good (Soil A) =	60	0.35	3.97
R	Residential Estate (Soil A) =	57	0.39	3.66
S	Residential 1/2 Acre (Soil A) =	54	0.44	3.35
T	Pasture - Open Space - Fair (Soil A) =	49	0.52	2.84

Basin	Area	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	Imp	Weighted Average	Comp CN
	acres	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*%*	*Acre*CN*	*CN*
Basin2D3	257.9											20	238									2%	19700	76.4
Basin2D4	75.74		4	42						2.74			27									65%	6607	87.2
Basin2D5	152.2		17	41						25.2			69									35%	12805	84.1
Basin2E1	12.18				2											10.2						10%	886	72.8
Basin2E2	105.0				21									62	18	4.01						65%	8119	77.3
Basin2F1	42.9											35.9				7						40%	3391	79.0
Basin2F2	121.9			12							110											65%	10250	84.1
Basin2F3	60.13			5						1.13		44	10									40%	4888	81.3
Basin2F4	21.09			15									6.09									35%	1873	88.8
Basin2F5	81									19		55	7									45%	6564	81.0
Basin2G1	63.27			35.3								28										70%	5583	88.2
Basin2G2	267.5		45	115								65	42.5									70%	23580	88.2
Basin2G3	87.8		37.8	50																		90%	8291	94.4
Basin2G4	158.6			25			38				62				33.8							65%	13168	83.0
Basin2G5	83.08		5				52			5	21.1											60%	7164	86.2
Basin2G6	191.8			10								92	40		28.8	21						35%	14897	77.7
Basin2H1	36.16			5				29	2.16													50%	3116	86.2
Basin2H2	52.66							31	21.7													30%	4454	84.6
Basin2H3	137						45	70	22													40%	11713	85.5

San' 'y Sewer Basin CN Values

CN Values - Existing Conditions

		CN	Cond	Dry
A	Impervious Areas (Soil A,B,C,D) =	98	0.00	7.84
B	Commercial and Business (Soil D) =	95	0.01	7.54
C	Commercial and Business (Soil C) =	94	0.01	7.43
D	Commercial and Business (Soil B) =	92	0.02	7.23
E	Commercial and Business (Soil A) =	89	0.03	6.92
F	Residential 1/4 Acre Lots (Soil D) =	87	0.04	6.72
G	Residential Estate (Soil D) =	85	0.06	6.52
H	Small Grain Contoured Good (Soil D) =	84	0.06	6.41
I	Herbaceious Open Space / Pasture - Fair (Soil D) =	83	0.07	6.31
J	Residential 1/4 Acre Lots (Soil C) =	83	0.07	6.31
K	Residential Estate (Soil C) =	81	0.09	6.11
L	Pasture - Fair (Soil C) =	76	0.14	5.6
M	Residential (Soil B) =	75	0.15	5.5
N	Residential Estate (Soil B) =	70	0.21	4.99
O	Pasture - Fair (Soil B) =	69	0.23	4.88
P	Residential 1/4 Acre Lots (Soil A) =	61	0.34	4.07
Q	Small Grain St Good (Soil A) =	60	0.35	3.97
R	Residential Estate (Soil A) =	57	0.39	3.66
S	Residential 1/2 Acre (Soil A) =	54	0.44	3.35
T	Pasture - Open Space - Fair (Soil A) =	49	0.52	2.84

Basin	Area	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	Imp	Weighted Average	Comp CN
	acres	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*%*	*Acre*CN*	*CN*
Basin2H4	82.23			5				34				31				12.2						35%	6715	81.7
Basin2H5	166.4			12				26.4				98	30									50%	13593	81.7
Basin2H6	30.49											12				18.5						25%	2248	73.7
Basin2H7	54.59							54.6														50%	4640	85.0
Basin2H8	88.81							70											18.8			50%	7022	79.1
Basin2H9	56.11							5		15									10		26.1	10%	3519	62.7
Basin2I1	54.75				7											8	30				9.75	40%	3504	64.0
Basin2I2	64.12						28					8.12			28							55%	5054	78.8
Basin2I3	90.68							15				35			40.7							50%	6958	76.7
Basin2I4	31.78							28		3.78												45%	2694	84.8
Basin2I5	12.37														12.4							50%	866	70.0
Basin2I6	51.47														35	16.5						40%	3586	69.7
Basin2I7	88.64							88.6														50%	7534	85.0
Basin2I8	161.3							71							84	6.3						45%	12350	76.5
Basin2I9	14.57							14.6														55%	1238	85.0
Basin2I10	59		9					50														50%	5105	86.5
Basin2I11	123.1		10					35				71	7.1									45%	10216	83.0
Basin2J1	37.17			35.2												2						90%	3444	92.7
Basin2J2	79.2			25							50					4.2						65%	6790	85.7

Sanitary Sewer Basin CN Values

CN Values - Existing Conditions

		CN	Cond	Dry
A	Impervious Areas (Soil A,B,C,D) =	98	0.00	7.84
B	Commercial and Business (Soil D) =	95	0.01	7.54
C	Commercial and Business (Soil C) =	94	0.01	7.43
D	Commercial and Business (Soil B) =	92	0.02	7.23
E	Commercial and Business (Soil A) =	89	0.03	6.92
F	Residential 1/4 Acre Lots (Soil D) =	87	0.04	6.72
G	Residential Estate (Soil D) =	85	0.06	6.52
H	Small Grain Contoured Good (Soil D) =	84	0.06	6.41
I	Herbaceious Open Space / Pasture - Fair (Soil D) =	83	0.07	6.31
J	Residential 1/4 Acre Lots (Soil C) =	83	0.07	6.31
K	Residential Estate (Soil C) =	81	0.09	6.11
L	Pasture - Fair (Soil C) =	76	0.14	5.6
M	Residential (Soil B) =	75	0.15	5.5
N	Residential Estate (Soil B) =	70	0.21	4.99
O	Pasture - Fair (Soil B) =	69	0.23	4.88
P	Residential 1/4 Acre Lots (Soil A) =	61	0.34	4.07
Q	Small Grain St Good (Soil A) =	60	0.35	3.97
R	Residential Estate (Soil A) =	57	0.39	3.66
S	Residential 1/2 Acre (Soil A) =	54	0.44	3.35
T	Pasture - Open Space - Fair (Soil A) =	49	0.52	2.84

Basin	Area	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	Imp	Weighted Average	Comp CN
	acres	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	*acre*	%	*Acre*CN*	*CN*
Basin2J3	195.6		15	61							115		4.63									70%	17056	87.2
Basin2J4	63.78		4				57									2.78						65%	5531	86.7
Basin2J5	44.99		15				28									1.99						65%	3998	88.9
Basin2J6	37.15		18				10			9.15												50%	3339	89.9
Basin2K1	79.62	3	35					40		31.8												30%	9655	121.3
Basin2K2	50.15		17					28.2	5													50%	4428	88.3
Basin2K3	36.2	1						34	1.2													40%	3089	85.3
Basin2K4	57.59							37											20.6			45%	4319	75.0
Basin2K5	69.66							19.7											50			50%	4521	64.9
Basin2K6	159.2							9.2											150			45%	9332	58.6
Basin2K7	48.17							15.2											33			45%	3170	65.8
Basin2K8	82.65							50		32.7												25%	6960	84.2
Basin2K9	229.2					49.2				15									60		105	25%	14189	61.9

CONDUCTIVITY AND % IMPERVIOUS

Santiary Sewer Basins Calculations

Basin	Area	Width	Slope	CN	Conductivity	Dry	% Imp
1A1	131.06	100	1	74.5	0.15818751	5.4454	10
1A2	128.75	400	0.3	90.1	0.02462142	7.0366	85
1A3	94.48	80	5	74.5	0.15818751	5.4454	75
1B1	38	690	1.2	69.8	0.21522456	4.966	40
1B2	51.57	720	2.7	85.3	0.05490537	6.547	65
1B3	134.29	745	0.79	83.4	0.06978605	6.3532	65
1B4	66.24	620	0.37	84.8	0.05867004	6.496	65
1C1	83.53	1020	2.8	85.3	0.05490537	6.547	60
1C1A	66.82	602	0.51	88.2	0.03530096	6.8428	60
1C1B	69.72	901	0.95	86.4	0.04701463	6.6592	55
1C1C	89.15	888	0.91	86.1	0.04911261	6.6286	50
1C1D	76.49	692	0.51	85.9	0.0505339	6.6082	35
1C2	59.5	938	0.625	86.4	0.04701463	6.6592	65
1C3	67	820	1.8	87.2	0.04162169	6.7408	60
1C4	62.19	750	1.02	86.5	0.04632441	6.6694	60
1D1	56.18	760	1.09	79.3	0.10693013	5.935	35
1D2	50.46	843	0.86	77.6	0.12418926	5.7616	55
1D3	108.15	827	1.2	88.2	0.03530096	6.8428	60
1D4	95.17	850	0.66	86.5	0.04632441	6.6694	50
1E1	44.37	720	5.5	74.6	0.15704283	5.4556	10
1E2	55.58	860	1.1	69.1	0.22421817	4.8946	55
1F1	193.54	1260	0.75	77.1	0.12945819	5.7106	40
1F2	52.03	980	2.58	79	0.1099006	5.9044	20
1F3	90.99	942	1.05	80.5	0.09538176	6.0574	50
1F4	71.78	1280	0.45	79.3	0.10693013	5.935	60
1F5	71.35	945	1.37	90	0.025139	7.0264	85
1G1	46.72	420	0.381	87.4	0.04031984	6.7612	80
1G2	179.88	1050	0.625	78	0.1200362	5.8024	60
1G3	93.49	1524	1.1	86.4	0.04701463	6.6592	60
1G4	143.49	1250	0.34	87	0.0429422	6.7204	65
1G5	173.22	840	0.32	89.7	0.02672179	6.9958	55
1G6	73.99	1100	0.28	87.3	0.04096843	6.751	55
1G7	97.06	1400	0.36	87.3	0.04096843	6.751	50
1G8	77.69	456	0.21	89.2	0.02945916	6.9448	35
1H1	165.29	766	0.603	90.5	0.02260151	7.0774	70
1I1	137.86	684	0.4	90.1	0.02462142	7.0366	70
1J1	145.34	845	0.5	85.3	0.05490537	6.547	75
1J2	42.03	621	0.81	83.2	0.0714418	6.3328	65
1K1	70.39	677	0.47	71.5	0.19389554	5.1394	60
1K2	70.33	420	0.85	69.7	0.21650205	4.9558	40
1K3	170.81	920	0.72	82.5	0.07736731	6.2614	50
1K4	84.05	1089	0.4	72.5	0.18170756	5.2414	60
1M1	59.94	981	1.8	86.2	0.04840874	6.6388	30
1M2	58.49	1026	0.9	89.2	0.02945916	6.9448	35
1M3	89.58	774	0.54	88.8	0.0317376	6.904	55
1M4	85.1	1148	1	87.5	0.03967594	6.7714	55
1M5	172.56	1073	0.35	87.4	0.04031984	6.7612	30
1M6	61.75	936	0.885	91.1	0.01972427	7.1386	70

Santiary Sewer Basins Calculations

Basin	Area	Width	Slope	CN	Conductivity	Dry	% Imp
1N1	88.52	966	0.595	88.4	0.03409389	6.8632	50
1N2	72.03	1200	0.45	89.4	0.02834937	6.9652	60
1N3	55.41	1146	0.52	88.6	0.03290607	6.8836	35
1N4	155.89	1168	0.32	81.3	0.08798703	6.139	20
1N5	25.71	644	0.28	87.5	0.03967594	6.7714	50
1N6	184.98	1412	0.41	84.9	0.05790833	6.5062	55
1N7	219.38	1628	0.52	87.7	0.03840225	6.7918	20
1N8	26.64	528	0.4	87.5	0.03967594	6.7714	60
1O1	249.68	1975	0.28	86.5	0.04632441	6.6694	55
1O2	79.92	925	0.6	99.3	0.00015147	7.975	20
1O3	111.7	1524	0.84	60.8	0.33856351	4.048	60
1O4	174.04	994	0.71	64.1	0.3780946	3.7726	35
1O5	75.94	920	0.21	90.1	0.02462142	7.0366	55
1P1	291.6	3120	0.96	87.7	0.03840225	6.7918	20
1P2	76.39	1129	0.6	84.8	0.05867004	6.496	25
1P3	180.59	1324	0.89	81.8	0.0834923	6.19	20
2A1	55.28	882	0.85	70.2	0.21013943	5.0068	7
2A2	160.41	496	0.74	72.1	0.18654973	5.2006	2
2B1	63.53	700	2.7	87	0.0429422	6.7204	55
2B2	65.39	760	2.4	87	0.0429422	6.7204	60
2B3	119.54	980	1.2	87	0.0429422	6.7204	60
2C1	72.7	1572	2.73	74.4	0.15933525	5.4352	45
2C2	32.43	657	4.33	72.7	0.1793033	5.2618	35
2C3	114.7	1609	0.55	76.3	0.13806414	5.629	55
2D1	34.78	960	0.636	76	0.141346	5.5984	1
2D2	315.07	2542	0.8	74.8	0.15476272	5.476	60
2D3	257.89	1271	1.69	76.4	0.20509464	5.0476	2
2D4	75.74	1465	0.78	87.2	0.04162169	6.7408	65
2D5	152.22	1363	0.65	84.1	0.06412336	6.4246	35
2E1	12.18	124	0.87	72.8	0.17810541	5.272	10
2E2	105.01	1765	0.22	77.3	0.12734036	5.731	65
2F1	42.9	765	0.52	79	0.92845216	-0.4706	40
2F2	121.92	1406	0.4	84.1	0.06412336	6.4246	65
2F3	60.13	984	0.6	81.3	0.82781749	0.5596	40
2F4	21.09	571	0.65	88.8	0.0317376	6.904	35
2F5	81	859	0.54	81	0.78267654	0.937	45
2G1	63.27	1421	0.8	88.2	0.42135635	3.4768	70
2G2	267.45	2108	0.71	88.2	0.212677	4.9864	70
2G3	87.8	1512	0.476	94.4	0.00728941	7.4752	90
2G4	158.63	2019	0.67	83	0.0731142	6.3124	65
2G5	83.08	1633	0.817	86.2	0.04840874	6.6388	60
2G6	191.8	1938	0.754	77.7	0.62333262	2.11	35
2H1	36.16	734	1.07	86.2	0.04840874	6.6388	50
2H2	52.66	1074	0.652	84.6	0.06020651	6.4756	30
2H3	136.95	1518	1.25	85.5	0.05343039	6.5674	40
2H4	141.76	1331	1.46	81.7	0.44698319	3.3034	35
2H5	30.19	1904	1.6	81.7	0.6827399	1.6918	50
2H6	30.49	645	0.45	73.7	0.58618104	2.365	25

Santiary Sewer Basins Calculations

Basin	Area	Width	Slope	CN	Conductivity	Dry	% Imp
2H7	54.59	1264	0.856	85	0.057151	6.5164	50
2H8	88.81	1519	0.64	79.1	0.1089068	5.9146	50
2H9	56.11	624	0.72	62.7	0.31131483	4.2418	10
2I1	54.75	1223	1.31	64	0.2929936	4.3744	40
2I2	64.12	1345	0.578	78.8	0.22034921	4.9252	55
2I3	90.68	1434	1.65	76.7	0.53191855	2.7322	50
2I4	31.78	998	0.74	84.8	0.05867004	6.496	45
2I5	12.37	520	1.07	70	0.212677	4.9864	50
2I6	51.47	1219	1.02	69.7	0.21650205	4.9558	40
2I7	88.64	1518	1.2	85	0.057151	6.5164	50
2I8	161.34	2820	0.85	76.5	0.13589266	5.6494	45
2I9	14.57	498	0.95	85	0.057151	6.5164	55
2I10	59	1140	1.14	86.5	0.04632441	6.6694	50
2I11	123.07	2708	0.87	83	0.65113645	1.9162	45
2J1	37.17	1245	0.4	92.7	0.01296624	7.3018	90
2J2	79.2	1159	0.665	85.7	0.0519732	6.5878	65
2J3	195.63	2624	0.08	87.2	0.04162169	6.7408	70
2J4	63.78	739	1.3	86.7	0.04495771	6.6898	65
2J5	44.99	835	1.74	88.9	0.03116066	6.9142	65
2J6	37.15	920	0.87	89.9	0.0256616	7.0162	50
2K1	79.62	1672	0.31	121.3	0.17245211	10.219	30
2K2	50.15	740	1.4	88.3	0.03469502	6.853	50
2K3	36.2	704	1.4	85.3	0.05490537	6.547	40
2K4	57.59	845	1.2	75	0.152495	5.4964	45
2K5	69.66	1017	1.1	64.9	0.28048027	4.4662	50
2K6	159.22	1602	1.2	58.6	0.37071183	3.8236	45
2K7	48.17	1289	0.87	65.8	0.26811707	4.558	45
2K8	82.62	1780	1.2	84.2	0.0633314	6.4348	25
2K9	229.15	3100	1.1	61.9	0.32272359	4.1602	25

End

PIPE LENGTH
PIPE DIAMETER

Pipe Length/Diameter Calculations

Feet in a mile = 5280 ft/mile
Infiltration 200 gal/mile/dia/day

	In	8	10	12	18	21	24	30	36	Length
	Ft	0.66667	0.83333	1	1.5	1.75	2	2.5	3	mile*dia
Basin1A1	(1A)007	3400						4800		2.70202
Basin1A2	(1A)014	2200	600					2000		1.319444
Basin1A3	(1A)027	8000						4300		3.046086
Basin1B1	(1B)009	3400					2000			1.186869
Basin1B2	(1B)005	4000								0.505051
Basin1B3	(1B)014	12000					1300			2.007576
Basin1B4	(1B)014	8800								1.111111
Basin1C1	(1C)001A	6300	1300	1200			2800			2.28851
Basin1C1A	(1C)015D	9800	1800				400			1.67298
Basin1C1B	(1C)021B	9800								1.237374
Basin1C1C	(1C)021	8500	3200				1200			2.032828
Basin1C1D	(1C)028	8800								1.111111
Basin1C2	(1C)179	12000		1300						1.761364
Basin1C3	(1C)178	10000								1.262626
Basin1C4	(1C)182	9200								1.161616
Basin1D1	(1D)005	2700	2800							0.782828
Basin1D2	(1D)014	5500	1300							0.899621
Basin1D3	(1D)018	12000	2000							1.830808
Basin1D4	(1D)023	13000	500							1.720328
Basin1E1	(1E)003A	400		3200						0.656566
Basin1E2	(1E)009	6800								0.858586
Basin1F1	(1F)004	17000			280	2200			2200	4.205177
Basin1F2	(1F)010	3200				985			1000	1.29869
Basin1F3	(1J)011	8200				800			1000	1.868687
Basin1F4	(1F)017A	4500								0.568182
Basin1F5	(1F)021	2000	3200		1300					1.126894
Basin1G1	(1G)002	4200	83	300					2000	1.736585
Basin1G2	(1G)003	18000	184							2.301768
Basin1G3	(1G)009B	7000	7000						2400	3.352273
Basin1G4	(1G)053	15500	1800							2.241162
Basin1G5	(1G)046	14000	1000							1.925505
Basin1G6	(1G)071	5700	3800							1.319444
Basin1G7	(1G)020	15000								1.893939
Basin1G8	(1G)020	5300								0.669192
Basin1H1	(1H)045	12000	2400							1.893939
Basin1I1	(1H)011	14800	1400							2.089646
Basin1J1	(1J)053	10000		1000	1800					1.963384
Basin1J2	(1K)001	3200		200	1200					0.782828
Basin1K1	(1K)004	9800								1.237374
Basin1K2	(1K)008	9600		2200						1.628788
Basin1K3	(1K)014	20000	800	2900						3.200758
Basin1K4	(2E)014	12000								1.515152
Basin1M1	(1M)003	4700					900		1200	1.616162
Basin1M2	(1M)281B	4200	1000	1600			700			1.256313
Basin1M3	(1M)094	10200	2400	1700						1.988636
Basin1M4	(1M)122	7800	4800							1.742424
Basin1M5	(1M)165	7200								0.909091
Basin1M6	(1M)162	6300								0.795455

Pipe Length/Diameter Calculations

Feet in a mile = 5280 ft/mile
Infiltration 200 gal/mile/dia/day

	In	8	10	12	18	21	24	30	36	Length
	Ft	0.66667	0.83333	1	1.5	1.75	2	2.5	3	mile*dia
Basin1N1	(1M)286A	9800	850				5000			3.265467
Basin1N2	(1N)013	8000	2200							1.357323
Basin1N3	(1N)022	5700	2300							1.082702
Basin1N4	(1N)025	15000								1.893939
Basin1N5	(1N)047	2800								0.353535
Basin1N6	(1N)047	15000								1.893939
Basin1N7	(1N)047	6100	1450							0.999053
Basin1N8	(1N)022	5000								0.631313
Basin1O1	(1O)305	29500	1180	530			3200			5.223485
Basin1O2	(1O)308	5100								0.643939
Basin1O3	(1O)309	1400								0.176768
Basin1O4	(1O)157	11500								1.45202
Basin1O5	(1O)157	4900								0.618687
Basin1P1	(1P)009	5000	5600	10500						3.503788
Basin1P2	(1P)043	300	4100							0.684975
Basin1P3	(1P)043	3900	1300							0.697601
Basin2A1	(2A)014	800							4900	2.885101
Basin2A2	(2A)048	0						10000	19000	15.5303
Basin2B1	(2A)017	4600	900							0.722854
Basin2B2	(2A)020	5400	400							0.744949
Basin2B3	(2A)020	7200								0.909091
Basin2C1	(2C)003	7100		1680				1680		2.010101
Basin2C2	(2C)009	500	2600	640				640		0.897727
Basin2C3	(2E)003	9980								1.260101
Basin2D1	(2D)003	0	450	3500	3800					1.813447
Basin2D2	(2D)011	45000	990							5.838068
Basin2D3	(2D)251	20000		5500	7900					5.811237
Basin2D4	(2D)045A	3300	3200							0.921717
Basin2D5	(2D)046A	6700	1800							1.130051
Basin2E1	(2A)064	0						2200		1.041667
Basin2E2	(2E)003	11500						6490		4.524937
Basin2F1	(2F)004	3200					800	1500		1.417298
Basin2F2	(2F)010	16500			3400					3.049242
Basin2F3	(2F)023	5500			1890					1.231376
Basin2F4	(2F)011	2200								0.277778
Basin2F5	(2F)025	2200		8900						1.963384
Basin2G1	(2G)002	4500		2000						0.94697
Basin2G2	(2G)040	9700		6100						2.380051
Basin2G3	(2G)009	7000	1500	400						1.196338
Basin2G4	(2G)019	15600	2800							2.411616
Basin2G5	(2G)026	9500	1200							1.388889
Basin2G6	(2G)359	20500	3800							3.188131
Basin2H10	(2H)058	1900	3000							0.713384
Basin2H2	(2H)007	3125				1750				0.97459
Basin2H3	(2H)012	3700	1900							0.767045
Basin2H4	(2H)012	12000	1320							1.723485
Basin2H5	(2H)013	3900			2300	335				1.256866
Basin2H6	(2H)033	8500		3700						1.77399

Pipe Length/Diameter Calculations

Feet in a mile = 5280 ft/mile
Infiltration 200 gal/mile/dia/day

	In	8	10	12	18	21	24	30	36	Length
	Ft	0.66667	0.83333	1	1.5	1.75	2	2.5	3	mile*dia
Basin2H7	(2H)049	2400		4580						1.170455
Basin2H8	(2H)286	5000	3000							1.104798
Basin2H9	(2H)290	10000	1150							1.444129
Basin2I1	(2I)003	4200								0.530303
Basin2I2	(2I)001	8800								1.111111
Basin2I3	(2I)008	8620		1300	1400					1.732323
Basin2I4	(2I)014	5000								0.631313
Basin2I5	(2I)020	1100		930						0.315025
Basin2I6	(2I)025A	2400		1860						0.655303
Basin2I7	(2I)021B	14200								1.792929
Basin2I8	(2I)029	24750	1100							3.298611
Basin2I9	(2I)049	2100		800						0.416667
Basin2I10	(2I)054	6980		1600						1.184343
Basin2I11	(2I)059	5800	2100	400						1.13952
Basin2J1	(2J)008	2400					1000	1800		1.534091
Basin2J2	(2J)047	9700								1.224747
Basin2J3	(2J)056	20000	150							2.548927
Basin2J4	(2J)026	400	1000				1600			0.814394
Basin2J5	(2J)029	4000								0.505051
Basin2J6	(2J)032	2400		680	800					0.659091
Basin2K1	(2K)317	7000			700					1.082702
Basin2K2	(2K)013	3500	1200	4000	700					1.587753
Basin2K3	(2K)019	3700		2400						0.921717
Basin2K4	(2K)014	8000								1.010101
Basin2K5	(2K)025	7500								0.94697
Basin2K6	(2K)029	16000		1700						2.342172
Basin2K7	(2K)033	4200		2600						1.022727
Basin2K8	(2K)042	2600	1700	5000						1.543561
Basin2K9	(2K)052	10100	4000							1.906566

TM 2-4

STORM EVENTS

ENVIROTECH
ENGINEERING & CONSULTING, INC.

City Wide RainFall Events

Event 1			Event 2			Event 3			Event 4			Event 5			Event 6		
5/24/07	0:00	0	4/13/07	0:00	0.02	3/30/07	0:00	0	4/28/06	0:00	0	6/23/06	0:00	0	8/20/06	0:00	0
5/24/07	0:30	0	4/13/07	0:30	0.02	3/30/07	0:30	0	4/28/06	0:30	0	6/23/06	0:30	0	8/20/06	0:30	0
5/24/07	1:00	0	4/13/07	1:00	0.6	3/30/07	1:00	0	4/28/06	1:00	0	6/23/06	1:00	0	8/20/06	1:00	0
5/24/07	1:30	0	4/13/07	1:30	0.05	3/30/07	1:30	0	4/28/06	1:30	0	6/23/06	1:30	0	8/20/06	1:30	0
5/24/07	2:00	0	4/13/07	2:00	0.05	3/30/07	2:00	0	4/28/06	2:00	0	6/23/06	2:00	0	8/20/06	2:00	0.28
5/24/07	2:30	0	4/13/07	2:30	0.04	3/30/07	2:30	0	4/28/06	2:30	0	6/23/06	2:30	0	8/20/06	2:30	1.64
5/24/07	3:00	0	4/13/07	3:00	0.01	3/30/07	3:00	0	4/28/06	3:00	0	6/23/06	3:00	0	8/20/06	3:00	0.68
5/24/07	3:30	0	4/13/07	3:30	0.01	3/30/07	3:30	0	4/28/06	3:30	0	6/23/06	3:30	0	8/20/06	3:30	0
5/24/07	4:00	0.12	4/13/07	4:00	0	3/30/07	4:00	0	4/28/06	4:00	0	6/23/06	4:00	0	8/20/06	4:00	0
5/24/07	4:30	0.17	4/13/07	4:30	0	3/30/07	4:30	0	4/28/06	4:30	0	6/23/06	4:30	0	8/20/06	4:30	0
5/24/07	5:00	0.52	4/13/07	5:00	0	3/30/07	5:00	0	4/28/06	5:00	0	6/23/06	5:00	0	8/20/06	5:00	0
5/24/07	5:30	0.5	4/13/07	5:30	0	3/30/07	5:30	0	4/28/06	5:30	0	6/23/06	5:30	0	8/20/06	5:30	0
5/24/07	6:00	0.48	4/13/07	6:00	0.05	3/30/07	6:00	0	4/28/06	6:00	0	6/23/06	6:00	0	8/20/06	6:00	0
5/24/07	6:30	0.12	4/13/07	6:30	0.03	3/30/07	6:30	0	4/28/06	6:30	0	6/23/06	6:30	0	8/20/06	6:30	0
5/24/07	7:00	0.05	4/13/07	7:00	0.08	3/30/07	7:00	0	4/28/06	7:00	0.08	6/23/06	7:00	0	8/20/06	7:00	0
5/24/07	7:30	0	4/13/07	7:30	0.21	3/30/07	7:30	0	4/28/06	7:30	0.21	6/23/06	7:30	0	8/20/06	7:30	0
5/24/07	8:00	0	4/13/07	8:00	0.07	3/30/07	8:00	0	4/28/06	8:00	0.66	6/23/06	8:00	0	8/20/06	8:00	0
5/24/07	8:30	0	4/13/07	8:30	0.16	3/30/07	8:30	0	4/28/06	8:30	0.38	6/23/06	8:30	0	8/20/06	8:30	0
5/24/07	9:00	0	4/13/07	9:00	0.01	3/30/07	9:00	0	4/28/06	9:00	0.27	6/23/06	9:00	0	8/20/06	9:00	0
5/24/07	9:30	0	4/13/07	9:30	0.01	3/30/07	9:30	0	4/28/06	9:30	0.35	6/23/06	9:30	0.17	8/20/06	9:30	0
5/24/07	10:00	0	4/13/07	10:00	0.09	3/30/07	10:00	0	4/28/06	10:00	0.17	6/23/06	10:00	0.19	8/20/06	10:00	0
5/24/07	10:30	0	4/13/07	10:30	0.03	3/30/07	10:30	0	4/28/06	10:30	0.12	6/23/06	10:30	0.25	8/20/06	10:30	0
5/24/07	11:00	0	4/13/07	11:00	0.03	3/30/07	11:00	0	4/28/06	11:00	0.09	6/23/06	11:00	0.89	8/20/06	11:00	0
5/24/07	11:30	0	4/13/07	11:30	0.33	3/30/07	11:30	0	4/28/06	11:30	0.14	6/23/06	11:30	0.68	8/20/06	11:30	0
5/24/07	12:00	0	4/13/07	12:00	0.16	3/30/07	12:00	0	4/28/06	12:00	0.08	6/23/06	12:00	0.21	8/20/06	12:00	0
5/24/07	12:30	0	4/13/07	12:30	0.04	3/30/07	12:30	0	4/28/06	12:30	0.08	6/23/06	12:30	0.17	8/20/06	12:30	0
5/24/07	13:00	0	4/13/07	13:00	0.04	3/30/07	13:00	0	4/28/06	13:00	0.09	6/23/06	13:00	0.08	8/20/06	13:00	0
5/24/07	13:30	0	4/13/07	13:30	0.03	3/30/07	13:30	0	4/28/06	13:30	0.08	6/23/06	13:30	0	8/20/06	13:30	0
5/24/07	14:00	0	4/13/07	14:00	0.03	3/30/07	14:00	0	4/28/06	14:00	0.28	6/23/06	14:00	0	8/20/06	14:00	0
5/24/07	14:30	0	4/13/07	14:30	0.03	3/30/07	14:30	0	4/28/06	14:30	0.21	6/23/06	14:30	0	8/20/06	14:30	0
5/24/07	15:00	0	4/13/07	15:00	0.02	3/30/07	15:00	0	4/28/06	15:00	0	6/23/06	15:00	0	8/20/06	15:00	0
5/24/07	15:30	0	4/13/07	15:30	0.02	3/30/07	15:30	0.22	4/28/06	15:30	0	6/23/06	15:30	0	8/20/06	15:30	0
5/24/07	16:00	0	4/13/07	16:00	0.02	3/30/07	16:00	0.36	4/28/06	16:00	0.03	6/23/06	16:00	0	8/20/06	16:00	0
5/24/07	16:30	0	4/13/07	16:30	0	3/30/07	16:30	0.78	4/28/06	16:30	0.04	6/23/06	16:30	0	8/20/06	16:30	0
5/24/07	17:00	0	4/13/07	17:00	0.74	3/30/07	17:00	0.45	4/28/06	17:00	0.1	6/23/06	17:00	0	8/20/06	17:00	0

City Wide RainFall Events

Event 1			Event 2			Event 3			Event 4			Event 5			Event 6		
5/24/07	17:30	0	4/13/07	17:30	0.08	3/30/07	17:30	0.18	4/28/06	17:30	0.18	6/23/06	17:30	0	8/20/06	17:30	0
5/24/07	18:00	0	4/13/07	18:00	0.03	3/30/07	18:00	0.09	4/28/06	18:00	0.28	6/23/06	18:00	0	8/20/06	18:00	0
5/24/07	18:30	0	4/13/07	18:30	0.02	3/30/07	18:30	0.04	4/28/06	18:30	0.14	6/23/06	18:30	0	8/20/06	18:30	0
5/24/07	19:00	0	4/13/07	19:00	0.02	3/30/07	19:00	0	4/28/06	19:00	0.12	6/23/06	19:00	0	8/20/06	19:00	0
5/24/07	19:30	0	4/13/07	19:30	0.02	3/30/07	19:30	0	4/28/06	19:30	0.1	6/23/06	19:30	0	8/20/06	19:30	0
5/24/07	20:00	0	4/13/07	20:00	0.02	3/30/07	20:00	0	4/28/06	20:00	0.08	6/23/06	20:00	0	8/20/06	20:00	0
5/24/07	20:30	0	4/13/07	20:30	0	3/30/07	20:30	0	4/28/06	20:30	0.09	6/23/06	20:30	0	8/20/06	20:30	0
5/24/07	21:00	0	4/13/07	21:00	0	3/30/07	21:00	0	4/28/06	21:00	0.27	6/23/06	21:00	0	8/20/06	21:00	0
5/24/07	21:30	0	4/13/07	21:30	0	3/30/07	21:30	0	4/28/06	21:30	0	6/23/06	21:30	0	8/20/06	21:30	0
5/24/07	22:00	0	4/13/07	22:00	0.12	3/30/07	22:00	0	4/28/06	22:00	0	6/23/06	22:00	0	8/20/06	22:00	0
5/24/07	22:30	0	4/13/07	22:30	0.1	3/30/07	22:30	0.08	4/28/06	22:30	0	6/23/06	22:30	0	8/20/06	22:30	0
5/24/07	23:00	0	4/13/07	23:00	0.02	3/30/07	23:00	0	4/28/06	23:00	0	6/23/06	23:00	0	8/20/06	23:00	0
5/24/07	23:30	0	4/13/07	23:30	0	3/30/07	23:30	0	4/28/06	23:30	0	6/23/06	23:30	0	8/20/06	23:30	0
5/25/07	0:00	0	4/14/07	0:00	0	3/31/07	0:00	0	4/29/06	0:00	0	6/24/06	0:00	0	8/21/06	0:00	0
Total RainFall		0.98			1.73			1.1			2.36			1.32			1.3

TM 2-5

I/I CALCULATIONS

ENVIROTECH
ENGINEERING & CONSULTING, INC.

I/I HYDROGRAPH DEVELOPMENT

Santiary Sewer Basin Calculations (Infiltration)

Max Allowed= 200 gal/mi/day/dia

			ST			MT			LT			en of Pip	Allowed	Area
Basin	Inlet	Depth	R1	T1	K1	R2	T2	K2	R3	T3	K3	mi/dia	gpm	acres
Basin1A1	(1A)007	7.83	0.53	0.51561	2	0.17	1.37495	2	0.3	2.94632	2	2.70202	540	0.79
Basin1A2	(1A)014	3.58	0.45	1.5146	2	0.14	4.03894	2	0.41	8.65487	2	1.31944	264	0.70
Basin1A3	(1A)027	18.54	0.53	1.22086	2	0.17	3.25563	2	0.3	6.97635	2	3.04609	609	1.29
Basin1B1	(1B)009	18.33	0.55	0.88715	2	0.18	2.36575	2	0.27	5.06946	2	1.18687	237	0.44
Basin1B2	(1B)005	9.87	0.48	1.87254	2	0.15	4.99344	2	0.37	10.7002	2	0.50505	101	0.21
Basin1B3	(1B)013	14.57	0.48	2.1748	2	0.15	5.79947	2	0.37	12.4274	2	2.00758	402	0.98
Basin1B4	(1B)014	15.35	0.48	2.72534	2	0.15	7.26758	2	0.37	15	2	1.11111	222	0.59
Basin1C1	(1C)001A	13.37	0.48	2.53656	2	0.15	6.76416	2	0.37	14.4946	2	2.28851	458	1.12
Basin1C1A	(1C)015D	12.75	0.46	3.76229	2	0.14	8	2	0.4	15	2	1.67298	335	0.87
Basin1C1B	(1C)021E	17.83	0.47	3.95045	2	0.15	8	2	0.38	15	2	1.23737	247	0.75
Basin1C1C	(1C)021	10.58	0.47	2.24399	2	0.15	5.98398	2	0.38	12.8228	2	2.03283	407	0.89
Basin1C1D	(1C)028	10.71	0.47	2.20768	2	0.15	5.88714	2	0.38	12.6153	2	1.11111	222	0.49
Basin1C2	(1C)179	17.25	0.47	3.82195	2	0.15	8	2	0.38	15	2	1.76136	352	1.05
Basin1C3	(1C)178	14.25	0.47	3.56635	2	0.15	8	2	0.38	15	2	1.26263	253	0.68
Basin1C4	(1C)182	12	0.47	2.69836	2	0.15	7.19563	2	0.38	15	2	1.16162	232	0.55
Basin1D1	(1D)005	8.08	0.51	0.78712	2	0.16	2.09898	2	0.33	4.49782	2	0.78283	157	0.26
Basin1D2	(1D)014	6.35	0.51	0.53262	2	0.16	1.42032	2	0.33	3.04355	2	0.89962	180	0.28
Basin1D3	(1D)018	13.83	0.46	4	2	0.14	8	2	0.4	15	2	1.83081	366	1.00
Basin1D4	(1D)023	14.72	0.47	3.30999	2	0.15	8	2	0.38	15	2	1.72033	344	0.94
Basin1E1	(1E)003A	5.91	0.53	0.39201	2	0.17	1.04536	2	0.3	2.24006	2	0.65657	131	0.19
Basin1E2	(1E)009	7.81	0.55	0.36283	2	0.18	0.96756	2	0.27	2.07334	2	0.85859	172	0.23
Basin1F1	(1F)004	9.94	0.52	0.79981	2	0.17	2.13282	2	0.31	4.57033	2	4.20518	841	1.31
Basin1F2	(1F)010	7.96	0.51	0.75447	2	0.16	2.01192	2	0.33	4.31126	2	1.29869	260	0.43
Basin1F3	(1J)011	12.3	0.5	1.34329	2	0.16	3.5821	2	0.34	7.67592	2	1.86869	374	0.73
Basin1F4	(1F)017A	17.37	0.51	1.69211	2	0.16	4.51229	2	0.33	9.6692	2	0.56818	114	0.27
Basin1F5	(1F)030	9.8252	0.45	4	2	0.14	8	2	0.41	15	2	1.12689	225	0.54
Basin1G1	(1G)002	15.43	0.46	3.98635	2	0.15	8	2	0.39	15	2	1.73658	347	1.00
Basin1G2	(1G)003	17.96	0.51	1.55856	2	0.16	4.15615	2	0.33	8.90604	2	2.30177	460	1.07
Basin1G3	(1G)009E	18.23	0.47	4	2	0.15	8	2	0.38	15	2	3.35227	670	2.07
Basin1G4	(1G)053	8.5	0.47	2.06188	2	0.15	5.49835	2	0.38	11.7822	2	2.24116	448	0.99
Basin1G5	(1G)046	12.54	0.45	4	2	0.14	8	2	0.41	15	2	1.92551	385	1.03
Basin1G6	(1G)071	10.15	0.47	2.58075	2	0.15	6.88199	2	0.38	14.7471	2	1.31944	264	0.59
Basin1G7	(1G)020	12.75	0.47	3.24183	2	0.15	8	2	0.38	15	2	1.89394	379	0.96

Santiary Sewer Basin Calculations (Infiltration)

Max Allowed= 200 gal/mi/day/dia

			ST			MT			LT			en of Pip	Allowed	Area
Basin	Inlet	Depth	R1	T1	K1	R2	T2	K2	R3	T3	K3	mi/dia	gpm	acres
Basin1G8	(1G)018	13.08	0.46	4	2	0.14	8	2	0.4	15	2	0.66919	134	0.36
Basin1H1	(1H)045	9.5	0.45	4	2	0.14	8	2	0.41	15	2	1.89394	379	0.93
Basin1I1	(1H)011	12	0.45	4	2	0.14	8	2	0.41	15	2	2.08965	418	1.10
Basin1J1	(1J)053	9.51	0.48	1.80424	2	0.15	4.81131	2	0.37	10.3099	2	1.96338	393	0.82
Basin1J2	(1K)001	13.83	0.49	2.0165	2	0.15	5.37734	2	0.36	11.5229	2	0.78283	157	0.36
Basin1K1	(1K)004	7.95	0.54	0.4271	2	0.18	1.13893	2	0.28	2.44056	2	1.23737	247	0.35
Basin1K2	(1K)008	11.04	0.55	0.53117	2	0.18	1.41646	2	0.27	3.03527	2	1.62879	326	0.46
Basin1K3	(1K)014	8.77	0.49	1.18079	2	0.16	3.14876	2	0.35	6.74734	2	3.20076	640	1.19
Basin1K4	(2E)014	20.87	0.54	1.1964	2	0.18	3.19041	2	0.28	6.8366	2	1.51515	303	0.64
Basin1M1	(1M)003	19.45	0.47	4	2	0.15	8	2	0.38	15	2	1.61616	323	1.04
Basin1M2	(1M)281E	18.35	0.46	4	2	0.14	8	2	0.4	15	2	1.25631	251	0.85
Basin1M3	(1M)094	10.5	0.46	3.44623	2	0.14	8	2	0.4	15	2	1.98864	398	0.95
Basin1M4	(1M)122	10.87	0.46	2.85385	2	0.15	7.61027	2	0.39	15	2	1.74242	348	0.81
Basin1M5	(1M)165	15.81	0.46	4	2	0.15	8	2	0.39	15	2	0.90909	182	0.53
Basin1M6	(1M)162	12.5	0.45	4	2	0.14	8	2	0.41	15	2	0.79545	159	0.44
Basin1N1	(1M)286/	28.15	0.46	4	2	0.14	8	2	0.4	15	2	3.26547	653	1.85
Basin1N2	(1N)013	4.85	0.45	1.78208	2	0.14	4.75221	2	0.41	10.1833	2	1.35732	271	0.69
Basin1N3	(1N)022	11.25	0.46	3.56127	2	0.14	8	2	0.4	15	2	1.0827	217	0.53
Basin1N4	(1N)025	10.79	0.5	1.27741	2	0.16	3.40644	2	0.34	7.29951	2	1.89394	379	0.71
Basin1N5	(1N)047	17.5	0.46	4	2	0.15	8	2	0.39	15	2	0.35354	71	0.22
Basin1N6	(1N)048	17.2	0.48	3.09397	2	0.15	8	2	0.37	15	2	1.89394	379	1.07
Basin1N7	(1N)049	16.9	0.46	4	2	0.14	8	2	0.4	15	2	0.99905	200	0.61
Basin1N8	(1N)022	11.25	0.46	2.95362	2	0.15	7.87631	2	0.39	15	2	0.63131	126	0.30
Basin1O1	(1O)305	12.6461	0.47	2.84365	2	0.15	7.58305	2	0.38	15	2	5.22348	1045	2.56
Basin1O2	(1O)308	13.9625	0.4	4	2	0.12	8	2	0.48	15	2	0.64394	129	0.41
Basin1O3	(1O)309	13.1419	0.58	0.40434	2	0.2	1.07824	2	0.22	2.31052	2	0.17677	35	0.05
Basin1O4	(1O)157	14.0314	0.57	0.38657	2	0.19	1.03085	2	0.24	2.20897	2	1.45202	290	0.44
Basin1O5	(1O)308/	13.7865	0.45	4	2	0.14	8	2	0.41	15	2	0.61869	124	0.35
Basin1P1	(1P)009	11.67	0.46	3.1655	2	0.14	8	2	0.4	15	2	3.50379	701	1.70
Basin1P2	(1P)065	16.76	0.48	2.97568	2	0.15	7.93515	2	0.37	15	2	0.68497	137	0.38
Basin1P3	(1P)044	4.08	0.49	0.50903	2	0.16	1.35741	2	0.35	2.90874	2	0.6976	140	0.25
Basin2A1	(2A)014	6.06	0.55	0.3004	2	0.18	0.80106	2	0.27	1.71655	2	2.8851	577	0.81
Basin2A2	(2A)048	7.85	0.54	0.43833	2	0.18	1.16889	2	0.28	2.50476	2	15.5303	3106	4.37

Santiary Sewer Basin Calculations (Infiltration)

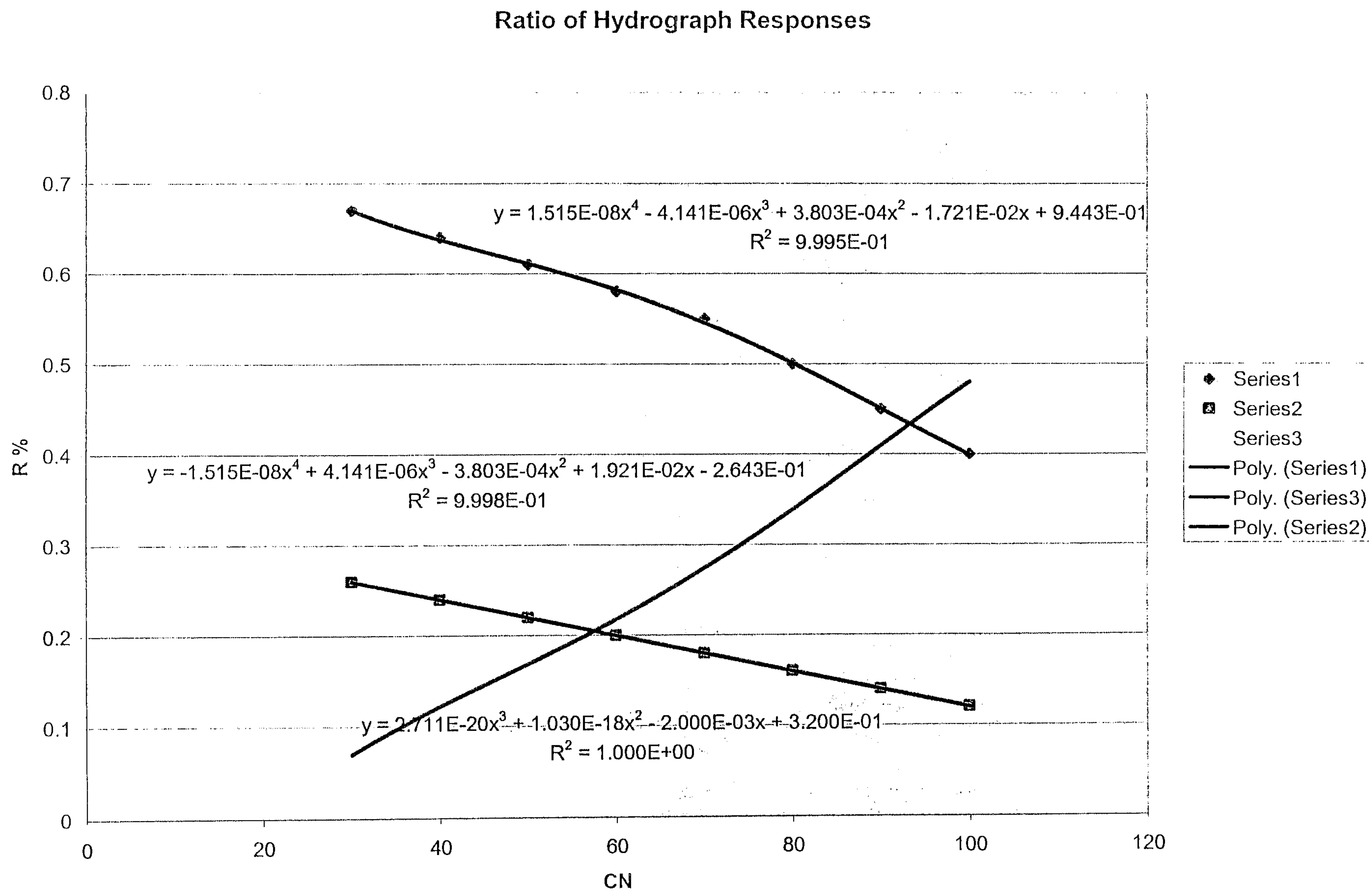
Max Allowed= 200 gal/mi/day/dia

			ST			MT			LT			en of Pip	Allowed	Area
Basin	Inlet	Depth	R1	T1	K1	R2	T2	K2	R3	T3	K3	mi/dia	gpm	acres
Basin2B1	(2A)017	10.93	0.47	2.65134	2	0.15	7.07023	2	0.38	15	2	0.72285	145	0.33
Basin2B2	(2A)020	13.01	0.47	3.15589	2	0.15	8	2	0.38	15	2	0.74495	149	0.38
Basin2B3	(2A)021	7.53	0.47	1.82658	2	0.15	4.87089	2	0.38	10.4376	2	0.90909	182	0.40
Basin2C1	(2C)003	10.94	0.53	0.71521	2	0.17	1.90723	2	0.3	4.08692	2	2.0101	402	0.61
Basin2C2	(2C)009	9.83	0.54	0.57108	2	0.17	1.52287	2	0.29	3.26329	2	0.89773	180	0.25
Basin2C3	(2E)004	11.83	0.52	0.89255	2	0.17	2.38013	2	0.31	5.10029	2	1.2601	252	0.42
Basin2D1	(2D)003	8.17	0.52	0.6021	2	0.17	1.6056	2	0.31	3.44056	2	1.81345	363	0.55
Basin2D2	(2D)011	19.88	0.53	1.33807	2	0.17	3.56819	2	0.3	7.64611	2	5.83807	1168	2.61
Basin2D3	(2D)267	14.8121	0.52	0.7523	2	0.17	2.00613	2	0.31	4.29885	2	5.81124	1162	2.31
Basin2D4	(2D)045A	18	0.47	4	2	0.15	8	2	0.38	15	2	0.92172	184	0.58
Basin2D5	(2D)046A	1305	0.48	4	2	0.15	8	2	0.37	15	2	1.13005	226	0.03
Basin2E1	(2A)064	10.97	0.53	0.64159	2	0.17	1.71091	2	0.3	3.66623	2	1.04167	208	0.31
Basin2E2	(2E)003	15.41	0.51	1.26057	2	0.17	3.36151	2	0.32	7.20323	2	4.52494	905	1.89
Basin2F1	(2F)004	19.02	0.51	0.21339	2	0.16	0.56905	2	0.33	1.21939	2	1.4173	283	0.70
Basin2F2	(2F)010	17.58	0.48	2.85582	2	0.15	7.61553	2	0.37	15	2	3.04924	610	1.71
Basin2F3	(2F)023	22.17	0.5	0.27897	2	0.16	0.74392	2	0.34	1.59412	2	1.23138	246	0.67
Basin2F4	(2F)011	16.28	0.46	4	2	0.14	8	2	0.4	15	2	0.27778	56	0.17
Basin2F5	(2F)025	19.9385	0.5	0.26536	2	0.16	0.70763	2	0.34	1.51635	2	1.96338	393	1.08
Basin2G1	(2G)002	16.58	0.46	0.40989	2	0.14	1.09303	2	0.4	2.34221	2	0.94697	189	0.58
Basin2G2	(2G)040	16	0.46	0.78366	2	0.14	2.08976	2	0.4	4.47806	2	2.38005	476	1.43
Basin2G3	(2G)009	10.12	0.43	4	2	0.13	8	2	0.44	15	2	1.19634	239	0.61
Basin2G4	(2G)019	9.15	0.49	1.30361	2	0.15	3.4763	2	0.36	7.44921	2	2.41162	482	0.92
Basin2G5	(2G)026	5.62	0.47	1.20932	2	0.15	3.22485	2	0.38	6.9104	2	1.38889	278	0.59
Basin2G6	(2G)359	6.67	0.51	0.11146	2	0.16	0.29724	2	0.33	0.63694	2	3.18813	638	1.00
Basin2H1	(2H)007	16.73	0.47	3.59999	2	0.15	8	2	0.38	15	2	0.71338	143	0.41
Basin2H2	(2H)012	13.83	0.48	2.39281	2	0.15	6.38082	2	0.37	13.6732	2	0.97459	195	0.48
Basin2H3	(2H)011	14.48	0.47	2.82299	2	0.15	7.52797	2	0.38	15	2	0.76705	153	0.40
Basin2H4	(2H)013	16.91	0.49	0.39408	2	0.16	1.05087	2	0.35	2.25187	2	1.72348	345	0.87
Basin2H5	(2H)033	7.65	0.49	0.11672	2	0.16	0.31125	2	0.35	0.66696	2	1.25687	251	0.45
Basin2H6	(2H)049	12.17	0.53	0.21627	2	0.17	0.57671	2	0.3	1.2358	2	1.77399	355	0.56
Basin2H7	(2H)286	17.75	0.48	3.23522	2	0.15	8	2	0.37	15	2	1.17045	234	0.68
Basin2H8	(2H)290	20.92	0.51	2.00095	2	0.16	5.33586	2	0.33	11.434	2	1.1048	221	0.57
Basin2H9	(2H)058	15.24	0.57	0.50993	2	0.19	1.35982	2	0.24	2.91391	2	1.44413	289	0.45

Santiary Sewer Basin Calculations (Infiltration)

Max Allowed= 200 gal/mi/day/dia

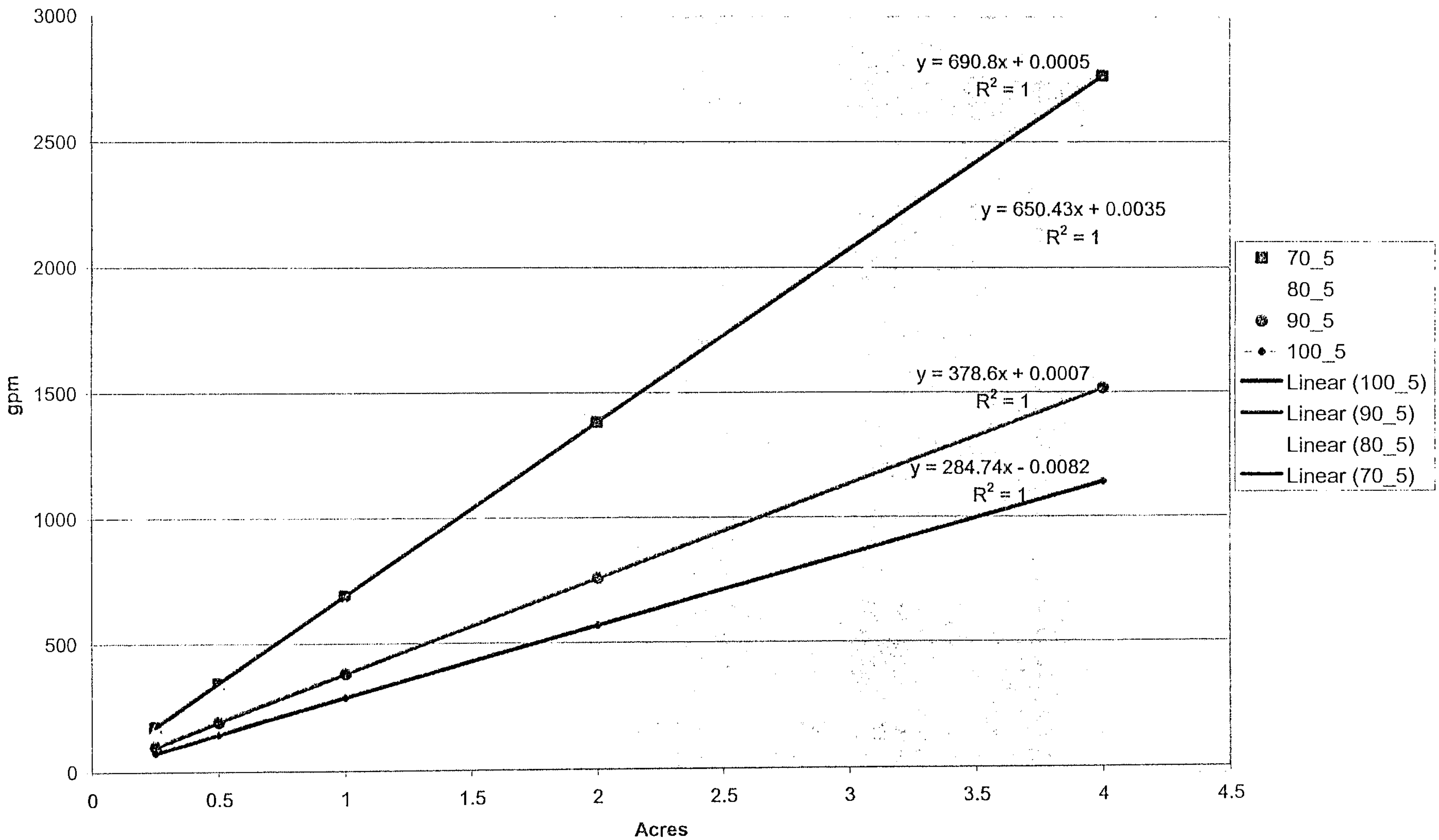
			ST			MT			LT			en of Pip	Allowed	Area
Basin	Inlet	Depth	R1	T1	K1	R2	T2	K2	R3	T3	K3	mi/dia	gpm	acres
Basin2I1	(2I)003	8.8	0.57	0.31286	2	0.19	0.8343	2	0.24	1.78778	2	0.5303	106	0.14
Basin2I2	(2I)001	9.71	0.51	0.45903	2	0.16	1.22407	2	0.33	2.623	2	1.11111	222	0.36
Basin2I3	(2I)008	12	0.52	0.235	2	0.17	0.62666	2	0.31	1.34285	2	1.73232	346	0.59
Basin2I4	(2I)014	8.61	0.48	1.52868	2	0.15	4.07647	2	0.37	8.73529	2	0.63131	126	0.26
Basin2I5	(2I)020	16.52	0.55	0.80913	2	0.18	2.15768	2	0.27	4.6236	2	0.31503	63	0.11
Basin2I6	(2I)025A	9.38	0.55	0.4513	2	0.18	1.20348	2	0.27	2.57888	2	0.6553	131	0.18
Basin2I7	(2I)021B	14.54	0.48	2.65014	2	0.15	7.06705	2	0.37	15	2	1.79293	359	0.92
Basin2I8	(2I)029	12.1	0.52	0.92751	2	0.17	2.47336	2	0.31	5.30005	2	3.29861	660	1.12
Basin2I9	(2I)049	16.16	0.48	2.94541	2	0.15	7.85444	2	0.37	15	2	0.41667	83	0.23
Basin2I10	(2I)054	11.836	0.47	2.66148	2	0.15	7.09729	2	0.38	15	2	1.18434	237	0.56
Basin2I11	(2I)059	10.244	0.49	0.16388	2	0.15	0.43701	2	0.36	0.93646	2	1.13952	228	0.44
Basin2J1	(2J)008	22.37	0.44	4	2	0.13	8	2	0.43	15	2	1.53409	307	1.08
Basin2J2	(2J)047	11.04	0.47	2.21268	2	0.15	5.90048	2	0.38	12.6439	2	1.22475	245	0.54
Basin2J3	(2J)056	5.33	0.47	1.33394	2	0.15	3.55717	2	0.38	7.62251	2	2.54893	510	1.14
Basin2J4	(2J)026	16.79	0.47	3.89023	2	0.15	8	2	0.38	15	2	0.81439	163	0.48
Basin2J5	(2J)029	17.83	0.46	4	2	0.14	8	2	0.4	15	2	0.50505	101	0.33
Basin2J6	(2J)032	13.22	0.45	4	2	0.14	8	2	0.41	15	2	0.65909	132	0.37
Basin2K1	(2K)317	14.67	0.34	0.88612	2	0.08	2.36297	2	0.58	5.06352	2	1.0827	217	0.69
Basin2K2	(2K)013	10.29	0.46	3.08942	2	0.14	8	2	0.4	15	2	1.58775	318	0.74
Basin2K3	(2K)019	6.8	0.48	1.2901	2	0.15	3.44026	2	0.37	7.37199	2	0.92172	184	0.38
Basin2K4	(2K)014	9.58	0.53	0.65439	2	0.17	1.74505	2	0.3	3.73939	2	1.0101	202	0.30
Basin2K5	(2K)025	9.18	0.57	0.34093	2	0.19	0.90915	2	0.24	1.94819	2	0.94697	189	0.25
Basin2K6	(2K)029	10	0.59	0.28099	2	0.2	0.74931	2	0.21	1.60566	2	2.34217	468	0.60
Basin2K7	(2K)033	13.7	0.56	0.53226	2	0.19	1.41936	2	0.25	3.04149	2	1.02273	205	0.31
Basin2K8	(2K)042	12.1817	0.48	2.00363	2	0.15	5.34302	2	0.37	11.4493	2	1.54356	309	0.68
Basin2K9	(2K)052	10.3488	0.58	0.33403	2	0.2	0.89076	2	0.22	1.90876	2	1.90657	381	0.50



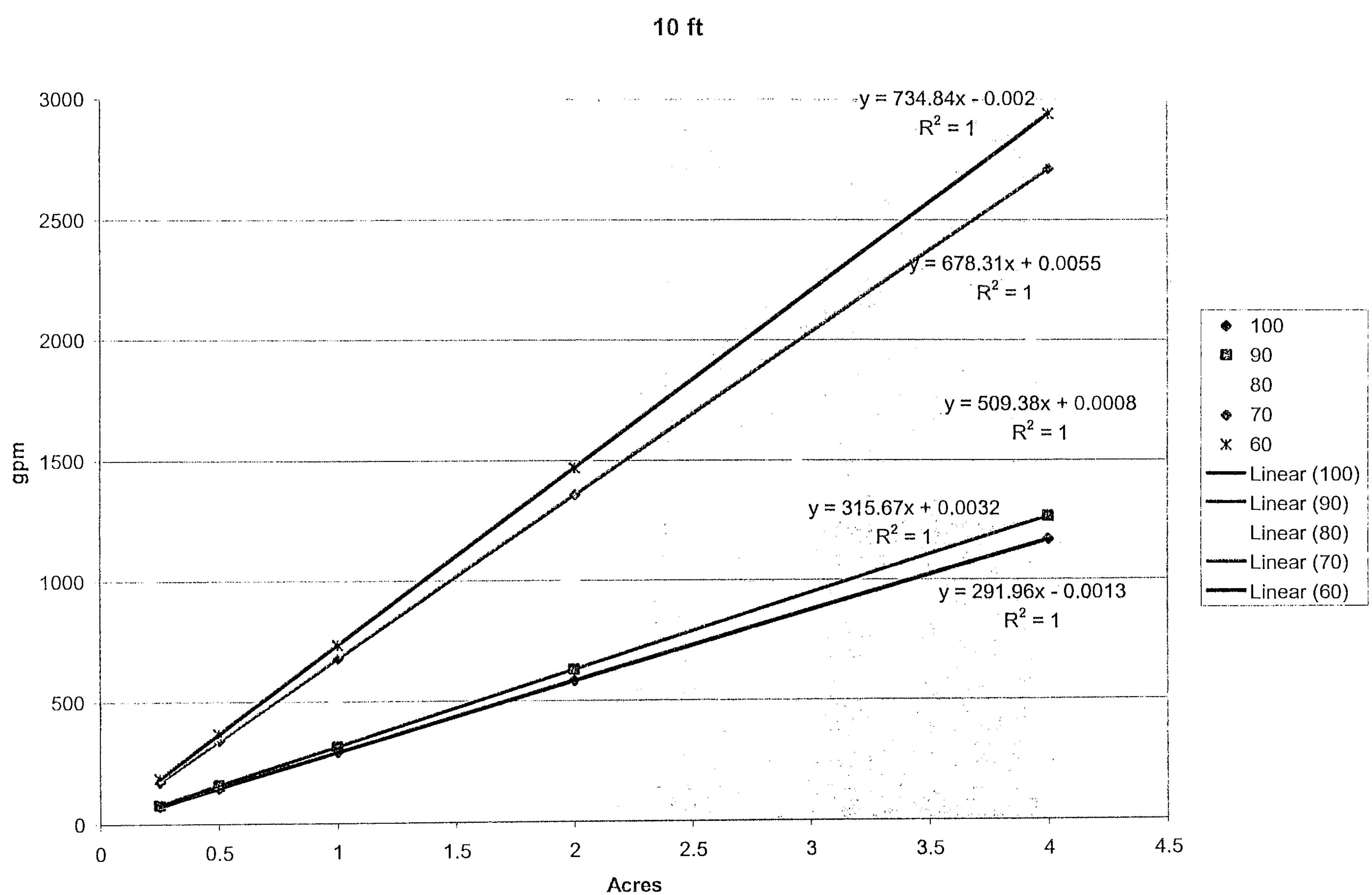
Ratio of Hydrograph Responses
y = 1.515E-08x4 - 4.141E-06x3 + 3.803E-04x2 - 1.721E-02x + 9.443E-01
R2 = 9.995E-01
y = -1.515E-08x4 + 4.141E-06x3 - 3.803E-04x2 + 1.921E-02x - 2.643E-01
R2 = 9.998E-01
y = 2.711E-20x3 + 1.030E-18x2 - 2.000E-03x + 3.200E-01
R2 = 1.000E+00
R %
CN
0
20
40
60
80
100
120
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
Series1
Series2
Series3
Poly. (Series1)
Poly. (Series3)
Poly. (Series2)

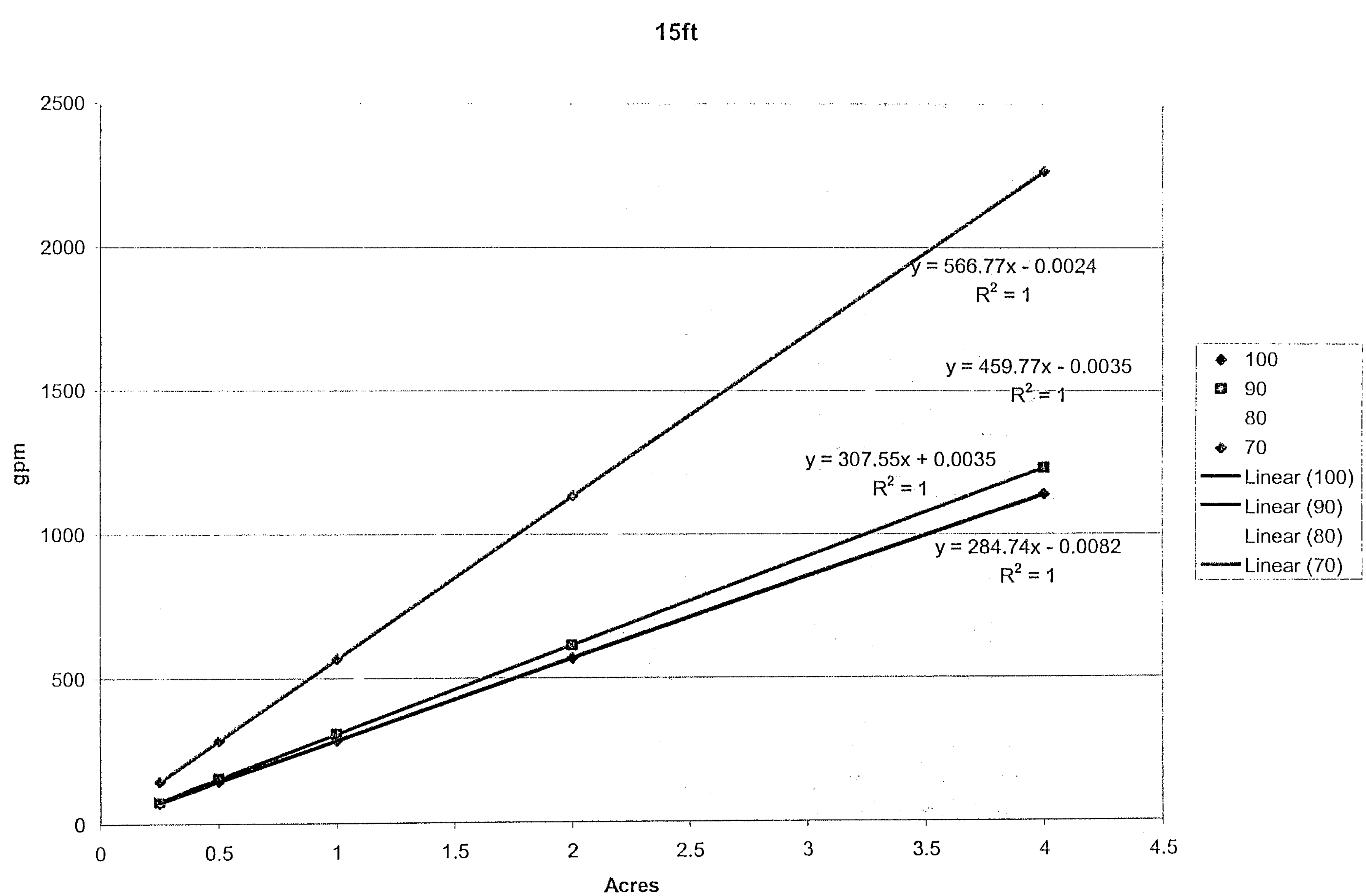
I/I FLOW DEVELOPMENT

5 ft

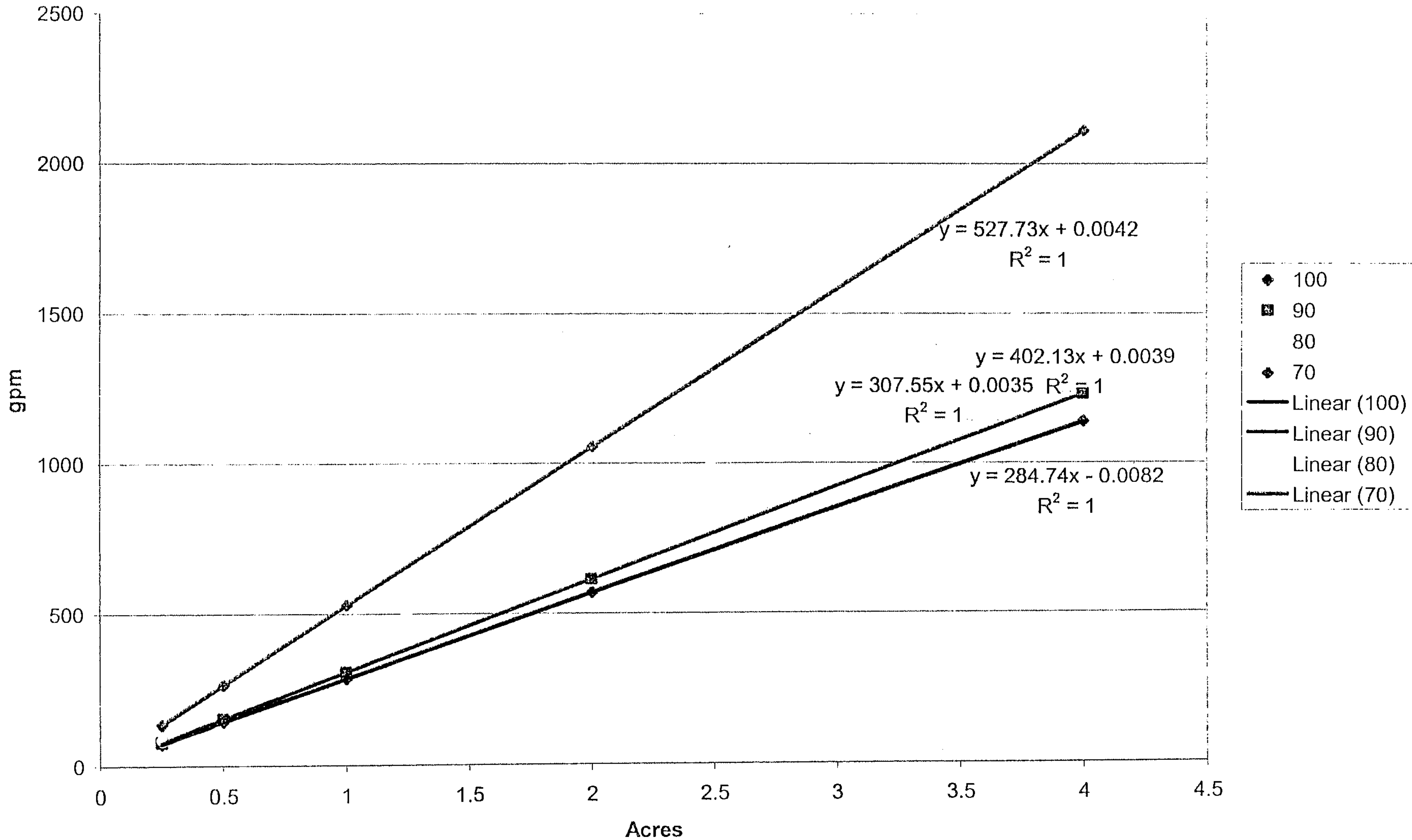


y = 690.8x + 0.0005
R^2 = 1
y = 650.43x + 0.0035
R^2 = 1
y = 378.6x + 0.0007
R^2 = 1
y = 284.74x - 0.0082
R^2 = 1
3000
2500
2000
1500
1000
500
0
gpm
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Acres
70_5
80_5
90_5
100_5
Linear (100_5)
Linear (90_5)
Linear (80_5)
Linear (70_5)


10 ft
gpm
Acres
3000
2500
2000
1500
1000
500
0
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
y = 734.84x - 0.002
R² = 1
y = 678.31x + 0.0055
R² = 1
y = 509.38x + 0.0008
R² = 1
y = 315.67x + 0.0032
R² = 1
y = 291.96x - 0.0013
R² = 1
100
90
80
70
60
Linear (100)
Linear (90)
Linear (80)
Linear (70)
Linear (60)

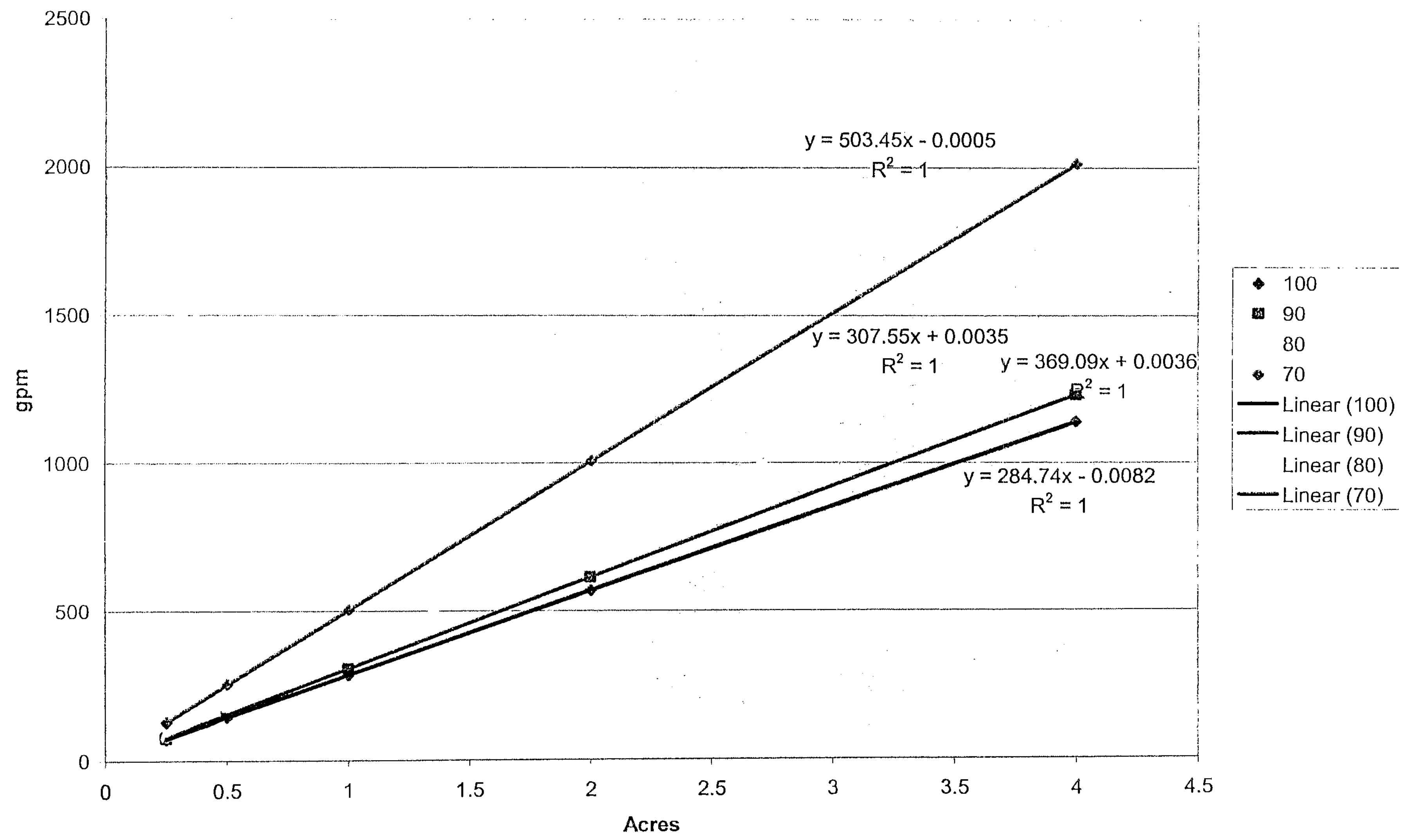

15ft
2500
2000
1500
1000
500
0
gpm
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Acres
y = 566.77x - 0.0024
R² = 1
y = 459.77x - 0.0035
R² = 1
y = 307.55x + 0.0035
R² = 1
y = 284.74x - 0.0082
R² = 1
100
90
80
70
Linear (100)
Linear (90)
Linear (80)
Linear (70)

20 ft

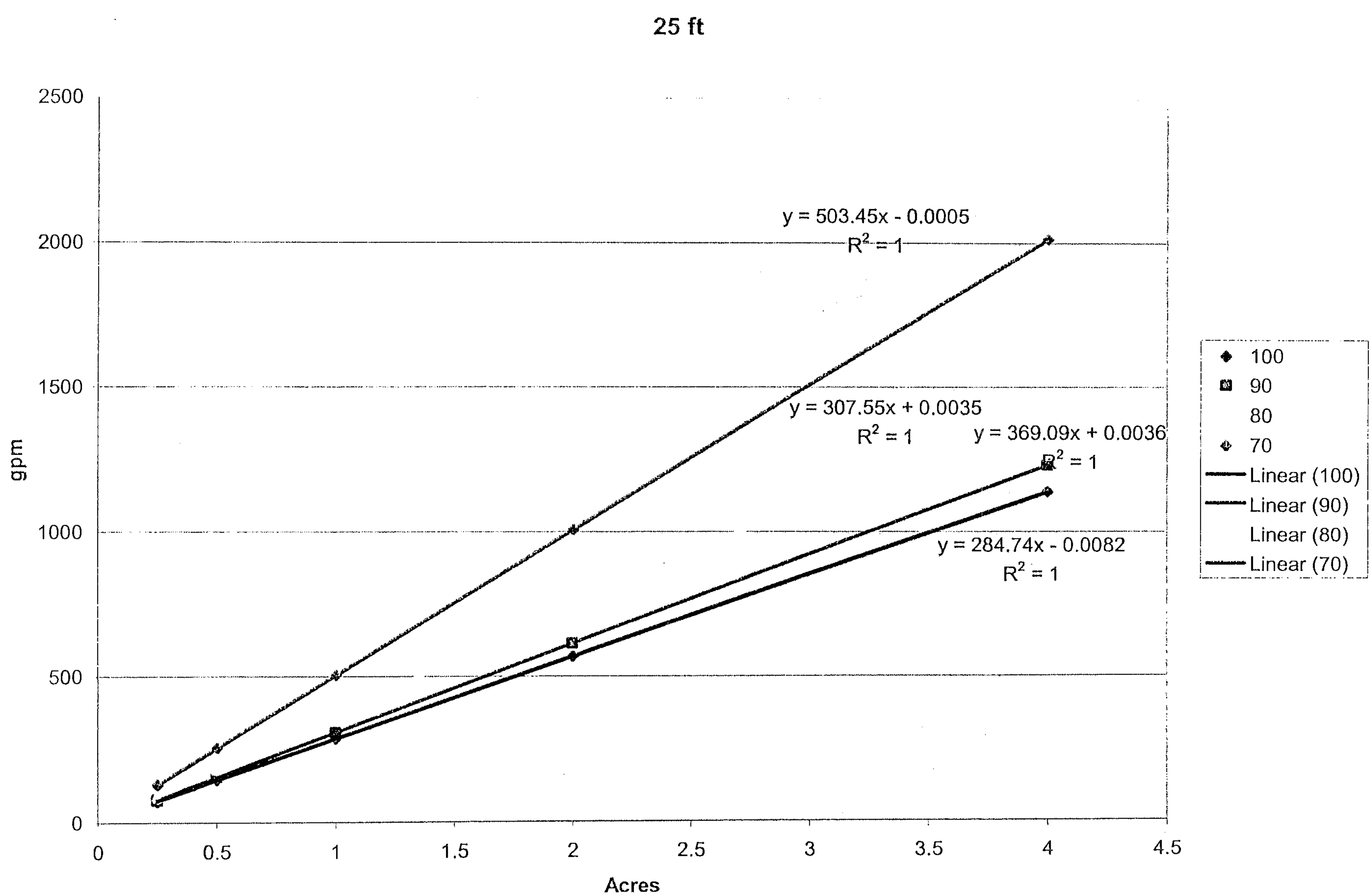


2500
2000
1500
1000
500
0
gpm
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Acres
y = 527.73x + 0.0042
$R^2 = 1$
y = 402.13x + 0.0039
y = 307.55x + 0.0035 $R^2 = 1$
$R^2 = 1$
y = 284.74x - 0.0082
$R^2 = 1$
100
90
80
70
Linear (100)
Linear (90)
Linear (80)
Linear (70)

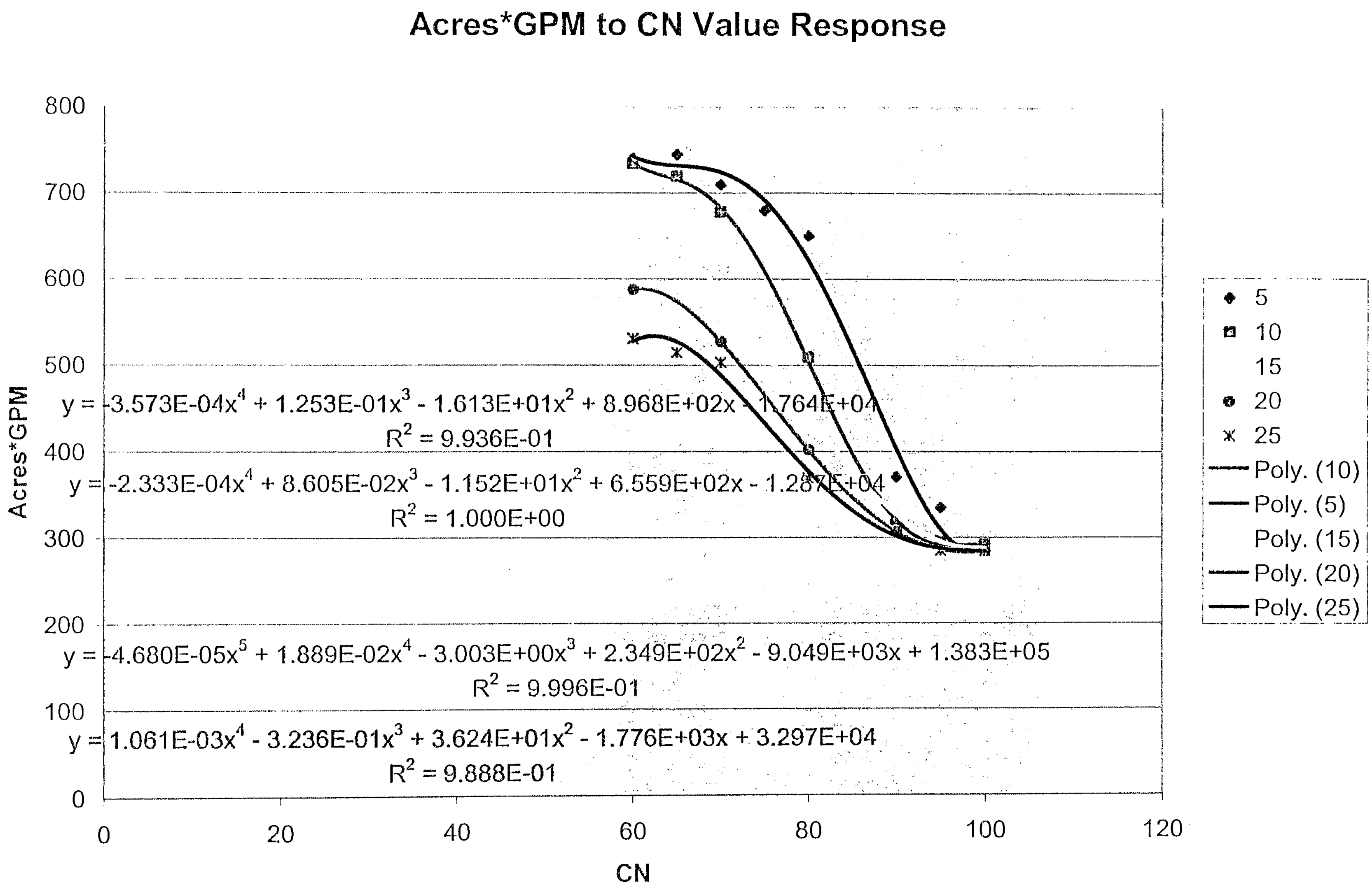
15ft



y = 503.45x - 0.0005
R2 = 1
y = 307.55x + 0.0035
R2 = 1
y = 369.09x + 0.0036
R2 = 1
y = 284.74x - 0.0082
R2 = 1
2500
2000
1500
1000
500
0
gpm
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Acres
100
90
80
70
Linear (100)
Linear (90)
Linear (80)
Linear (70)



25 ft
2500
2000
1500
1000
500
0
gpm
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Acres
y = 503.45x - 0.0005
R^2 = 1
y = 307.55x + 0.0035
R^2 = 1
y = 369.09x + 0.0036
R^2 = 1
y = 284.74x - 0.0082
R^2 = 1
100
90
80
70
Linear (100)
Linear (90)
Linear (80)
Linear (70)


Acres*GPM to CN Value Response
800
700
600
500
400
300
200
100
0
Acres*GPM
y = -3.573E-04x4 + 1.253E-01x3 - 1.613E+01x2 + 8.968E+02x - 1.764E+04
R2 = 9.936E-01
y = -2.333E-04x4 + 8.605E-02x3 - 1.152E+01x2 + 6.559E+02x - 1.287E+04
R2 = 1.000E+00
y = -4.680E-05x5 + 1.889E-02x4 - 3.003E+00x3 + 2.349E+02x2 - 9.049E+03x + 1.383E+05
R2 = 9.996E-01
y = 1.061E-03x4 - 3.236E-01x3 + 3.624E+01x2 - 1.776E+03x + 3.297E+04
R2 = 9.888E-01
0
20
40
60
80
100
120
CN
5
10
15
20
25
Poly. (10)
Poly. (5)
Poly. (15)
Poly. (20)
Poly. (25)

TM 2-6

SWMM MODEL
AND
OUTPUT

ENVIROTECH
ENGINEERING & CONSULTING, INC.

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.011)
  --------------------------------------------------------------

  BASIN 1A SANITARY SEWER HYDRAULIC ANALYSIS: 1YR PRECIP.
  XYS=BAS1A.XYS
  ******************************

  ****************
  Analysis Options
  ****************
  Flow Units ............... GPM
  Infiltration Method ...... CURVE_NUMBER
  Flow Routing Method ...... KINWAVE
  Starting Date ............ JAN-01-2008 00:00:00
  Ending Date .............. JAN-04-2008 12:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Wet Time Step ............ 00:01:00
  Dry Time Step ............ 00:03:00
  Routing Time Step ........ 30.00 sec


  *************
  Element Count
  *************
  Number of rain gages ...... 1
  Number of subcatchments ... 125
  Number of nodes ........... 952
  Number of links ........... 961
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                           Data          Interval
  Name                Data Source          Type            hours
  ----------------------------------------------------------------
  CurrentRainEvent    Event1               INTENSITY        1.00


  ********************
  Subcatchment Summary
  ********************
  Name                         Area     Width   %Imperv    %Slope    Rain
Gage             Outlet

-----------------------------------------------------------------------
-------------------------------
  Basin1A1                   131.06    100.00     10.00    1.0000
CurrentRainEvent     (1A)007
  Basin1A2                   128.75    400.00     85.00    0.3000
CurrentRainEvent     (1A)014
  Basin1A3                    94.48     80.00     75.00    5.0000
CurrentRainEvent     (1A)027
  Basin1B1                    38.00    690.00     40.00    1.2000
CurrentRainEvent     (1B)009
  Basin1B2                    51.57    720.00     65.00    2.7000
CurrentRainEvent     (1B)005
  Basin1B3                   134.29    745.00     65.00    0.7900
```

CurrentRainEvent	(1B)014			
Basin1B4	66.24	620.00	65.00	0.3700
CurrentRainEvent	(1B)014			
Basin1C1	83.53	1020.00	60.00	2.8000
CurrentRainEvent	(1C)001A			
Basin1C1A	66.82	602.00	60.00	0.5100
CurrentRainEvent	(1C)015D			
Basin1C1B	69.72	901.00	55.00	0.9500
CurrentRainEvent	(1C)021B			
Basin1C1C	89.15	888.00	50.00	0.9100
CurrentRainEvent	(1C)021			
Basin1C1D	76.49	692.00	35.00	0.5100
CurrentRainEvent	(1C)028			
Basin1C2	59.50	938.00	65.00	0.6250
CurrentRainEvent	(1C)179			
Basin1C3	67.00	820.00	60.00	1.8000
CurrentRainEvent	(1C)178			
Basin1C4	62.19	750.00	60.00	1.0200
CurrentRainEvent	(1C)182			
Basin1D1	56.18	760.00	35.00	1.0900
CurrentRainEvent	(1D)005			
Basin1D2	50.46	843.00	55.00	0.8600
CurrentRainEvent	(1D)014			
Basin1D3	108.15	827.00	60.00	1.2000
CurrentRainEvent	(1D)018			
Basin1D4	95.17	850.00	50.00	0.6600
CurrentRainEvent	(1D)023			
Basin1E1	44.37	720.00	10.00	5.5000
CurrentRainEvent	(1E)003A			
Basin1E2	55.58	860.00	55.00	1.1000
CurrentRainEvent	(1E)009			
Basin1F1	193.54	1260.00	40.00	0.7500
CurrentRainEvent	(1F)004			
Basin1F2	52.03	980.00	20.00	2.5800
CurrentRainEvent	(1F)010			
Basin1F3	90.99	942.00	50.00	1.0500
CurrentRainEvent	(1J)011			
Basin1F4	71.78	1280.00	60.00	0.4500
CurrentRainEvent	(1F)017A			
Basin1F5	71.35	945.00	85.00	1.3700
CurrentRainEvent	(1F)021			
Basin1G1	46.72	420.00	80.00	0.3810
CurrentRainEvent	(1G)002			
Basin1G2	179.88	1050.00	60.00	0.6250
CurrentRainEvent	(1G)003			
Basin1G3	93.49	1524.00	60.00	1.1000
CurrentRainEvent	(1G)009B			
Basin1G4	143.49	1250.00	65.00	0.3400
CurrentRainEvent	(1G)053			
Basin1G5	173.22	840.00	55.00	0.3200
CurrentRainEvent	(1G)046			
Basin1G6	73.99	1100.00	55.00	0.2800
CurrentRainEvent	(1G)071			
Basin1G8	97.06	1400.00	50.00	0.3600
CurrentRainEvent	(1G)020			
Basin1G9	77.69	456.00	35.00	0.2100
CurrentRainEvent	(1G)020			
Basin1H1	165.29	766.00	70.00	0.6030
CurrentRainEvent	(1H)043			
Basin1I1	137.86	684.00	70.00	0.4000
CurrentRainEvent	(1H)011			

Basin1J1	145.34	845.00	75.00	0.5000
CurrentRainEvent	(1J)053			
Basin1J2	42.03	621.00	65.00	0.8100
CurrentRainEvent	(1K)001			
Basin1K1	70.39	677.00	60.00	0.4700
CurrentRainEvent	(1K)004			
Basin1K2	70.33	420.00	40.00	0.8500
CurrentRainEvent	(1K)008			
Basin1K3	170.81	920.00	50.00	0.7200
CurrentRainEvent	(1K)014			
Basin1K4	84.05	1089.00	60.00	0.4000
CurrentRainEvent	(2E)014			
Basin1M1	59.94	981.00	30.00	1.8000
CurrentRainEvent	(1M)003			
Basin1M2	58.49	1026.00	35.00	0.9000
CurrentRainEvent	(1M)281B			
Basin1M3	89.58	774.00	55.00	0.5400
CurrentRainEvent	(1M)094			
Basin1M4	85.10	1148.00	55.00	1.0000
CurrentRainEvent	(1M)122			
Basin1M5	172.56	1073.00	30.00	0.3500
CurrentRainEvent	(1M)165			
Basin1M6	61.75	936.00	70.00	0.8850
CurrentRainEvent	(1M)162			
Basin1N1	88.52	966.00	50.00	0.5950
CurrentRainEvent	(1M)286A			
Basin1N2	72.03	1200.00	60.00	0.4500
CurrentRainEvent	(1N)013			
Basin1N3	55.41	1146.00	35.00	0.5200
CurrentRainEvent	(1N)022			
Basin1N4	155.89	1168.00	20.00	0.3200
CurrentRainEvent	(1N)025			
Basin1N5	25.71	644.00	50.00	0.2800
CurrentRainEvent	(1N)047			
Basin1N6	184.98	1412.00	55.00	0.4100
CurrentRainEvent	(1N)047			
Basin1N7	219.38	1628.00	20.00	0.5200
CurrentRainEvent	(1N)047			
Basin1N8	26.64	528.00	60.00	0.4000
CurrentRainEvent	(1N)022			
Basin1O1	249.68	1975.00	55.00	0.2800
CurrentRainEvent	(1O)305			
Basin1O2	79.92	925.00	20.00	0.6000
CurrentRainEvent	(1O)308			
Basin1O3	111.70	1524.00	60.00	0.8400
CurrentRainEvent	(1O)309			
Basin1O4	174.04	994.00	35.00	0.7100
CurrentRainEvent	(1O)157			
Basin1O5	75.94	920.00	55.00	0.2100
CurrentRainEvent	(1O)157			
Basin1P1	291.60	3120.00	20.00	0.9600
CurrentRainEvent	(1P)009			
Basin1P2	76.39	1129.00	25.00	0.6000
CurrentRainEvent	(1P)043			
Basin1P3	180.59	1324.00	20.00	0.8900
CurrentRainEvent	(1P)043			
Basin2A1	55.28	882.00	7.00	0.8500
CurrentRainEvent	(2A)014			
Basin2A2	160.41	496.00	2.00	0.7400
CurrentRainEvent	(2A)048			
Basin2B1	63.53	700.00	55.00	2.7000

CurrentRainEvent	(2A)017			
Basin2B2	65.39	760.00	60.00	2.4000
CurrentRainEvent	(2A)020			
Basin2B3	119.54	980.00	60.00	1.2000
CurrentRainEvent	(2A)020			
Basin2C1	72.70	1572.00	45.00	2.7300
CurrentRainEvent	(2C)003			
Basin2C2	32.43	657.00	35.00	4.3300
CurrentRainEvent	(2C)009			
Basin2C3	114.70	1609.00	55.00	0.5500
CurrentRainEvent	(2E)003			
Basin2D1	34.78	960.00	1.00	0.6360
CurrentRainEvent	(2D)003			
Basin2D2	315.07	2542.00	60.00	0.8000
CurrentRainEvent	(2D)011			
Basin2D3	257.89	1271.00	2.00	1.6900
CurrentRainEvent	(2D)251			
Basin2D4	75.74	1465.00	65.00	0.7800
CurrentRainEvent	(2D)045A			
Basin2D5	152.22	1363.00	35.00	0.6500
CurrentRainEvent	(2D)046A			
Basin2E1	12.18	124.00	100.00	0.8700
CurrentRainEvent	(2A)064			
Basin2E2	12.18	124.00	10.00	0.8700
CurrentRainEvent	(2E)003			
Basin2F1	42.90	765.00	40.00	0.5200
CurrentRainEvent	(2F)004			
Basin2F2	121.92	1406.00	65.00	0.4000
CurrentRainEvent	(2F)010			
Basin2F3	60.13	984.00	40.00	0.6000
CurrentRainEvent	(2F)023			
Basin2F4	21.09	571.00	35.00	0.6500
CurrentRainEvent	(2F)011			
Basin2F5	81.00	859.00	45.00	0.5400
CurrentRainEvent	(2F)025			
Basin2G1	63.27	1421.00	70.00	0.8000
CurrentRainEvent	(2G)002			
Basin2G2	267.45	2108.00	70.00	0.7100
CurrentRainEvent	(2G)040			
Basin2G3	87.80	1512.00	90.00	0.4760
CurrentRainEvent	(2G)009			
Basin2G4	158.63	2019.00	65.00	0.6700
CurrentRainEvent	(2G)019			
Basin2G5	83.08	1633.00	60.00	0.8170
CurrentRainEvent	(2G)026			
Basin2G6	191.80	1938.00	35.00	0.7540
CurrentRainEvent	(2G)359			
Basin2H10	36.16	734.00	50.00	1.0700
CurrentRainEvent	(2H)058			
Basin2H2	52.66	1074.00	30.00	0.6520
CurrentRainEvent	(2H)007			
Basin2H3	136.95	1518.00	40.00	1.2500
CurrentRainEvent	(2H)012			
Basin2H4	141.76	1331.00	35.00	1.4600
CurrentRainEvent	(2H)012			
Basin2H5	30.19	1904.00	50.00	1.6000
CurrentRainEvent	(2H)013			
Basin2H6	30.49	645.00	25.00	0.4500
CurrentRainEvent	(2H)033			
Basin2H7	54.59	1264.00	50.00	0.8560
CurrentRainEvent	(2H)049			

Basin2H8	88.81	1519.00	50.00	0.6400
CurrentRainEvent	(2H)286			
Basin2H9	56.11	624.00	10.00	0.7200
CurrentRainEvent	(2H)290			
Basin2I1	54.75	1223.00	40.00	1.3100
CurrentRainEvent	(2I)003			
Basin2I10	64.12	1345.00	55.00	0.5780
CurrentRainEvent	(2I)054			
Basin2I11	90.68	1434.00	50.00	1.6500
CurrentRainEvent	(2I)059			
Basin2I2	31.78	998.00	45.00	0.7400
CurrentRainEvent	(2I)001			
Basin2I3	12.37	520.00	50.00	1.0700
CurrentRainEvent	(2I)008			
Basin2I4	51.47	1219.00	40.00	1.0200
CurrentRainEvent	(2I)014			
Basin2I5	88.64	1518.00	50.00	1.2000
CurrentRainEvent	(2I)020			
Basin2I6	161.34	2820.00	45.00	0.8500
CurrentRainEvent	(2I)025A			
Basin2I7	14.57	498.00	55.00	0.9500
CurrentRainEvent	(2I)021B			
Basin2I8	59.00	1140.00	50.00	1.1400
CurrentRainEvent	(2I)029			
Basin2I9	123.07	2708.00	45.00	0.8700
CurrentRainEvent	(2I)049			
Basin2J1	37.17	1245.00	90.00	0.4000
CurrentRainEvent	(2J)008			
Basin2J2	79.20	1159.00	65.00	0.6650
CurrentRainEvent	(2J)047			
Basin2J3	195.63	2624.00	70.00	0.0800
CurrentRainEvent	(2J)056			
Basin2J4	63.78	739.00	65.00	1.3000
CurrentRainEvent	(2J)026			
Basin2J5	44.99	835.00	65.00	1.7400
CurrentRainEvent	(2J)029			
Basin2J6	37.15	920.00	50.00	0.8700
CurrentRainEvent	(2J)032			
Basin2K1	79.62	1672.00	30.00	0.3100
CurrentRainEvent	(2K)317			
Basin2K2	50.15	740.00	50.00	1.4000
CurrentRainEvent	(2K)013			
Basin2K3	36.20	704.00	40.00	1.4000
CurrentRainEvent	(2K)019			
Basin2K4	57.59	845.00	45.00	1.2000
CurrentRainEvent	(2K)014			
Basin2K5	69.66	1017.00	50.00	1.1000
CurrentRainEvent	(2K)025			
Basin2K6	159.22	1602.00	45.00	1.2000
CurrentRainEvent	(2K)029			
Basin2K7	48.17	1289.00	45.00	0.8700
CurrentRainEvent	(2K)033			
Basin2K8	82.62	1780.00	25.00	1.2000
CurrentRainEvent	(2K)042			
Basin2K9	229.15	3100.00	25.00	1.1000
CurrentRainEvent	(2K)052			

****
Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
(1A)000	JUNCTION	1147.49	10.15	0.0	
(1A)000A	JUNCTION	1148.49	10.47	0.0	
(1A)000B	JUNCTION	1149.40	7.55	0.0	
(1A)001	JUNCTION	1149.55	6.74	0.0	Yes
(1A)002	JUNCTION	1149.66	6.55	0.0	
(1A)003	JUNCTION	1150.86	7.10	0.0	
(1A)004	JUNCTION	1151.49	7.41	0.0	Yes
(1A)005	JUNCTION	1152.36	9.12	0.0	
(1A)006	JUNCTION	1154.35	9.41	0.0	
(1A)007	JUNCTION	1156.40	7.83	0.0	Yes
(1A)008	JUNCTION	1158.45	9.50	0.0	
(1A)009	JUNCTION	1159.30	9.00	0.0	
(1A)010	JUNCTION	1161.15	6.85	0.0	
(1A)011	JUNCTION	1161.40	7.50	0.0	
(1A)012	JUNCTION	1161.75	3.95	0.0	
(1A)013	JUNCTION	1162.72	10.33	0.0	
(1A)014	JUNCTION	1163.35	3.58	0.0	Yes
(1A)015	JUNCTION	1164.20	12.42	0.0	Yes
(1A)016	JUNCTION	1165.05	21.79	0.0	
(1A)017	JUNCTION	1165.63	13.58	0.0	
(1A)018	JUNCTION	1166.65	13.04	0.0	
(1A)019	JUNCTION	1166.75	11.75	0.0	
(1A)020	JUNCTION	1168.08	12.95	0.0	
(1A)021	JUNCTION	1169.85	10.15	0.0	
(1A)022	JUNCTION	1171.98	8.15	0.0	
(1A)023	JUNCTION	1173.48	6.27	0.0	Yes
(1A)024	JUNCTION	1175.63	6.41	0.0	
(1A)024A	JUNCTION	1176.10	8.06	0.0	
(1A)025	JUNCTION	1177.78	6.43	0.0	
(1A)026	JUNCTION	1179.98	13.58	0.0	Yes
(1A)027	JUNCTION	1181.71	18.54	0.0	Yes
(1A)028	JUNCTION	1182.25	8.75	0.0	
(1A)029	JUNCTION	1182.97	11.21	0.0	
(1A)030	JUNCTION	1183.48	17.42	0.0	
(1A)031	JUNCTION	1184.51	11.73	0.0	
(1A)032	JUNCTION	1185.30	21.91	0.0	
(1A)033	JUNCTION	1186.13	19.58	0.0	
(1A)034	JUNCTION	1186.60	9.66	0.0	
(1A)035	JUNCTION	1187.51	11.75	0.0	
(1A)035A	JUNCTION	1187.96	6.54	0.0	
(1A)036	JUNCTION	1188.41	4.80	0.0	
(1A)037	JUNCTION	1189.24	11.11	0.0	
(1A)038	JUNCTION	1189.48	11.16	0.0	
(1A)039	JUNCTION	1190.43	10.29	0.0	
(1A)040	JUNCTION	1191.09	10.91	0.0	
(1A)041	JUNCTION	1191.43	14.50	0.0	

(1A)042	JUNCTION	1192.10	13.90	0.0
Yes				
(1B)001	JUNCTION	1177.46	5.91	0.0
(1B)002	JUNCTION	1178.32	13.24	0.0
(1B)003	JUNCTION	1179.43	10.07	0.0
(1B)004	JUNCTION	1179.50	11.00	0.0
(1B)005	JUNCTION	1181.13	9.87	0.0
Yes				
(1B)006	JUNCTION	1182.17	13.68	0.0
(1B)009	JUNCTION	1182.83	18.33	0.0
Yes				
(1B)010	JUNCTION	1185.43	22.63	0.0
Yes				
(1B)011	JUNCTION	1186.63	10.00	0.0
(1B)013	JUNCTION	1187.94	14.57	0.0
(1B)014	JUNCTION	1189.14	15.35	0.0
Yes				
(1C)001	JUNCTION	1189.67	17.11	0.0
Yes				
(1C)001A	JUNCTION	1190.63	13.37	0.0
(1C)001C	JUNCTION	1197.00	9.32	0.0
(1C)001D	JUNCTION	1197.78	15.70	0.0
(1C)001E	JUNCTION	1200.96	8.31	0.0
(1C)001F	JUNCTION	1203.51	8.86	0.0
(1C)001G	JUNCTION	1192.50	12.10	0.0
(1C)002	JUNCTION	1197.77	10.08	0.0
Yes				
(1C)003	JUNCTION	1198.02	4.87	0.0
Yes				
(1C)004	JUNCTION	1199.20	8.06	0.0
Yes				
(1C)005	JUNCTION	1199.21	6.29	0.0
(1C)006	JUNCTION	1200.19	6.50	0.0
Yes				
(1C)006A	JUNCTION	1201.52	9.41	0.0
(1C)007	JUNCTION	1201.72	9.71	0.0
Yes				
(1C)009	JUNCTION	1204.48	7.66	0.0
(1C)010	JUNCTION	1206.53	12.73	0.0
(1C)011	JUNCTION	1207.35	12.45	0.0
(1C)012	JUNCTION	1213.57	11.50	0.0
(1C)015A	JUNCTION	1207.53	12.27	0.0
Yes				
(1C)015B	JUNCTION	1210.11	13.16	0.0
(1C)015C	JUNCTION	1211.45	6.82	0.0
(1C)015D	JUNCTION	1213.01	12.75	0.0
Yes				
(1C)016	JUNCTION	1214.45	13.65	0.0
Yes				
(1C)016A	JUNCTION	1215.24	17.31	0.0
Yes				
(1C)016B	JUNCTION	1216.58	12.15	0.0
(1C)016C	JUNCTION	1217.91	16.94	0.0
(1C)017	JUNCTION	1217.62	9.75	0.0
(1C)018	JUNCTION	1219.18	13.83	0.0
(1C)019	JUNCTION	1220.23	14.75	0.0
Yes				
(1C)020	JUNCTION	1221.53	10.00	0.0
Yes				
(1C)021	JUNCTION	1220.22	10.58	0.0
(1C)021A	JUNCTION	1220.98	15.62	0.0

(1C)021B	JUNCTION	1221.82	17.83	0.0	Yes
(1C)021C	JUNCTION	1222.98	16.12	0.0	
(1C)021D	JUNCTION	1223.96	14.88	0.0	
(1C)022	JUNCTION	1222.93	11.50	0.0	Yes
(1C)023	JUNCTION	1224.25	11.08	0.0	
(1C)024	JUNCTION	1225.16	11.96	0.0	Yes
(1C)025	JUNCTION	1225.56	12.67	0.0	
(1C)027	JUNCTION	1227.94	11.62	0.0	Yes
(1C)028	JUNCTION	1229.01	10.71	0.0	Yes
(1C)041	JUNCTION	1203.83	8.89	0.0	Yes
(1C)176	JUNCTION	1200.93	12.83	0.0	Yes
(1C)177	JUNCTION	1203.93	12.58	0.0	Yes
(1C)178	JUNCTION	1207.12	14.25	0.0	Yes
(1C)179	JUNCTION	1210.13	17.25	0.0	Yes
(1C)179A	JUNCTION	1210.23	17.55	0.0	
(1C)180	JUNCTION	1213.24	14.92	0.0	Yes
(1C)180A	JUNCTION	1216.23	17.29	0.0	Yes
(1C)181	JUNCTION	1219.17	13.22	0.0	Yes
(1C)182	JUNCTION	1220.72	12.00	0.0	Yes
(1D)001	JUNCTION	1172.98	8.92	0.0	Yes
(1D)002	JUNCTION	1174.79	11.32	0.0	
(1D)003	JUNCTION	1176.34	12.82	0.0	
(1D)004	JUNCTION	1181.16	8.92	0.0	
(1D)005	JUNCTION	1183.10	8.08	0.0	Yes
(1D)006	JUNCTION	1185.15	7.67	0.0	
(1D)007	JUNCTION	1188.98	6.25	0.0	
(1D)008	JUNCTION	1192.99	12.83	0.0	
(1D)009	JUNCTION	1194.68	12.20	0.0	
(1D)010	JUNCTION	1195.50	13.04	0.0	
(1D)011	JUNCTION	1196.22	7.04	0.0	
(1D)012	JUNCTION	1197.04	11.51	0.0	Yes
(1D)013	JUNCTION	1204.18	15.08	0.0	
(1D)014	JUNCTION	1205.83	6.35	0.0	Yes
(1D)015	JUNCTION	1207.25	9.46	0.0	Yes
(1D)016	JUNCTION	1208.23	10.29	0.0	Yes
(1D)017	JUNCTION	1209.21	9.75	0.0	Yes
(1D)018	JUNCTION	1210.19	13.83	0.0	Yes
(1D)019	JUNCTION	1211.19	14.45	0.0	
(1D)020	JUNCTION	1212.14	16.45	0.0	

					Yes
(1D)021	JUNCTION	1213.10	17.21	0.0	Yes
(1D)022	JUNCTION	1214.12	16.91	0.0	Yes
(1D)023	JUNCTION	1215.10	14.72	0.0	Yes
(1E)001	JUNCTION	1191.96	9.12	0.0	
(1E)002	JUNCTION	1193.20	7.50	0.0	
(1E)003	JUNCTION	1194.72	6.75	0.0	
(1E)003A	JUNCTION	1196.00	5.91	0.0	
(1E)005	JUNCTION	1197.60	10.95	0.0	Yes
(1E)006	JUNCTION	1199.00	26.26	0.0	
(1E)007	JUNCTION	1200.04	27.04	0.0	
(1E)008	JUNCTION	1201.70	10.00	0.0	
(1E)009	JUNCTION	1202.53	7.81	0.0	Yes
(1F)001	JUNCTION	1195.23	17.39	0.0	Yes
(1F)003	JUNCTION	1199.20	28.61	0.0	Yes
(1F)004	JUNCTION	1199.78	9.94	0.0	Yes
(1F)005	JUNCTION	1199.88	6.43	0.0	
(1F)006	JUNCTION	1200.11	6.80	0.0	Yes
(1F)008	JUNCTION	1200.42	7.39	0.0	Yes
(1F)008A	JUNCTION	1200.54	7.27	0.0	
(1F)009	JUNCTION	1200.64	8.38	0.0	Yes
(1F)010	JUNCTION	1200.81	7.96	0.0	Yes
(1F)011	JUNCTION	1201.45	7.27	0.0	Yes
(1F)012A	JUNCTION	1202.47	10.15	0.0	
(1F)013	JUNCTION	1203.80	12.34	0.0	Yes
(1F)014	JUNCTION	1203.90	13.03	0.0	
(1F)015	JUNCTION	1204.98	11.22	0.0	
(1F)016	JUNCTION	1205.75	12.60	0.0	Yes
(1F)017	JUNCTION	1200.94	14.56	0.0	
(1F)017A	JUNCTION	1201.33	17.37	0.0	Yes
(1F)017B	JUNCTION	1201.48	18.52	0.0	
(1F)017C	JUNCTION	1201.83	12.17	0.0	Yes
(1F)017D	JUNCTION	1201.95	14.25	0.0	
(1F)017E	JUNCTION	1202.33	10.67	0.0	
(1F)017F	JUNCTION	1203.20	9.20	0.0	
(1F)017G	JUNCTION	1206.11	5.41	0.0	Yes
(1F)018	JUNCTION	1207.14	7.34	0.0	Yes
(1F)019	JUNCTION	1207.88	8.75	0.0	
(1F)020	JUNCTION	1210.44	9.83	0.0	
(1F)021	JUNCTION	1212.29	8.00	0.0	Yes
(1F)022	JUNCTION	1213.80	9.00	0.0	

(1F)023	JUNCTION	1214.89	10.58	0.0
(1F)024	JUNCTION	1221.63	12.10	0.0
(1F)025	JUNCTION	1227.07	11.13	0.0
Yes				
(1F)026	JUNCTION	1233.06	11.31	0.0
(1F)026A	JUNCTION	1233.63	10.37	0.0
Yes				
(1F)027	JUNCTION	1234.23	10.77	0.0
Yes				
(1F)028	JUNCTION	1234.74	10.26	0.0
Yes				
(1F)029	JUNCTION	1235.33	11.17	0.0
(1F)029A	JUNCTION	1235.93	10.07	0.0
(1F)030	JUNCTION	1236.67	9.83	0.0
Yes				
(1G)001	JUNCTION	1203.21	14.39	0.0
Yes				
(1G)001A	JUNCTION	1203.60	14.91	0.0
(1G)002	JUNCTION	1204.07	15.43	0.0
Yes				
(1G)003	JUNCTION	1204.34	17.96	0.0
Yes				
(1G)004	JUNCTION	1204.67	17.93	0.0
(1G)005	JUNCTION	1205.17	16.83	0.0
Yes				
(1G)006	JUNCTION	1205.27	18.23	0.0
(1G)007	JUNCTION	1205.65	18.95	0.0
(1G)008A	JUNCTION	1206.37	17.13	0.0
Yes				
(1G)008B	JUNCTION	1207.27	16.46	0.0
(1G)008C	JUNCTION	1207.65	18.85	0.0
Yes				
(1G)009A	JUNCTION	1208.02	18.48	0.0
Yes				
(1G)009B	JUNCTION	1208.47	18.23	0.0
(1G)009C	JUNCTION	1208.92	23.78	0.0
Yes				
(1G)009D	JUNCTION	1208.98	23.62	0.0
(1G)009E	JUNCTION	1209.23	22.47	0.0
(1G)010	JUNCTION	1209.71	21.79	0.0
Yes				
(1G)011	JUNCTION	1210.07	19.53	0.0
(1G)012	JUNCTION	1210.60	18.40	0.0
Yes				
(1G)013	JUNCTION	1211.10	19.90	0.0
(1G)014	JUNCTION	1219.94	8.46	0.0
Yes				
(1G)014A	JUNCTION	1220.58	12.00	0.0
(1G)015	JUNCTION	1221.70	12.00	0.0
(1G)016	JUNCTION	1222.48	10.37	0.0
Yes				
(1G)017	JUNCTION	1223.20	11.51	0.0
(1G)018	JUNCTION	1224.02	13.08	0.0
Yes				
(1G)018A	JUNCTION	1224.19	14.08	0.0
(1G)020	JUNCTION	1225.79	12.75	0.0
Yes				
(1G)045	JUNCTION	1227.75	12.50	0.0
Yes				
(1G)046	JUNCTION	1228.74	12.54	0.0
(1G)047	JUNCTION	1229.09	10.39	0.0

Yes				
(1G)048	JUNCTION	1230.30	9.50	0.0
(1G)049	JUNCTION	1230.86	8.76	0.0
(1G)050	JUNCTION	1231.25	8.50	0.0
(1G)051	JUNCTION	1231.67	8.62	0.0
(1G)052	JUNCTION	1232.08	8.50	0.0
(1G)053	JUNCTION	1232.91	8.50	0.0
(1G)054	JUNCTION	1233.71	8.50	0.0
(1G)055	JUNCTION	1234.52	8.50	0.0
(1G)056	JUNCTION	1235.32	9.00	0.0
(1G)057	JUNCTION	1237.14	9.00	0.0
(1G)058	JUNCTION	1238.97	9.00	0.0
(1G)059	JUNCTION	1240.68	9.00	0.0
(1G)060	JUNCTION	1240.82	10.00	0.0
(1G)061	JUNCTION	1242.52	10.00	0.0
(1G)062	JUNCTION	1244.52	10.00	0.0
(1G)063	JUNCTION	1244.88	10.00	0.0
(1G)064	JUNCTION	1247.02	10.15	0.0
(1G)065	JUNCTION	1248.49	10.15	0.0
(1G)066	JUNCTION	1249.44	10.15	0.0
(1G)067	JUNCTION	1251.15	10.15	0.0
(1G)068	JUNCTION	1253.26	10.15	0.0
(1G)069	JUNCTION	1255.78	10.15	0.0
(1G)070	JUNCTION	1257.94	10.15	0.0
(1G)071	JUNCTION	1259.60	10.15	0.0
(1G)146	JUNCTION	1204.48	16.00	0.0
(1G)146A	JUNCTION	1204.74	17.00	0.0
(1G)162	JUNCTION	1217.52	15.00	0.0
Yes				
(1G)162A	JUNCTION	1218.46	15.00	0.0
(1G)162B	JUNCTION	1219.16	14.50	0.0
(1G)162C	JUNCTION	1219.99	14.00	0.0
(1G)162D	JUNCTION	1215.93	14.32	0.0
(1G)243	JUNCTION	1229.12	12.50	0.0
(1H)001	JUNCTION	1215.96	10.00	0.0
Yes				
(1H)004	JUNCTION	1218.26	9.00	0.0
(1H)005	JUNCTION	1218.28	9.73	0.0
(1H)006	JUNCTION	1219.78	9.23	0.0
(1H)007	JUNCTION	1220.69	11.27	0.0
(1H)008	JUNCTION	1221.86	15.97	0.0
(1H)009	JUNCTION	1222.00	10.60	0.0
Yes				
(1H)010	JUNCTION	1222.39	12.27	0.0
(1H)011	JUNCTION	1223.00	12.00	0.0
Yes				
(1H)038	JUNCTION	1218.81	7.92	0.0
Yes				
(1H)039	JUNCTION	1224.03	13.60	0.0
(1H)040	JUNCTION	1228.46	9.17	0.0
(1H)041	JUNCTION	1229.00	9.00	0.0
(1H)042	JUNCTION	1230.85	10.53	0.0
(1H)043	JUNCTION	1231.34	10.11	0.0
Yes				
(1H)044	JUNCTION	1232.62	9.40	0.0
Yes				
(1H)045	JUNCTION	1233.56	9.50	0.0
Yes				
(1J)001	JUNCTION	1192.96	25.54	0.0
(1J)002	JUNCTION	1194.02	28.98	0.0
(1J)003	JUNCTION	1194.78	17.52	0.0

Yes				
(1J)004	JUNCTION	1195.54	17.26	0.0
(1J)005	JUNCTION	1196.30	16.90	0.0
(1J)006	JUNCTION	1197.02	8.18	0.0
Yes				
(1J)007	JUNCTION	1197.52	6.68	0.0
(1J)008	JUNCTION	1197.85	9.55	0.0
(1J)009	JUNCTION	1198.23	10.77	0.0
(1J)010	JUNCTION	1198.82	13.18	0.0
(1J)011	JUNCTION	1199.05	12.30	0.0
Yes				
(1J)012	JUNCTION	1199.56	13.24	0.0
(1J)013	JUNCTION	1200.07	19.59	0.0
(1J)014	JUNCTION	1200.42	22.78	0.0
(1J)041	JUNCTION	1200.90	20.10	0.0
(1J)042	JUNCTION	1204.16	10.41	0.0
(1J)042A	JUNCTION	1206.48	8.17	0.0
(1J)042B	JUNCTION	1210.10	13.40	0.0
(1J)043	JUNCTION	1213.06	20.17	0.0
(1J)044	JUNCTION	1213.85	29.00	0.0
Yes				
(1J)045	JUNCTION	1214.48	20.66	0.0
(1J)046	JUNCTION	1214.69	10.05	0.0
Yes				
(1J)047	JUNCTION	1214.79	9.79	0.0
(1J)048	JUNCTION	1215.34	10.83	0.0
(1J)050	JUNCTION	1216.89	11.08	0.0
Yes				
(1J)050A	JUNCTION	1216.98	11.37	0.0
(1J)051	JUNCTION	1218.77	12.17	0.0
(1J)052	JUNCTION	1218.82	10.80	0.0
(1J)053	JUNCTION	1218.97	9.51	0.0
Yes				
(1J)054	JUNCTION	1220.30	16.33	0.0
(1J)054A	JUNCTION	1220.61	13.91	0.0
(1J)055	JUNCTION	1220.70	23.66	0.0
(1J)056	JUNCTION	1221.52	17.41	0.0
(1J)057	JUNCTION	1222.08	23.75	0.0
(1J)058	JUNCTION	1222.75	12.50	0.0
(1J)059	JUNCTION	1223.04	11.50	0.0
(1J)060	JUNCTION	1223.25	10.58	0.0
(1K)001	JUNCTION	1229.15	13.83	0.0
Yes				
(1K)002	JUNCTION	1229.68	8.33	0.0
(1K)002A	JUNCTION	1230.13	7.62	0.0
Yes				
(1K)003	JUNCTION	1230.51	9.13	0.0
(1K)004	JUNCTION	1231.11	7.95	0.0
Yes				
(1K)005	JUNCTION	1231.97	7.66	0.0
Yes				
(1K)006	JUNCTION	1231.98	7.45	0.0
Yes				
(1K)007	JUNCTION	1232.87	6.91	0.0
Yes				
(1K)008	JUNCTION	1233.66	11.04	0.0
Yes				
(1K)008A	JUNCTION	1234.10	15.90	0.0
Yes				
(1K)009	JUNCTION	1234.46	13.33	0.0
Yes				

(1K)010	JUNCTION	1235.24	12.91	0.0	Yes
(1K)011	JUNCTION	1235.70	12.12	0.0	Yes
(1K)012	JUNCTION	1236.58	10.80	0.0	
(1K)013	JUNCTION	1237.18	23.41	0.0	
(1K)014	JUNCTION	1237.66	8.77	0.0	
(1M)000	JUNCTION	1211.52	18.28	0.0	
(1M)001	JUNCTION	1214.55	19.45	0.0	
(1M)001A	JUNCTION	1213.08	17.00	0.0	
(1M)001B	JUNCTION	1212.04	17.00	0.0	
(1M)002	JUNCTION	1215.45	18.05	0.0	
(1M)003	JUNCTION	1216.05	19.45	0.0	Yes
(1M)010	JUNCTION	1220.34	16.17	0.0	
(1M)011	JUNCTION	1221.30	13.54	0.0	
(1M)013	JUNCTION	1222.58	15.65	0.0	
(1M)014	JUNCTION	1223.61	16.39	0.0	
(1M)015	JUNCTION	1224.66	14.12	0.0	
(1M)016	JUNCTION	1225.84	18.00	0.0	
(1M)017	JUNCTION	1225.97	18.00	0.0	
(1M)018	JUNCTION	1226.49	21.83	0.0	
(1M)019	JUNCTION	1227.30	18.75	0.0	
(1M)021	JUNCTION	1229.11	14.25	0.0	
(1M)022	JUNCTION	1229.75	13.12	0.0	Yes
(1M)023	JUNCTION	1230.40	14.08	0.0	
(1M)024	JUNCTION	1231.80	13.08	0.0	
(1M)025	JUNCTION	1232.70	11.58	0.0	
(1M)026	JUNCTION	1233.51	11.58	0.0	
(1M)027	JUNCTION	1234.86	11.50	0.0	
(1M)028	JUNCTION	1235.85	11.50	0.0	
(1M)035	JUNCTION	1219.42	10.00	0.0	Yes
(1M)036	JUNCTION	1219.87	8.00	0.0	
(1M)037	JUNCTION	1220.45	8.81	0.0	Yes
(1M)038	JUNCTION	1221.00	8.75	0.0	
(1M)039	JUNCTION	1222.37	8.58	0.0	Yes
(1M)040	JUNCTION	1223.02	9.00	0.0	
(1M)041	JUNCTION	1224.04	9.25	0.0	Yes
(1M)092	JUNCTION	1225.07	8.65	0.0	Yes
(1M)093	JUNCTION	1225.23	8.83	0.0	Yes
(1M)094	JUNCTION	1226.75	10.50	0.0	Yes
(1M)116	JUNCTION	1226.94	10.54	0.0	
(1M)117	JUNCTION	1227.17	10.12	0.0	
(1M)118	JUNCTION	1227.76	10.46	0.0	
(1M)119	JUNCTION	1228.92	7.08	0.0	Yes
(1M)120	JUNCTION	1229.10	7.08	0.0	
(1M)121	JUNCTION	1230.22	5.80	0.0	
(1M)122	JUNCTION	1230.83	10.87	0.0	
(1M)123	JUNCTION	1231.73	6.15	0.0	Yes
(1M)124	JUNCTION	1232.93	8.67	0.0	
(1M)125	JUNCTION	1233.60	4.13	0.0	

(1M)126	JUNCTION	1234.19	5.08	0.0
(1M)127	JUNCTION	1235.51	4.29	0.0
(1M)128	JUNCTION	1236.19	4.38	0.0
Yes				
(1M)129	JUNCTION	1237.12	43.00	0.0
Yes				
(1M)130	JUNCTION	1237.35	43.00	0.0
(1M)131	JUNCTION	1237.88	4.50	0.0
Yes				
(1M)132	JUNCTION	1238.94	6.04	0.0
Yes				
(1M)133	JUNCTION	1239.94	5.39	0.0
Yes				
(1M)161	JUNCTION	1236.00	18.25	0.0
(1M)162	JUNCTION	1237.77	12.50	0.0
(1M)163	JUNCTION	1239.56	17.79	0.0
(1M)164	JUNCTION	1241.36	15.56	0.0
(1M)165	JUNCTION	1243.19	15.81	0.0
(1M)278	JUNCTION	1217.03	21.77	0.0
Yes				
(1M)279	JUNCTION	1217.50	17.50	0.0
(1M)279B	JUNCTION	1217.94	16.66	0.0
(1M)281	JUNCTION	1218.99	18.51	0.0
(1M)281B	JUNCTION	1219.65	18.35	0.0
Yes				
(1M)282	JUNCTION	1220.15	18.35	0.0
(1M)283	JUNCTION	1220.70	16.80	0.0
Yes				
(1M)284	JUNCTION	1228.47	24.03	0.0
(1M)285	JUNCTION	1229.45	27.05	0.0
(1M)285A	JUNCTION	1229.86	28.04	0.0
(1M)286	JUNCTION	1230.38	27.12	0.0
(1M)286A	JUNCTION	1231.05	28.15	0.0
Yes				
(1M)287	JUNCTION	1231.72	26.98	0.0
(1M)288	JUNCTION	1232.47	26.23	0.0
(1M)288A	JUNCTION	1233.02	24.98	0.0
(1M)288B	JUNCTION	1233.66	25.34	0.0
(1M)288C	JUNCTION	1234.21	25.79	0.0
(1N)004	JUNCTION	1221.21	17.39	0.0
Yes				
(1N)005	JUNCTION	1222.11	13.00	0.0
Yes				
(1N)006	JUNCTION	1223.16	22.14	0.0
Yes				
(1N)007	JUNCTION	1224.19	17.91	0.0
Yes				
(1N)007D	JUNCTION	1224.47	17.50	0.0
(1N)007E	JUNCTION	1224.72	17.20	0.0
(1N)008	JUNCTION	1225.77	5.42	0.0
Yes				
(1N)009	JUNCTION	1226.30	8.10	0.0
Yes				
(1N)011	JUNCTION	1227.43	3.44	0.0
Yes				
(1N)013	JUNCTION	1228.60	4.85	0.0
Yes				
(1N)014	JUNCTION	1229.77	6.75	0.0
Yes				
(1N)015	JUNCTION	1230.32	7.65	0.0
Yes				

(1N)016	JUNCTION	1231.22	6.54	0.0
(1N)017	JUNCTION	1232.30	8.00	0.0
(1N)018	JUNCTION	1232.88	9.13	0.0
Yes				
(1N)019	JUNCTION	1233.44	8.92	0.0
(1N)020	JUNCTION	1234.51	9.60	0.0
Yes				
(1N)021	JUNCTION	1235.58	10.21	0.0
Yes				
(1N)022	JUNCTION	1236.64	11.25	0.0
Yes				
(1N)023	JUNCTION	1237.73	12.50	0.0
(1N)024	JUNCTION	1238.78	11.83	0.0
(1N)025	JUNCTION	1240.18	10.79	0.0
Yes				
(1N)045	JUNCTION	1227.96	16.25	0.0
(1N)046	JUNCTION	1229.55	16.83	0.0
(1N)047	JUNCTION	1230.68	17.50	0.0
Yes				
(1N)109A	JUNCTION	1225.06	20.24	0.0
(1N)110	JUNCTION	1225.92	22.58	0.0
Yes				
(1N)111A	JUNCTION	1226.78	22.42	0.0
(1N)112A	JUNCTION	1227.62	22.18	0.0
(1N)112B	JUNCTION	1228.10	23.10	0.0
(1O)001	JUNCTION	1236.24	11.10	0.0
Yes				
(1O)001A	JUNCTION	1237.05	12.57	0.0
(1O)002	JUNCTION	1237.20	12.36	0.0
Yes				
(1O)002A	JUNCTION	1237.34	11.95	0.0
(1O)003	JUNCTION	1238.00	11.50	0.0
(1O)004	JUNCTION	1238.55	12.00	0.0
Yes				
(1O)005A	JUNCTION	1239.29	16.70	0.0
Yes				
(1O)005B	JUNCTION	1239.48	16.22	0.0
(1O)005C	JUNCTION	1239.66	16.12	0.0
(1O)005D	JUNCTION	1239.82	15.92	0.0
(1O)005E	JUNCTION	1239.83	13.25	0.0
(1O)010	JUNCTION	1251.71	12.79	0.0
(1O)011	JUNCTION	1251.77	12.81	0.0
(1O)012	JUNCTION	1252.51	12.91	0.0
(1O)013	JUNCTION	1253.50	13.20	0.0
(1O)014	JUNCTION	1253.87	13.43	0.0
(1O)015	JUNCTION	1255.16	21.64	0.0
(1O)016	JUNCTION	1256.10	21.40	0.0
(1O)017	JUNCTION	1257.34	20.86	0.0
(1O)018	JUNCTION	1258.62	18.78	0.0
(1O)019	JUNCTION	1260.25	17.02	0.0
(1O)020	JUNCTION	1261.74	14.53	0.0
(1O)021	JUNCTION	1262.57	15.24	0.0
(1O)072	JUNCTION	1238.16	19.54	0.0
Yes				
(1O)157	JUNCTION	1251.77	14.03	0.0
Yes				
(1O)300	JUNCTION	1234.84	27.06	0.0
Yes				
(1O)301	JUNCTION	1235.62	27.38	0.0
(1O)302	JUNCTION	1236.45	23.55	0.0
Yes				

(10)303	JUNCTION	1237.31	21.59	0.0	Yes
(10)304A	JUNCTION	1249.69	12.00	0.0	
(10)304B	JUNCTION	1240.00	20.00	0.0	
(10)305	JUNCTION	1248.55	12.65	0.0	Yes
(10)305A	JUNCTION	1248.50	10.80	0.0	Yes
(10)306	JUNCTION	1249.39	12.61	0.0	Yes
(10)306A	JUNCTION	1250.23	13.57	0.0	Yes
(10)307	JUNCTION	1250.66	13.34	0.0	
(10)308	JUNCTION	1251.17	13.96	0.0	
(10)308A	JUNCTION	1251.31	13.79	0.0	
(10)309	JUNCTION	1251.58	13.14	0.0	Yes
(1P)002	JUNCTION	1130.00	12.35	0.0	
(1P)003	JUNCTION	1130.42	12.25	0.0	
(1P)004	JUNCTION	1131.88	12.50	0.0	
(1P)005	JUNCTION	1134.50	11.80	0.0	
(1P)006	JUNCTION	1136.62	12.78	0.0	
(1P)007	JUNCTION	1140.56	13.39	0.0	
(1P)008	JUNCTION	1143.00	14.00	0.0	Yes
(1P)008A	JUNCTION	1143.50	14.00	0.0	
(1P)009	JUNCTION	1146.76	11.67	0.0	
(1P)010	JUNCTION	1147.05	11.17	0.0	
(1P)011	JUNCTION	1149.42	11.58	0.0	Yes
(1P)012	JUNCTION	1151.82	12.08	0.0	
(1P)013	JUNCTION	1154.18	12.85	0.0	
(1P)014	JUNCTION	1156.54	12.79	0.0	
(1P)015	JUNCTION	1158.90	13.85	0.0	
(1P)016	JUNCTION	1160.71	14.88	0.0	
(1P)016A	JUNCTION	1161.55	15.58	0.0	
(1P)017	JUNCTION	1161.88	16.25	0.0	Yes
(1P)018	JUNCTION	1163.77	14.63	0.0	Yes
(1P)024	JUNCTION	1164.09	11.56	0.0	Yes
(1P)042	JUNCTION	1133.28	9.92	0.0	
(1P)042A	JUNCTION	1134.72	12.37	0.0	
(1P)043	JUNCTION	1136.16	13.92	0.0	Yes
(1P)044	JUNCTION	1136.52	4.08	0.0	
(1P)065	JUNCTION	1137.24	16.76	0.0	Yes
(1P)073	JUNCTION	1164.26	13.87	0.0	Yes
(1P)079	JUNCTION	1162.58	15.90	0.0	Yes
(2A)001	JUNCTION	1146.85	12.25	0.0	
(2A)002	JUNCTION	1148.65	11.82	0.0	
(2A)003	JUNCTION	1149.77	11.98	0.0	
(2A)004	JUNCTION	1150.99	10.51	0.0	
(2A)005	JUNCTION	1152.28	14.52	0.0	
(2A)006	JUNCTION	1152.81	15.99	0.0	
(2A)007	JUNCTION	1153.44	13.91	0.0	
(2A)008	JUNCTION	1153.93	10.47	0.0	

(2A)009	JUNCTION	1154.63	7.97	0.0
(2A)010	JUNCTION	1155.34	9.46	0.0
(2A)011	JUNCTION	1156.05	10.55	0.0
(2A)012	JUNCTION	1156.66	6.64	0.0
(2A)013	JUNCTION	1157.26	7.69	0.0
(2A)014	JUNCTION	1157.94	6.06	0.0
(2A)015	JUNCTION	1158.17	10.03	0.0
Yes				
(2A)016	JUNCTION	1158.49	10.51	0.0
(2A)017	JUNCTION	1159.12	10.93	0.0
(2A)018	JUNCTION	1159.49	8.51	0.0
(2A)019	JUNCTION	1159.85	8.20	0.0
(2A)020	JUNCTION	1160.69	13.01	0.0
Yes				
(2A)021	JUNCTION	1162.47	7.53	0.0
(2A)022	JUNCTION	1164.35	8.20	0.0
(2A)023	JUNCTION	1165.27	5.98	0.0
(2A)024	JUNCTION	1165.74	12.71	0.0
(2A)025	JUNCTION	1166.00	12.95	0.0
(2A)026	JUNCTION	1166.39	9.86	0.0
(2A)027	JUNCTION	1167.09	10.96	0.0
(2A)028	JUNCTION	1167.45	10.75	0.0
(2A)029	JUNCTION	1167.80	7.47	0.0
(2A)030	JUNCTION	1168.20	10.00	0.0
(2A)031	JUNCTION	1169.51	7.79	0.0
(2A)032	JUNCTION	1169.69	11.81	0.0
(2A)033	JUNCTION	1170.06	12.99	0.0
(2A)034	JUNCTION	1170.29	11.06	0.0
Yes				
(2A)035	JUNCTION	1172.03	11.17	0.0
(2A)036	JUNCTION	1173.77	10.83	0.0
(2A)037	JUNCTION	1175.50	7.00	0.0
(2A)038	JUNCTION	1177.24	13.84	0.0
(2A)039	JUNCTION	1178.79	15.51	0.0
(2A)040	JUNCTION	1180.22	19.20	0.0
(2A)041	JUNCTION	1181.95	14.05	0.0
(2A)042	JUNCTION	1183.55	23.75	0.0
(2A)043	JUNCTION	1185.38	19.02	0.0
(2A)044	JUNCTION	1186.70	7.95	0.0
(2A)045	JUNCTION	1187.90	9.50	0.0
(2A)046	JUNCTION	1189.40	6.00	0.0
(2A)047	JUNCTION	1190.00	9.00	0.0
(2A)049	JUNCTION	1191.47	8.03	0.0
(2A)050	JUNCTION	1192.29	10.01	0.0
(2A)051	JUNCTION	1193.69	16.01	0.0
(2A)052	JUNCTION	1195.09	12.01	0.0
(2A)053	JUNCTION	1196.14	14.46	0.0
(2A)054	JUNCTION	1199.19	11.99	0.0
(2A)055	JUNCTION	1199.85	10.50	0.0
(2A)056	JUNCTION	1200.67	9.73	0.0
(2A)057	JUNCTION	1202.00	7.52	0.0
(2A)058	JUNCTION	1203.10	14.00	0.0
(2A)059	JUNCTION	1204.22	7.78	0.0
(2A)060	JUNCTION	1205.74	7.96	0.0
(2A)061	JUNCTION	1206.97	7.54	0.0
(2A)062	JUNCTION	1209.26	6.75	0.0
(2A)063	JUNCTION	1212.01	7.36	0.0
(2A)064	JUNCTION	1213.93	10.97	0.0
(2A)065	JUNCTION	1215.87	24.03	0.0
(2A)066	JUNCTION	1225.01	20.64	0.0
(2A)067	JUNCTION	1225.79	20.01	0.0

(2A)068	JUNCTION	1227.02	20.68	0.0
(2A)069	JUNCTION	1205.82	20.33	0.0
(2C)001	JUNCTION	1206.10	13.90	0.0
(2C)002	JUNCTION	1206.40	13.60	0.0
(2C)003	JUNCTION	1207.06	10.94	0.0
(2C)004	JUNCTION	1207.78	12.22	0.0
(2C)005	JUNCTION	1208.49	7.51	0.0
(2C)006	JUNCTION	1209.02	5.79	0.0
(2C)007	JUNCTION	1209.50	5.21	0.0
(2C)008	JUNCTION	1209.91	3.33	0.0
(2D)001	JUNCTION	1211.09	3.41	0.0
(2D)001A	JUNCTION	1211.45	5.83	0.0
(2D)002	JUNCTION	1213.00	7.00	0.0
(2D)003	JUNCTION	1214.70	8.17	0.0
(2D)004	JUNCTION	1216.27	8.37	0.0
(2D)005	JUNCTION	1217.86	9.75	0.0
(2D)006	JUNCTION	1219.49	12.21	0.0
Yes				
(2D)007	JUNCTION	1221.35	6.75	0.0
(2D)008	JUNCTION	1222.34	16.66	0.0
(2D)009	JUNCTION	1225.04	19.96	0.0
Yes				
(2D)010	JUNCTION	1225.44	20.56	0.0
(2D)011	JUNCTION	1226.12	19.88	0.0
Yes				
(2D)012	JUNCTION	1227.96	24.04	0.0
Yes				
(2D)013	JUNCTION	1229.15	24.85	0.0
Yes				
(2D)014	JUNCTION	1229.96	25.04	0.0
(2D)015	JUNCTION	1240.96	10.04	0.0
(2D)016	JUNCTION	1243.40	12.60	0.0
(2D)017	JUNCTION	1245.11	13.89	0.0
(2D)018	JUNCTION	1245.82	14.18	0.0
(2D)019	JUNCTION	1246.10	13.90	0.0
(2D)020	JUNCTION	1246.74	14.26	0.0
(2D)021	JUNCTION	1248.58	13.42	0.0
(2D)022	JUNCTION	1249.58	12.42	0.0
(2D)023	JUNCTION	1249.81	12.19	0.0
(2D)024	JUNCTION	1251.25	11.75	0.0
(2D)025	JUNCTION	1251.56	10.44	0.0
(2D)039	JUNCTION	1216.06	5.75	0.0
(2D)040	JUNCTION	1217.64	21.42	0.0
(2D)041	JUNCTION	1219.24	10.76	0.0
(2D)042	JUNCTION	1220.74	24.71	0.0
(2D)043	JUNCTION	1222.54	23.08	0.0
(2D)044	JUNCTION	1224.34	6.66	0.0
(2D)045	JUNCTION	1226.14	21.81	0.0
Yes				
(2D)045A	JUNCTION	1226.86	18.00	0.0
(2D)046	JUNCTION	1227.76	15.08	0.0
Yes				
(2D)046A	JUNCTION	1228.58	1305.00	0.0
Yes				
(2D)241	JUNCTION	1213.87	16.13	0.0
(2D)242	JUNCTION	1214.91	18.09	0.0
(2D)243	JUNCTION	1215.83	19.17	0.0
(2D)245	JUNCTION	1217.50	19.50	0.0
(2D)246	JUNCTION	1218.27	11.73	0.0
(2D)247	JUNCTION	1219.05	11.95	0.0
(2D)248	JUNCTION	1219.87	11.13	0.0

(2D)249	JUNCTION	1220.73	13.27	0.0
(2D)250	JUNCTION	1221.22	4.78	0.0
(2D)251	JUNCTION	1221.92	12.94	0.0
(2D)252	JUNCTION	1223.01	13.99	0.0
(2D)253	JUNCTION	1223.49	10.51	0.0
(2D)254	JUNCTION	1224.43	20.57	0.0
(2D)255	JUNCTION	1225.31	14.69	0.0
(2D)256	JUNCTION	1226.09	13.91	0.0
(2D)257	JUNCTION	1226.72	14.28	0.0
(2D)258	JUNCTION	1227.40	10.60	0.0
(2D)259	JUNCTION	1228.12	14.88	0.0
(2D)260	JUNCTION	1228.76	11.24	0.0
(2D)261	JUNCTION	1229.46	10.54	0.0
(2D)262	JUNCTION	1230.61	9.39	0.0
(2D)263	JUNCTION	1231.64	6.36	0.0
Yes				
(2D)264	JUNCTION	1232.56	12.44	0.0
(2D)265	JUNCTION	1233.31	9.69	0.0
(2D)266	JUNCTION	1234.21	9.79	0.0
(2D)267	JUNCTION	1235.19	14.81	0.0
Yes				
(2E)001	JUNCTION	1227.46	19.08	0.0
(2E)002	JUNCTION	1228.25	22.41	0.0
(2E)003	JUNCTION	1229.22	15.41	0.0
Yes				
(2E)004	JUNCTION	1229.58	11.83	0.0
(2E)005	JUNCTION	1229.72	18.33	0.0
(2E)006	JUNCTION	1229.96	18.50	0.0
(2E)007	JUNCTION	1230.66	18.54	0.0
(2E)008	JUNCTION	1231.37	20.25	0.0
(2E)009	JUNCTION	1232.08	19.12	0.0
(2E)010	JUNCTION	1232.79	20.32	0.0
(2E)011	JUNCTION	1233.35	21.08	0.0
(2E)012	JUNCTION	1233.90	22.75	0.0
(2E)013	JUNCTION	1234.62	20.25	0.0
(2E)014	JUNCTION	1235.12	20.87	0.0
(2E)043	JUNCTION	1247.51	6.39	0.0
Yes				
(2F)001	JUNCTION	1235.77	22.25	0.0
(2F)002	JUNCTION	1236.42	22.48	0.0
(2F)003	JUNCTION	1237.07	18.53	0.0
(2F)004	JUNCTION	1237.38	19.02	0.0
Yes				
(2F)005	JUNCTION	1237.73	18.47	0.0
Yes				
(2F)006	JUNCTION	1237.87	15.13	0.0
(2F)007	JUNCTION	1238.31	14.39	0.0
(2F)008	JUNCTION	1238.48	15.02	0.0
(2F)009	JUNCTION	1238.55	17.45	0.0
(2F)010	JUNCTION	1239.42	17.58	0.0
(2F)011	JUNCTION	1239.72	16.28	0.0
(2F)012	JUNCTION	1240.82	16.38	0.0
(2F)013	JUNCTION	1241.75	17.55	0.0
(2F)014	JUNCTION	1242.68	16.52	0.0
(2F)015	JUNCTION	1243.61	20.19	0.0
(2F)016	JUNCTION	1244.54	20.46	0.0
(2F)017	JUNCTION	1245.47	21.33	0.0
Yes				
(2F)018	JUNCTION	1246.40	21.37	0.0
(2F)019	JUNCTION	1247.33	19.17	0.0
(2F)020	JUNCTION	1248.26	18.54	0.0

(2F)021	JUNCTION	1249.19	15.62	0.0
(2F)022	JUNCTION	1250.52	22.00	0.0
(2F)023	JUNCTION	1250.57	22.17	0.0
Yes				
(2F)024	JUNCTION	1251.93	22.07	0.0
(2F)025	JUNCTION	1252.06	19.94	0.0
(2F)026	JUNCTION	1252.21	19.79	0.0
(2F)027	JUNCTION	1252.32	21.68	0.0
(2F)028	JUNCTION	1252.47	20.53	0.0
(2F)029	JUNCTION	1252.59	21.41	0.0
(2F)030	JUNCTION	1252.71	21.29	0.0
(2F)031	JUNCTION	1252.85	21.15	0.0
(2F)032	JUNCTION	1252.98	21.32	0.0
(2F)033	JUNCTION	1253.07	25.93	0.0
Yes				
(2G)001	JUNCTION	1252.28	15.90	0.0
(2G)002	JUNCTION	1253.00	16.58	0.0
Yes				
(2G)002A	JUNCTION	1253.49	17.21	0.0
(2G)003	JUNCTION	1253.81	15.80	0.0
(2G)004	JUNCTION	1255.41	13.50	0.0
Yes				
(2G)005	JUNCTION	1257.05	12.17	0.0
(2G)006	JUNCTION	1259.57	12.23	0.0
Yes				
(2G)007	JUNCTION	1260.37	11.58	0.0
Yes				
(2G)008	JUNCTION	1260.48	10.46	0.0
(2G)009	JUNCTION	1261.35	10.12	0.0
Yes				
(2G)010	JUNCTION	1261.89	8.67	0.0
(2G)011	JUNCTION	1263.02	10.80	0.0
Yes				
(2G)012	JUNCTION	1263.82	10.43	0.0
(2G)012A	JUNCTION	1264.27	10.42	0.0
(2G)013	JUNCTION	1265.10	10.22	0.0
(2G)013A	JUNCTION	1265.63	11.17	0.0
Yes				
(2G)014	JUNCTION	1267.95	9.37	0.0
(2G)015	JUNCTION	1268.00	9.29	0.0
Yes				
(2G)016	JUNCTION	1268.62	12.58	0.0
Yes				
(2G)016A	JUNCTION	1268.77	13.25	0.0
(2G)018	JUNCTION	1269.22	12.46	0.0
Yes				
(2G)019	JUNCTION	1269.72	9.15	0.0
Yes				
(2G)020	JUNCTION	1270.55	9.42	0.0
Yes				
(2G)021	JUNCTION	1271.18	10.46	0.0
Yes				
(2G)022	JUNCTION	1271.88	8.83	0.0
Yes				
(2G)023	JUNCTION	1272.48	8.17	0.0
Yes				
(2G)024	JUNCTION	1272.87	6.87	0.0
(2G)025	JUNCTION	1273.43	7.08	0.0
(2G)026	JUNCTION	1276.53	5.62	0.0
Yes				
(2G)040	JUNCTION	1255.99	16.00	0.0

(2G)041	JUNCTION	1256.24	15.76	0.0
(2G)042	JUNCTION	1256.51	15.49	0.0
(2G)043	JUNCTION	1256.74	15.26	0.0
(2G)043A	JUNCTION	1256.89	15.11	0.0
(2G)044	JUNCTION	1257.03	14.97	0.0
(2G)045	JUNCTION	1257.19	14.81	0.0
Yes				
(2G)359	JUNCTION	1274.22	6.67	0.0
Yes				
(2H)001	JUNCTION	1248.90	22.10	0.0
(2H)002	JUNCTION	1249.59	22.41	0.0
Yes				
(2H)003	JUNCTION	1250.32	21.68	0.0
(2H)005	JUNCTION	1251.05	21.95	0.0
(2H)006	JUNCTION	1251.66	18.34	0.0
(2H)007	JUNCTION	1252.27	16.73	0.0
Yes				
(2H)008	JUNCTION	1253.49	16.51	0.0
(2H)009	JUNCTION	1253.59	16.41	0.0
(2H)010	JUNCTION	1253.70	16.30	0.0
(2H)011	JUNCTION	1255.52	14.48	0.0
(2H)012	JUNCTION	1256.17	13.83	0.0
Yes				
(2H)013	JUNCTION	1257.09	16.91	0.0
Yes				
(2H)014	JUNCTION	1257.73	14.27	0.0
Yes				
(2H)015	JUNCTION	1258.46	11.04	0.0
(2H)016	JUNCTION	1259.00	10.00	0.0
Yes				
(2H)017	JUNCTION	1259.56	8.94	0.0
(2H)017A	JUNCTION	1260.40	9.60	0.0
Yes				
(2H)018	JUNCTION	1260.70	10.30	0.0
(2H)019	JUNCTION	1261.30	11.75	0.0
Yes				
(2H)020	JUNCTION	1261.40	14.40	0.0
Yes				
(2H)021	JUNCTION	1262.54	11.46	0.0
Yes				
(2H)022	JUNCTION	1265.22	13.78	0.0
(2H)023	JUNCTION	1265.49	14.51	0.0
(2H)024	JUNCTION	1268.18	10.82	0.0
(2H)025	JUNCTION	1268.74	9.26	0.0
(2H)026	JUNCTION	1264.94	8.50	0.0
Yes				
(2H)027	JUNCTION	1266.12	12.33	0.0
(2H)028	JUNCTION	1267.29	14.00	0.0
(2H)029	JUNCTION	1268.48	14.00	0.0
(2H)030	JUNCTION	1269.40	9.00	0.0
Yes				
(2H)031	JUNCTION	1269.64	7.20	0.0
(2H)032	JUNCTION	1269.73	7.73	0.0
Yes				
(2H)033	JUNCTION	1270.81	7.65	0.0
(2H)034	JUNCTION	1271.83	6.97	0.0
(2H)036	JUNCTION	1272.81	12.67	0.0
Yes				
(2H)037	JUNCTION	1274.02	9.38	0.0
(2H)038	JUNCTION	1275.22	11.78	0.0
(2H)039	JUNCTION	1276.64	11.35	0.0

(2H)040	JUNCTION	1277.55	7.37	0.0
(2H)041	JUNCTION	1278.45	8.05	0.0
(2H)042	JUNCTION	1279.87	9.13	0.0
(2H)043	JUNCTION	1280.82	9.58	0.0
(2H)044	JUNCTION	1281.64	10.06	0.0
(2H)045	JUNCTION	1282.34	11.15	0.0
(2H)046	JUNCTION	1283.01	11.15	0.0
(2H)047	JUNCTION	1283.25	16.92	0.0
(2H)048	JUNCTION	1284.37	12.62	0.0
(2H)049	JUNCTION	1285.60	12.17	0.0
Yes				
(2H)050	JUNCTION	1286.56	12.04	0.0
(2H)051	JUNCTION	1287.28	11.75	0.0
(2H)051A	JUNCTION	1288.06	10.45	0.0
(2H)052	JUNCTION	1289.23	12.00	0.0
(2H)053	JUNCTION	1289.54	18.44	0.0
(2H)054	JUNCTION	1290.05	18.94	0.0
(2H)054A	JUNCTION	1290.90	19.10	0.0
Yes				
(2H)055	JUNCTION	1291.92	19.08	0.0
(2H)055A	JUNCTION	1292.46	19.54	0.0
(2H)056	JUNCTION	1294.11	17.02	0.0
(2H)057	JUNCTION	1294.81	14.53	0.0
Yes				
(2H)058	JUNCTION	1295.28	15.24	0.0
Yes				
(2H)285	JUNCTION	1289.98	14.49	0.0
Yes				
(2H)286	JUNCTION	1290.62	17.75	0.0
Yes				
(2H)287	JUNCTION	1291.69	22.13	0.0
(2H)288	JUNCTION	1293.09	22.14	0.0
(2H)289	JUNCTION	1294.43	22.15	0.0
Yes				
(2H)290	JUNCTION	1295.06	20.92	0.0
(2I)001	JUNCTION	1269.29	9.71	0.0
Yes				
(2I)001A	JUNCTION	1269.10	10.90	0.0
(2I)002	JUNCTION	1271.86	8.14	0.0
Yes				
(2I)003	JUNCTION	1273.20	8.80	0.0
Yes				
(2I)004	JUNCTION	1273.70	9.30	0.0
(2I)005	JUNCTION	1275.54	9.46	0.0
(2I)006	JUNCTION	1276.60	13.40	0.0
(2I)008	JUNCTION	1278.00	12.00	0.0
Yes				
(2I)009	JUNCTION	1279.64	9.36	0.0
Yes				
(2I)010	JUNCTION	1280.00	10.00	0.0
(2I)011	JUNCTION	1280.60	9.40	0.0
Yes				
(2I)012	JUNCTION	1281.28	9.72	0.0
(2I)013	JUNCTION	1282.76	11.24	0.0
(2I)014	JUNCTION	1283.39	8.61	0.0
Yes				
(2I)015	JUNCTION	1283.87	11.13	0.0
(2I)016	JUNCTION	1284.40	12.60	0.0
(2I)017	JUNCTION	1284.54	12.46	0.0
(2I)017A	JUNCTION	1284.60	12.40	0.0
Yes				

(2I)018	JUNCTION	1285.34	11.66	0.0
(2I)019	JUNCTION	1286.15	10.85	0.0
(2I)020	JUNCTION	1287.48	16.52	0.0
Yes				
(2I)021	JUNCTION	1288.56	15.44	0.0
(2I)021A	JUNCTION	1288.86	15.14	0.0
(2I)021B	JUNCTION	1289.46	14.54	0.0
Yes				
(2I)021C	JUNCTION	1289.55	14.45	0.0
(2I)022	JUNCTION	1289.64	11.42	0.0
(2I)023	JUNCTION	1290.72	9.27	0.0
(2I)024	JUNCTION	1291.80	11.20	0.0
(2I)025	JUNCTION	1292.88	10.12	0.0
(2I)025A	JUNCTION	1293.62	9.38	0.0
Yes				
(2I)026	JUNCTION	1293.96	9.04	0.0
(2I)027	JUNCTION	1294.94	12.06	0.0
(2I)028	JUNCTION	1295.09	11.90	0.0
Yes				
(2I)029	JUNCTION	1295.29	12.10	0.0
Yes				
(2I)044	JUNCTION	1276.65	8.72	0.0
(2I)045	JUNCTION	1277.38	10.43	0.0
(2I)046	JUNCTION	1281.61	13.50	0.0
(2I)047	JUNCTION	1285.58	19.42	0.0
(2I)048	JUNCTION	1289.53	18.96	0.0
(2I)049	JUNCTION	1290.84	16.16	0.0
Yes				
(2I)050	JUNCTION	1292.77	15.73	0.0
(2I)051	JUNCTION	1293.24	14.56	0.0
Yes				
(2I)052	JUNCTION	1293.62	14.38	0.0
(2I)053	JUNCTION	1294.99	13.21	0.0
(2I)054	JUNCTION	1296.16	11.84	0.0
(2I)055	JUNCTION	1297.06	10.74	0.0
Yes				
(2I)056	JUNCTION	1298.45	9.55	0.0
(2I)057	JUNCTION	1299.11	11.89	0.0
(2I)058	JUNCTION	1300.43	11.57	0.0
(2I)059	JUNCTION	1302.26	10.24	0.0
Yes				
(2J)001	JUNCTION	1239.36	15.64	0.0
(2J)002	JUNCTION	1239.73	15.27	0.0
(2J)003	JUNCTION	1239.81	15.19	0.0
(2J)004	JUNCTION	1240.04	17.96	0.0
(2J)005	JUNCTION	1240.09	17.91	0.0
(2J)006	JUNCTION	1240.57	19.43	0.0
(2J)007	JUNCTION	1241.10	19.90	0.0
(2J)008	JUNCTION	1241.63	22.37	0.0
(2J)009	JUNCTION	1241.85	22.15	0.0
(2J)010	JUNCTION	1242.09	20.91	0.0
(2J)011	JUNCTION	1242.66	21.34	0.0
Yes				
(2J)012	JUNCTION	1243.17	21.83	0.0
(2J)013	JUNCTION	1244.14	21.86	0.0
(2J)014	JUNCTION	1244.99	22.01	0.0
(2J)015	JUNCTION	1245.91	24.09	0.0
(2J)016	JUNCTION	1246.81	24.19	0.0
(2J)017	JUNCTION	1247.72	22.28	0.0
(2J)018	JUNCTION	1247.88	22.12	0.0
(2J)019	JUNCTION	1248.90	22.10	0.0

(2J)020	JUNCTION	1242.31	21.69	0.0	Yes
(2J)021	JUNCTION	1246.20	16.80	0.0	Yes
(2J)022	JUNCTION	1246.37	17.63	0.0	
(2J)023	JUNCTION	1247.35	16.65	0.0	
(2J)026	JUNCTION	1249.21	16.79	0.0	Yes
(2J)027	JUNCTION	1250.42	17.58	0.0	
(2J)028	JUNCTION	1251.06	18.94	0.0	
(2J)029	JUNCTION	1252.17	17.83	0.0	
(2J)030	JUNCTION	1253.86	16.14	0.0	
(2J)031	JUNCTION	1255.43	15.57	0.0	
(2J)032	JUNCTION	1256.78	13.22	0.0	
(2J)033	JUNCTION	1258.11	11.89	0.0	
(2J)040	JUNCTION	1248.95	17.05	0.0	Yes
(2J)041	JUNCTION	1249.37	17.63	0.0	
(2J)042	JUNCTION	1251.74	12.26	0.0	
(2J)043	JUNCTION	1252.07	10.93	0.0	Yes
(2J)044	JUNCTION	1252.69	8.52	0.0	Yes
(2J)045	JUNCTION	1253.12	9.93	0.0	Yes
(2J)045A	JUNCTION	1253.53	8.47	0.0	
(2J)046	JUNCTION	1254.04	8.96	0.0	Yes
(2J)047	JUNCTION	1254.96	11.04	0.0	Yes
(2J)048	JUNCTION	1255.88	12.12	0.0	Yes
(2J)049	JUNCTION	1256.02	11.98	0.0	
(2J)050	JUNCTION	1257.00	13.00	0.0	Yes
(2J)051	JUNCTION	1257.54	15.17	0.0	
(2J)052	JUNCTION	1258.18	15.08	0.0	
(2J)053	JUNCTION	1258.73	12.58	0.0	Yes
(2J)054	JUNCTION	1260.19	10.09	0.0	Yes
(2J)055	JUNCTION	1261.11	6.42	0.0	
(2J)056	JUNCTION	1261.74	5.33	0.0	Yes
(2J)057	JUNCTION	1262.30	4.70	0.0	
(2J)060	JUNCTION	1263.42	4.58	0.0	Yes
(2K)001	JUNCTION	1249.05	21.95	0.0	Yes
(2K)002	JUNCTION	1254.77	16.23	0.0	Yes
(2K)003	JUNCTION	1256.06	13.44	0.0	Yes
(2K)004	JUNCTION	1257.14	12.33	0.0	
(2K)005	JUNCTION	1258.22	10.78	0.0	
(2K)006	JUNCTION	1259.48	10.52	0.0	
(2K)007	JUNCTION	1261.13	9.67	0.0	
(2K)008	JUNCTION	1262.27	8.73	0.0	
(2K)009	JUNCTION	1263.41	8.59	0.0	
(2K)010	JUNCTION	1264.55	8.45	0.0	
(2K)011	JUNCTION	1265.69	8.31	0.0	

Yes				
(2K)012	JUNCTION	1266.83	8.17	0.0
(2K)013	JUNCTION	1267.71	10.29	0.0
Yes				
(2K)014	JUNCTION	1268.42	9.58	0.0
Yes				
(2K)015	JUNCTION	1269.02	8.98	0.0
(2K)016	JUNCTION	1270.08	7.92	0.0
Yes				
(2K)017	JUNCTION	1270.60	7.60	0.0
Yes				
(2K)018	JUNCTION	1271.60	9.00	0.0
Yes				
(2K)018A	JUNCTION	1272.00	8.12	0.0
(2K)019	JUNCTION	1272.70	6.80	0.0
Yes				
(2K)020	JUNCTION	1273.70	7.25	0.0
(2K)021	JUNCTION	1273.80	7.17	0.0
Yes				
(2K)022	JUNCTION	1275.00	7.00	0.0
Yes				
(2K)022A	JUNCTION	1275.40	8.00	0.0
(2K)023	JUNCTION	1276.20	8.10	0.0
(2K)024	JUNCTION	1277.00	7.25	0.0
(2K)024A	JUNCTION	1277.10	9.00	0.0
Yes				
(2K)025	JUNCTION	1278.50	9.18	0.0
Yes				
(2K)026	JUNCTION	1279.82	8.92	0.0
(2K)027	JUNCTION	1284.20	12.80	0.0
Yes				
(2K)028	JUNCTION	1285.03	15.97	0.0
(2K)029	JUNCTION	1286.00	10.00	0.0
Yes				
(2K)030	JUNCTION	1286.96	12.04	0.0
(2K)031	JUNCTION	1288.10	12.90	0.0
(2K)032	JUNCTION	1289.21	11.79	0.0
Yes				
(2K)033	JUNCTION	1290.30	13.70	0.0
Yes				
(2K)033A	JUNCTION	1290.96	11.23	0.0
Yes				
(2K)034	JUNCTION	1291.39	9.70	0.0
(2K)035	JUNCTION	1292.49	8.70	0.0
(2K)036	JUNCTION	1293.59	10.67	0.0
(2K)037	JUNCTION	1294.71	11.29	0.0
Yes				
(2K)038	JUNCTION	1295.09	12.41	0.0
(2K)039	JUNCTION	1295.96	12.54	0.0
(2K)040	JUNCTION	1296.66	13.34	0.0
(2K)041	JUNCTION	1297.51	11.99	0.0
(2K)042	JUNCTION	1298.02	12.18	0.0
(2K)043	JUNCTION	1298.87	11.13	0.0
(2K)044	JUNCTION	1299.72	12.28	0.0
(2K)045	JUNCTION	1300.58	11.42	0.0
(2K)046	JUNCTION	1301.43	9.57	0.0
(2K)047	JUNCTION	1302.28	11.72	0.0
(2K)048	JUNCTION	1303.14	14.36	0.0
(2K)049	JUNCTION	1303.99	11.21	0.0
(2K)050	JUNCTION	1304.68	11.12	0.0
(2K)051	JUNCTION	1305.36	10.54	0.0

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  (2K)052             JUNCTION           1306.05     10.35       0.0
Yes
  (2K)314             JUNCTION           1250.64     18.26       0.0
  (2K)315             JUNCTION           1251.52     17.08       0.0
  (2K)316             JUNCTION           1252.40     16.30       0.0
  (2K)317             JUNCTION           1252.76     14.67       0.0
  ForcedMain          JUNCTION           1148.50     10.00       0.0
  (PLANT)             OUTFALL            1145.00      0.00       0.0
  (1C)026             DIVIDER            1226.87     12.67       0.0
Yes
  (1F)012             DIVIDER            1202.30      7.93       0.0
  (1G)019             DIVIDER            1225.09     13.00       0.0
  (2A)048             DIVIDER            1190.65      7.85       0.0
  (2C)009             DIVIDER            1210.66      9.83       0.0
  (2D)244             DIVIDER            1217.17     11.83       0.0
  (1M)012             DIVIDER            1221.44     14.25       0.0
  (2J)025             DIVIDER            1248.28     17.72       0.0
  (1C)001B            DIVIDER            1193.50     13.50       0.0
Yes
  (1M)020             DIVIDER            1228.05     14.73       0.0
Yes
  (1A)STOR            STORAGE            1100.00     58.00       0.0
  (1A)DIV             STORAGE            1147.99      8.01       0.0
  (2A)000             STORAGE            1130.00     29.00       0.0
  NorthEnidStorage    STORAGE            1239.83      0.00       0.0
  (1O)304C            STORAGE            1239.83     21.17       0.0
  LiftStation         STORAGE            1124.35     22.00       0.0
  (1O)304             STORAGE            1238.81     19.95       0.0
  (1C)Storage         STORAGE            1191.30      6.90       0.0
  PlantStorage        STORAGE            1152.00     11.00       0.0


  ************
  Link Summary
  ************
  Name                From Node        To Node          Type             Length
%Slope Roughness

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  (1A)000A            (1A)000A         (1A)000          CONDUIT            98.7
1.0133    0.0160
  (1A)000B            (1A)000B         (1A)000A         CONDUIT           406.7
0.2237    0.0160
  (1A)001             (1A)001          (1A)000B         CONDUIT           521.0
0.0288    0.0160
  (1A)002             (1A)002          (1A)001          CONDUIT            98.4
0.1118    0.0160
  (1A)003             (1A)003          (1A)002          CONDUIT           391.7
0.3064    0.0160
  (1A)004             (1A)004          (1A)003          CONDUIT           331.5
0.1900    0.0160
  (1A)005             (1A)005          (1A)004          CONDUIT           353.4
0.2462    0.0160
  (1A)006             (1A)006          (1A)005          CONDUIT           446.4
0.4458    0.0160
  (1A)007             (1A)007          (1A)006          CONDUIT           506.3
0.4049    0.0160
  (1A)008             (1A)008          (1A)007          CONDUIT           499.1
0.4107    0.0160
  (1A)009             (1A)009          (1A)008          CONDUIT           504.6
```

					0.1685	0.0160
(1A)010	(1A)010	(1A)009	CONDUIT	502.8	0.3679	0.0160
(1A)011	(1A)011	(1A)010	CONDUIT	484.6	0.0516	0.0160
(1A)012	(1A)012	(1A)011	CONDUIT	555.5	0.0630	0.0160
(1A)013	(1A)013	(1A)012	CONDUIT	424.4	0.2285	0.0160
(1A)014	(1A)014	(1A)013	CONDUIT	184.0	0.3424	0.0160
(1A)015	(1A)015	(1A)014	CONDUIT	185.8	0.4575	0.0160
(1A)016	(1A)016	(1A)015	CONDUIT	495.5	0.1716	0.0160
(1A)017	(1A)017	(1A)016	CONDUIT	524.9	0.1105	0.0160
(1A)018	(1A)018	(1A)017	CONDUIT	271.3	0.3760	0.0160
(1A)019	(1A)019	(1A)018	CONDUIT	183.4	0.0545	0.0160
(1A)020	(1A)020	(1A)019	CONDUIT	298.7	0.4452	0.0160
(1A)021	(1A)021	(1A)020	CONDUIT	537.4	0.3294	0.0160
(1A)022	(1A)022	(1A)021	CONDUIT	382.5	0.5568	0.0160
(1A)023	(1A)023	(1A)022	CONDUIT	499.1	0.3005	0.0160
(1A)024	(1A)024	(1A)023	CONDUIT	479.1	0.4488	0.0160
(1A)024A	(1A)024A	(1A)024	CONDUIT	468.2	0.1004	0.0160
(1A)025	(1A)025	(1A)024A	CONDUIT	29.4	5.7201	0.0160
(1A)026	(1A)026	(1A)025	CONDUIT	568.5	0.3870	0.0160
(1A)027	(1A)027	(1A)026	CONDUIT	345.5	0.5008	0.0160
(1A)028	(1A)028	(1A)027	CONDUIT	407.0	0.1327	0.0160
(1A)029	(1A)029	(1A)028	CONDUIT	234.5	0.3070	0.0160
(1A)030	(1A)030	(1A)029	CONDUIT	424.8	0.1200	0.0160
(1A)031	(1A)031	(1A)030	CONDUIT	501.1	0.2056	0.0160
(1A)032	(1A)032	(1A)031	CONDUIT	452.1	0.1747	0.0160
(1A)033	(1A)033	(1A)032	CONDUIT	448.3	0.1851	0.0160
(1A)034	(1A)034	(1A)033	CONDUIT	424.7	0.1107	0.0160
(1A)035	(1A)035	(1A)034	CONDUIT	360.5	0.2524	0.0160
(1A)035A	(1A)035A	(1A)035	CONDUIT	382.1	0.1178	0.0160
(1A)036	(1A)036	(1A)035A	CONDUIT	128.5	0.3503	0.0160
(1A)037	(1A)037	(1A)036	CONDUIT	450.2	0.1844	0.0160

(1A)038	(1A)038	(1A)037	CONDUIT	337.0	0.0712	0.0160
(1A)039	(1A)039	(1A)038	CONDUIT	307.6	0.3089	0.0160
(1A)040	(1A)040	(1A)039	CONDUIT	374.6	0.1762	0.0160
(1A)041	(1A)041	(1A)040	CONDUIT	177.1	0.1920	0.0160
(1A)042	(1A)042	(1A)041	CONDUIT	338.6	0.1979	0.0160
(1B)001	(1B)001	(1A)024A	CONDUIT	54.4	2.5014	0.0160
(1B)002	(1B)002	(1B)001	CONDUIT	257.9	0.3334	0.0160
(1B)003	(1B)003	(1B)002	CONDUIT	362.2	0.3065	0.0160
(1B)004	(1B)004	(1B)003	CONDUIT	284.2	0.0246	0.0160
(1B)005	(1B)005	(1B)004	CONDUIT	236.2	0.6902	0.0160
(1B)006	(1B)006	(1B)005	CONDUIT	334.7	0.3108	0.0160
(1B)009	(1B)009	(1B)006	CONDUIT	202.2	0.3264	0.0160
(1B)010	(1B)010	(1B)009	CONDUIT	414.0	0.6280	0.0160
(1B)011	(1B)011	(1B)010	CONDUIT	415.3	0.2889	0.0160
(1B)013	(1B)013	(1B)011	CONDUIT	277.0	0.4730	0.0160
(1B)014	(1B)014	(1B)013	CONDUIT	368.3	0.3258	0.0160
(1C)001	(1C)001	(1B)014	CONDUIT	147.8	0.3585	0.0160
(1C)001A	(1C)001A	(1C)001	CONDUIT	306.4	0.3133	0.0160
(1C)001B	(1C)001B	(1C)001A	CONDUIT	143.9	1.9943	0.0160
(1C)001BO	(1C)001B	(1C)001G	CONDUIT	133.3	1.4998	0.0160
(1C)001C	(1C)001C	(1C)001B	CONDUIT	243.0	1.4404	0.0160
(1C)001D	(1C)001D	(1C)001C	CONDUIT	273.6	0.2851	0.0160
(1C)001E	(1C)001E	(1C)001D	CONDUIT	170.8	1.8614	0.0160
(1C)001F	(1C)001F	(1C)001E	CONDUIT	239.7	1.0639	0.0160
(1C)001G	(1C)001G	(1C)Storage	CONDUIT	94.0	1.2766	0.0160
(1C)002	(1C)002	(1C)001	CONDUIT	304.7	2.6584	0.0160
(1C)003	(1C)003	(1C)002	CONDUIT	149.9	0.1667	0.0160
(1C)004	(1C)004	(1C)003	CONDUIT	200.9	0.5874	0.0160
(1C)005	(1C)005	(1C)004	CONDUIT	29.3	0.0341	0.0160
(1C)006	(1C)006	(1C)005	CONDUIT	217.1	0.4513	0.0160
(1C)006A	(1C)006A	(1C)006	CONDUIT	204.5		

					0.6503	0.0160
(1C)007	(1C)007	(1C)006A	CONDUIT	39.4	0.5079	0.0160
(1C)009	(1C)009	(1C)001F	CONDUIT	141.3	0.6863	0.0160
(1C)010	(1C)010	(1C)009	CONDUIT	152.7	1.3422	0.0160
(1C)011	(1C)011	(1C)010	CONDUIT	84.8	0.9672	0.0160
(1C)012	(1C)012	(1C)015A	CONDUIT	178.0	3.3931	0.0160
(1C)015A	(1C)015A	(1C)011	CONDUIT	42.6	0.4223	0.0160
(1C)015B	(1C)015B	(1C)015A	CONDUIT	341.3	0.7560	0.0160
(1C)015C	(1C)015C	(1C)015B	CONDUIT	187.8	0.7135	0.0160
(1C)016	(1C)016	(1C)015D	CONDUIT	317.3	0.4538	0.0160
(1C)016A	(1C)016A	(1C)016	CONDUIT	141.5	0.5583	0.0160
(1C)016B	(1C)016B	(1C)016A	CONDUIT	325.4	0.4118	0.0160
(1C)016C	(1C)016C	(1C)016B	CONDUIT	334.3	0.3979	0.0160
(1C)017	(1C)017	(1C)016	CONDUIT	26.7	11.8593	0.0160
(1C)018	(1C)018	(1C)017	CONDUIT	381.8	0.4085	0.0160
(1C)019	(1C)019	(1C)018	CONDUIT	274.9	0.3819	0.0160
(1C)01D	(1C)015D	(1C)015C	CONDUIT	308.0	0.5064	0.0160
(1C)020	(1C)020	(1C)019	CONDUIT	318.8	0.4078	0.0160
(1C)021	(1C)021	(1C)016C	CONDUIT	320.8	0.7202	0.0160
(1C)021A	(1C)021A	(1C)021	CONDUIT	423.9	0.1793	0.0160
(1C)021B	(1C)021B	(1C)021A	CONDUIT	229.1	0.3666	0.0160
(1C)021C	(1C)021C	(1C)021B	CONDUIT	347.5	0.3338	0.0160
(1C)021D	(1C)021D	(1C)021C	CONDUIT	320.8	0.3055	0.0160
(1C)022	(1C)022	(1C)021	CONDUIT	160.4	0.4426	0.0160
(1C)023	(1C)023	(1C)022	CONDUIT	404.8	0.3261	0.0160
(1C)024	(1C)024	(1C)023	CONDUIT	248.3	0.3665	0.0160
(1C)025	(1C)025	(1C)024	CONDUIT	263.5	0.1518	0.0160
(1C)026	(1C)026	(1C)025	CONDUIT	397.1	0.3299	0.0160
(1C)026A	(1C)026	(1C)021D	CONDUIT	168.1	1.7315	0.0160
(1C)027	(1C)027	(1C)026	CONDUIT	324.6	0.3296	0.0160
(1C)028	(1C)028	(1C)027	CONDUIT	328.4	0.3258	0.0160

(1C)041	(1C)041	(1C)007	CONDUIT	325.0	0.6492	0.0160
(1C)176	(1C)176	(1C)002	CONDUIT	334.0	0.9461	0.0160
(1C)177	(1C)177	(1C)176	CONDUIT	319.4	0.9394	0.0160
(1C)178	(1C)178	(1C)177	CONDUIT	342.3	0.9320	0.0160
(1C)179	(1C)179	(1C)178	CONDUIT	319.3	0.9427	0.0160
(1C)179A	(1C)179A	(1C)179	CONDUIT	16.7	0.5992	0.0160
(1C)180	(1C)180	(1C)179A	CONDUIT	321.4	0.9365	0.0160
(1C)180A	(1C)180A	(1C)180	CONDUIT	319.4	0.9362	0.0160
(1C)181	(1C)181	(1C)180A	CONDUIT	317.3	0.9266	0.0160
(1C)182	(1C)182	(1C)181	CONDUIT	169.1	0.9168	0.0160
(1C)Storage	(1C)Storage	(1C)001	CONDUIT	194.4	0.8386	0.0160
(1D)001	(1D)001	(1A)017	CONDUIT	287.6	2.5558	0.0160
(1D)002	(1D)002	(1D)001	CONDUIT	203.8	0.8880	0.0160
(1D)003	(1D)003	(1D)002	CONDUIT	143.9	1.0771	0.0160
(1D)004	(1D)004	(1D)003	CONDUIT	264.9	1.8196	0.0160
(1D)005	(1D)005	(1D)004	CONDUIT	252.6	0.7680	0.0160
(1D)006	(1D)006	(1D)005	CONDUIT	214.3	0.9567	0.0160
(1D)007	(1D)007	(1D)006	CONDUIT	412.1	0.9293	0.0160
(1D)008	(1D)008	(1D)007	CONDUIT	428.9	0.9349	0.0160
(1D)009	(1D)009	(1D)008	CONDUIT	404.2	0.4181	0.0160
(1D)010	(1D)010	(1D)009	CONDUIT	204.6	0.4008	0.0160
(1D)011	(1D)011	(1D)010	CONDUIT	54.9	1.3120	0.0160
(1D)012	(1D)012	(1D)011	CONDUIT	182.1	0.4502	0.0160
(1D)013	(1D)013	(1D)012	CONDUIT	352.9	2.0229	0.0160
(1D)014	(1D)014	(1D)013	CONDUIT	327.5	0.5038	0.0160
(1D)015	(1D)015	(1D)014	CONDUIT	338.4	0.4196	0.0160
(1D)016	(1D)016	(1D)015	CONDUIT	328.5	0.2983	0.0160
(1D)017	(1D)017	(1D)016	CONDUIT	336.3	0.2914	0.0160
(1D)018	(1D)018	(1D)017	CONDUIT	328.9	0.2980	0.0160
(1D)019	(1D)019	(1D)018	CONDUIT	331.6	0.3016	0.0160
(1D)020	(1D)020	(1D)019	CONDUIT	318.2		

					0.2986	0.0160
(1D)021	(1D)021	(1D)020	CONDUIT	317.9	0.3020	0.0160
(1D)022	(1D)022	(1D)021	CONDUIT	343.1	0.2973	0.0160
(1D)023	(1D)023	(1D)022	CONDUIT	329.3	0.2976	0.0160
(1E)001	(1E)001	(1A)041	CONDUIT	147.8	0.3585	0.0160
(1E)002	(1E)002	(1E)001	CONDUIT	378.7	0.3274	0.0160
(1E)003	(1E)003	(1E)002	CONDUIT	482.1	0.3153	0.0160
(1E)003A	(1E)003A	(1E)003	CONDUIT	391.1	0.3273	0.0160
(1E)005	(1E)005	(1E)003A	CONDUIT	502.3	0.3185	0.0160
(1E)006	(1E)006	(1E)005	CONDUIT	425.5	0.3290	0.0160
(1E)007	(1E)007	(1E)006	CONDUIT	316.1	0.3290	0.0160
(1E)008	(1E)008	(1E)007	CONDUIT	536.0	0.3097	0.0160
(1E)009	(1E)009	(1E)008	CONDUIT	234.2	0.3544	0.0160
(1F)001	(1F)001	(1J)002	CONDUIT	275.9	0.4386	0.0160
(1F)003	(1F)003	(1F)001	CONDUIT	340.6	1.1655	0.0160
(1F)004	(1F)004	(1F)003	CONDUIT	294.1	0.1972	0.0160
(1F)005	(1F)005	(1F)004	CONDUIT	174.0	0.0575	0.0160
(1F)006	(1F)006	(1F)005	CONDUIT	180.9	0.1271	0.0160
(1F)008	(1F)008	(1F)006	CONDUIT	333.2	0.0930	0.0160
(1F)008A	(1F)008A	(1F)008	CONDUIT	158.3	0.0758	0.0160
(1F)009	(1F)009	(1F)008A	CONDUIT	19.7	0.5066	0.0160
(1F)010	(1F)010	(1F)009	CONDUIT	159.3	0.1067	0.0160
(1F)011	(1F)011	(1F)010	CONDUIT	347.2	0.1843	0.0160
(1F)012	(1F)012	(1F)011	CONDUIT	389.9	0.2180	0.0160
(1F)012A	(1F)012A	(1F)012	CONDUIT	78.9	0.2154	0.0160
(1F)012O	(1F)012	(1J)011	CONDUIT	130.3	2.4948	0.0160
(1F)013	(1F)013	(1F)012A	CONDUIT	481.6	0.2762	0.0160
(1F)014	(1F)014	(1F)013	CONDUIT	182.0	0.0549	0.0160
(1F)015	(1F)015	(1F)014	CONDUIT	253.0	0.4269	0.0160
(1F)016	(1F)016	(1F)015	CONDUIT	204.8	0.3759	0.0160
(1F)017	(1F)017	(1J)014	CONDUIT	249.3	0.2086	0.0160

(1F)017A	(1F)017A	(1F)017	CONDUIT	188.8	0.2066	0.0160
(1F)017B	(1F)017B	(1F)017A	CONDUIT	69.7	0.2153	0.0160
(1F)017C	(1F)017C	(1F)017B	CONDUIT	148.4	0.2358	0.0160
(1F)017D	(1F)017D	(1F)017C	CONDUIT	94.5	0.1269	0.0160
(1F)017E	(1F)017E	(1F)017D	CONDUIT	183.7	0.2068	0.0160
(1F)017F	(1F)017F	(1F)017E	CONDUIT	26.5	3.2867	0.0160
(1F)017G-1	(1F)017G	(1F)017F	CONDUIT	98.6	2.9513	0.0160
(1F)018	(1F)018	(1F)017G	CONDUIT	165.3	0.6231	0.0160
(1F)019	(1F)019	(1F)018	CONDUIT	145.7	0.5080	0.0160
(1F)020	(1F)020	(1F)019	CONDUIT	510.5	0.5015	0.0160
(1F)021	(1F)021	(1F)020	CONDUIT	426.6	0.4336	0.0160
(1F)022	(1F)022	(1F)021	CONDUIT	325.8	0.4635	0.0160
(1F)023	(1F)023	(1F)022	CONDUIT	209.0	0.5215	0.0160
(1F)024	(1F)024	(1F)023	CONDUIT	263.7	2.5557	0.0160
(1F)025	(1F)025	(1F)024	CONDUIT	209.0	2.6025	0.0160
(1F)026	(1F)026	(1F)025	CONDUIT	222.4	2.6933	0.0160
(1F)026A	(1F)026A	(1F)026	CONDUIT	213.9	0.2665	0.0160
(1F)027	(1F)027	(1F)026A	CONDUIT	212.7	0.2821	0.0160
(1F)028	(1F)028	(1F)027	CONDUIT	186.6	0.2733	0.0160
(1F)029	(1F)029	(1F)028	CONDUIT	204.3	0.2887	0.0160
(1F)029A	(1F)029A	(1F)029	CONDUIT	216.3	0.2773	0.0160
(1F)030	(1F)030	(1F)029A	CONDUIT	264.9	0.2793	0.0160
(1G)001	(1G)001	(1F)017E	CONDUIT	495.7	0.1775	0.0160
(1G)001A	(1G)001A	(1G)001	CONDUIT	186.6	0.2090	0.0160
(1G)002	(1G)002	(1G)001A	CONDUIT	221.2	0.2124	0.0160
(1G)003	(1G)003	(1G)002	CONDUIT	255.8	0.1056	0.0160
(1G)004	(1G)004	(1G)003	CONDUIT	209.7	0.1574	0.0160
(1G)005	(1G)005	(1G)004	CONDUIT	199.2	0.2510	0.0160
(1G)006	(1G)006	(1G)005	CONDUIT	179.5	0.0557	0.0160
(1G)007	(1G)007	(1G)006	CONDUIT	125.3	0.3032	0.0160
(1G)008	(1G)008A	(1G)007	CONDUIT	420.1		

					0.1714	0.0160
(1G)008C	(1G)008C	(1G)008B	CONDUIT	228.5	0.1663	0.0160
(1G)009	(1G)008B	(1G)008A	CONDUIT	205.5	0.4380	0.0160
(1G)009A	(1G)009A	(1G)008C	CONDUIT	168.8	0.2192	0.0160
(1G)009B	(1G)009B	(1G)009A	CONDUIT	204.4	0.2201	0.0160
(1G)009C	(1G)009C	(1G)009B	CONDUIT	218.1	0.2064	0.0160
(1G)009D	(1G)009D	(1G)009C	CONDUIT	31.4	0.1908	0.0160
(1G)009E	(1G)009E	(1G)009D	CONDUIT	148.9	0.1679	0.0160
(1G)010	(1G)010	(1G)009E	CONDUIT	227.8	0.2107	0.0160
(1G)011	(1G)011	(1G)010	CONDUIT	168.8	0.2133	0.0160
(1G)012	(1G)012	(1G)011	CONDUIT	255.6	0.2074	0.0160
(1G)013	(1G)013	(1G)012	CONDUIT	249.6	0.2003	0.0160
(1G)014	(1G)014	(1G)009B	CONDUIT	149.9	7.6518	0.0160
(1G)014A	(1G)014A	(1G)014	CONDUIT	179.3	0.3570	0.0160
(1G)015	(1G)015	(1G)014A	CONDUIT	341.2	0.3283	0.0160
(1G)016	(1G)016	(1G)015	CONDUIT	230.4	0.3385	0.0160
(1G)017	(1G)017	(1G)016	CONDUIT	205.1	0.3511	0.0160
(1G)018	(1G)018	(1G)017	CONDUIT	238.3	0.3441	0.0160
(1G)018A	(1G)018A	(1G)018	CONDUIT	20.3	0.8374	0.0160
(1G)019	(1G)019	(1G)162C	CONDUIT	232.2	2.1961	0.0160
(1G)019O	(1G)019	(1G)018A	CONDUIT	275.0	0.3272	0.0160
(1G)020	(1G)020	(1G)019	CONDUIT	194.9	0.3591	0.0160
(1G)045	(1G)045	(1G)020	CONDUIT	194.9	1.0056	0.0160
(1G)046	(1G)046	(1G)045	CONDUIT	271.2	0.3650	0.0160
(1G)047	(1G)047	(1G)046	CONDUIT	108.3	0.3232	0.0160
(1G)048	(1G)048	(1G)047	CONDUIT	382.0	0.3168	0.0160
(1G)049	(1G)049	(1G)048	CONDUIT	190.0	0.2947	0.0160
(1G)050	(1G)050	(1G)049	CONDUIT	185.0	0.2108	0.0160
(1G)051	(1G)051	(1G)050	CONDUIT	193.0	0.2200	0.0160
(1G)052	(1G)052	(1G)051	CONDUIT	182.0	0.2200	0.0160
(1G)053	(1G)053	(1G)052	CONDUIT	380.0	0.2200	0.0160

(1G)054	(1G)054	(1G)053	CONDUIT	365.0	0.2200	0.0160
(1G)055	(1G)055	(1G)054	CONDUIT	365.0	0.2200	0.0160
(1G)056	(1G)056	(1G)055	CONDUIT	363.0	0.2200	0.0160
(1G)057	(1G)057	(1G)056	CONDUIT	365.0	0.5000	0.0160
(1G)058	(1G)058	(1G)057	CONDUIT	365.0	0.5000	0.0160
(1G)059	(1G)059	(1G)058	CONDUIT	342.0	0.5000	0.0160
(1G)060	(1G)060	(1G)059	CONDUIT	29.0	0.5000	0.0160
(1G)061	(1G)061	(1G)060	CONDUIT	339.0	0.5000	0.0160
(1G)062	(1G)062	(1G)061	CONDUIT	334.0	0.6000	0.0160
(1G)063	(1G)063	(1G)062	CONDUIT	60.0	0.6000	0.0160
(1G)064	(1G)064	(1G)063	CONDUIT	356.0	0.6000	0.0160
(1G)065	(1G)065	(1G)064	CONDUIT	245.0	0.6000	0.0160
(1G)066	(1G)066	(1G)065	CONDUIT	159.0	0.6000	0.0160
(1G)067	(1G)067	(1G)066	CONDUIT	285.0	0.6000	0.0160
(1G)068	(1G)068	(1G)067	CONDUIT	351.0	0.6000	0.0160
(1G)069	(1G)069	(1G)068	CONDUIT	421.0	0.6000	0.0160
(1G)070	(1G)070	(1G)069	CONDUIT	360.0	0.6000	0.0160
(1G)071	(1G)071	(1G)070	CONDUIT	277.0	0.6000	0.0160
(1G)146	(1G)146	(1G)002	CONDUIT	103.8	0.3951	0.0160
(1G)146A	(1G)146A	(1G)146	CONDUIT	49.8	0.5221	0.0160
(1G)162	(1G)162	(1G)162D	CONDUIT	495.8	0.3207	0.0160
(1G)162A	(1G)162A	(1G)162	CONDUIT	280.9	0.3346	0.0160
(1G)162B	(1G)162B	(1G)162A	CONDUIT	198.6	0.3525	0.0160
(1G)162C	(1G)162C	(1G)162B	CONDUIT	249.4	0.3328	0.0160
(1G)162D	(1G)162D	(1G)009E	CONDUIT	51.4	13.0401	0.0160
(1G)243	(1G)243	(1G)045	CONDUIT	432.8	0.3166	0.0160
(1H)001	(1H)001	(1F)023	CONDUIT	209.5	0.5108	0.0160
(1H)004	(1H)004	(1J)050	CONDUIT	60.0	2.2818	0.0160
(1H)005	(1H)005	(1H)004	CONDUIT	289.0	0.0069	0.0160
(1H)006	(1H)006	(1H)005	CONDUIT	350.8	0.4276	0.0160
(1H)007	(1H)007	(1H)006	CONDUIT	184.1		

0.4942 0.0160
(1H)008 (1H)008 (1H)007 CONDUIT 259.0
0.4518 0.0160
(1H)009 (1H)009 (1H)008 CONDUIT 25.2
0.5564 0.0160
(1H)010 (1H)010 (1H)009 CONDUIT 139.4
0.2798 0.0160
(1H)011 (1H)011 (1H)010 CONDUIT 32.9
1.8530 0.0160
(1H)038 (1H)038 (1H)001 CONDUIT 201.7
1.4129 0.0160
(1H)039 (1H)039 (1H)038 CONDUIT 271.1
1.9258 0.0160
(1H)040 (1H)040 (1H)039 CONDUIT 38.6
11.4678 0.0160
(1H)041 (1H)041 (1H)040 CONDUIT 253.5
0.2130 0.0160
(1H)042 (1H)042 (1H)041 CONDUIT 156.1
1.1854 0.0160
(1H)043 (1H)043 (1H)042 CONDUIT 77.1
0.6357 0.0160
(1H)044 (1H)044 (1H)043 CONDUIT 246.0
0.5203 0.0160
(1H)045 (1H)045 (1H)044 CONDUIT 189.0
0.4974 0.0160
(1J)001 (1J)001 (1A)042 CONDUIT 243.9
0.3526 0.0160
(1J)002 (1J)002 (1J)001 CONDUIT 397.0
0.2670 0.0160
(1J)003 (1J)003 (1J)002 CONDUIT 323.9
0.2346 0.0160
(1J)004 (1J)004 (1J)003 CONDUIT 415.8
0.1828 0.0160
(1J)005 (1J)005 (1J)004 CONDUIT 456.3
0.1665 0.0160
(1J)006 (1J)006 (1J)005 CONDUIT 380.4
0.1893 0.0160
(1J)007 (1J)007 (1J)006 CONDUIT 226.3
0.2210 0.0160
(1J)008 (1J)008 (1J)007 CONDUIT 98.0
0.3368 0.0160
(1J)009 (1J)009 (1J)008 CONDUIT 228.5
0.1663 0.0160
(1J)010 (1J)010 (1J)009 CONDUIT 260.2
0.2267 0.0160
(1J)011 (1J)011 (1J)010 CONDUIT 185.4
0.1241 0.0160
(1J)012 (1J)012 (1J)011 CONDUIT 274.3
0.1860 0.0160
(1J)013 (1J)013 (1J)012 CONDUIT 247.8
0.2058 0.0160
(1J)014 (1J)014 (1J)013 CONDUIT 135.9
0.2576 0.0160
(1J)041 (1J)041 (1J)014 CONDUIT 61.7
0.7778 0.0160
(1J)042 (1J)042 (1J)041 CONDUIT 230.3
1.4152 0.0160
(1J)042A (1J)042A (1J)042 CONDUIT 179.8
1.2905 0.0160
(1J)042B (1J)042B (1J)042A CONDUIT 211.0
1.7153 0.0160

(1J)043	(1J)043	(1J)042B	CONDUIT	301.4	0.9822	0.0160
(1J)044	(1J)044	(1J)043	CONDUIT	505.5	0.1563	0.0160
(1J)045	(1J)045	(1J)044	CONDUIT	400.3	0.1574	0.0160
(1J)046	(1J)046	(1J)045	CONDUIT	205.1	0.1024	0.0160
(1J)047	(1J)047	(1J)046	CONDUIT	63.8	0.1568	0.0160
(1J)048	(1J)048	(1J)047	CONDUIT	56.8	0.9685	0.0160
(1J)050	(1J)050	(1J)048	CONDUIT	352.9	0.4393	0.0160
(1J)050A	(1J)050A	(1J)050	CONDUIT	56.7	0.1586	0.0160
(1J)051	(1J)051	(1J)050A	CONDUIT	347.4	0.5153	0.0160
(1J)052	(1J)052	(1J)051	CONDUIT	236.6	0.0211	0.0160
(1J)053	(1J)053	(1J)052	CONDUIT	84.6	0.1773	0.0160
(1J)054	(1J)054	(1J)053	CONDUIT	290.7	0.4575	0.0160
(1J)054A	(1J)054A	(1J)054	CONDUIT	70.5	0.4394	0.0160
(1J)055	(1J)055	(1J)054A	CONDUIT	296.5	0.0304	0.0160
(1J)056	(1J)056	(1J)055	CONDUIT	411.3	0.1994	0.0160
(1J)057	(1J)057	(1J)056	CONDUIT	344.8	0.1624	0.0160
(1J)058	(1J)058	(1J)057	CONDUIT	312.6	0.2143	0.0160
(1J)059	(1J)059	(1J)058	CONDUIT	336.4	0.0862	0.0160
(1J)060	(1J)060	(1J)059	CONDUIT	332.2	0.0632	0.0160
(1K)001	(1K)001	(1J)060	CONDUIT	266.1	2.2169	0.0160
(1K)002	(1K)002	(1K)001	CONDUIT	28.1	1.8855	0.0160
(1K)002A	(1K)002A	(1K)002	CONDUIT	23.8	1.8900	0.0160
(1K)003	(1K)003	(1K)002A	CONDUIT	106.2	0.3580	0.0160
(1K)004	(1K)004	(1K)003	CONDUIT	326.6	0.1837	0.0160
(1K)005	(1K)005	(1K)004	CONDUIT	363.5	0.2366	0.0160
(1K)006	(1K)006	(1K)005	CONDUIT	41.2	0.0243	0.0160
(1K)007	(1K)007	(1K)006	CONDUIT	377.3	0.2359	0.0160
(1K)008	(1K)008	(1K)007	CONDUIT	349.3	0.2262	0.0160
(1K)008A	(1K)008A	(1K)008	CONDUIT	103.6	0.4248	0.0160
(1K)009	(1K)009	(1K)008A	CONDUIT	263.0	0.1369	0.0160
(1K)010	(1K)010	(1K)009	CONDUIT	364.3		

0.2141 0.0160
(1K)011 (1K)011 (1K)010 CONDUIT 181.1
0.2539 0.0160
(1K)012 (1K)012 (1K)011 CONDUIT 419.6
0.2097 0.0160
(1K)013 (1K)013 (1K)012 CONDUIT 510.8
0.1175 0.0160
(1K)014 (1K)014 (1K)013 CONDUIT 263.4
0.1822 0.0160
(1M)000 (1M)000 (1G)013 CONDUIT 165.1
0.2543 0.0160
(1M)000A (1M)001B (1M)000 CONDUIT 58.7
0.8856 0.0160
(1M)000B (1M)001A (1M)001B CONDUIT 385.8
0.2696 0.0160
(1M)001 (1M)001 (1M)001A CONDUIT 301.0
0.4884 0.0160
(1M)002 (1M)002 (1M)001 CONDUIT 337.5
0.2667 0.0160
(1M)003 (1M)003 (1M)002 CONDUIT 181.4
0.3307 0.0160
(1M)010 (1M)010 (1M)282 CONDUIT 38.8
0.4898 0.0160
(1M)011 (1M)011 (1M)010 CONDUIT 396.6
0.2421 0.0160
(1M)012 (1M)012 (1M)011 CONDUIT 20.7
0.6760 0.0160
(1M)012O (1M)012 (1M)038 CONDUIT 297.0
0.1482 0.0160
(1M)013 (1M)013 (1M)012 CONDUIT 474.8
0.2401 0.0160
(1M)014 (1M)014 (1M)013 CONDUIT 421.3
0.2445 0.0160
(1M)015 (1M)015 (1M)014 CONDUIT 431.0
0.2436 0.0160
(1M)016 (1M)016 (1M)015 CONDUIT 492.3
0.2397 0.0160
(1M)017 (1M)017 (1M)016 CONDUIT 14.2
0.9142 0.0160
(1M)018 (1M)018 (1M)017 CONDUIT 191.8
0.2711 0.0160
(1M)019 (1M)019 (1M)018 CONDUIT 322.0
0.2516 0.0160
(1M)020 (1M)020 (1M)019 CONDUIT 299.5
0.2504 0.0160
(1M)020O (1M)020 (1M)123 CONDUIT 22.2
1.4401 0.0160
(1M)021 (1M)021 (1M)020 CONDUIT 321.0
0.3302 0.0160
(1M)022 (1M)022 (1M)021 CONDUIT 178.5
0.3586 0.0160
(1M)023 (1M)023 (1M)022 CONDUIT 178.6
0.3640 0.0160
(1M)024 (1M)024 (1M)023 CONDUIT 435.4
0.3216 0.0160
(1M)024A (1M)025 (1M)024 CONDUIT 266.5
0.3377 0.0160
(1M)025 (1M)026 (1M)025 CONDUIT 239.3
0.3384 0.0160
(1M)027 (1M)027 (1M)026 CONDUIT 414.2
0.3259 0.0160

(1M)028	(1M)028	(1M)027	CONDUIT	296.9	0.3334	0.0160
(1M)035	(1M)035	(1M)281	CONDUIT	147.0	0.2925	0.0160
(1M)036	(1M)036	(1M)035	CONDUIT	158.3	0.2842	0.0160
(1M)037	(1M)037	(1M)036	CONDUIT	163.4	0.3549	0.0160
(1M)038	(1M)038	(1M)037	CONDUIT	153.3	0.3588	0.0160
(1M)039	(1M)039	(1M)012	CONDUIT	97.6	0.9526	0.0160
(1M)040	(1M)040	(1M)039	CONDUIT	166.0	0.3917	0.0160
(1M)041	(1M)041	(1M)040	CONDUIT	306.9	0.3324	0.0160
(1M)092	(1M)092	(1M)041	CONDUIT	316.7	0.3252	0.0160
(1M)093	(1M)093	(1M)092	CONDUIT	14.8	1.0825	0.0160
(1M)094	(1M)094	(1M)093	CONDUIT	481.1	0.3159	0.0160
(1M)116	(1M)116	(1M)094	CONDUIT	27.6	0.6874	0.0160
(1M)117	(1M)117	(1M)116	CONDUIT	42.8	0.5376	0.0160
(1M)118	(1M)118	(1M)117	CONDUIT	160.2	0.3682	0.0160
(1M)119	(1M)119	(1M)118	CONDUIT	339.8	0.3414	0.0160
(1M)120	(1M)120	(1M)119	CONDUIT	24.9	0.7232	0.0160
(1M)121	(1M)121	(1M)120	CONDUIT	341.4	0.3281	0.0160
(1M)122	(1M)122	(1M)121	CONDUIT	167.3	0.3647	0.0160
(1M)123	(1M)123	(1M)122	CONDUIT	270.4	0.3328	0.0160
(1M)124	(1M)124	(1M)123	CONDUIT	363.2	0.3304	0.0160
(1M)125	(1M)125	(1M)124	CONDUIT	195.8	0.3423	0.0160
(1M)126	(1M)126	(1M)125	CONDUIT	158.8	0.3716	0.0160
(1M)127	(1M)127	(1M)126	CONDUIT	407.8	0.3237	0.0160
(1M)128	(1M)128	(1M)127	CONDUIT	190.2	0.3575	0.0160
(1M)129	(1M)129	(1M)128	CONDUIT	280.5	0.3315	0.0160
(1M)130	(1M)130	(1M)129	CONDUIT	44.2	0.5208	0.0160
(1M)131	(1M)131	(1M)130	CONDUIT	140.5	0.3773	0.0160
(1M)132	(1M)132	(1M)131	CONDUIT	321.8	0.3294	0.0160
(1M)133	(1M)133	(1M)132	CONDUIT	302.2	0.3309	0.0160
(1M)161	(1M)161	(1M)020	CONDUIT	424.0	1.8750	0.0160
(1M)162	(1M)162	(1M)161	CONDUIT	354.0		

0.5000 0.0160
(1M)163 (1M)163 (1M)162 CONDUIT 358.0
0.5000 0.0160
(1M)164 (1M)164 (1M)163 CONDUIT 360.0
0.5000 0.0160
(1M)165 (1M)165 (1M)164 CONDUIT 366.0
0.5000 0.0160
(1M)278 (1M)278 (1M)003 CONDUIT 369.7
0.2651 0.0160
(1M)279 (1M)279 (1M)278 CONDUIT 168.9
0.2782 0.0160
(1M)279B (1M)279B (1M)279 CONDUIT 140.3
0.3137 0.0160
(1M)281 (1M)281 (1M)279B CONDUIT 255.6
0.4108 0.0160
(1M)281B (1M)281B (1M)281 CONDUIT 148.2
0.4454 0.0160
(1M)282 (1M)282 (1M)281B CONDUIT 290.2
0.1723 0.0160
(1M)283 (1M)283 (1M)282 CONDUIT 183.4
0.2999 0.0160
(1M)284 (1M)284 (1N)112B CONDUIT 165.6
0.2235 0.0160
(1M)285 (1M)285 (1M)284 CONDUIT 404.9
0.2420 0.0160
(1M)285A (1M)285A (1M)285 CONDUIT 171.8
0.2387 0.0160
(1M)286 (1M)286 (1M)285A CONDUIT 237.4
0.2191 0.0160
(1M)287 (1M)287 (1M)286A CONDUIT 241.6
0.2774 0.0160
(1M)2876A (1M)286A (1M)286 CONDUIT 244.4
0.2742 0.0160
(1M)288 (1M)288 (1M)287 CONDUIT 270.9
0.2768 0.0160
(1M)288A (1M)288A (1M)288 CONDUIT 189.9
0.2896 0.0160
(1M)288B (1M)288B (1M)288A CONDUIT 224.8
0.2847 0.0160
(1M)288C (1M)288C (1M)288B CONDUIT 226.2
0.2431 0.0160
(1N)004 (1N)004 (1M)283 CONDUIT 193.4
0.2637 0.0160
(1N)005 (1N)005 (1N)004 CONDUIT 336.5
0.2675 0.0160
(1N)006 (1N)006 (1N)005 CONDUIT 371.4
0.2828 0.0160
(1N)007 (1N)007 (1N)006 CONDUIT 358.0
0.2877 0.0160
(1N)007D (1N)007D (1N)007 CONDUIT 59.2
0.4727 0.0160
(1N)007E (1N)007E (1N)007 CONDUIT 98.0
0.5408 0.0160
(1N)008 (1N)008 (1N)007E CONDUIT 315.6
0.3327 0.0160
(1N)009 (1N)009 (1N)008 CONDUIT 146.6
0.3615 0.0160
(1N)011 (1N)011 (1N)009 CONDUIT 344.9
0.3276 0.0160
(1N)013 (1N)013 (1N)011 CONDUIT 353.3
0.3312 0.0160

(1N)014	(1N)014	(1N)013	CONDUIT	358.9	0.3260	0.0160
(1N)015	(1N)015	(1N)014	CONDUIT	148.7	0.3699	0.0160
(1N)016	(1N)016	(1N)015	CONDUIT	269.8	0.3336	0.0160
(1N)017	(1N)017	(1N)016	CONDUIT	324.0	0.3334	0.0160
(1N)018	(1N)018	(1N)017	CONDUIT	160.6	0.3612	0.0160
(1N)019	(1N)019	(1N)018	CONDUIT	198.4	0.2822	0.0160
(1N)020	(1N)020	(1N)019	CONDUIT	277.7	0.3853	0.0160
(1N)021	(1N)021	(1N)020	CONDUIT	322.6	0.3317	0.0160
(1N)022	(1N)022	(1N)021	CONDUIT	319.8	0.3315	0.0160
(1N)023	(1N)023	(1N)022	CONDUIT	328.1	0.3322	0.0160
(1N)024	(1N)024	(1N)023	CONDUIT	319.8	0.3284	0.0160
(1N)025	(1N)025	(1N)024	CONDUIT	431.5	0.3245	0.0160
(1N)045	(1N)045	(1N)007D	CONDUIT	360.3	0.9687	0.0160
(1N)046	(1N)046	(1N)045	CONDUIT	434.4	0.3660	0.0160
(1N)047	(1N)047	(1N)046	CONDUIT	334.2	0.3381	0.0160
(1N)109A	(1N)109A	(1N)007	CONDUIT	391.0	0.2225	0.0160
(1N)110	(1N)110	(1N)109A	CONDUIT	230.4	0.3732	0.0160
(1N)111A	(1N)111A	(1N)110	CONDUIT	374.2	0.2298	0.0160
(1N)112A	(1N)112A	(1N)111A	CONDUIT	333.7	0.2517	0.0160
(1N)112B	(1N)112B	(1N)112A	CONDUIT	150.8	0.3182	0.0160
(1O)001	(1O)001	(1M)028	CONDUIT	103.1	0.3782	0.0160
(1O)001A	(1O)001A	(1O)001	CONDUIT	229.3	0.3532	0.0160
(1O)002	(1O)002	(1O)001A	CONDUIT	19.6	0.7637	0.0160
(1O)002A	(1O)002A	(1O)002	CONDUIT	17.8	0.7874	0.0160
(1O)003	(1O)003	(1O)002A	CONDUIT	183.0	0.3607	0.0160
(1O)004	(1O)004	(1O)003	CONDUIT	154.1	0.3569	0.0160
(1O)005A	(1O)005A	(1O)004	CONDUIT	209.1	0.3540	0.0160
(1O)005B	(1O)005B	(1O)005A	CONDUIT	43.4	0.4379	0.0160
(1O)005C	(1O)005C	(1O)005B	CONDUIT	34.9	0.5152	0.0160
(1O)005D	(1O)005D	(1O)005C	CONDUIT	30.6	0.5225	0.0160
(1O)005E	(1O)005E	(1O)005C	CONDUIT	32.8		

0.5183	0.0160			
(1O)010	(1O)010	(1O)309	CONDUIT	295.0
0.0447	0.0160			
(1O)011	(1O)011	(1O)010	CONDUIT	146.0
0.0440	0.0160			
(1O)012	(1O)012	(1O)011	CONDUIT	245.0
0.3000	0.0160			
(1O)013	(1O)013	(1O)012	CONDUIT	330.0
0.3000	0.0160			
(1O)014	(1O)014	(1O)013	CONDUIT	124.0
0.3000	0.0160			
(1O)015	(1O)015	(1O)014	CONDUIT	429.0
0.3000	0.0160			
(1O)016	(1O)016	(1O)015	CONDUIT	315.0
0.3000	0.0160			
(1O)017	(1O)017	(1O)016	CONDUIT	412.0
0.3000	0.0160			
(1O)018	(1O)018	(1O)017	CONDUIT	428.0
0.3000	0.0160			
(1O)019	(1O)019	(1O)018	CONDUIT	406.0
0.4000	0.0160			
(1O)020	(1O)020	(1O)019	CONDUIT	372.0
0.4000	0.0160			
(1O)021	(1O)021	(1O)020	CONDUIT	208.0
0.4000	0.0160			
(1O)072	(1O)072	(1O)303	CONDUIT	314.2
0.2705	0.0160			
(1O)157	(1O)157	(1O)308A	CONDUIT	169.9
0.2679	0.0160			
(1O)300	(1O)300	(1M)288C	CONDUIT	217.0
0.2903	0.0160			
(1O)301	(1O)301	(1O)300	CONDUIT	266.7
0.2924	0.0160			
(1O)302	(1O)302	(1O)301	CONDUIT	304.4
0.2727	0.0160			
(1O)303	(1O)303	(1O)302	CONDUIT	312.7
0.2750	0.0160			
(1O)304	(1O)304	(1O)072	CONDUIT	261.1
0.2489	0.0160			
(1O)304A	(1O)304A	(1O)304B	CONDUIT	190.9
5.0765	0.0160			
(1O)304B	(1O)304B	(1O)304C	CONDUIT	60.8
0.2796	0.0160			
(1O)304C	(1O)304C	(1O)005D	CONDUIT	33.0
0.0303	0.0160			
(1O)305	(1O)305	(1O)305A	CONDUIT	305.8
0.0176	0.0160			
(1O)305A	(1O)305A	(1O)304	CONDUIT	40.6
23.8729	0.0160			
(1O)306	(1O)306	(1O)305	CONDUIT	301.6
0.2767	0.0160			
(1O)306A	(1O)306A	(1O)306	CONDUIT	305.8
0.2759	0.0160			
(1O)307	(1O)307	(1O)306A	CONDUIT	155.0
0.2767	0.0160			
(1O)308	(1O)308	(1O)307	CONDUIT	185.3
0.2733	0.0160			
(1O)308A	(1O)308A	(1O)308	CONDUIT	52.4
0.2786	0.0160			
(1O)309	(1O)309	(1O)308	CONDUIT	160.0
0.2566	0.0160			

(1P)003	(1P)003	(1P)002	CONDUIT	46.9	0.8953	0.0130
(1P)004	(1P)004	(1P)003	CONDUIT	378.6	0.3857	0.0130
(1P)005	(1P)005	(1P)004	CONDUIT	389.2	0.6732	0.0130
(1P)006	(1P)006	(1P)005	CONDUIT	472.2	0.4490	0.0130
(1P)007	(1P)007	(1P)006	CONDUIT	472.1	0.8345	0.0130
(1P)008	(1P)008	(1P)007	CONDUIT	486.5	0.5015	0.0130
(1P)008A	(1P)008A	(1P)008	CONDUIT	27.0	1.8525	0.0130
(1P)009	(1P)009	(1P)008A	CONDUIT	232.4	1.4032	0.0130
(1P)010	(1P)010	(1P)009	CONDUIT	52.7	0.5414	0.0130
(1P)011	(1P)011	(1P)010	CONDUIT	394.9	0.6011	0.0130
(1P)012	(1P)012	(1P)011	CONDUIT	403.4	0.5937	0.0130
(1P)013	(1P)013	(1P)012	CONDUIT	403.4	0.5869	0.0130
(1P)014	(1P)014	(1P)013	CONDUIT	401.1	0.5880	0.0130
(1P)015	(1P)015	(1P)014	CONDUIT	397.5	0.5940	0.0130
(1P)016	(1P)016	(1P)015	CONDUIT	403.0	0.4472	0.0130
(1P)016A	(1P)016A	(1P)016	CONDUIT	186.4	0.4521	0.0130
(1P)017	(1P)017	(1P)016A	CONDUIT	74.1	0.4496	0.0130
(1P)018	(1P)018	(1P)017	CONDUIT	422.2	0.4464	0.0130
(1P)024	(1P)024	(1P)017	CONDUIT	493.4	0.4478	0.0130
(1P)042	(1P)042	(1P)003	CONDUIT	208.1	1.3760	0.0130
(1P)042A	(1P)042A	(1P)042	CONDUIT	474.9	0.3019	0.0130
(1P)043	(1P)043	(1P)042A	CONDUIT	466.4	0.3103	0.0130
(1P)044	(1P)044	(1P)043	CONDUIT	115.7	0.3110	0.0130
(1P)065	(1P)065	(1P)043	CONDUIT	369.1	0.2915	0.0130
(1P)073	(1P)073	(1P)016A	CONDUIT	460.6	0.5892	0.0130
(1P)079	(1P)079	(1P)017	CONDUIT	120.2	0.5775	0.0130
(2A)001	(2A)001	(2A)000	CONDUIT	444.9	0.1349	0.0160
(2A)002	(2A)002	(2A)001	CONDUIT	46.6	3.8660	0.0160
(2A)003	(2A)003	(2A)002	CONDUIT	268.3	0.4174	0.0160
(2A)004	(2A)004	(2A)003	CONDUIT	343.0	0.3556	0.0160
(2A)005	(2A)005	(2A)004	CONDUIT	367.6		

0.3509	0.0160			
(2A)006	(2A)006	(2A)005	CONDUIT	378.7
0.1399	0.0160			
(2A)007	(2A)007	(2A)006	CONDUIT	354.1
0.1779	0.0160			
(2A)008	(2A)008	(2A)007	CONDUIT	313.9
0.1561	0.0160			
(2A)009	(2A)009	(2A)008	CONDUIT	453.5
0.1544	0.0160			
(2A)010	(2A)010	(2A)009	CONDUIT	463.6
0.1532	0.0160			
(2A)011	(2A)011	(2A)010	CONDUIT	488.3
0.1454	0.0160			
(2A)012	(2A)012	(2A)011	CONDUIT	398.9
0.1529	0.0160			
(2A)013	(2A)013	(2A)012	CONDUIT	419.3
0.1431	0.0160			
(2A)014	(2A)014	(2A)013	CONDUIT	325.6
0.2089	0.0160			
(2A)015	(2A)015	(2A)014	CONDUIT	111.5
0.2064	0.0160			
(2A)016	(2A)016	(2A)015	CONDUIT	179.1
0.1787	0.0160			
(2A)017	(2A)017	(2A)016	CONDUIT	308.5
0.2042	0.0160			
(2A)018	(2A)018	(2A)017	CONDUIT	203.6
0.1817	0.0160			
(2A)019	(2A)019	(2A)018	CONDUIT	150.3
0.2395	0.0160			
(2A)020	(2A)020	(2A)019	CONDUIT	473.1
0.1775	0.0160			
(2A)021	(2A)021	(2A)020	CONDUIT	440.3
0.4042	0.0160			
(2A)022	(2A)022	(2A)021	CONDUIT	431.7
0.4355	0.0160			
(2A)023	(2A)023	(2A)022	CONDUIT	204.5
0.4499	0.0160			
(2A)024	(2A)024	(2A)023	CONDUIT	91.4
0.5144	0.0160			
(2A)025	(2A)025	(2A)024	CONDUIT	41.5
0.6268	0.0160			
(2A)026	(2A)026	(2A)025	CONDUIT	72.5
0.5379	0.0160			
(2A)027	(2A)027	(2A)026	CONDUIT	381.4
0.1835	0.0160			
(2A)028	(2A)028	(2A)027	CONDUIT	265.2
0.1358	0.0160			
(2A)029	(2A)029	(2A)028	CONDUIT	215.2
0.1626	0.0160			
(2A)030	(2A)030	(2A)029	CONDUIT	205.2
0.1949	0.0160			
(2A)031	(2A)031	(2A)030	CONDUIT	537.1
0.2439	0.0160			
(2A)032	(2A)032	(2A)031	CONDUIT	116.3
0.1547	0.0160			
(2A)033	(2A)033	(2A)032	CONDUIT	168.1
0.2201	0.0160			
(2A)034	(2A)034	(2A)033	CONDUIT	66.9
0.3440	0.0160			
(2A)035	(2A)035	(2A)034	CONDUIT	500.3
0.3478	0.0160			

(2A)036	(2A)036	(2A)035	CONDUIT	497.5	0.3498	0.0160
(2A)037	(2A)037	(2A)036	CONDUIT	573.9	0.3015	0.0160
(2A)038	(2A)038	(2A)037	CONDUIT	483.6	0.3598	0.0160
(2A)039	(2A)039	(2A)038	CONDUIT	444.6	0.3486	0.0160
(2A)040	(2A)040	(2A)039	CONDUIT	418.7	0.3416	0.0160
(2A)041	(2A)041	(2A)040	CONDUIT	495.1	0.3494	0.0160
(2A)042	(2A)042	(2A)041	CONDUIT	458.1	0.3493	0.0160
(2A)043	(2A)043	(2A)042	CONDUIT	460.4	0.3975	0.0160
(2A)044	(2A)044	(2A)043	CONDUIT	392.9	0.3360	0.0160
(2A)045	(2A)045	(2A)044	CONDUIT	379.5	0.3162	0.0160
(2A)046	(2A)046	(2A)045	CONDUIT	497.9	0.3013	0.0160
(2A)047	(2A)047	(2A)046	CONDUIT	395.2	0.1518	0.0160
(2A)048	(2A)048	(2A)047	CONDUIT	437.2	0.1487	0.0160
(2A)048O	(2A)048	(1A)038	CONDUIT	38.4	6.5172	0.0160
(2A)049	(2A)049	(2A)048	CONDUIT	517.1	0.1586	0.0160
(2A)050	(2A)050	(2A)049	CONDUIT	581.4	0.1410	0.0160
(2A)051	(2A)051	(2A)050	CONDUIT	390.7	0.3583	0.0160
(2A)052	(2A)052	(2A)051	CONDUIT	402.9	0.3475	0.0160
(2A)053	(2A)053	(2A)052	CONDUIT	290.0	0.3620	0.0160
(2A)054	(2A)054	(2A)053	CONDUIT	301.0	1.0134	0.0160
(2A)055	(2A)055	(2A)054	CONDUIT	433.7	0.1522	0.0160
(2A)056	(2A)056	(2A)055	CONDUIT	543.8	0.1508	0.0160
(2A)057	(2A)057	(2A)056	CONDUIT	550.0	0.2418	0.0160
(2A)058	(2A)058	(2A)057	CONDUIT	519.6	0.2117	0.0160
(2A)059	(2A)059	(2A)058	CONDUIT	494.9	0.2263	0.0160
(2A)060	(2A)060	(2A)059	CONDUIT	393.6	0.3862	0.0160
(2A)061	(2A)061	(2A)060	CONDUIT	382.6	0.3215	0.0160
(2A)062	(2A)062	(2A)061	CONDUIT	489.8	0.4676	0.0160
(2A)063	(2A)063	(2A)062	CONDUIT	197.8	1.3904	0.0160
(2A)064	(2A)064	(2A)063	CONDUIT	453.5	0.4234	0.0160
(2A)065	(2A)065	(2A)064	CONDUIT	479.3		

					0.4047	0.0160
(2A)066	(2A)066	(2A)065	CONDUIT	475.3	1.9229	0.0160
(2A)067	(2A)067	(2A)066	CONDUIT	171.1	0.4559	0.0160
(2A)068	(2A)068	(2A)067	CONDUIT	291.9	0.4214	0.0160
(2A)069	(2A)069	(2A)057	CONDUIT	29.9	12.7802	0.0160
(2C)001	(2C)001	(2A)069	CONDUIT	182.9	0.1531	0.0160
(2C)002	(2C)002	(2C)001	CONDUIT	190.8	0.1572	0.0160
(2C)003	(2C)003	(2C)002	CONDUIT	298.7	0.2210	0.0160
(2C)004	(2C)004	(2C)003	CONDUIT	316.5	0.2275	0.0160
(2C)005	(2C)005	(2C)004	CONDUIT	299.3	0.2372	0.0160
(2C)006	(2C)006	(2C)005	CONDUIT	261.6	0.2026	0.0160
(2C)007	(2C)007	(2C)006	CONDUIT	211.9	0.2265	0.0160
(2C)008	(2C)008	(2C)007	CONDUIT	171.6	0.2390	0.0160
(2C)009	(2C)009	(2C)008	CONDUIT	334.1	0.2245	0.0160
(2C)009O	(2C)009	(2A)062	CONDUIT	29.4	1.3601	0.0160
(2D)001	(2D)001	(2C)009	CONDUIT	348.4	0.1234	0.0160
(2D)001A	(2D)001A	(2D)001	CONDUIT	326.0	0.1104	0.0160
(2D)002	(2D)002	(2D)001A	CONDUIT	380.9	0.4070	0.0160
(2D)003	(2D)003	(2D)002	CONDUIT	405.1	0.4196	0.0160
(2D)004	(2D)004	(2D)003	CONDUIT	422.9	0.3712	0.0160
(2D)005	(2D)005	(2D)004	CONDUIT	377.0	0.4217	0.0160
(2D)006	(2D)006	(2D)005	CONDUIT	352.6	0.4623	0.0160
(2D)007	(2D)007	(2D)006	CONDUIT	543.9	0.3420	0.0160
(2D)008	(2D)008	(2D)007	CONDUIT	347.0	0.2853	0.0160
(2D)009	(2D)009	(2D)008	CONDUIT	277.8	0.9719	0.0160
(2D)010	(2D)010	(2D)009	CONDUIT	116.5	0.3433	0.0160
(2D)011	(2D)011	(2D)010	CONDUIT	161.5	0.4212	0.0160
(2D)012	(2D)012	(2D)011	CONDUIT	321.2	0.5729	0.0160
(2D)013	(2D)013	(2D)012	CONDUIT	214.4	0.5549	0.0160
(2D)014	(2D)014	(2D)013	CONDUIT	173.3	0.4673	0.0160
(2D)015	(2D)015	(2D)014	CONDUIT	545.2	2.0176	0.0160

(2D)016	(2D)016	(2D)015	CONDUIT	588.6	0.4146	0.0160
(2D)017	(2D)017	(2D)016	CONDUIT	331.7	0.5156	0.0160
(2D)018	(2D)018	(2D)017	CONDUIT	124.1	0.5720	0.0160
(2D)019	(2D)019	(2D)018	CONDUIT	48.8	0.5741	0.0160
(2D)020	(2D)020	(2D)019	CONDUIT	159.8	0.4004	0.0160
(2D)021	(2D)021	(2D)020	CONDUIT	446.6	0.4120	0.0160
(2D)022	(2D)022	(2D)021	CONDUIT	249.5	0.4008	0.0160
(2D)023	(2D)023	(2D)022	CONDUIT	37.4	0.6155	0.0160
(2D)024	(2D)024	(2D)023	CONDUIT	298.8	0.4819	0.0160
(2D)025	(2D)025	(2D)024	CONDUIT	37.4	0.8293	0.0160
(2D)039	(2D)039	(2D)003	CONDUIT	151.6	0.8974	0.0160
(2D)040	(2D)040	(2D)244	CONDUIT	311.1	0.1511	0.0160
(2D)041	(2D)041	(2D)040	CONDUIT	393.5	0.4066	0.0160
(2D)042	(2D)042	(2D)041	CONDUIT	384.6	0.3900	0.0160
(2D)043	(2D)043	(2D)042	CONDUIT	444.8	0.4047	0.0160
(2D)044	(2D)044	(2D)043	CONDUIT	443.8	0.4056	0.0160
(2D)045	(2D)045	(2D)044	CONDUIT	442.1	0.4071	0.0160
(2D)045A	(2D)045A	(2D)045	CONDUIT	211.3	0.3408	0.0160
(2D)046	(2D)046	(2D)045A	CONDUIT	221.1	0.4071	0.0160
(2D)046A	(2D)046A	(2D)046	CONDUIT	228.6	0.3587	0.0160
(2D)241	(2D)241	(2A)063	CONDUIT	263.5	0.7058	0.0160
(2D)242	(2D)242	(2D)241	CONDUIT	406.5	0.2558	0.0160
(2D)243	(2D)243	(2D)242	CONDUIT	361.3	0.2547	0.0160
(2D)244	(2D)244	(2D)243	CONDUIT	395.9	0.3385	0.0160
(2D)244O	(2D)244	(2D)039	CONDUIT	92.0	2.8360	0.0160
(2D)245	(2D)245	(2D)244	CONDUIT	236.7	0.1394	0.0160
(2D)246	(2D)246	(2D)245	CONDUIT	295.5	0.2606	0.0160
(2D)247	(2D)247	(2D)246	CONDUIT	302.6	0.2578	0.0160
(2D)248	(2D)248	(2D)247	CONDUIT	297.8	0.2753	0.0160
(2D)249	(2D)249	(2D)248	CONDUIT	338.0	0.2544	0.0160
(2D)250	(2D)250	(2D)249	CONDUIT	168.8		

					0.2902	0.0160
(2D)251	(2D)251	(2D)250	CONDUIT	262.0	0.2672	0.0160
(2D)252	(2D)252	(2D)251	CONDUIT	408.0	0.2672	0.0160
(2D)253	(2D)253	(2D)252	CONDUIT	181.0	0.2672	0.0160
(2D)254	(2D)254	(2D)253	CONDUIT	351.0	0.2672	0.0160
(2D)255	(2D)255	(2D)254	CONDUIT	330.0	0.2672	0.0160
(2D)256	(2D)256	(2D)255	CONDUIT	289.0	0.2672	0.0160
(2D)257	(2D)257	(2D)256	CONDUIT	239.0	0.2672	0.0160
(2D)258	(2D)258	(2D)257	CONDUIT	253.0	0.2672	0.0160
(2D)259	(2D)259	(2D)258	CONDUIT	270.0	0.2672	0.0160
(2D)260	(2D)260	(2D)259	CONDUIT	238.0	0.2672	0.0160
(2D)261	(2D)261	(2D)260	CONDUIT	263.0	0.2672	0.0160
(2D)262	(2D)262	(2D)261	CONDUIT	432.0	0.2672	0.0160
(2D)263	(2D)263	(2D)262	CONDUIT	383.0	0.2672	0.0160
(2D)264	(2D)264	(2D)263	CONDUIT	347.0	0.2672	0.0160
(2D)265	(2D)265	(2D)264	CONDUIT	280.0	0.2672	0.0160
(2D)266	(2D)266	(2D)265	CONDUIT	336.0	0.2672	0.0160
(2D)267	(2D)267	(2D)266	CONDUIT	366.0	0.2672	0.0160
(2E)001	(2E)001	(2A)068	CONDUIT	433.6	0.1015	0.0160
(2E)002	(2E)002	(2E)001	CONDUIT	479.7	0.1647	0.0160
(2E)003	(2E)003	(2E)002	CONDUIT	207.5	0.4675	0.0160
(2E)004	(2E)004	(2E)003	CONDUIT	254.6	0.1414	0.0160
(2E)005	(2E)005	(2E)004	CONDUIT	277.8	0.0504	0.0160
(2E)006	(2E)006	(2E)005	CONDUIT	501.6	0.0478	0.0160
(2E)007	(2E)007	(2E)006	CONDUIT	464.0	0.1509	0.0160
(2E)008	(2E)008	(2E)007	CONDUIT	198.7	0.3573	0.0160
(2E)009	(2E)009	(2E)008	CONDUIT	354.3	0.2004	0.0160
(2E)010	(2E)010	(2E)009	CONDUIT	495.4	0.1433	0.0160
(2E)011	(2E)011	(2E)010	CONDUIT	398.2	0.1406	0.0160
(2E)012	(2E)012	(2E)011	CONDUIT	385.6	0.1426	0.0160
(2E)013	(2E)013	(2E)012	CONDUIT	536.1	0.1343	0.0160

(2E)014	(2E)014	(2E)013	CONDUIT	370.1	0.1351	0.0160
(2E)043	(2E)043	(2E)014	CONDUIT	104.6	0.3919	0.0160
(2F)001	(2F)001	(2E)014	CONDUIT	514.3	0.1264	0.0160
(2F)002	(2F)002	(2F)001	CONDUIT	501.6	0.1296	0.0160
(2F)003	(2F)003	(2F)002	CONDUIT	498.5	0.1304	0.0160
(2F)004	(2F)004	(2F)003	CONDUIT	244.5	0.1268	0.0160
(2F)005	(2F)005	(2F)004	CONDUIT	266.5	0.1313	0.0160
(2F)006	(2F)006	(2F)005	CONDUIT	106.4	0.1315	0.0160
(2F)007	(2F)007	(2F)006	CONDUIT	336.8	0.1306	0.0160
(2F)008	(2F)008	(2F)007	CONDUIT	146.6	0.1160	0.0160
(2F)009	(2F)009	(2F)008	CONDUIT	50.2	0.1394	0.0160
(2F)010	(2F)010	(2F)009	CONDUIT	38.9	2.2354	0.0160
(2F)011	(2F)011	(2F)010	CONDUIT	123.8	0.2423	0.0160
(2F)012	(2F)012	(2F)011	CONDUIT	478.6	0.2298	0.0160
(2F)013	(2F)013	(2F)012	CONDUIT	470.9	0.1975	0.0160
(2F)014	(2F)014	(2F)013	CONDUIT	455.0	0.2044	0.0160
(2F)015	(2F)015	(2F)014	CONDUIT	445.5	0.2088	0.0160
(2F)016	(2F)016	(2F)015	CONDUIT	470.9	0.1975	0.0160
(2F)017	(2F)017	(2F)016	CONDUIT	470.9	0.1975	0.0160
(2F)018	(2F)018	(2F)017	CONDUIT	461.5	0.2015	0.0160
(2F)019	(2F)019	(2F)018	CONDUIT	461.4	0.2015	0.0160
(2F)020	(2F)020	(2F)019	CONDUIT	480.5	0.1935	0.0160
(2F)021	(2F)021	(2F)020	CONDUIT	467.8	0.1988	0.0160
(2F)022	(2F)022	(2F)021	CONDUIT	454.8	0.2924	0.0160
(2F)023	(2F)023	(2F)022	CONDUIT	25.2	0.2151	0.0160
(2F)024	(2F)024	(2F)023	CONDUIT	597.0	0.2264	0.0160
(2F)025	(2F)025	(2F)024	CONDUIT	603.0	0.0225	0.0160
(2F)026	(2F)026	(2F)025	CONDUIT	647.0	0.0225	0.0150
(2F)027	(2F)027	(2F)026	CONDUIT	517.0	0.0225	0.0150
(2F)028	(2F)028	(2F)027	CONDUIT	637.0	0.0225	0.0150
(2F)029	(2F)029	(2F)028	CONDUIT	570.0		

					0.0225	0.0150
(2F)030	(2F)030	(2F)029	CONDUIT	518.0	0.0225	0.0150
(2F)031	(2F)031	(2F)030	CONDUIT	609.0	0.0225	0.0150
(2F)032	(2F)032	(2F)031	CONDUIT	585.0	0.0225	0.0150
(2F)033	(2F)033	(2F)032	CONDUIT	387.0	0.0225	0.0150
(2G)001	(2G)001	(2F)022	CONDUIT	521.2	0.3374	0.0160
(2G)002	(2G)002	(2G)001	CONDUIT	224.6	0.3202	0.0160
(2G)002A	(2G)002A	(2G)002	CONDUIT	148.6	0.3305	0.0160
(2G)003	(2G)003	(2G)002A	CONDUIT	99.1	0.3246	0.0160
(2G)004	(2G)004	(2G)003	CONDUIT	485.5	0.3303	0.0160
(2G)005	(2G)005	(2G)004	CONDUIT	495.3	0.3295	0.0160
(2G)006	(2G)006	(2G)005	CONDUIT	498.7	0.5053	0.0160
(2G)007	(2G)007	(2G)006	CONDUIT	163.5	0.4920	0.0160
(2G)008	(2G)008	(2G)007	CONDUIT	30.4	0.3564	0.0160
(2G)009	(2G)009	(2G)008	CONDUIT	158.6	0.5478	0.0160
(2G)010	(2G)010	(2G)009	CONDUIT	115.0	0.4735	0.0160
(2G)011	(2G)011	(2G)010	CONDUIT	227.8	0.4969	0.0160
(2G)012	(2G)012	(2G)011	CONDUIT	369.8	0.2138	0.0160
(2G)012A	(2G)012A	(2G)012	CONDUIT	82.6	0.5550	0.0160
(2G)013	(2G)013	(2G)012A	CONDUIT	132.1	0.6273	0.0160
(2G)013A	(2G)013A	(2G)013	CONDUIT	52.8	0.9994	0.0160
(2G)014	(2G)014	(2G)013A	CONDUIT	346.8	0.6691	0.0160
(2G)015	(2G)015	(2G)014	CONDUIT	33.0	0.1647	0.0160
(2G)016	(2G)016	(2G)015	CONDUIT	303.8	0.2037	0.0160
(2G)016A	(2G)016A	(2G)016	CONDUIT	82.5	0.1803	0.0160
(2G)018	(2G)018	(2G)016A	CONDUIT	214.6	0.2087	0.0160
(2G)019	(2G)019	(2G)018	CONDUIT	254.2	0.1979	0.0160
(2G)020	(2G)020	(2G)019	CONDUIT	419.4	0.1978	0.0160
(2G)021	(2G)021	(2G)020	CONDUIT	313.7	0.2011	0.0160
(2G)022	(2G)022	(2G)021	CONDUIT	346.7	0.2009	0.0160
(2G)023	(2G)023	(2G)022	CONDUIT	297.2	0.2008	0.0160

(2G)024	(2G)024	(2G)023	CONDUIT	198.1	0.1986	0.0160
(2G)025	(2G)025	(2G)024	CONDUIT	112.3	0.4951	0.0160
(2G)026	(2G)026	(2G)025	CONDUIT	307.1	1.0114	0.0160
(2G)040	(2G)040	(2G)002A	CONDUIT	505.2	0.4960	0.0160
(2G)041	(2G)041	(2G)040	CONDUIT	499.0	0.0500	0.0150
(2G)042	(2G)042	(2G)041	CONDUIT	524.0	0.0500	0.0150
(2G)043	(2G)043	(2G)042	CONDUIT	469.0	0.0500	0.0150
(2G)043A	(2G)043A	(2G)043	CONDUIT	292.0	0.0500	0.0150
(2G)044	(2G)044	(2G)043A	CONDUIT	293.0	0.0500	0.0150
(2G)045	(2G)045	(2G)044	CONDUIT	313.0	0.0500	0.0150
(2G)359	(2G)359	(2G)025	CONDUIT	386.4	0.2061	0.0160
(2H)001	(2H)001	(2J)018	CONDUIT	430.1	0.2371	0.0160
(2H)002	(2H)002	(2H)001	CONDUIT	418.5	0.1649	0.0160
(2H)003	(2H)003	(2H)002	CONDUIT	465.1	0.1570	0.0160
(2H)005	(2H)005	(2H)003	CONDUIT	450.9	0.1619	0.0160
(2H)006	(2H)006	(2H)005	CONDUIT	380.8	0.1602	0.0160
(2H)007	(2H)007	(2H)006	CONDUIT	310.5	0.1965	0.0160
(2H)008	(2H)008	(2H)007	CONDUIT	316.5	0.3854	0.0160
(2H)009	(2H)009	(2H)008	CONDUIT	30.2	0.3312	0.0160
(2H)010	(2H)010	(2H)009	CONDUIT	35.1	0.3134	0.0160
(2H)011	(2H)011	(2H)010	CONDUIT	488.8	0.3724	0.0160
(2H)012	(2H)012	(2H)011	CONDUIT	299.7	0.2169	0.0160
(2H)013	(2H)013	(2H)012	CONDUIT	499.5	0.1842	0.0160
(2H)014	(2H)014	(2H)013	CONDUIT	164.7	0.3885	0.0160
(2H)015	(2H)015	(2H)014	CONDUIT	261.9	0.2787	0.0160
(2H)016	(2H)016	(2H)015	CONDUIT	369.9	0.1460	0.0160
(2H)017	(2H)017	(2H)016	CONDUIT	59.5	0.9418	0.0160
(2H)017A	(2H)017A	(2H)017	CONDUIT	311.2	0.2699	0.0160
(2H)018	(2H)018	(2H)017A	CONDUIT	124.1	0.2417	0.0160
(2H)019	(2H)019	(2H)018	CONDUIT	235.0	0.2554	0.0160
(2H)020	(2H)020	(2H)019	CONDUIT	43.3		

0.2311 0.0160				
(2H)021	(2H)021	(2H)020	CONDUIT	391.5
0.2912 0.0160				
(2H)022	(2H)022	(2H)021	CONDUIT	448.6
0.5974 0.0160				
(2H)023	(2H)023	(2H)022	CONDUIT	42.8
0.6311 0.0160				
(2H)024	(2H)024	(2H)023	CONDUIT	522.0
0.5153 0.0160				
(2H)025	(2H)025	(2H)024	CONDUIT	357.9
0.1565 0.0160				
(2H)026	(2H)026	(2H)021	CONDUIT	333.4
0.7202 0.0160				
(2H)027	(2H)027	(2H)026	CONDUIT	339.0
0.3472 0.0160				
(2H)028	(2H)028	(2H)027	CONDUIT	326.7
0.3572 0.0160				
(2H)029	(2H)029	(2H)028	CONDUIT	321.3
0.3707 0.0160				
(2H)030	(2H)030	(2H)029	CONDUIT	332.1
0.2776 0.0160				
(2H)031	(2H)031	(2H)030	CONDUIT	259.3
0.0929 0.0160				
(2H)032	(2H)032	(2H)031	CONDUIT	62.8
0.1497 0.0160				
(2H)033	(2H)033	(2H)032	CONDUIT	30.2
3.5773 0.0160				
(2H)034	(2H)034	(2H)033	CONDUIT	299.9
0.3385 0.0160				
(2H)036	(2H)036	(2H)034	CONDUIT	276.1
0.3560 0.0160				
(2H)037	(2H)037	(2H)036	CONDUIT	276.1
0.4368 0.0160				
(2H)038	(2H)038	(2H)037	CONDUIT	335.8
0.3580 0.0160				
(2H)039	(2H)039	(2H)038	CONDUIT	334.9
0.4246 0.0160				
(2H)040	(2H)040	(2H)039	CONDUIT	391.6
0.2308 0.0160				
(2H)041	(2H)041	(2H)040	CONDUIT	253.5
0.3577 0.0160				
(2H)042	(2H)042	(2H)041	CONDUIT	253.5
0.5609 0.0160				
(2H)043	(2H)043	(2H)042	CONDUIT	388.7
0.2444 0.0160				
(2H)044	(2H)044	(2H)043	CONDUIT	268.3
0.3034 0.0160				
(2H)045	(2H)045	(2H)044	CONDUIT	226.9
0.3093 0.0160				
(2H)046	(2H)046	(2H)045	CONDUIT	189.1
0.3543 0.0160				
(2H)047	(2H)047	(2H)046	CONDUIT	274.2
0.0883 0.0160				
(2H)048	(2H)048	(2H)047	CONDUIT	97.2
1.1528 0.0160				
(2H)049	(2H)049	(2H)048	CONDUIT	442.2
0.2775 0.0160				
(2H)050	(2H)050	(2H)049	CONDUIT	493.0
0.1947 0.0160				
(2H)051	(2H)051	(2H)050	CONDUIT	380.2
0.1881 0.0160				

(2H)051A	(2H)051A	(2H)051	CONDUIT	294.7	0.2653	0.0160
(2H)052	(2H)052	(2H)051A	CONDUIT	310.3	0.3780	0.0160
(2H)053	(2H)053	(2H)052	CONDUIT	471.0	0.0658	0.0160
(2H)054	(2H)054	(2H)053	CONDUIT	124.1	0.4125	0.0160
(2H)054A	(2H)054A	(2H)054	CONDUIT	205.0	0.4130	0.0160
(2H)055	(2H)055	(2H)054A	CONDUIT	246.0	0.4140	0.0160
(2H)055A	(2H)055A	(2H)055	CONDUIT	130.0	0.4140	0.0160
(2H)056	(2H)056	(2H)055A	CONDUIT	399.0	0.4140	0.0160
(2H)057	(2H)057	(2H)056	CONDUIT	170.0	0.4140	0.0160
(2H)058	(2H)058	(2H)057	CONDUIT	113.0	0.4140	0.0160
(2H)285	(2H)285	(2H)053	CONDUIT	120.4	0.3655	0.0160
(2H)286	(2H)286	(2H)285	CONDUIT	193.0	0.3316	0.0160
(2H)287	(2H)287	(2H)286	CONDUIT	324.0	0.3302	0.0160
(2H)288	(2H)288	(2H)287	CONDUIT	424.0	0.3302	0.0160
(2H)289	(2H)289	(2H)288	CONDUIT	408.0	0.3284	0.0160
(2H)290	(2H)290	(2H)289	CONDUIT	189.0	0.3333	0.0160
(2I)001	(2I)001	(2I)001A	CONDUIT	60.8	0.3126	0.0160
(2I)001A	(2I)001A	(2H)025	CONDUIT	225.6	0.1596	0.0160
(2I)002	(2I)002	(2I)001	CONDUIT	255.3	1.0068	0.0160
(2I)003	(2I)003	(2I)002	CONDUIT	328.2	0.4083	0.0160
(2I)004	(2I)004	(2I)003	CONDUIT	131.3	0.3809	0.0160
(2I)005	(2I)005	(2I)004	CONDUIT	447.3	0.4113	0.0160
(2I)006	(2I)006	(2I)005	CONDUIT	250.8	0.4226	0.0160
(2I)008	(2I)008	(2I)006	CONDUIT	343.9	0.4071	0.0160
(2I)009	(2I)009	(2I)008	CONDUIT	418.2	0.3921	0.0160
(2I)010	(2I)010	(2I)009	CONDUIT	84.4	0.4266	0.0160
(2I)011	(2I)011	(2I)010	CONDUIT	147.4	0.4070	0.0160
(2I)012	(2I)012	(2I)011	CONDUIT	166.4	0.4087	0.0160
(2I)013	(2I)013	(2I)012	CONDUIT	374.3	0.3954	0.0160
(2I)014	(2I)014	(2I)013	CONDUIT	212.3	0.2968	0.0160
(2I)015	(2I)015	(2I)014	CONDUIT	161.0		

0.2981	0.0160			
(2I)016	(2I)016	(2I)015	CONDUIT	167.5
0.3165	0.0160			
(2I)017	(2I)017	(2I)016	CONDUIT	36.5
0.3839	0.0160			
(2I)018	(2I)018	(2I)017A	CONDUIT	294.0
0.2517	0.0160			
(2I)019	(2I)019	(2I)018	CONDUIT	230.2
0.3518	0.0160			
(2I)020	(2I)020	(2I)019	CONDUIT	352.6
0.3771	0.0160			
(2I)021	(2I)021	(2I)020	CONDUIT	359.8
0.3002	0.0160			
(2I)021A	(2I)021A	(2I)021	CONDUIT	102.1
0.2937	0.0160			
(2I)021B	(2I)021B	(2I)021A	CONDUIT	206.6
0.2905	0.0160			
(2I)021C	(2I)021C	(2I)021B	CONDUIT	105.5
0.0853	0.0160			
(2I)022	(2I)022	(2I)021C	CONDUIT	32.4
0.2774	0.0160			
(2I)023	(2I)023	(2I)022	CONDUIT	362.3
0.2981	0.0160			
(2I)024	(2I)024	(2I)023	CONDUIT	364.7
0.2961	0.0160			
(2I)025	(2I)025	(2I)024	CONDUIT	362.3
0.2981	0.0160			
(2I)025A	(2I)025A	(2I)025	CONDUIT	252.8
0.2927	0.0160			
(2I)026	(2I)026	(2I)025A	CONDUIT	104.6
0.3251	0.0160			
(2I)027	(2I)027	(2I)026	CONDUIT	328.2
0.2986	0.0160			
(2I)028	(2I)028	(2I)027	CONDUIT	56.0
0.2704	0.0160			
(2I)029	(2I)029	(2I)028	CONDUIT	63.2
0.3192	0.0160			
(2I)044	(2I)044	(2I)005	CONDUIT	111.0
1.0000	0.0160			
(2I)045	(2I)045	(2I)044	CONDUIT	73.0
1.0000	0.0160			
(2I)046	(2I)046	(2I)045	CONDUIT	423.0
1.0000	0.0160			
(2I)047	(2I)047	(2I)046	CONDUIT	397.0
1.0000	0.0160			
(2I)048	(2I)048	(2I)047	CONDUIT	395.0
1.0000	0.0160			
(2I)049	(2I)049	(2I)048	CONDUIT	131.0
1.0000	0.0160			
(2I)050	(2I)050	(2I)049	CONDUIT	482.0
0.4000	0.0160			
(2I)051	(2I)051	(2I)050	CONDUIT	118.0
0.4000	0.0160			
(2I)052	(2I)052	(2I)051	CONDUIT	96.0
0.4000	0.0160			
(2I)053	(2I)053	(2I)052	CONDUIT	341.0
0.4000	0.0160			
(2I)054	(2I)054	(2I)053	CONDUIT	294.0
0.4000	0.0160			
(2I)055	(2I)055	(2I)054	CONDUIT	225.0
0.4000	0.0160			

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  (2I)056        (2I)056        (2I)055        CONDUIT        346.0
0.4000    0.0160
  (2I)057        (2I)057        (2I)056        CONDUIT        166.0
0.4000    0.0160
  (2I)058        (2I)058        (2I)057        CONDUIT        329.0
0.4000    0.0160
  (2I)059        (2I)059        (2I)058        CONDUIT        457.0
0.4000    0.0160
  (2J)001        (2J)001        (2F)009        CONDUIT        457.0
0.1772    0.0160
  (2J)002        (2J)002        (2J)001        CONDUIT        313.8
0.1179    0.0160
  (2J)003        (2J)003        (2J)002        CONDUIT         66.3
0.1207    0.0160
  (2J)004        (2J)004        (2J)003        CONDUIT        198.9
0.1157    0.0160
  (2J)005        (2J)005        (2J)004        CONDUIT         34.8
0.1438    0.0160
  (2J)006        (2J)006        (2J)005        CONDUIT        395.6
0.1213    0.0160
  (2J)007        (2J)007        (2J)006        CONDUIT        445.7
0.1189    0.0160
  (2J)008        (2J)008        (2J)007        CONDUIT        445.6
0.1189    0.0160
  (2J)009        (2J)009        (2J)008        CONDUIT        106.2
0.2072    0.0160
  (2J)010        (2J)010        (2J)009        CONDUIT        113.7
0.2111    0.0160
  (2J)011        (2J)011        (2J)010        CONDUIT        152.3
0.3741    0.0160
  (2J)012        (2J)012        (2J)011        CONDUIT        253.8
0.2010    0.0160
  (2J)013        (2J)013        (2J)012        CONDUIT        498.4
0.1946    0.0160
  (2J)014        (2J)014        (2J)013        CONDUIT        411.3
0.2067    0.0160
  (2J)015        (2J)015        (2J)014        CONDUIT        471.6
0.1951    0.0160
  (2J)016        (2J)016        (2J)015        CONDUIT        444.8
0.2023    0.0160
  (2J)017        (2J)017        (2J)016        CONDUIT        389.1
0.2339    0.0160
  (2J)018        (2J)018        (2J)017        CONDUIT         79.1
0.2023    0.0160
  (2J)019        (2J)019        (2J)018        CONDUIT        415.7
0.2453    0.0160
  (2J)020        (2J)020        (2J)010        CONDUIT         61.4
0.0163    0.0160
  (2J)021        (2J)021        (2J)020        CONDUIT        266.0
1.4622    0.0160
  (2J)022        (2J)022        (2J)021        CONDUIT         56.2
0.3023    0.0160
  (2J)023        (2J)023        (2J)022        CONDUIT        478.4
0.2049    0.0160
  (2J)024        (2J)025        (2J)023        CONDUIT         99.6
0.9341    0.0160
  (2J)0250       (2J)025        (2J)013        CONDUIT         31.4
26.4115    0.0160
  (2J)026        (2J)026        (2J)025        CONDUIT        298.3
0.3117    0.0160
  (2J)027        (2J)027        (2J)026        CONDUIT        371.0
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					0.3261	0.0160
(2J)028	(2J)028	(2J)027	CONDUIT	207.9	0.3079	0.0160
(2J)029	(2J)029	(2J)028	CONDUIT	339.7	0.3267	0.0160
(2J)030	(2J)030	(2J)029	CONDUIT	357.6	0.4726	0.0160
(2J)031	(2J)031	(2J)030	CONDUIT	355.4	0.4418	0.0160
(2J)032	(2J)032	(2J)031	CONDUIT	333.1	0.4053	0.0160
(2J)033	(2J)033	(2J)032	CONDUIT	315.1	0.4220	0.0160
(2J)040	(2J)040	(2J)025	CONDUIT	119.5	0.5606	0.0160
(2J)041	(2J)041	(2J)040	CONDUIT	131.9	0.3183	0.0160
(2J)042	(2J)042	(2J)041	CONDUIT	766.6	0.3091	0.0160
(2J)043	(2J)043	(2J)042	CONDUIT	92.4	0.3573	0.0160
(2J)044	(2J)044	(2J)043	CONDUIT	210.9	0.2940	0.0160
(2J)045	(2J)045	(2J)044	CONDUIT	129.6	0.3317	0.0160
(2J)045A	(2J)045A	(2J)045	CONDUIT	143.8	0.2851	0.0160
(2J)046	(2J)046	(2J)045A	CONDUIT	161.6	0.3156	0.0160
(2J)047	(2J)047	(2J)046	CONDUIT	309.4	0.2974	0.0160
(2J)048	(2J)048	(2J)047	CONDUIT	301.7	0.3049	0.0160
(2J)049	(2J)049	(2J)048	CONDUIT	27.7	0.5052	0.0160
(2J)050	(2J)050	(2J)049	CONDUIT	306.3	0.3199	0.0160
(2J)051	(2J)051	(2J)050	CONDUIT	178.6	0.3024	0.0160
(2J)052	(2J)052	(2J)051	CONDUIT	144.7	0.4422	0.0160
(2J)053	(2J)053	(2J)052	CONDUIT	133.9	0.4106	0.0160
(2J)054	(2J)054	(2J)053	CONDUIT	343.3	0.4253	0.0160
(2J)055	(2J)055	(2J)054	CONDUIT	212.4	0.4331	0.0160
(2J)056	(2J)056	(2J)055	CONDUIT	144.7	0.4354	0.0160
(2J)057	(2J)057	(2J)056	CONDUIT	138.6	0.4041	0.0160
(2J)058	(2J)060	(2J)057	CONDUIT	303.2	0.3694	0.0160
(2K)001	(2K)001	(2J)019	CONDUIT	397.9	0.0377	0.0160
(2K)002	(2K)002	(2K)001	CONDUIT	333.0	1.7176	0.0160
(2K)003	(2K)003	(2K)002	CONDUIT	359.9	0.3585	0.0160
(2K)004	(2K)004	(2K)003	CONDUIT	366.6	0.2946	0.0160

(2K)005	(2K)005	(2K)004	CONDUIT	359.9	0.3001	0.0160
(2K)006	(2K)006	(2K)005	CONDUIT	411.4	0.3063	0.0160
(2K)007	(2K)007	(2K)006	CONDUIT	404.6	0.4078	0.0160
(2K)008	(2K)008	(2K)007	CONDUIT	368.8	0.3091	0.0160
(2K)009	(2K)009	(2K)008	CONDUIT	344.2	0.3312	0.0160
(2K)010	(2K)010	(2K)009	CONDUIT	391.1	0.2915	0.0160
(2K)011	(2K)011	(2K)010	CONDUIT	458.3	0.2488	0.0160
(2K)012	(2K)012	(2K)011	CONDUIT	321.1	0.3551	0.0160
(2K)013	(2K)013	(2K)012	CONDUIT	304.0	0.2895	0.0160
(2K)014	(2K)014	(2K)013	CONDUIT	161.9	0.4385	0.0160
(2K)015	(2K)015	(2K)014	CONDUIT	243.6	0.2463	0.0160
(2K)016	(2K)016	(2K)015	CONDUIT	254.8	0.4160	0.0160
(2K)017	(2K)017	(2K)016	CONDUIT	131.9	0.3943	0.0160
(2K)018	(2K)018	(2K)017	CONDUIT	292.8	0.3415	0.0160
(2K)018A	(2K)018A	(2K)018	CONDUIT	105.1	0.3807	0.0160
(2K)019	(2K)019	(2K)018A	CONDUIT	154.2	0.4539	0.0160
(2K)020	(2K)020	(2K)019	CONDUIT	236.9	0.4221	0.0160
(2K)021	(2K)021	(2K)020	CONDUIT	38.5	0.2601	0.0160
(2K)022	(2K)022	(2K)021	CONDUIT	257.8	0.4656	0.0160
(2K)022A	(2K)022A	(2K)022	CONDUIT	99.4	0.4023	0.0160
(2K)023	(2K)023	(2K)022A	CONDUIT	212.3	0.3768	0.0160
(2K)024	(2K)024	(2K)023	CONDUIT	176.6	0.4531	0.0160
(2K)024A	(2K)024A	(2K)024	CONDUIT	27.8	0.3601	0.0160
(2K)025	(2K)025	(2K)024A	CONDUIT	330.4	0.4237	0.0160
(2K)026	(2K)026	(2K)025	CONDUIT	435.8	0.3029	0.0160
(2K)027	(2K)027	(2K)026	CONDUIT	60.4	7.2577	0.0160
(2K)028	(2K)028	(2K)027	CONDUIT	371.0	0.2237	0.0160
(2K)029	(2K)029	(2K)028	CONDUIT	449.3	0.2159	0.0160
(2K)030	(2K)030	(2K)029	CONDUIT	433.6	0.2214	0.0160
(2K)031	(2K)031	(2K)030	CONDUIT	520.8	0.2189	0.0160
(2K)032	(2K)032	(2K)031	CONDUIT	498.4		

0.2227 0.0160
(2K)033 (2K)033 (2K)032 CONDUIT 502.9
0.2167 0.0160
(2K)033A (2K)033A (2K)033 CONDUIT 321.9
0.2051 0.0160
(2K)034 (2K)034 (2K)033A CONDUIT 203.5
0.2113 0.0160
(2K)035 (2K)035 (2K)034 CONDUIT 469.4
0.2344 0.0160
(2K)036 (2K)036 (2K)035 CONDUIT 494.0
0.2227 0.0160
(2K)037 (2K)037 (2K)036 CONDUIT 525.3
0.2132 0.0160
(2K)038 (2K)038 (2K)037 CONDUIT 177.0
0.2133 0.0160
(2K)039 (2K)039 (2K)038 CONDUIT 409.0
0.2133 0.0160
(2K)040 (2K)040 (2K)039 CONDUIT 327.0
0.2133 0.0160
(2K)041 (2K)041 (2K)040 CONDUIT 399.0
0.2133 0.0160
(2K)042 (2K)042 (2K)041 CONDUIT 239.0
0.2133 0.0160
(2K)043 (2K)043 (2K)042 CONDUIT 400.0
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(2K)052 (2K)052 (2K)051 CONDUIT 322.0
0.2133 0.0160
(2K)314 (2K)314 (2K)001 CONDUIT 310.7
0.5118 0.0160
(2K)315 (2K)315 (2K)314 CONDUIT 377.8
0.2329 0.0160
(2K)316 (2K)316 (2K)315 CONDUIT 252.6
0.3484 0.0160
(2K)317 (2K)317 (2K)316 CONDUIT 108.0
0.3333 0.0160
FordedMain2 ForcedMain (2A)001 CONDUIT 1693.0
0.0975 0.0160
Line2ToPlant (1A)000 (2A)000 CONDUIT 387.0
0.3204 0.0160
NorthEnid NorthEnidStorage(1O)005E CONDUIT 101.4
0.0010 0.0160
1 (1P)002 LiftStation CONDUIT 7.0
23.5714 0.0160
PUMP1@(2A)000-(PLANT)(2A)000 (PLANT) TYPE4 PUMP
ForcedMain LiftStation ForcedMain TYPE4 PUMP

OverflowPump	(2A)000	PlantStorage	TYPE1 PUMP
(IO)304C-O	(1O)304C	NorthEnidStorage	ORIFICE
WEIR1@(1A)DIV-	(1A)STOR(1A)DIV	(1A)STOR	WEIR
(1O)304-1	(1O)304	(1O)304A	WEIR

****
Cross Section Summary
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
(1A)000A	CIRCULAR	2.75	5.94	0.69	2.75	1	19414.02
(1A)000B	CIRCULAR	2.75	5.94	0.69	2.75	1	9122.73
(1A)001	CIRCULAR	2.75	5.94	0.69	2.75	1	3272.59
(1A)002	CIRCULAR	2.75	5.94	0.69	2.75	1	6449.69
(1A)003	CIRCULAR	2.75	5.94	0.69	2.75	1	10675.22
(1A)004	CIRCULAR	2.75	5.94	0.69	2.75	1	8407.38
(1A)005	CIRCULAR	2.75	5.94	0.69	2.75	1	9569.40
(1A)006	CIRCULAR	2.75	5.94	0.69	2.75	1	12876.77
(1A)007	CIRCULAR	2.75	5.94	0.69	2.75	1	12272.52
(1A)008	CIRCULAR	2.75	5.94	0.69	2.75	1	12360.35
(1A)009	CIRCULAR	2.75	5.94	0.69	2.75	1	7915.83
(1A)010	CIRCULAR	2.75	5.94	0.69	2.75	1	11698.54
(1A)011	CIRCULAR	2.75	5.94	0.69	2.75	1	4380.48
(1A)012	CIRCULAR	2.75	5.94	0.69	2.75	1	4840.93
(1A)013	CIRCULAR	2.75	5.94	0.69	2.75	1	9219.98
(1A)014	CIRCULAR	2.75	5.94	0.69	2.75	1	11285.62
(1A)015	CIRCULAR	2.75	5.94	0.69	2.75	1	13044.84
(1A)016	CIRCULAR	2.75	5.94	0.69	2.75	1	7988.19
(1A)017	CIRCULAR	2.75	5.94	0.69	2.75	1	6411.09
(1A)018	CIRCULAR	2.50	4.91	0.63	2.50	1	9172.48
(1A)019	CIRCULAR	2.50	4.91	0.63	2.50	1	3492.31
(1A)020	CIRCULAR	2.50	4.91	0.63	2.50	1	9980.46
(1A)021	CIRCULAR	2.50	4.91	0.63	2.50		

1	8584.63					
	(1A)022	CIRCULAR	2.50	4.91	0.63	2.50
1	11161.95					
	(1A)023	CIRCULAR	2.50	4.91	0.63	2.50
1	8200.10					
	(1A)024	CIRCULAR	2.50	4.91	0.63	2.50
1	10020.34					
	(1A)024A	CIRCULAR	2.50	4.91	0.63	2.50
1	4739.20					
	(1A)025	CIRCULAR	2.50	4.91	0.63	2.50
1	35774.56					
	(1A)026	CIRCULAR	2.50	4.91	0.63	2.50
1	9304.70					
	(1A)027	CIRCULAR	2.50	4.91	0.63	2.50
1	10584.97					
	(1A)028	CIRCULAR	2.50	4.91	0.63	2.50
1	5448.56					
	(1A)029	CIRCULAR	2.50	4.91	0.63	2.50
1	8287.61					
	(1A)030	CIRCULAR	2.50	4.91	0.63	2.50
1	5182.62					
	(1A)031	CIRCULAR	2.50	4.91	0.63	2.50
1	6781.81					
	(1A)032	CIRCULAR	2.50	4.91	0.63	2.50
1	6252.43					
	(1A)033	CIRCULAR	2.50	4.91	0.63	2.50
1	6436.08					
	(1A)034	CIRCULAR	2.50	4.91	0.63	2.50
1	4975.75					
	(1A)035	CIRCULAR	2.50	4.91	0.63	2.50
1	7515.50					
	(1A)035A	CIRCULAR	2.50	4.91	0.63	2.50
1	5133.21					
	(1A)036	CIRCULAR	2.50	4.91	0.63	2.50
1	8852.73					
	(1A)037	CIRCULAR	2.50	4.91	0.63	2.50
1	6422.48					
	(1A)038	CIRCULAR	2.50	4.91	0.63	2.50
1	3991.80					
	(1A)039	CIRCULAR	2.50	4.91	0.63	2.50
1	8313.07					
	(1A)040	CIRCULAR	2.50	4.91	0.63	2.50
1	6278.81					
	(1A)041	CIRCULAR	2.50	4.91	0.63	2.50
1	6554.48					
	(1A)042	CIRCULAR	3.00	7.07	0.75	3.00
1	10819.87					
	(1B)001	CIRCULAR	2.00	3.14	0.50	2.00
1	13047.72					
	(1B)002	CIRCULAR	2.00	3.14	0.50	2.00
1	4763.87					
	(1B)003	CIRCULAR	2.00	3.14	0.50	2.00
1	4567.14					
	(1B)004	CIRCULAR	2.00	3.14	0.50	2.00
1	1294.81					
	(1B)005	CIRCULAR	2.00	3.14	0.50	2.00
1	6853.72					
	(1B)006	CIRCULAR	2.00	3.14	0.50	2.00
1	4598.89					
	(1B)009	CIRCULAR	2.00	3.14	0.50	2.00
1	4713.43					

(1B)010	CIRCULAR	2.00	3.14	0.50	2.00	1	6537.95
(1B)011	CIRCULAR	2.00	3.14	0.50	2.00	1	4434.44
(1B)013	CIRCULAR	2.00	3.14	0.50	2.00	1	5673.67
(1B)014	CIRCULAR	2.00	3.14	0.50	2.00	1	4709.00
(1C)001	CIRCULAR	2.00	3.14	0.50	2.00	1	4939.88
(1C)001A	CIRCULAR	2.00	3.14	0.50	2.00	1	4617.74
(1C)001B	CIRCULAR	2.00	3.14	0.50	2.00	1	11650.39
(1C)001BO	CIRCULAR	2.00	3.14	0.50	2.00	1	10103.30
(1C)001C	CIRCULAR	2.00	3.14	0.50	2.00	1	9901.33
(1C)001D	CIRCULAR	2.00	3.14	0.50	2.00	1	4404.88
(1C)001E	CIRCULAR	2.00	3.14	0.50	2.00	1	11255.47
(1C)001F	CIRCULAR	2.00	3.14	0.50	2.00	1	8509.40
(1C)001G	CIRCULAR	2.00	3.14	0.50	2.00	1	9321.19
(1C)002	CIRCULAR	1.00	0.79	0.25	1.00	1	2118.38
(1C)003	CIRCULAR	0.83	0.54	0.21	0.83	1	325.91
(1C)004	CIRCULAR	0.83	0.54	0.21	0.83	1	611.73
(1C)005	CIRCULAR	0.83	0.54	0.21	0.83	1	147.48
(1C)006	CIRCULAR	0.83	0.54	0.21	0.83	1	536.21
(1C)006A	CIRCULAR	0.83	0.54	0.21	0.83	1	643.64
(1C)007	CIRCULAR	0.83	0.54	0.21	0.83	1	568.80
(1C)009	CIRCULAR	2.00	3.14	0.50	2.00	1	6834.61
(1C)010	CIRCULAR	2.00	3.14	0.50	2.00	1	9557.52
(1C)011	CIRCULAR	2.00	3.14	0.50	2.00	1	8113.44
(1C)012	CIRCULAR	0.83	0.54	0.21	0.83	1	1470.22
(1C)015A	CIRCULAR	2.00	3.14	0.50	2.00	1	5361.35
(1C)015B	CIRCULAR	2.00	3.14	0.50	2.00	1	7172.97
(1C)015C	CIRCULAR	2.00	3.14	0.50	2.00	1	6968.48
(1C)016	CIRCULAR	2.00	3.14	0.50	2.00	1	5557.65
(1C)016A	CIRCULAR	2.00	3.14	0.50	2.00	1	6164.47
(1C)016B	CIRCULAR	2.00	3.14	0.50	2.00	1	5294.30
(1C)016C	CIRCULAR	2.00	3.14	0.50	2.00		

1	5203.89					
	(1C)017	CIRCULAR	2.00	3.14	0.50	2.00
1	28410.25					
	(1C)018	CIRCULAR	0.83	0.54	0.21	0.83
1	510.16					
	(1C)019	CIRCULAR	0.83	0.54	0.21	0.83
1	493.25					
	(1C)01D	CIRCULAR	2.00	3.14	0.50	2.00
1	5870.89					
	(1C)020	CIRCULAR	0.83	0.54	0.21	0.83
1	509.66					
	(1C)021	CIRCULAR	2.00	3.14	0.50	2.00
1	7001.12					
	(1C)021A	CIRCULAR	1.50	1.77	0.38	1.50
1	1622.09					
	(1C)021B	CIRCULAR	1.50	1.77	0.38	1.50
1	2319.34					
	(1C)021C	CIRCULAR	1.50	1.77	0.38	1.50
1	2213.23					
	(1C)021D	CIRCULAR	1.50	1.77	0.38	1.50
1	2117.34					
	(1C)022	CIRCULAR	0.83	0.54	0.21	0.83
1	530.99					
	(1C)023	CIRCULAR	0.83	0.54	0.21	0.83
1	455.80					
	(1C)024	CIRCULAR	0.83	0.54	0.21	0.83
1	483.17					
	(1C)025	CIRCULAR	0.83	0.54	0.21	0.83
1	310.99					
	(1C)026	CIRCULAR	0.83	0.54	0.21	0.83
1	458.40					
	(1C)026A	CIRCULAR	1.50	1.77	0.38	1.50
1	5040.68					
	(1C)027	CIRCULAR	0.83	0.54	0.21	0.83
1	458.26					
	(1C)028	CIRCULAR	0.83	0.54	0.21	0.83
1	455.58					
	(1C)041	CIRCULAR	0.83	0.54	0.21	0.83
1	643.11					
	(1C)176	CIRCULAR	1.00	0.79	0.25	1.00
1	1263.73					
	(1C)177	CIRCULAR	1.00	0.79	0.25	1.00
1	1259.27					
	(1C)178	CIRCULAR	1.00	0.79	0.25	1.00
1	1254.34					
	(1C)179	CIRCULAR	1.00	0.79	0.25	1.00
1	1261.47					
	(1C)179A	CIRCULAR	1.00	0.79	0.25	1.00
1	1005.70					
	(1C)180	CIRCULAR	1.00	0.79	0.25	1.00
1	1257.32					
	(1C)180A	CIRCULAR	1.00	0.79	0.25	1.00
1	1257.17					
	(1C)181	CIRCULAR	1.00	0.79	0.25	1.00
1	1250.69					
	(1C)182	CIRCULAR	1.00	0.79	0.25	1.00
1	1244.07					
	(1C)Storage	CIRCULAR	1.00	0.79	0.25	1.00
1	1189.84					
	(1D)001	CIRCULAR	0.83	0.54	0.21	0.83
1	1263.78					

(1D)002	CIRCULAR	0.83	0.54	0.21	0.83	1	744.92
(1D)003	CIRCULAR	0.83	0.54	0.21	0.83	1	820.43
(1D)004	CIRCULAR	0.83	0.54	0.21	0.83	1	1066.34
(1D)005	CIRCULAR	0.83	0.54	0.21	0.83	1	692.76
(1D)006	CIRCULAR	0.83	0.54	0.21	0.83	1	773.20
(1D)007	CIRCULAR	0.83	0.54	0.21	0.83	1	762.05
(1D)008	CIRCULAR	0.83	0.54	0.21	0.83	1	764.34
(1D)009	CIRCULAR	0.83	0.54	0.21	0.83	1	511.15
(1D)010	CIRCULAR	0.83	0.54	0.21	0.83	1	500.45
(1D)011	CIRCULAR	0.83	0.54	0.21	0.83	1	905.45
(1D)012	CIRCULAR	0.83	0.54	0.21	0.83	1	530.42
(1D)013	CIRCULAR	0.83	0.54	0.21	0.83	1	1124.34
(1D)014	CIRCULAR	0.83	0.54	0.21	0.83	1	561.08
(1D)015	CIRCULAR	0.83	0.54	0.21	0.83	1	512.05
(1D)016	CIRCULAR	0.83	0.54	0.21	0.83	1	431.76
(1D)017	CIRCULAR	0.83	0.54	0.21	0.83	1	426.73
(1D)018	CIRCULAR	0.83	0.54	0.21	0.83	1	431.53
(1D)019	CIRCULAR	0.83	0.55	0.21	0.83	1	438.75
(1D)020	CIRCULAR	0.83	0.55	0.21	0.83	1	436.53
(1D)021	CIRCULAR	0.83	0.55	0.21	0.83	1	439.02
(1D)022	CIRCULAR	0.83	0.55	0.21	0.83	1	435.60
(1D)023	CIRCULAR	0.83	0.54	0.21	0.83	1	435.44
(1E)001	CIRCULAR	1.00	0.79	0.25	1.00	1	777.96
(1E)002	CIRCULAR	1.00	0.79	0.25	1.00	1	743.45
(1E)003	CIRCULAR	1.00	0.79	0.25	1.00	1	729.54
(1E)003A	CIRCULAR	1.00	0.79	0.25	1.00	1	743.27
(1E)005	CIRCULAR	1.00	0.79	0.25	1.00	1	733.28
(1E)006	CIRCULAR	1.00	0.79	0.25	1.00	1	745.23
(1E)007	CIRCULAR	1.00	0.79	0.25	1.00	1	745.23
(1E)008	CIRCULAR	1.00	0.79	0.25	1.00	1	723.07
(1E)009	CIRCULAR	1.00	0.79	0.25	1.00		

	(1F)023	CIRCULAR	0.83	0.54	0.21	0.83
1	576.36					
	(1F)024	CIRCULAR	0.83	0.54	0.21	0.83
1	1275.98					
	(1F)025	CIRCULAR	0.83	0.54	0.21	0.83
1	1287.60					
	(1F)026	CIRCULAR	0.83	0.54	0.21	0.83
1	1309.88					
	(1F)026A	CIRCULAR	0.83	0.54	0.21	0.83
1	412.02					
	(1F)027	CIRCULAR	0.83	0.54	0.21	0.83
1	423.92					
	(1F)028	CIRCULAR	0.83	0.54	0.21	0.83
1	417.26					
	(1F)029	CIRCULAR	0.83	0.54	0.21	0.83
1	428.88					
	(1F)029A	CIRCULAR	0.83	0.54	0.21	0.83
1	420.32					
	(1F)030	CIRCULAR	0.83	0.54	0.21	0.83
1	421.83					
	(1G)001	CIRCULAR	3.00	7.07	0.75	3.00
1	10248.75					
	(1G)001A	CIRCULAR	3.00	7.07	0.75	3.00
1	11120.72					
	(1G)002	CIRCULAR	3.00	7.07	0.75	3.00
1	11211.11					
	(1G)003	CIRCULAR	3.00	7.07	0.75	3.00
1	7902.60					
	(1G)004	CIRCULAR	3.00	7.07	0.75	3.00
1	9648.47					
	(1G)005	CIRCULAR	3.00	7.07	0.75	3.00
1	12185.71					
	(1G)006	CIRCULAR	3.00	7.07	0.75	3.00
1	5741.02					
	(1G)007	CIRCULAR	3.00	7.07	0.75	3.00
1	13392.71					
	(1G)008	CIRCULAR	3.00	7.07	0.75	3.00
1	10069.70					
	(1G)008C	CIRCULAR	3.00	7.07	0.75	3.00
1	9918.40					
	(1G)009	CIRCULAR	3.00	7.07	0.75	3.00
1	16097.49					
	(1G)009A	CIRCULAR	3.00	7.07	0.75	3.00
1	11387.71					
	(1G)009B	CIRCULAR	3.00	7.07	0.75	3.00
1	11412.39					
	(1G)009C	CIRCULAR	3.00	7.07	0.75	3.00
1	11049.68					
	(1G)009D	CIRCULAR	3.00	7.07	0.75	3.00
1	10623.97					
	(1G)009E	CIRCULAR	3.00	7.07	0.75	3.00
1	9967.87					
	(1G)010	CIRCULAR	3.00	7.07	0.75	3.00
1	11165.66					
	(1G)011	CIRCULAR	3.00	7.07	0.75	3.00
1	11232.43					
	(1G)012	CIRCULAR	3.00	7.07	0.75	3.00
1	11076.55					
	(1G)013	CIRCULAR	3.00	7.07	0.75	3.00
1	10885.96					
	(1G)014	CIRCULAR	0.83	0.54	0.21	0.83

1	2207.83					
	(1G)014A	CIRCULAR	0.83	0.54	0.21	0.83
1	476.88					
	(1G)015	CIRCULAR	0.83	0.54	0.21	0.83
1	457.29					
	(1G)016	CIRCULAR	0.83	0.54	0.21	0.83
1	464.38					
	(1G)017	CIRCULAR	0.83	0.54	0.21	0.83
1	472.95					
	(1G)018	CIRCULAR	0.83	0.54	0.21	0.83
1	468.21					
	(1G)018A	CIRCULAR	0.83	0.54	0.21	0.83
1	730.40					
	(1G)019	CIRCULAR	0.83	0.54	0.21	0.83
1	1182.80					
	(1G)019O	CIRCULAR	0.83	0.54	0.21	0.83
1	456.57					
	(1G)020	CIRCULAR	0.83	0.54	0.21	0.83
1	478.29					
	(1G)045	CIRCULAR	0.83	0.54	0.21	0.83
1	800.40					
	(1G)046	CIRCULAR	0.83	0.54	0.21	0.83
1	482.23					
	(1G)047	CIRCULAR	0.83	0.54	0.21	0.83
1	453.78					
	(1G)048	CIRCULAR	0.83	0.54	0.21	0.83
1	449.21					
	(1G)049	CIRCULAR	0.83	0.54	0.21	0.83
1	433.31					
	(1G)050	CIRCULAR	0.83	0.54	0.21	0.83
1	366.46					
	(1G)051	CIRCULAR	0.83	0.54	0.21	0.83
1	374.37					
	(1G)052	CIRCULAR	0.67	0.35	0.17	0.67
1	206.97					
	(1G)053	CIRCULAR	0.67	0.35	0.17	0.67
1	206.97					
	(1G)054	CIRCULAR	0.67	0.35	0.17	0.67
1	206.97					
	(1G)055	CIRCULAR	0.67	0.35	0.17	0.67
1	206.97					
	(1G)056	CIRCULAR	0.67	0.35	0.17	0.67
1	206.97					
	(1G)057	CIRCULAR	0.67	0.35	0.17	0.67
1	312.02					
	(1G)058	CIRCULAR	0.67	0.35	0.17	0.67
1	312.02					
	(1G)059	CIRCULAR	0.67	0.35	0.17	0.67
1	312.02					
	(1G)060	CIRCULAR	0.67	0.35	0.17	0.67
1	312.02					
	(1G)061	CIRCULAR	0.67	0.35	0.17	0.67
1	312.02					
	(1G)062	CIRCULAR	0.67	0.35	0.17	0.67
1	341.80					
	(1G)063	CIRCULAR	0.67	0.35	0.17	0.67
1	341.80					
	(1G)064	CIRCULAR	0.67	0.35	0.17	0.67
1	341.80					
	(1G)065	CIRCULAR	0.67	0.35	0.17	0.67
1	341.80					

(1G)066	CIRCULAR	0.67	0.35	0.17	0.67	1	341.80
(1G)067	CIRCULAR	0.67	0.35	0.17	0.67	1	341.80
(1G)068	CIRCULAR	0.67	0.35	0.17	0.67	1	341.80
(1G)069	CIRCULAR	0.67	0.35	0.17	0.67	1	341.80
(1G)070	CIRCULAR	0.67	0.35	0.17	0.67	1	341.80
(1G)071	CIRCULAR	0.67	0.35	0.17	0.67	1	341.80
(1G)146	CIRCULAR	1.00	0.79	0.25	1.00	1	816.65
(1G)146A	CIRCULAR	1.00	0.79	0.25	1.00	1	938.79
(1G)162	CIRCULAR	0.83	0.54	0.21	0.83	1	451.97
(1G)162A	CIRCULAR	0.83	0.54	0.21	0.83	1	461.67
(1G)162B	CIRCULAR	0.83	0.54	0.21	0.83	1	473.89
(1G)162C	CIRCULAR	0.83	0.54	0.21	0.83	1	460.45
(1G)162D	CIRCULAR	0.83	0.54	0.21	0.83	1	2882.21
(1G)243	CIRCULAR	0.83	0.54	0.21	0.83	1	449.08
(1H)001	CIRCULAR	0.83	0.54	0.21	0.83	1	570.46
(1H)004	CIRCULAR	1.00	0.79	0.25	1.00	1	1962.63
(1H)005	CIRCULAR	0.83	0.54	0.21	0.83	1	66.40
(1H)006	CIRCULAR	0.83	0.54	0.21	0.83	1	521.92
(1H)007	CIRCULAR	0.83	0.54	0.21	0.83	1	561.12
(1H)008	CIRCULAR	0.83	0.54	0.21	0.83	1	536.47
(1H)009	CIRCULAR	0.83	0.54	0.21	0.83	1	595.38
(1H)010	CIRCULAR	0.83	0.54	0.21	0.83	1	422.17
(1H)011	CIRCULAR	0.83	0.54	0.21	0.83	1	1086.48
(1H)038	CIRCULAR	0.83	0.54	0.21	0.83	1	948.73
(1H)039	CIRCULAR	0.83	0.54	0.21	0.83	1	1107.61
(1H)040	CIRCULAR	0.83	0.54	0.21	0.83	1	2702.87
(1H)041	CIRCULAR	0.83	0.54	0.21	0.83	1	368.35
(1H)042	CIRCULAR	1.00	0.79	0.25	1.00	1	1414.57
(1H)043	CIRCULAR	0.83	0.54	0.21	0.83	1	636.37
(1H)044	CIRCULAR	0.83	0.54	0.21	0.83	1	575.73
(1H)045	CIRCULAR	0.83	0.54	0.21	0.83		

1	562.88					
	(1J)001	CIRCULAR	3.00	7.07	0.75	3.00
1	14442.36					
	(1J)002	CIRCULAR	3.00	7.07	0.75	3.00
1	12568.54					
	(1J)003	CIRCULAR	3.00	7.07	0.75	3.00
1	11781.38					
	(1J)004	CIRCULAR	3.00	7.07	0.75	3.00
1	10398.99					
	(1J)005	CIRCULAR	3.00	7.07	0.75	3.00
1	9926.33					
	(1J)006	CIRCULAR	3.00	7.07	0.75	3.00
1	10581.86					
	(1J)007	CIRCULAR	3.00	7.07	0.75	3.00
1	11433.87					
	(1J)008	CIRCULAR	3.00	7.07	0.75	3.00
1	14115.94					
	(1J)009	CIRCULAR	3.00	7.07	0.75	3.00
1	9919.49					
	(1J)010	CIRCULAR	3.00	7.07	0.75	3.00
1	11581.61					
	(1J)011	CIRCULAR	3.00	7.07	0.75	3.00
1	8567.27					
	(1J)012	CIRCULAR	3.00	7.07	0.75	3.00
1	10488.98					
	(1J)013	CIRCULAR	3.00	7.07	0.75	3.00
1	11034.59					
	(1J)014	CIRCULAR	3.00	7.07	0.75	3.00
1	12345.08					
	(1J)041	CIRCULAR	1.25	1.23	0.31	1.25
1	2077.63					
	(1J)042	CIRCULAR	1.25	1.23	0.31	1.25
1	2802.46					
	(1J)042A	CIRCULAR	1.25	1.23	0.31	1.25
1	2676.15					
	(1J)042B	CIRCULAR	1.25	1.23	0.31	1.25
1	3085.30					
	(1J)043	CIRCULAR	1.25	1.23	0.31	1.25
1	2334.64					
	(1J)044	CIRCULAR	1.25	1.23	0.31	1.25
1	931.27					
	(1J)045	CIRCULAR	1.75	2.41	0.44	1.75
1	2292.33					
	(1J)046	CIRCULAR	1.75	2.41	0.44	1.75
1	1849.05					
	(1J)047	CIRCULAR	1.75	2.41	0.44	1.75
1	2287.83					
	(1J)048	CIRCULAR	1.75	2.41	0.44	1.75
1	5686.50					
	(1J)050	CIRCULAR	1.75	2.41	0.44	1.75
1	3829.64					
	(1J)050A	CIRCULAR	1.75	2.41	0.44	1.75
1	2301.32					
	(1J)051	CIRCULAR	1.75	2.41	0.44	1.75
1	4148.04					
	(1J)052	CIRCULAR	1.25	1.23	0.31	1.25
1	342.47					
	(1J)053	CIRCULAR	1.25	1.23	0.31	1.25
1	991.94					
	(1J)054	CIRCULAR	1.25	1.23	0.31	1.25
1	1593.36					

(1J)054A	CIRCULAR	1.25	1.23	0.31	1.25	1	1561.55
(1J)055	CIRCULAR	1.25	1.23	0.31	1.25	1	410.45
(1J)056	CIRCULAR	1.25	1.23	0.31	1.25	1	1051.87
(1J)057	CIRCULAR	1.25	1.23	0.31	1.25	1	949.33
(1J)058	CIRCULAR	1.25	1.23	0.31	1.25	1	1090.57
(1J)059	CIRCULAR	1.25	1.23	0.31	1.25	1	691.71
(1J)060	CIRCULAR	1.25	1.23	0.31	1.25	1	592.25
(1K)001	CIRCULAR	1.25	1.23	0.31	1.25	1	3507.49
(1K)002	CIRCULAR	1.25	1.23	0.31	1.25	1	3234.69
(1K)002A	CIRCULAR	1.25	1.23	0.31	1.25	1	3238.56
(1K)003	CIRCULAR	1.00	0.79	0.25	1.00	1	777.34
(1K)004	CIRCULAR	1.00	0.79	0.25	1.00	1	556.91
(1K)005	CIRCULAR	1.00	0.79	0.25	1.00	1	631.94
(1K)006	CIRCULAR	1.00	0.79	0.25	1.00	1	202.44
(1K)007	CIRCULAR	1.00	0.79	0.25	1.00	1	631.05
(1K)008	CIRCULAR	1.00	0.79	0.25	1.00	1	617.93
(1K)008A	CIRCULAR	1.00	0.79	0.25	1.00	1	846.85
(1K)009	CIRCULAR	1.00	0.79	0.25	1.00	1	480.70
(1K)010	CIRCULAR	1.00	0.79	0.25	1.00	1	601.17
(1K)011	CIRCULAR	1.00	0.79	0.25	1.00	1	654.74
(1K)012	CIRCULAR	1.00	0.79	0.25	1.00	1	595.04
(1K)013	CIRCULAR	1.00	0.79	0.25	1.00	1	445.31
(1K)014	CIRCULAR	1.00	0.79	0.25	1.00	1	554.63
(1M)000	CIRCULAR	3.00	7.07	0.75	3.00	1	12266.85
(1M)000A	CIRCULAR	3.00	7.07	0.75	3.00	1	22889.18
(1M)000B	CIRCULAR	3.00	7.07	0.75	3.00	1	12629.31
(1M)001	CIRCULAR	3.00	7.07	0.75	3.00	1	16998.53
(1M)002	CIRCULAR	3.00	7.07	0.75	3.00	1	12560.66
(1M)003	CIRCULAR	3.00	7.07	0.75	3.00	1	13987.58
(1M)010	CIRCULAR	2.00	3.14	0.50	2.00	1	5773.80
(1M)011	CIRCULAR	1.00	0.79	0.25	1.00		

1	639.26				
(1M)012	CIRCULAR	1.00	0.79	0.25	1.00
1	1068.25				
(1M)012O	CIRCULAR	0.83	0.54	0.21	0.83
1	307.21				
(1M)013	CIRCULAR	1.00	0.79	0.25	1.00
1	636.62				
(1M)014	CIRCULAR	1.00	0.79	0.25	1.00
1	642.43				
(1M)015	CIRCULAR	1.00	0.79	0.25	1.00
1	641.30				
(1M)016	CIRCULAR	1.00	0.79	0.25	1.00
1	636.10				
(1M)017	CIRCULAR	1.00	0.79	0.25	1.00
1	1242.28				
(1M)018	CIRCULAR	1.00	0.79	0.25	1.00
1	676.55				
(1M)019	CIRCULAR	1.00	0.79	0.25	1.00
1	651.65				
(1M)020	CIRCULAR	1.00	0.79	0.25	1.00
1	650.20				
(1M)020O	CIRCULAR	0.83	0.54	0.21	0.83
1	957.83				
(1M)021	CIRCULAR	0.83	0.54	0.21	0.83
1	458.67				
(1M)022	CIRCULAR	0.83	0.54	0.21	0.83
1	477.93				
(1M)023	CIRCULAR	0.83	0.54	0.21	0.83
1	481.57				
(1M)024	CIRCULAR	0.83	0.54	0.21	0.83
1	452.61				
(1M)024A	CIRCULAR	0.83	0.54	0.21	0.83
1	463.79				
(1M)025	CIRCULAR	0.83	0.54	0.21	0.83
1	464.33				
(1M)027	CIRCULAR	0.83	0.54	0.21	0.83
1	455.64				
(1M)028	CIRCULAR	0.83	0.54	0.21	0.83
1	460.89				
(1M)035	CIRCULAR	1.00	0.79	0.25	1.00
1	702.63				
(1M)036	CIRCULAR	1.00	0.79	0.25	1.00
1	692.66				
(1M)037	CIRCULAR	0.83	0.54	0.21	0.83
1	475.48				
(1M)038	CIRCULAR	0.83	0.54	0.21	0.83
1	478.12				
(1M)039	CIRCULAR	0.83	0.54	0.21	0.83
1	779.00				
(1M)040	CIRCULAR	0.83	0.54	0.21	0.83
1	499.51				
(1M)041	CIRCULAR	0.83	0.54	0.21	0.83
1	460.16				
(1M)092	CIRCULAR	0.83	0.54	0.21	0.83
1	455.19				
(1M)093	CIRCULAR	0.83	0.54	0.21	0.83
1	830.44				
(1M)094	CIRCULAR	0.83	0.54	0.21	0.83
1	448.61				
(1M)116	CIRCULAR	0.83	0.54	0.21	0.83
1	661.75				

(1M)117	CIRCULAR	0.83	0.54	0.21	0.83
1	585.23				
(1M)118	CIRCULAR	0.83	0.54	0.21	0.83
1	484.31				
(1M)119	CIRCULAR	0.83	0.54	0.21	0.83
1	466.35				
(1M)120	CIRCULAR	0.83	0.54	0.21	0.83
1	678.75				
(1M)121	CIRCULAR	0.83	0.54	0.21	0.83
1	457.18				
(1M)122	CIRCULAR	0.83	0.54	0.21	0.83
1	482.01				
(1M)123	CIRCULAR	0.83	0.54	0.21	0.83
1	460.47				
(1M)124	CIRCULAR	0.83	0.54	0.21	0.83
1	458.76				
(1M)125	CIRCULAR	0.83	0.54	0.21	0.83
1	466.95				
(1M)126	CIRCULAR	0.83	0.54	0.21	0.83
1	486.56				
(1M)127	CIRCULAR	0.83	0.54	0.21	0.83
1	454.10				
(1M)128	CIRCULAR	0.83	0.54	0.21	0.83
1	477.21				
(1M)129	CIRCULAR	0.83	0.54	0.21	0.83
1	459.56				
(1M)130	CIRCULAR	43.00	1452.20	10.75	43.00
1	21279601.62				
(1M)131	CIRCULAR	0.83	0.54	0.21	0.83
1	490.28				
(1M)132	CIRCULAR	0.83	0.54	0.21	0.83
1	458.10				
(1M)133	CIRCULAR	0.83	0.54	0.21	0.83
1	459.12				
(1M)161	CIRCULAR	0.67	0.35	0.17	0.67
1	604.23				
(1M)162	CIRCULAR	0.67	0.35	0.17	0.67
1	312.02				
(1M)163	CIRCULAR	0.67	0.35	0.17	0.67
1	312.02				
(1M)164	CIRCULAR	0.67	0.35	0.17	0.67
1	312.02				
(1M)165	CIRCULAR	0.67	0.35	0.17	0.67
1	312.02				
(1M)278	CIRCULAR	3.00	7.07	0.75	3.00
1	12522.37				
(1M)279	CIRCULAR	3.00	7.07	0.75	3.00
1	12829.34				
(1M)279B	CIRCULAR	3.00	7.07	0.75	3.00
1	13623.26				
(1M)281	CIRCULAR	3.00	7.07	0.75	3.00
1	15590.54				
(1M)281B	CIRCULAR	2.00	3.14	0.50	2.00
1	5506.01				
(1M)282	CIRCULAR	2.00	3.14	0.50	2.00
1	3424.61				
(1M)283	CIRCULAR	2.00	3.14	0.50	2.00
1	4518.16				
(1M)284	CIRCULAR	2.00	3.14	0.50	2.00
1	3900.15				
(1M)285	CIRCULAR	2.00	3.14	0.50	2.00

1	4058.67					
	(1M)285A	CIRCULAR	2.00	3.14	0.50	2.00
1	4030.77					
	(1M)286	CIRCULAR	2.00	3.14	0.50	2.00
1	3861.22					
	(1M)287	CIRCULAR	2.00	3.14	0.50	2.00
1	4344.71					
	(1M)2876A	CIRCULAR	2.00	3.14	0.50	2.00
1	4319.84					
	(1M)288	CIRCULAR	2.00	3.14	0.50	2.00
1	4340.73					
	(1M)288A	CIRCULAR	2.00	3.14	0.50	2.00
1	4439.80					
	(1M)288B	CIRCULAR	2.00	3.14	0.50	2.00
1	4401.57					
	(1M)288C	CIRCULAR	2.00	3.14	0.50	2.00
1	4067.81					
	(1N)004	CIRCULAR	2.00	3.14	0.50	2.00
1	4236.34					
	(1N)005	CIRCULAR	2.00	3.14	0.50	2.00
1	4266.45					
	(1N)006	CIRCULAR	2.00	3.14	0.50	2.00
1	4386.80					
	(1N)007	CIRCULAR	2.00	3.14	0.50	2.00
1	4425.09					
	(1N)007D	CIRCULAR	0.83	0.54	0.21	0.83
1	548.73					
	(1N)007E	CIRCULAR	0.83	0.54	0.21	0.83
1	586.96					
	(1N)008	CIRCULAR	0.83	0.54	0.21	0.83
1	460.38					
	(1N)009	CIRCULAR	0.83	0.54	0.21	0.83
1	479.87					
	(1N)011	CIRCULAR	0.83	0.54	0.21	0.83
1	456.85					
	(1N)013	CIRCULAR	0.83	0.54	0.21	0.83
1	459.32					
	(1N)014	CIRCULAR	0.83	0.54	0.21	0.83
1	455.73					
	(1N)015	CIRCULAR	0.83	0.54	0.21	0.83
1	485.46					
	(1N)016	CIRCULAR	0.83	0.54	0.21	0.83
1	461.02					
	(1N)017	CIRCULAR	0.83	0.54	0.21	0.83
1	460.84					
	(1N)018	CIRCULAR	0.83	0.54	0.21	0.83
1	479.67					
	(1N)019	CIRCULAR	0.83	0.54	0.21	0.83
1	424.03					
	(1N)020	CIRCULAR	0.83	0.54	0.21	0.83
1	495.40					
	(1N)021	CIRCULAR	0.83	0.54	0.21	0.83
1	459.70					
	(1N)022	CIRCULAR	0.83	0.54	0.21	0.83
1	459.54					
	(1N)023	CIRCULAR	0.83	0.54	0.21	0.83
1	460.01					
	(1N)024	CIRCULAR	0.83	0.54	0.21	0.83
1	457.36					
	(1N)025	CIRCULAR	0.83	0.54	0.21	0.83
1	454.64					

(1N)045	CIRCULAR	0.83	0.54	0.21	0.83
1 785.58					
(1N)046	CIRCULAR	0.83	0.54	0.21	0.83
1 482.87					
(1N)047	CIRCULAR	0.83	0.54	0.21	0.83
1 464.10					
(1N)109A	CIRCULAR	2.00	3.14	0.50	2.00
1 3891.64					
(1N)110	CIRCULAR	2.00	3.14	0.50	2.00
1 5039.82					
(1N)111A	CIRCULAR	2.00	3.14	0.50	2.00
1 3954.86					
(1N)112A	CIRCULAR	2.00	3.14	0.50	2.00
1 4138.86					
(1N)112B	CIRCULAR	2.00	3.14	0.50	2.00
1 4653.95					
(1O)001	CIRCULAR	0.83	0.54	0.21	0.83
1 490.85					
(1O)001A	CIRCULAR	0.83	0.54	0.21	0.83
1 474.34					
(1O)002	CIRCULAR	0.83	0.54	0.21	0.83
1 697.53					
(1O)002A	CIRCULAR	0.83	0.54	0.21	0.83
1 708.24					
(1O)003	CIRCULAR	0.83	0.54	0.21	0.83
1 479.37					
(1O)004	CIRCULAR	0.83	0.54	0.21	0.83
1 476.83					
(1O)005A	CIRCULAR	0.83	0.54	0.21	0.83
1 474.86					
(1O)005B	CIRCULAR	1.00	0.79	0.25	1.00
1 859.77					
(1O)005C	CIRCULAR	1.00	0.79	0.25	1.00
1 932.55					
(1O)005D	CIRCULAR	1.00	0.79	0.25	1.00
1 939.19					
(1O)005E	CIRCULAR	1.00	0.79	0.25	1.00
1 935.38					
(1O)010	CIRCULAR	0.67	0.35	0.17	0.67
1 93.32					
(1O)011	CIRCULAR	0.67	0.35	0.17	0.67
1 92.56					
(1O)012	CIRCULAR	0.67	0.35	0.17	0.67
1 241.69					
(1O)013	CIRCULAR	0.67	0.35	0.17	0.67
1 241.69					
(1O)014	CIRCULAR	0.67	0.35	0.17	0.67
1 241.69					
(1O)015	CIRCULAR	0.67	0.35	0.17	0.67
1 241.69					
(1O)016	CIRCULAR	0.67	0.35	0.17	0.67
1 241.69					
(1O)017	CIRCULAR	0.67	0.35	0.17	0.67
1 241.69					
(1O)018	CIRCULAR	0.67	0.35	0.17	0.67
1 241.69					
(1O)019	CIRCULAR	0.67	0.35	0.17	0.67
1 279.08					
(1O)020	CIRCULAR	0.67	0.35	0.17	0.67
1 279.08					
(1O)021	CIRCULAR	0.67	0.35	0.17	0.67

1	279.08					
	(1O)072	CIRCULAR	2.00	3.14	0.50	2.00
1	4291.06					
	(1O)157	CIRCULAR	2.00	3.14	0.50	2.00
1	4269.98					
	(1O)300	CIRCULAR	2.00	3.14	0.50	2.00
1	4445.34					
	(1O)301	CIRCULAR	2.00	3.14	0.50	2.00
1	4461.33					
	(1O)302	CIRCULAR	2.00	3.14	0.50	2.00
1	4307.79					
	(1O)303	CIRCULAR	2.00	3.14	0.50	2.00
1	4326.23					
	(1O)304	CIRCULAR	2.00	3.14	0.50	2.00
1	4116.06					
	(1O)304A	CIRCULAR	1.00	0.79	0.25	1.00
1	2927.39					
	(1O)304B	CIRCULAR	1.00	0.79	0.25	1.00
1	686.97					
	(1O)304C	CIRCULAR	1.00	0.79	0.25	1.00
1	226.00					
	(1O)305	CIRCULAR	2.00	3.14	0.50	2.00
1	1095.29					
	(1O)305A	CIRCULAR	2.00	3.14	0.50	2.00
1	40308.56					
	(1O)306	CIRCULAR	2.00	3.14	0.50	2.00
1	4339.64					
	(1O)306A	CIRCULAR	2.00	3.14	0.50	2.00
1	4333.24					
	(1O)307	CIRCULAR	2.00	3.14	0.50	2.00
1	4339.90					
	(1O)308	CIRCULAR	2.00	3.14	0.50	2.00
1	4312.68					
	(1O)308A	CIRCULAR	2.00	3.14	0.50	2.00
1	4354.22					
	(1O)309	CIRCULAR	2.00	3.14	0.50	2.00
1	4179.35					
	(1P)003	CIRCULAR	1.00	0.79	0.25	1.00
1	1513.10					
	(1P)004	CIRCULAR	1.00	0.79	0.25	1.00
1	993.07					
	(1P)005	CIRCULAR	1.00	0.79	0.25	1.00
1	1312.02					
	(1P)006	CIRCULAR	1.00	0.79	0.25	1.00
1	1071.50					
	(1P)007	CIRCULAR	1.00	0.79	0.25	1.00
1	1460.80					
	(1P)008	CIRCULAR	1.00	0.79	0.25	1.00
1	1132.44					
	(1P)008A	CIRCULAR	1.00	0.79	0.25	1.00
1	2176.50					
	(1P)009	CIRCULAR	1.00	0.79	0.25	1.00
1	1894.23					
	(1P)010	CIRCULAR	1.00	0.79	0.25	1.00
1	1176.67					
	(1P)011	CIRCULAR	1.00	0.79	0.25	1.00
1	1239.82					
	(1P)012	CIRCULAR	1.00	0.79	0.25	1.00
1	1232.18					
	(1P)013	CIRCULAR	1.00	0.79	0.25	1.00
1	1225.03					

(1P)014	CIRCULAR	1.00	0.79	0.25	1.00	1	1226.25
(1P)015	CIRCULAR	1.00	0.79	0.25	1.00	1	1232.47
(1P)016	CIRCULAR	1.00	0.79	0.25	1.00	1	1069.41
(1P)016A	CIRCULAR	1.00	0.79	0.25	1.00	1	1075.26
(1P)017	CIRCULAR	1.00	0.79	0.25	1.00	1	1072.20
(1P)018	CIRCULAR	1.00	0.79	0.25	1.00	1	1068.42
(1P)024	CIRCULAR	1.00	0.79	0.25	1.00	1	1070.05
(1P)042	CIRCULAR	0.83	0.54	0.21	0.83	1	1152.31
(1P)042A	CIRCULAR	0.83	0.54	0.21	0.83	1	539.73
(1P)043	CIRCULAR	0.83	0.54	0.21	0.83	1	547.19
(1P)044	CIRCULAR	0.83	0.54	0.21	0.83	1	547.82
(1P)065	CIRCULAR	0.83	0.54	0.21	0.83	1	530.40
(1P)073	CIRCULAR	1.00	0.79	0.25	1.00	1	1227.42
(1P)079	CIRCULAR	1.00	0.79	0.25	1.00	1	1215.19
(2A)001	CIRCULAR	3.00	7.07	0.75	3.00	1	8932.36
(2A)002	CIRCULAR	3.00	7.07	0.75	3.00	1	47824.60
(2A)003	CIRCULAR	3.00	7.07	0.75	3.00	1	15714.33
(2A)004	CIRCULAR	3.00	7.07	0.75	3.00	1	14505.38
(2A)005	CIRCULAR	3.00	7.07	0.75	3.00	1	14408.24
(2A)006	CIRCULAR	3.00	7.07	0.75	3.00	1	9099.02
(2A)007	CIRCULAR	3.00	7.07	0.75	3.00	1	10258.98
(2A)008	CIRCULAR	3.00	7.07	0.75	3.00	1	9609.86
(2A)009	CIRCULAR	3.00	7.07	0.75	3.00	1	9556.02
(2A)010	CIRCULAR	3.00	7.07	0.75	3.00	1	9518.94
(2A)011	CIRCULAR	3.00	7.07	0.75	3.00	1	9275.24
(2A)012	CIRCULAR	3.00	7.07	0.75	3.00	1	9511.38
(2A)013	CIRCULAR	3.00	7.07	0.75	3.00	1	9201.10
(2A)014	CIRCULAR	3.00	7.07	0.75	3.00	1	11115.96
(2A)015	CIRCULAR	3.00	7.07	0.75	3.00	1	11049.08
(2A)016	CIRCULAR	3.00	7.07	0.75	3.00	1	10281.03
(2A)017	CIRCULAR	3.00	7.07	0.75	3.00		

1	10992.04					
	(2A)018	CIRCULAR	3.00	7.07	0.75	3.00
1	10369.18					
	(2A)019	CIRCULAR	3.00	7.07	0.75	3.00
1	11904.41					
	(2A)020	CIRCULAR	3.00	7.07	0.75	3.00
1	10248.75					
	(2A)021	CIRCULAR	3.00	7.07	0.75	3.00
1	15464.73					
	(2A)022	CIRCULAR	3.00	7.07	0.75	3.00
1	16051.09					
	(2A)023	CIRCULAR	3.00	7.07	0.75	3.00
1	16314.31					
	(2A)024	CIRCULAR	3.00	7.07	0.75	3.00
1	17444.91					
	(2A)025	CIRCULAR	3.00	7.07	0.75	3.00
1	19257.01					
	(2A)026	CIRCULAR	3.00	7.07	0.75	3.00
1	17839.59					
	(2A)027	CIRCULAR	3.00	7.07	0.75	3.00
1	10419.62					
	(2A)028	CIRCULAR	3.00	7.07	0.75	3.00
1	8961.78					
	(2A)029	CIRCULAR	3.00	7.07	0.75	3.00
1	9809.45					
	(2A)030	CIRCULAR	3.00	7.07	0.75	3.00
1	10739.24					
	(2A)031	CIRCULAR	3.00	7.07	0.75	3.00
1	12012.40					
	(2A)032	CIRCULAR	3.00	7.07	0.75	3.00
1	9566.97					
	(2A)033	CIRCULAR	3.00	7.07	0.75	3.00
1	11411.05					
	(2A)034	CIRCULAR	3.00	7.07	0.75	3.00
1	14266.00					
	(2A)035	CIRCULAR	3.00	7.07	0.75	3.00
1	14344.93					
	(2A)036	CIRCULAR	3.00	7.07	0.75	3.00
1	14385.10					
	(2A)037	CIRCULAR	3.00	7.07	0.75	3.00
1	13355.05					
	(2A)038	CIRCULAR	3.00	7.07	0.75	3.00
1	14589.17					
	(2A)039	CIRCULAR	3.00	7.07	0.75	3.00
1	14361.27					
	(2A)040	CIRCULAR	3.00	7.07	0.75	3.00
1	14215.39					
	(2A)041	CIRCULAR	3.00	7.07	0.75	3.00
1	14377.99					
	(2A)042	CIRCULAR	3.00	7.07	0.75	3.00
1	14375.57					
	(2A)043	CIRCULAR	3.00	7.07	0.75	3.00
1	15334.35					
	(2A)044	CIRCULAR	3.00	7.07	0.75	3.00
1	14098.50					
	(2A)045	CIRCULAR	3.00	7.07	0.75	3.00
1	13677.67					
	(2A)046	CIRCULAR	3.00	7.07	0.75	3.00
1	13351.13					
	(2A)047	CIRCULAR	3.00	7.07	0.75	3.00
1	9477.75					

	(2A)048	CIRCULAR	3.00	7.07	0.75	3.00
1	9378.28					
	(2A)048O	CIRCULAR	1.00	0.79	0.25	1.00
1	3316.87					
	(2A)049	CIRCULAR	3.00	7.07	0.75	3.00
1	9685.55					
	(2A)050	CIRCULAR	3.00	7.07	0.75	3.00
1	9134.39					
	(2A)051	CIRCULAR	3.00	7.07	0.75	3.00
1	14559.53					
	(2A)052	CIRCULAR	3.00	7.07	0.75	3.00
1	14338.48					
	(2A)053	CIRCULAR	3.00	7.07	0.75	3.00
1	14635.32					
	(2A)054	CIRCULAR	3.00	7.07	0.75	3.00
1	24485.14					
	(2A)055	CIRCULAR	3.00	7.07	0.75	3.00
1	9488.64					
	(2A)056	CIRCULAR	3.00	7.07	0.75	3.00
1	9444.98					
	(2A)057	CIRCULAR	3.00	7.07	0.75	3.00
1	11960.96					
	(2A)058	CIRCULAR	3.00	7.07	0.75	3.00
1	11190.94					
	(2A)059	CIRCULAR	2.50	4.91	0.63	2.50
1	7116.06					
	(2A)060	CIRCULAR	2.50	4.91	0.63	2.50
1	9295.82					
	(2A)061	CIRCULAR	2.50	4.91	0.63	2.50
1	8480.87					
	(2A)062	CIRCULAR	2.50	4.91	0.63	2.50
1	10228.16					
	(2A)063	CIRCULAR	1.50	1.77	0.38	1.50
1	4516.89					
	(2A)064	CIRCULAR	2.50	4.91	0.63	2.50
1	9733.03					
	(2A)065	CIRCULAR	2.50	4.91	0.63	2.50
1	9516.11					
	(2A)066	CIRCULAR	2.50	4.91	0.63	2.50
1	20742.05					
	(2A)067	CIRCULAR	2.50	4.91	0.63	2.50
1	10099.95					
	(2A)068	CIRCULAR	2.50	4.91	0.63	2.50
1	9709.56					
	(2A)069	CIRCULAR	1.00	0.79	0.25	1.00
1	4644.80					
	(2C)001	CIRCULAR	1.00	0.79	0.25	1.00
1	508.32					
	(2C)002	CIRCULAR	1.00	0.79	0.25	1.00
1	515.22					
	(2C)003	CIRCULAR	1.00	0.79	0.25	1.00
1	610.74					
	(2C)004	CIRCULAR	1.00	0.79	0.25	1.00
1	619.72					
	(2C)005	CIRCULAR	1.00	0.79	0.25	1.00
1	632.84					
	(2C)006	CIRCULAR	1.00	0.79	0.25	1.00
1	584.87					
	(2C)007	CIRCULAR	1.00	0.79	0.25	1.00
1	618.39					
	(2C)008	CIRCULAR	1.00	0.79	0.25	1.00

1	635.12					
	(2C)009	CIRCULAR	1.00	0.79	0.25	1.00
1	615.62					
	(2C)009O	CIRCULAR	0.67	0.35	0.17	0.67
1	514.62					
	(2D)001	CIRCULAR	1.00	0.79	0.25	1.00
1	456.44					
	(2D)001A	CIRCULAR	1.00	0.79	0.25	1.00
1	431.78					
	(2D)002	CIRCULAR	1.00	0.79	0.25	1.00
1	828.87					
	(2D)003	CIRCULAR	1.00	0.79	0.25	1.00
1	841.62					
	(2D)004	CIRCULAR	1.00	0.79	0.25	1.00
1	791.61					
	(2D)005	CIRCULAR	1.00	0.79	0.25	1.00
1	843.73					
	(2D)006	CIRCULAR	1.00	0.79	0.25	1.00
1	883.44					
	(2D)007	CIRCULAR	1.00	0.79	0.25	1.00
1	759.80					
	(2D)008	CIRCULAR	1.00	0.79	0.25	1.00
1	694.03					
	(2D)009	CIRCULAR	0.67	0.35	0.17	0.67
1	440.26					
	(2D)010	CIRCULAR	0.67	0.35	0.17	0.67
1	261.64					
	(2D)011	CIRCULAR	0.67	0.35	0.17	0.67
1	289.81					
	(2D)012	CIRCULAR	0.67	0.35	0.17	0.67
1	338.01					
	(2D)013	CIRCULAR	0.67	0.35	0.17	0.67
1	332.67					
	(2D)014	CIRCULAR	0.67	0.35	0.17	0.67
1	305.27					
	(2D)015	CIRCULAR	0.67	0.35	0.17	0.67
1	634.34					
	(2D)016	CIRCULAR	0.67	0.35	0.17	0.67
1	287.54					
	(2D)017	CIRCULAR	0.67	0.35	0.17	0.67
1	320.66					
	(2D)018	CIRCULAR	0.67	0.35	0.17	0.67
1	337.74					
	(2D)019	CIRCULAR	0.67	0.35	0.17	0.67
1	338.38					
	(2D)020	CIRCULAR	0.67	0.35	0.17	0.67
1	282.58					
	(2D)021	CIRCULAR	0.67	0.35	0.17	0.67
1	286.63					
	(2D)022	CIRCULAR	0.67	0.35	0.17	0.67
1	282.72					
	(2D)023	CIRCULAR	0.67	0.35	0.17	0.67
1	350.35					
	(2D)024	CIRCULAR	0.67	0.35	0.17	0.67
1	310.02					
	(2D)025	CIRCULAR	0.67	0.35	0.17	0.67
1	406.69					
	(2D)039	CIRCULAR	0.83	0.54	0.21	0.83
1	748.86					
	(2D)040	CIRCULAR	0.83	0.54	0.21	0.83
1	307.25					

	(2D)041	CIRCULAR	0.83	0.54	0.21	0.83
1	504.09					
	(2D)042	CIRCULAR	0.83	0.54	0.21	0.83
1	493.70					
	(2D)043	CIRCULAR	0.83	0.54	0.21	0.83
1	502.86					
	(2D)044	CIRCULAR	0.83	0.54	0.21	0.83
1	503.43					
	(2D)045	CIRCULAR	0.83	0.54	0.21	0.83
1	504.40					
	(2D)045A	CIRCULAR	0.83	0.54	0.21	0.83
1	461.50					
	(2D)046	CIRCULAR	0.83	0.54	0.21	0.83
1	509.27					
	(2D)046A	CIRCULAR	0.83	0.54	0.21	0.83
1	478.03					
	(2D)241	CIRCULAR	1.50	1.77	0.38	1.50
1	3218.22					
	(2D)242	CIRCULAR	1.50	1.77	0.38	1.50
1	1937.49					
	(2D)243	CIRCULAR	1.50	1.77	0.38	1.50
1	1933.12					
	(2D)244	CIRCULAR	1.50	1.77	0.38	1.50
1	2228.70					
	(2D)244O	CIRCULAR	0.83	0.54	0.21	0.83
1	1344.13					
	(2D)245	CIRCULAR	1.50	1.77	0.38	1.50
1	1430.35					
	(2D)246	CIRCULAR	1.50	1.77	0.38	1.50
1	1955.36					
	(2D)247	CIRCULAR	1.50	1.77	0.38	1.50
1	1945.02					
	(2D)248	CIRCULAR	1.50	1.77	0.38	1.50
1	2010.04					
	(2D)249	CIRCULAR	1.50	1.77	0.38	1.50
1	1932.23					
	(2D)250	CIRCULAR	1.50	1.77	0.38	1.50
1	2063.59					
	(2D)251	CIRCULAR	1.50	1.77	0.38	1.50
1	1980.04					
	(2D)252	CIRCULAR	1.00	0.79	0.25	1.00
1	671.58					
	(2D)253	CIRCULAR	1.50	1.77	0.38	1.50
1	1980.04					
	(2D)254	CIRCULAR	1.50	1.77	0.38	1.50
1	1980.04					
	(2D)255	CIRCULAR	1.50	1.77	0.38	1.50
1	1980.04					
	(2D)256	CIRCULAR	1.50	1.77	0.38	1.50
1	1980.04					
	(2D)257	CIRCULAR	1.50	1.77	0.38	1.50
1	1980.04					
	(2D)258	CIRCULAR	1.50	1.77	0.38	1.50
1	1980.04					
	(2D)259	CIRCULAR	1.50	1.77	0.38	1.50
1	1980.04					
	(2D)260	CIRCULAR	1.50	1.77	0.38	1.50
1	1980.04					
	(2D)261	CIRCULAR	1.50	1.77	0.38	1.50
1	1980.04					
	(2D)262	CIRCULAR	1.50	1.77	0.38	1.50

1	1980.04				
(2D)263	CIRCULAR	1.50	1.77	0.38	1.50
1	1980.04				
(2D)264	CIRCULAR	1.50	1.77	0.38	1.50
1	1980.04				
(2D)265	CIRCULAR	1.25	1.23	0.31	1.25
1	1217.65				
(2D)266	CIRCULAR	1.25	1.23	0.31	1.25
1	1217.65				
(2D)267	CIRCULAR	1.25	1.23	0.31	1.25
1	1217.65				
(2E)001	CIRCULAR	2.50	4.91	0.63	2.50
1	4764.84				
(2E)002	CIRCULAR	2.50	4.91	0.63	2.50
1	6070.23				
(2E)003	CIRCULAR	2.50	4.91	0.63	2.50
1	10227.00				
(2E)004	CIRCULAR	2.50	4.91	0.63	2.50
1	5624.29				
(2E)005	CIRCULAR	2.50	4.91	0.63	2.50
1	3358.16				
(2E)006	CIRCULAR	2.50	4.91	0.63	2.50
1	3271.92				
(2E)007	CIRCULAR	2.50	4.91	0.63	2.50
1	5809.93				
(2E)008	CIRCULAR	2.50	4.91	0.63	2.50
1	8940.87				
(2E)009	CIRCULAR	2.50	4.91	0.63	2.50
1	6696.37				
(2E)010	CIRCULAR	2.50	4.91	0.63	2.50
1	5662.63				
(2E)011	CIRCULAR	2.50	4.91	0.63	2.50
1	5609.45				
(2E)012	CIRCULAR	2.50	4.91	0.63	2.50
1	5649.17				
(2E)013	CIRCULAR	2.50	4.91	0.63	2.50
1	5481.75				
(2E)014	CIRCULAR	2.50	4.91	0.63	2.50
1	5497.61				
(2E)043	CIRCULAR	1.00	0.79	0.25	1.00
1	813.32				
(2F)001	CIRCULAR	2.50	4.91	0.63	2.50
1	5317.76				
(2F)002	CIRCULAR	2.50	4.91	0.63	2.50
1	5384.39				
(2F)003	CIRCULAR	2.50	4.91	0.63	2.50
1	5401.43				
(2F)004	CIRCULAR	2.50	4.91	0.63	2.50
1	5325.82				
(2F)005	CIRCULAR	2.50	4.91	0.63	2.50
1	5420.82				
(2F)006	CIRCULAR	2.50	4.91	0.63	2.50
1	5424.79				
(2F)007	CIRCULAR	2.50	4.91	0.63	2.50
1	5406.45				
(2F)008	CIRCULAR	2.50	4.91	0.63	2.50
1	5093.65				
(2F)009	CIRCULAR	2.25	3.98	0.56	2.25
1	4216.18				
(2F)010	CIRCULAR	1.50	1.77	0.38	1.50
1	5727.28				

(2F)011	CIRCULAR	1.50	1.77	0.38	1.50	1	1885.64
(2F)012	CIRCULAR	1.50	1.77	0.38	1.50	1	1836.49
(2F)013	CIRCULAR	1.50	1.77	0.38	1.50	1	1702.29
(2F)014	CIRCULAR	1.50	1.77	0.38	1.50	1	1731.79
(2F)015	CIRCULAR	1.50	1.77	0.38	1.50	1	1750.22
(2F)016	CIRCULAR	1.50	1.77	0.38	1.50	1	1702.27
(2F)017	CIRCULAR	1.50	1.77	0.38	1.50	1	1702.29
(2F)018	CIRCULAR	1.50	1.77	0.38	1.50	1	1719.63
(2F)019	CIRCULAR	1.50	1.77	0.38	1.50	1	1719.72
(2F)020	CIRCULAR	1.50	1.77	0.38	1.50	1	1685.27
(2F)021	CIRCULAR	1.50	1.77	0.38	1.50	1	1708.05
(2F)022	CIRCULAR	1.50	1.77	0.38	1.50	1	2071.46
(2F)023	CIRCULAR	1.00	0.79	0.25	1.00	1	602.60
(2F)024	CIRCULAR	1.00	0.79	0.25	1.00	1	618.23
(2F)025	CIRCULAR	1.00	0.79	0.25	1.00	1	194.86
(2F)026	CIRCULAR	1.00	0.79	0.25	1.00	1	207.85
(2F)027	CIRCULAR	1.00	0.79	0.25	1.00	1	207.85
(2F)028	CIRCULAR	1.00	0.79	0.25	1.00	1	207.85
(2F)029	CIRCULAR	1.00	0.79	0.25	1.00	1	207.85
(2F)030	CIRCULAR	1.00	0.79	0.25	1.00	1	207.85
(2F)031	CIRCULAR	1.00	0.79	0.25	1.00	1	207.85
(2F)032	CIRCULAR	1.00	0.79	0.25	1.00	1	207.85
(2F)033	CIRCULAR	1.00	0.79	0.25	1.00	1	207.85
(2G)001	CIRCULAR	1.00	0.79	0.25	1.00	1	754.64
(2G)002	CIRCULAR	1.00	0.79	0.25	1.00	1	735.24
(2G)002A	CIRCULAR	1.00	0.79	0.25	1.00	1	746.92
(2G)003	CIRCULAR	1.00	0.79	0.25	1.00	1	740.28
(2G)004	CIRCULAR	1.00	0.79	0.25	1.00	1	746.70
(2G)005	CIRCULAR	1.00	0.79	0.25	1.00	1	745.85
(2G)006	CIRCULAR	0.83	0.54	0.21	0.83	1	567.38
(2G)007	CIRCULAR	0.83	0.54	0.21	0.83		

						1	559.87
(2G)008	CIRCULAR	0.83	0.54	0.21	0.83	1	476.52
(2G)009	CIRCULAR	0.83	0.54	0.21	0.83	1	590.75
(2G)010	CIRCULAR	0.83	0.54	0.21	0.83	1	549.21
(2G)011	CIRCULAR	0.83	0.54	0.21	0.83	1	562.60
(2G)012	CIRCULAR	0.83	0.54	0.21	0.83	1	369.07
(2G)012A	CIRCULAR	0.83	0.54	0.21	0.83	1	594.62
(2G)013	CIRCULAR	0.83	0.54	0.21	0.83	1	632.16
(2G)013A	CIRCULAR	0.83	0.54	0.21	0.83	1	797.92
(2G)014	CIRCULAR	0.83	0.54	0.21	0.83	1	652.85
(2G)015	CIRCULAR	0.83	0.54	0.21	0.83	1	323.96
(2G)016	CIRCULAR	0.83	0.54	0.21	0.83	1	360.19
(2G)016A	CIRCULAR	0.83	0.54	0.21	0.83	1	338.87
(2G)018	CIRCULAR	0.83	0.54	0.21	0.83	1	364.66
(2G)019	CIRCULAR	0.83	0.54	0.21	0.83	1	355.09
(2G)020	CIRCULAR	0.83	0.54	0.21	0.83	1	354.96
(2G)021	CIRCULAR	0.83	0.54	0.21	0.83	1	357.92
(2G)022	CIRCULAR	0.83	0.54	0.21	0.83	1	357.72
(2G)023	CIRCULAR	0.83	0.54	0.21	0.83	1	357.62
(2G)024	CIRCULAR	0.83	0.54	0.21	0.83	1	355.73
(2G)025	CIRCULAR	0.83	0.54	0.21	0.83	1	561.58
(2G)026	CIRCULAR	0.83	0.54	0.21	0.83	1	802.70
(2G)040	CIRCULAR	1.00	0.79	0.25	1.00	1	915.00
(2G)041	CIRCULAR	1.00	0.79	0.25	1.00	1	309.89
(2G)042	CIRCULAR	1.00	0.79	0.25	1.00	1	309.89
(2G)043	CIRCULAR	1.00	0.79	0.25	1.00	1	309.89
(2G)043A	CIRCULAR	1.00	0.79	0.25	1.00	1	309.89
(2G)044	CIRCULAR	1.00	0.79	0.25	1.00	1	309.89
(2G)045	CIRCULAR	1.00	0.79	0.25	1.00	1	309.89
(2G)359	CIRCULAR	0.83	0.54	0.21	0.83	1	362.32
(2H)001	CIRCULAR	1.75	2.41	0.44	1.75	1	2813.84

(2H)002	CIRCULAR	1.75	2.41	0.44	1.75	1	2346.29
(2H)003	CIRCULAR	1.75	2.41	0.44	1.75	1	2289.32
(2H)005	CIRCULAR	1.75	2.41	0.44	1.75	1	2324.96
(2H)006	CIRCULAR	1.75	2.41	0.44	1.75	1	2312.74
(2H)007	CIRCULAR	1.75	2.41	0.44	1.75	1	2561.14
(2H)008	CIRCULAR	1.75	2.41	0.44	1.75	1	3587.28
(2H)009	CIRCULAR	1.75	2.41	0.44	1.75	1	3325.59
(2H)010	CIRCULAR	1.75	2.41	0.44	1.75	1	3234.76
(2H)011	CIRCULAR	1.75	2.41	0.44	1.75	1	3526.04
(2H)012	CIRCULAR	1.75	2.41	0.44	1.75	1	2690.95
(2H)013	CIRCULAR	1.75	2.41	0.44	1.75	1	2479.85
(2H)014	CIRCULAR	1.50	1.77	0.38	1.50	1	2387.77
(2H)015	CIRCULAR	1.50	1.77	0.38	1.50	1	2022.37
(2H)016	CIRCULAR	1.50	1.77	0.38	1.50	1	1463.60
(2H)017	CIRCULAR	1.50	1.77	0.38	1.50	1	3717.55
(2H)017A	CIRCULAR	1.50	1.77	0.38	1.50	1	1990.19
(2H)018	CIRCULAR	1.50	1.77	0.38	1.50	1	1883.35
(2H)019	CIRCULAR	1.50	1.77	0.38	1.50	1	1935.77
(2H)020	CIRCULAR	1.50	1.77	0.38	1.50	1	1841.33
(2H)021	CIRCULAR	1.50	1.77	0.38	1.50	1	2067.07
(2H)022	CIRCULAR	1.25	1.23	0.31	1.25	1	1820.78
(2H)023	CIRCULAR	1.25	1.23	0.31	1.25	1	1871.49
(2H)024	CIRCULAR	1.25	1.23	0.31	1.25	1	1691.10
(2H)025	CIRCULAR	1.25	1.23	0.31	1.25	1	931.82
(2H)026	CIRCULAR	1.00	0.79	0.25	1.00	1	1102.63
(2H)027	CIRCULAR	1.00	0.79	0.25	1.00	1	765.53
(2H)028	CIRCULAR	1.00	0.79	0.25	1.00	1	776.53
(2H)029	CIRCULAR	1.00	0.79	0.25	1.00	1	791.03
(2H)030	CIRCULAR	1.00	0.79	0.25	1.00	1	684.58
(2H)031	CIRCULAR	1.00	0.79	0.25	1.00	1	396.08
(2H)032	CIRCULAR	1.00	0.79	0.25	1.00		

						1	502.67
(2H)033	CIRCULAR	1.00	0.79	0.25	1.00	1	2457.42
(2H)034	CIRCULAR	1.00	0.79	0.25	1.00	1	755.88
(2H)036	CIRCULAR	1.00	0.79	0.25	1.00	1	775.25
(2H)037	CIRCULAR	1.00	0.79	0.25	1.00	1	858.69
(2H)038	CIRCULAR	1.00	0.79	0.25	1.00	1	777.40
(2H)039	CIRCULAR	1.00	0.79	0.25	1.00	1	846.62
(2H)040	CIRCULAR	1.00	0.79	0.25	1.00	1	624.21
(2H)041	CIRCULAR	1.00	0.79	0.25	1.00	1	777.10
(2H)042	CIRCULAR	1.00	0.79	0.25	1.00	1	973.03
(2H)043	CIRCULAR	1.00	0.79	0.25	1.00	1	642.33
(2H)044	CIRCULAR	1.00	0.79	0.25	1.00	1	715.66
(2H)045	CIRCULAR	1.00	0.79	0.25	1.00	1	722.62
(2H)046	CIRCULAR	1.00	0.79	0.25	1.00	1	773.42
(2H)047	CIRCULAR	1.00	0.79	0.25	1.00	1	386.00
(2H)048	CIRCULAR	1.00	0.79	0.25	1.00	1	1395.01
(2H)049	CIRCULAR	1.00	0.79	0.25	1.00	1	684.39
(2H)050	CIRCULAR	1.00	0.79	0.25	1.00	1	573.31
(2H)051	CIRCULAR	1.00	0.79	0.25	1.00	1	563.47
(2H)051A	CIRCULAR	1.00	0.79	0.25	1.00	1	669.24
(2H)052	CIRCULAR	1.00	0.79	0.25	1.00	1	798.81
(2H)053	CIRCULAR	1.00	0.79	0.25	1.00	1	333.32
(2H)054	CIRCULAR	0.83	0.54	0.21	0.83	1	512.64
(2H)054A	CIRCULAR	0.83	0.54	0.21	0.83	1	512.95
(2H)055	CIRCULAR	0.83	0.54	0.21	0.83	1	513.55
(2H)055A	CIRCULAR	0.83	0.54	0.21	0.83	1	513.55
(2H)056	CIRCULAR	0.83	0.54	0.21	0.83	1	513.55
(2H)057	CIRCULAR	0.83	0.54	0.21	0.83	1	513.55
(2H)058	CIRCULAR	0.83	0.54	0.21	0.83	1	513.55
(2H)285	CIRCULAR	0.83	0.54	0.21	0.83	1	482.52
(2H)286	CIRCULAR	0.83	0.54	0.21	0.83	1	459.62

(2H)287	CIRCULAR	0.83	0.54	0.21	0.83	1	458.67
(2H)288	CIRCULAR	0.83	0.54	0.21	0.83	1	458.63
(2H)289	CIRCULAR	0.83	0.54	0.21	0.83	1	457.41
(2H)290	CIRCULAR	0.83	0.54	0.21	0.83	1	460.81
(2I)001	CIRCULAR	1.25	1.23	0.31	1.25	1	1317.11
(2I)001A	CIRCULAR	1.25	1.23	0.31	1.25	1	941.02
(2I)002	CIRCULAR	1.25	1.23	0.31	1.25	1	2363.70
(2I)003	CIRCULAR	1.25	1.23	0.31	1.25	1	1505.25
(2I)004	CIRCULAR	1.25	1.23	0.31	1.25	1	1453.82
(2I)005	CIRCULAR	1.25	1.23	0.31	1.25	1	1510.84
(2I)006	CIRCULAR	1.25	1.23	0.31	1.25	1	1531.40
(2I)008	CIRCULAR	1.25	1.23	0.31	1.25	1	1503.14
(2I)009	CIRCULAR	1.25	1.23	0.31	1.25	1	1475.18
(2I)010	CIRCULAR	1.25	1.23	0.31	1.25	1	1538.62
(2I)011	CIRCULAR	1.25	1.23	0.31	1.25	1	1502.87
(2I)012	CIRCULAR	1.25	1.23	0.31	1.25	1	1505.92
(2I)013	CIRCULAR	1.25	1.23	0.31	1.25	1	1481.37
(2I)014	CIRCULAR	1.25	1.23	0.31	1.25	1	1283.31
(2I)015	CIRCULAR	1.25	1.23	0.31	1.25	1	1286.11
(2I)016	CIRCULAR	1.25	1.23	0.31	1.25	1	1325.24
(2I)017	CIRCULAR	1.25	1.23	0.31	1.25	1	1459.56
(2I)018	CIRCULAR	1.00	0.79	0.25	1.00	1	651.87
(2I)019	CIRCULAR	1.25	1.23	0.31	1.25	1	1397.26
(2I)020	CIRCULAR	1.00	0.79	0.25	1.00	1	797.91
(2I)021	CIRCULAR	1.00	0.79	0.25	1.00	1	711.82
(2I)021A	CIRCULAR	1.17	1.07	0.29	1.17	1	1062.23
(2I)021B	CIRCULAR	1.17	1.07	0.29	1.17	1	1057.05
(2I)021C	CIRCULAR	1.17	1.07	0.29	1.17	1	572.94
(2I)022	CIRCULAR	1.17	1.07	0.29	1.17	1	1032.37
(2I)023	CIRCULAR	1.00	0.79	0.25	1.00	1	709.42
(2I)024	CIRCULAR	1.00	0.79	0.25	1.00		

1	707.04					
	(2I)025	CIRCULAR	1.00	0.79	0.25	1.00
1	709.40					
	(2I)025A	CIRCULAR	1.00	0.79	0.25	1.00
1	702.88					
	(2I)026	CIRCULAR	1.00	0.79	0.25	1.00
1	740.86					
	(2I)027	CIRCULAR	1.00	0.79	0.25	1.00
1	709.93					
	(2I)028	CIRCULAR	1.00	0.79	0.25	1.00
1	675.56					
	(2I)029	CIRCULAR	1.00	0.79	0.25	1.00
1	734.04					
	(2I)044	CIRCULAR	1.00	0.79	0.25	1.00
1	1299.27					
	(2I)045	CIRCULAR	1.00	0.79	0.25	1.00
1	1299.27					
	(2I)046	CIRCULAR	1.00	0.79	0.25	1.00
1	1299.27					
	(2I)047	CIRCULAR	1.00	0.79	0.25	1.00
1	1299.27					
	(2I)048	CIRCULAR	1.00	0.79	0.25	1.00
1	1299.27					
	(2I)049	CIRCULAR	1.00	0.79	0.25	1.00
1	1299.27					
	(2I)050	CIRCULAR	1.00	0.79	0.25	1.00
1	821.73					
	(2I)051	CIRCULAR	1.00	0.79	0.25	1.00
1	821.73					
	(2I)052	CIRCULAR	1.00	0.79	0.25	1.00
1	821.73					
	(2I)053	CIRCULAR	1.00	0.79	0.25	1.00
1	821.73					
	(2I)054	CIRCULAR	1.00	0.79	0.25	1.00
1	821.73					
	(2I)055	CIRCULAR	1.00	0.79	0.25	1.00
1	821.73					
	(2I)056	CIRCULAR	1.00	0.79	0.25	1.00
1	821.73					
	(2I)057	CIRCULAR	1.00	0.79	0.25	1.00
1	821.73					
	(2I)058	CIRCULAR	1.00	0.79	0.25	1.00
1	821.73					
	(2I)059	CIRCULAR	1.00	0.79	0.25	1.00
1	821.73					
	(2J)001	CIRCULAR	2.25	3.98	0.56	2.25
1	4754.69					
	(2J)002	CIRCULAR	2.25	3.98	0.56	2.25
1	3878.35					
	(2J)003	CIRCULAR	2.25	3.98	0.56	2.25
1	3923.49					
	(2J)004	CIRCULAR	2.25	3.98	0.56	2.25
1	3840.88					
	(2J)005	CIRCULAR	2.25	3.98	0.56	2.25
1	4282.25					
	(2J)006	CIRCULAR	2.25	3.98	0.56	2.25
1	3933.94					
	(2J)007	CIRCULAR	2.25	3.98	0.56	2.25
1	3894.78					
	(2J)008	CIRCULAR	2.25	3.98	0.56	2.25
1	3894.91					

(2J)009	CIRCULAR	2.25	3.98	0.56	2.25	1	5141.41
(2J)010	CIRCULAR	2.25	3.98	0.56	2.25	1	5189.38
(2J)011	CIRCULAR	2.00	3.14	0.50	2.00	1	5046.16
(2J)012	CIRCULAR	2.00	3.14	0.50	2.00	1	3698.22
(2J)013	CIRCULAR	2.00	3.14	0.50	2.00	1	3639.35
(2J)014	CIRCULAR	2.00	3.14	0.50	2.00	1	3750.51
(2J)015	CIRCULAR	2.00	3.14	0.50	2.00	1	3643.82
(2J)016	CIRCULAR	2.00	3.14	0.50	2.00	1	3711.02
(2J)017	CIRCULAR	2.00	3.14	0.50	2.00	1	3989.50
(2J)018	CIRCULAR	2.00	3.14	0.50	2.00	1	3710.83
(2J)019	CIRCULAR	1.75	2.41	0.44	1.75	1	2862.13
(2J)020	CIRCULAR	0.75	0.44	0.19	0.75	1	76.97
(2J)021	CIRCULAR	0.75	0.44	0.19	0.75	1	729.52
(2J)022	CIRCULAR	0.75	0.44	0.19	0.75	1	331.72
(2J)023	CIRCULAR	0.83	0.54	0.21	0.83	1	361.26
(2J)024	CIRCULAR	0.83	0.54	0.21	0.83	1	771.41
(2J)0250	CIRCULAR	0.83	0.54	0.21	0.83	1	4101.86
(2J)026	CIRCULAR	0.83	0.54	0.21	0.83	1	445.64
(2J)027	CIRCULAR	0.83	0.54	0.21	0.83	1	455.80
(2J)028	CIRCULAR	0.83	0.54	0.21	0.83	1	442.88
(2J)029	CIRCULAR	0.83	0.54	0.21	0.83	1	456.23
(2J)030	CIRCULAR	0.67	0.35	0.17	0.67	1	303.35
(2J)031	CIRCULAR	0.67	0.35	0.17	0.67	1	293.29
(2J)032	CIRCULAR	0.67	0.35	0.17	0.67	1	280.94
(2J)033	CIRCULAR	0.67	0.35	0.17	0.67	1	286.66
(2J)040	CIRCULAR	0.83	0.54	0.21	0.83	1	597.59
(2J)041	CIRCULAR	0.83	0.54	0.21	0.83	1	450.32
(2J)042	CIRCULAR	0.83	0.54	0.21	0.83	1	443.78
(2J)043	CIRCULAR	0.83	0.54	0.21	0.83	1	477.06
(2J)044	CIRCULAR	0.83	0.54	0.21	0.83	1	432.76
(2J)045	CIRCULAR	0.83	0.54	0.21	0.83		

1	459.69				
(2J)045A	CIRCULAR	0.83	0.54	0.21	0.83
1	426.15				
(2J)046	CIRCULAR	0.83	0.54	0.21	0.83
1	448.36				
(2J)047	CIRCULAR	0.83	0.54	0.21	0.83
1	435.24				
(2J)048	CIRCULAR	0.83	0.54	0.21	0.83
1	440.74				
(2J)049	CIRCULAR	0.83	0.54	0.21	0.83
1	567.32				
(2J)050	CIRCULAR	0.83	0.54	0.21	0.83
1	451.46				
(2J)051	CIRCULAR	0.83	0.54	0.21	0.83
1	438.92				
(2J)052	CIRCULAR	0.67	0.35	0.17	0.67
1	293.44				
(2J)053	CIRCULAR	0.67	0.35	0.17	0.67
1	282.76				
(2J)054	CIRCULAR	0.67	0.35	0.17	0.67
1	287.78				
(2J)055	CIRCULAR	0.67	0.35	0.17	0.67
1	290.40				
(2J)056	CIRCULAR	0.67	0.35	0.17	0.67
1	291.16				
(2J)057	CIRCULAR	0.67	0.35	0.17	0.67
1	280.52				
(2J)058	CIRCULAR	0.67	0.35	0.17	0.67
1	268.18				
(2K)001	CIRCULAR	1.75	2.41	0.44	1.75
1	1121.85				
(2K)002	CIRCULAR	1.25	1.23	0.31	1.25
1	3087.32				
(2K)003	CIRCULAR	1.25	1.23	0.31	1.25
1	1410.42				
(2K)004	CIRCULAR	1.25	1.23	0.31	1.25
1	1278.70				
(2K)005	CIRCULAR	1.25	1.23	0.31	1.25
1	1290.55				
(2K)006	CIRCULAR	1.25	1.23	0.31	1.25
1	1303.70				
(2K)007	CIRCULAR	1.25	1.23	0.31	1.25
1	1504.42				
(2K)008	CIRCULAR	1.25	1.23	0.31	1.25
1	1309.71				
(2K)009	CIRCULAR	1.25	1.23	0.31	1.25
1	1355.73				
(2K)010	CIRCULAR	1.25	1.23	0.31	1.25
1	1271.78				
(2K)011	CIRCULAR	1.25	1.23	0.31	1.25
1	1174.94				
(2K)012	CIRCULAR	1.25	1.23	0.31	1.25
1	1403.75				
(2K)013	CIRCULAR	1.25	1.23	0.31	1.25
1	1267.51				
(2K)014	CIRCULAR	1.00	0.79	0.25	1.00
1	860.38				
(2K)015	CIRCULAR	1.00	0.79	0.25	1.00
1	644.79				
(2K)016	CIRCULAR	1.00	0.79	0.25	1.00
1	838.01				

(2K)017	CIRCULAR	1.00	0.79	0.25	1.00	1	815.82
(2K)018	CIRCULAR	1.00	0.79	0.25	1.00	1	759.31
(2K)018A	CIRCULAR	1.00	0.79	0.25	1.00	1	801.66
(2K)019	CIRCULAR	1.00	0.79	0.25	1.00	1	875.31
(2K)020	CIRCULAR	1.00	0.79	0.25	1.00	1	844.09
(2K)021	CIRCULAR	1.00	0.79	0.25	1.00	1	662.60
(2K)022	CIRCULAR	1.00	0.79	0.25	1.00	1	886.52
(2K)022A	CIRCULAR	1.00	0.79	0.25	1.00	1	824.08
(2K)023	CIRCULAR	1.00	0.79	0.25	1.00	1	797.51
(2K)024	CIRCULAR	1.00	0.79	0.25	1.00	1	874.53
(2K)024A	CIRCULAR	1.00	0.79	0.25	1.00	1	779.67
(2K)025	CIRCULAR	1.00	0.79	0.25	1.00	1	845.71
(2K)026	CIRCULAR	1.00	0.79	0.25	1.00	1	715.03
(2K)027	CIRCULAR	1.00	0.79	0.25	1.00	1	3500.23
(2K)028	CIRCULAR	1.00	0.79	0.25	1.00	1	614.52
(2K)029	CIRCULAR	1.00	0.79	0.25	1.00	1	603.71
(2K)030	CIRCULAR	1.00	0.79	0.25	1.00	1	611.35
(2K)031	CIRCULAR	1.00	0.79	0.25	1.00	1	607.89
(2K)032	CIRCULAR	1.00	0.79	0.25	1.00	1	613.14
(2K)033	CIRCULAR	1.00	0.79	0.25	1.00	1	604.88
(2K)033A	CIRCULAR	1.00	0.79	0.25	1.00	1	588.36
(2K)034	CIRCULAR	1.00	0.79	0.25	1.00	1	597.24
(2K)035	CIRCULAR	1.00	0.79	0.25	1.00	1	628.97
(2K)036	CIRCULAR	1.00	0.79	0.25	1.00	1	613.12
(2K)037	CIRCULAR	1.00	0.79	0.25	1.00	1	599.96
(2K)038	CIRCULAR	1.00	0.79	0.25	1.00	1	600.06
(2K)039	CIRCULAR	1.00	0.79	0.25	1.00	1	600.06
(2K)040	CIRCULAR	1.00	0.79	0.25	1.00	1	600.06
(2K)041	CIRCULAR	1.00	0.79	0.25	1.00	1	600.06
(2K)042	CIRCULAR	1.00	0.79	0.25	1.00	1	600.06
(2K)043	CIRCULAR	1.00	0.79	0.25	1.00		

						1	600.06
(2K)044	CIRCULAR	1.00	0.79	0.25	1.00	1	600.06
(2K)045	CIRCULAR	1.00	0.79	0.25	1.00	1	600.06
(2K)046	CIRCULAR	1.00	0.79	0.25	1.00	1	600.06
(2K)047	CIRCULAR	1.00	0.79	0.25	1.00	1	600.06
(2K)048	CIRCULAR	1.00	0.79	0.25	1.00	1	600.06
(2K)049	CIRCULAR	1.00	0.79	0.25	1.00	1	600.06
(2K)050	CIRCULAR	1.00	0.79	0.25	1.00	1	600.06
(2K)051	CIRCULAR	1.00	0.79	0.25	1.00	1	600.06
(2K)052	CIRCULAR	1.00	0.79	0.25	1.00	1	600.06
(2K)314	CIRCULAR	0.83	0.54	0.21	0.83	1	570.99
(2K)315	CIRCULAR	0.83	0.54	0.21	0.83	1	385.19
(2K)316	CIRCULAR	0.83	0.54	0.21	0.83	1	471.10
(2K)317	CIRCULAR	0.83	0.54	0.21	0.83	1	460.77
FordedMain2	CIRCULAR	0.67	0.35	0.17	0.67	1	137.76
Line2ToPlant	CIRCULAR	2.75	5.94	0.69	2.75	1	10917.24
NorthEnid	CIRCULAR	1.00	0.79	0.25	1.00	1	40.80
1	CIRCULAR	1.00	0.79	0.25	1.00	1	6307.99

********************* Rainfall Dependent I/I *********************	Volume acre-feet	Volume Mgallons
Sewershed Rainfall	7.129	2.323
RDII Produced	0.643	0.210
RDII Ratio	0.090	

************************** Runoff Quantity Continuity **************************	Volume acre-feet	Depth inches
Total Precipitation	967.651	0.980
Evaporation Loss	0.000	0.000
Infiltration Loss	418.507	0.424
Surface Runoff	504.700	0.511
Final Surface Storage	44.267	0.045
Continuity Error (%)	0.018	

************************** Flow Routing Continuity **************************	Volume acre-feet	Volume Mgallons
Dry Weather Inflow	87.042	28.364

Wet Weather Inflow	504.699	164.464
Groundwater Inflow	0.000	0.000
RDII Inflow	0.643	0.210
External Inflow	3.898	1.270
External Outflow	71.944	23.444
Surface Flooding	513.729	167.406
Evaporation Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	10.693	3.484
Continuity Error (%)	-0.014	

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Subcatchment Runoff Summary
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Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Peak Runoff GPM	Runoff Coeff
Basin1A1	0.980	0.000	0.000	0.833	0.097	2441.291	0.099
Basin1A2	0.980	0.000	0.000	0.104	0.821	10485.074	0.837
Basin1A3	0.980	0.000	0.000	0.226	0.703	7684.863	0.718
Basin1B1	0.980	0.000	0.000	0.530	0.404	3520.517	0.413
Basin1B2	0.980	0.000	0.000	0.245	0.692	8355.060	0.706
Basin1B3	0.980	0.000	0.000	0.284	0.652	16596.611	0.665
Basin1B4	0.980	0.000	0.000	0.274	0.662	8609.841	0.676
Basin1C1	0.980	0.000	0.000	0.285	0.652	12567.899	0.665
Basin1C1A	0.980	0.000	0.000	0.287	0.650	8666.274	0.663
Basin1C1B	0.980	0.000	0.000	0.325	0.611	9366.611	0.624
Basin1C1C	0.980	0.000	0.000	0.376	0.560	10613.581	0.571
Basin1C1D	0.980	0.000	0.000	0.518	0.416	6374.860	0.425
Basin1C2	0.980	0.000	0.000	0.248	0.689	9140.888	0.703
Basin1C3	0.980	0.000	0.000	0.274	0.663	10068.859	0.677
Basin1C4	0.980	0.000	0.000	0.286	0.651	8938.294	0.664
Basin1D1	0.980	0.000	0.000	0.544	0.390	4819.147	0.398
Basin1D2	0.980	0.000	0.000	0.374	0.562		

						6452.397	0.573
Basin1D3	0.980	0.000	0.000	0.280	0.657	14871.396	0.670
Basin1D4	0.980	0.000	0.000	0.381	0.555	10871.928	0.567
Basin1E1	0.980	0.000	0.000	0.763	0.168	1651.961	0.171
Basin1E2	0.980	0.000	0.000	0.398	0.538	6874.224	0.549
Basin1F1	0.980	0.000	0.000	0.531	0.403	16706.775	0.412
Basin1F2	0.980	0.000	0.000	0.651	0.281	3215.587	0.287
Basin1F3	0.980	0.000	0.000	0.413	0.523	10506.898	0.534
Basin1F4	0.980	0.000	0.000	0.329	0.608	9781.890	0.621
Basin1F5	0.980	0.000	0.000	0.086	0.854	14059.284	0.871
Basin1G1	0.980	0.000	0.000	0.140	0.797	6979.829	0.813
Basin1G2	0.980	0.000	0.000	0.349	0.587	20281.951	0.599
Basin1G3	0.980	0.000	0.000	0.280	0.657	13981.578	0.671
Basin1G4	0.980	0.000	0.000	0.263	0.674	18221.377	0.687
Basin1G5	0.980	0.000	0.000	0.338	0.596	15856.390	0.608
Basin1G6	0.980	0.000	0.000	0.330	0.607	9318.534	0.619
Basin1G8	0.980	0.000	0.000	0.367	0.569	11528.483	0.581
Basin1G9	0.980	0.000	0.000	0.516	0.418	5398.789	0.426
Basin1H1	0.980	0.000	0.000	0.202	0.733	19574.069	0.748
Basin1I1	0.980	0.000	0.000	0.209	0.725	15240.436	0.740
Basin1J1	0.980	0.000	0.000	0.194	0.742	18429.132	0.757
Basin1J2	0.980	0.000	0.000	0.267	0.671	6349.742	0.685
Basin1K1	0.980	0.000	0.000	0.358	0.579	8588.449	0.590
Basin1K2	0.980	0.000	0.000	0.547	0.388	5935.036	0.396
Basin1K3	0.980	0.000	0.000	0.423	0.512	17143.857	0.523
Basin1K4	0.980	0.000	0.000	0.354	0.583	10677.666	0.595
Basin1M1	0.980	0.000	0.000	0.504	0.430	5485.024	0.438
Basin1M2	0.980	0.000	0.000	0.430	0.504	6081.850	0.514
Basin1M3	0.980	0.000	0.000	0.320	0.616	10927.564	0.628
Basin1M4	0.980	0.000	0.000	0.313	0.624	11688.184	0.636
Basin1M5	0.980	0.000	0.000	0.568	0.365	11576.089	0.372

Basin1M6	0.980	0.000	0.000	0.171	0.767	10739.830	0.783
Basin1N1	0.980	0.000	0.000	0.355	0.581	10595.094	0.593
Basin1N2	0.980	0.000	0.000	0.260	0.677	10558.020	0.690
Basin1N3	0.980	0.000	0.000	0.445	0.489	5551.138	0.499
Basin1N4	0.980	0.000	0.000	0.704	0.229	7288.103	0.233
Basin1N5	0.980	0.000	0.000	0.351	0.585	3263.628	0.597
Basin1N6	0.980	0.000	0.000	0.363	0.573	20481.760	0.584
Basin1N7	0.980	0.000	0.000	0.632	0.300	11479.953	0.306
Basin1N8	0.980	0.000	0.000	0.277	0.660	3883.859	0.673
Basin1O1	0.980	0.000	0.000	0.356	0.580	26573.767	0.592
Basin1O2	0.980	0.000	0.000	0.091	0.830	8128.319	0.847
Basin1O3	0.980	0.000	0.000	0.365	0.572	14553.794	0.583
Basin1O4	0.980	0.000	0.000	0.602	0.332	12676.644	0.339
Basin1O5	0.980	0.000	0.000	0.308	0.628	9064.934	0.640
Basin1P1	0.980	0.000	0.000	0.594	0.338	17556.376	0.345
Basin1P2	0.980	0.000	0.000	0.591	0.342	5183.497	0.349
Basin1P3	0.980	0.000	0.000	0.684	0.248	9004.163	0.253
Basin2A1	0.980	0.000	0.000	0.838	0.094	1084.572	0.096
Basin2A2	0.980	0.000	0.000	0.903	0.027	857.123	0.028
Basin2B1	0.980	0.000	0.000	0.310	0.626	8995.105	0.639
Basin2B2	0.980	0.000	0.000	0.274	0.663	9905.917	0.677
Basin2B3	0.980	0.000	0.000	0.289	0.648	16470.338	0.661
Basin2C1	0.980	0.000	0.000	0.459	0.476	8080.925	0.486
Basin2C2	0.980	0.000	0.000	0.550	0.384	2907.203	0.392
Basin2C3	0.980	0.000	0.000	0.386	0.550	14078.695	0.561
Basin2D1	0.980	0.000	0.000	0.853	0.077	457.051	0.078
Basin2D2	0.980	0.000	0.000	0.351	0.586	39382.951	0.598
Basin2D3	0.980	0.000	0.000	0.896	0.034	1649.981	0.035
Basin2D4	0.980	0.000	0.000	0.236	0.701	12173.054	0.715
Basin2D5	0.980	0.000	0.000	0.531	0.403	12669.296	0.411
Basin2E1	0.980	0.000	0.000	0.000	0.940		

						2358.020	0.960
Basin2E2	0.980	0.000	0.000	0.811	0.121	309.945	0.123
Basin2F1	0.980	0.000	0.000	0.577	0.377	3766.268	0.384
Basin2F2	0.980	0.000	0.000	0.273	0.664	16817.966	0.678
Basin2F3	0.980	0.000	0.000	0.568	0.377	5272.488	0.384
Basin2F4	0.980	0.000	0.000	0.427	0.507	2298.314	0.518
Basin2F5	0.980	0.000	0.000	0.517	0.424	7730.837	0.432
Basin2G1	0.980	0.000	0.000	0.274	0.664	9691.476	0.677
Basin2G2	0.980	0.000	0.000	0.268	0.669	36750.020	0.683
Basin2G3	0.980	0.000	0.000	0.041	0.900	17616.558	0.918
Basin2G4	0.980	0.000	0.000	0.272	0.665	23201.236	0.679
Basin2G5	0.980	0.000	0.000	0.280	0.656	12448.156	0.670
Basin2G6	0.980	0.000	0.000	0.605	0.330	14534.390	0.336
Basin2H10	0.980	0.000	0.000	0.352	0.584	4784.192	0.596
Basin2H2	0.980	0.000	0.000	0.536	0.398	4381.817	0.406
Basin2H3	0.980	0.000	0.000	0.455	0.480	13956.665	0.490
Basin2H4	0.980	0.000	0.000	0.602	0.332	10897.170	0.339
Basin2H5	0.980	0.000	0.000	0.465	0.471	3523.153	0.480
Basin2H6	0.980	0.000	0.000	0.697	0.236	1717.732	0.241
Basin2H7	0.980	0.000	0.000	0.363	0.573	7111.252	0.584
Basin2H8	0.980	0.000	0.000	0.414	0.522	10416.577	0.532
Basin2H9	0.980	0.000	0.000	0.829	0.102	1296.960	0.104
Basin2I1	0.980	0.000	0.000	0.540	0.395	4987.077	0.403
Basin2I10	0.980	0.000	0.000	0.398	0.539	7931.127	0.550
Basin2I11	0.980	0.000	0.000	0.464	0.472	10105.592	0.482
Basin2I2	0.980	0.000	0.000	0.398	0.538	3922.348	0.549
Basin2I3	0.980	0.000	0.000	0.428	0.508	1475.507	0.519
Basin2I4	0.980	0.000	0.000	0.527	0.407	4813.886	0.415
Basin2I5	0.980	0.000	0.000	0.366	0.569	11364.573	0.581
Basin2I6	0.980	0.000	0.000	0.466	0.469	17130.821	0.479
Basin2I7	0.980	0.000	0.000	0.315	0.621	2148.329	0.634

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  Basin2I8                0.980     0.000     0.000     0.349     0.586
7825.418     0.598
  Basin2I9                0.980     0.000     0.000     0.512     0.424
12405.361     0.432
  Basin2J1                0.980     0.000     0.000     0.047     0.894
7797.906     0.912
  Basin2J2                0.980     0.000     0.000     0.254     0.684
12025.945     0.698
  Basin2J3                0.980     0.000     0.000     0.227     0.709
23258.152     0.723
  Basin2J4                0.980     0.000     0.000     0.245     0.693
9899.569     0.707
  Basin2J5                0.980     0.000     0.000     0.216     0.721
7656.490     0.736
  Basin2J6                0.980     0.000     0.000     0.304     0.631
5342.098     0.644
  Basin2K1                0.980     0.000     0.000     0.080     0.850
10619.730     0.867
  Basin2K2                0.980     0.000     0.000     0.333     0.602
6700.603     0.615
  Basin2K3                0.980     0.000     0.000     0.436     0.499
4028.908     0.509
  Basin2K4                0.980     0.000     0.000     0.472     0.463
6055.480     0.472
  Basin2K5                0.980     0.000     0.000     0.452     0.484
7759.793     0.494
  Basin2K6                0.980     0.000     0.000     0.507     0.429
15655.865     0.437
  Basin2K7                0.980     0.000     0.000     0.491     0.444
4944.197     0.453
  Basin2K8                0.980     0.000     0.000     0.567     0.366
6427.887     0.374
  Basin2K9                0.980     0.000     0.000     0.688     0.245
12940.673     0.250

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  System                  0.980     0.000     0.000     0.424
0.5111232951.070       0.522


  ******************
  Node Depth Summary
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--------------------------------------------------------------------------
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                                  Average  Maximum  Maximum  Time of Max
Max Vol.    Total
                                    Depth    Depth      HGL   Occurrence
Ponded  Minutes
  Node                 Type          Feet     Feet     Feet  days hr:min
acre-in  Flooded

--------------------------------------------------------------------------
----------------
  (1A)000              JUNCTION      1.02     1.08  1148.57     3  07:09
0        0
  (1A)000A             JUNCTION      1.13     1.19  1149.68     3  07:08
0        0
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(1A)000B	JUNCTION	2.35	2.54	1151.94	0	07:13	0	0
(1A)001	JUNCTION	5.75	6.74	1156.29	0	07:13	0	4034
(1A)002	JUNCTION	1.54	6.55	1156.21	1	06:51	0	22
(1A)003	JUNCTION	1.29	1.95	1152.81	1	07:04	0	0
(1A)004	JUNCTION	1.29	1.95	1153.44	1	07:02	0	0
(1A)005	JUNCTION	1.20	1.77	1154.13	1	07:01	0	0
(1A)006	JUNCTION	1.04	1.51	1155.86	1	07:00	0	0
(1A)007	JUNCTION	1.04	1.51	1157.91	1	07:00	0	0
(1A)008	JUNCTION	1.32	1.54	1159.99	1	17:13	0	0
(1A)009	JUNCTION	1.32	1.53	1160.83	1	17:12	0	0
(1A)010	JUNCTION	2.00	2.51	1163.66	1	07:09	0	0
(1A)011	JUNCTION	2.71	7.50	1168.90	1	05:34	0	699
(1A)012	JUNCTION	2.04	3.95	1165.70	1	05:37	0	570
(1A)013	JUNCTION	1.55	10.33	1173.05	1	06:20	0	166
(1A)014	JUNCTION	1.17	3.58	1166.93	1	06:37	0	95
(1A)015	JUNCTION	1.30	1.48	1165.68	1	10:13	0	0
(1A)016	JUNCTION	1.48	1.71	1166.76	1	10:11	0	0
(1A)017	JUNCTION	1.48	1.71	1167.34	1	10:09	0	0
(1A)018	JUNCTION	2.15	2.37	1169.02	0	07:31	0	0
(1A)019	JUNCTION	9.52	11.75	1178.50	0	07:10	0	3929
(1A)020	JUNCTION	1.22	1.39	1169.47	2	08:25	0	0
(1A)021	JUNCTION	1.22	1.39	1171.24	2	20:06	0	0
(1A)022	JUNCTION	1.25	1.43	1173.41	2	21:45	0	0
(1A)023	JUNCTION	1.25	1.43	1174.91	2	21:44	0	0
(1A)024	JUNCTION	1.87	2.32	1177.95	0	20:10	0	0
(1A)024A	JUNCTION	3.40	8.06	1184.16	0	20:10	0	1299
(1A)025	JUNCTION	1.12	2.29	1180.07	1	06:37	0	0
(1A)026	JUNCTION	1.30	13.58	1193.56	1	06:37	0	81
(1A)027	JUNCTION	1.55	18.54	1200.25	1	06:53	0	27
(1A)028	JUNCTION	1.46	1.68	1183.93	3	08:24	0	0
(1A)029	JUNCTION	1.51	1.74	1184.71	3	08:23		

0	0						
	(1A)030	JUNCTION	1.51	1.74	1185.22	3	08:21
0	0						
	(1A)031	JUNCTION	1.34	1.53	1186.04	3	08:19
0	0						
	(1A)032	JUNCTION	1.34	1.53	1186.83	3	08:17
0	0						
	(1A)033	JUNCTION	1.56	1.80	1187.93	2	22:36
0	0						
	(1A)034	JUNCTION	1.56	1.80	1188.40	3	08:53
0	0						
	(1A)035	JUNCTION	1.52	1.76	1189.27	2	09:17
0	0						
	(1A)035A	JUNCTION	1.53	1.76	1189.72	0	08:35
0	0						
	(1A)036	JUNCTION	1.32	1.50	1189.91	2	22:33
0	0						
	(1A)037	JUNCTION	1.89	2.31	1191.55	3	07:54
0	0						
	(1A)038	JUNCTION	4.86	11.16	1200.64	0	08:01
0	1673						
	(1A)039	JUNCTION	1.22	2.28	1192.71	1	06:14
0	0						
	(1A)040	JUNCTION	2.01	10.91	1202.00	1	05:32
0	460						
	(1A)041	JUNCTION	2.27	14.50	1205.93	1	05:32
0	440						
	(1A)042	JUNCTION	1.58	13.90	1206.00	1	05:46
0	209						
	(1B)001	JUNCTION	0.50	0.74	1178.20	1	14:49
0	0						
	(1B)002	JUNCTION	0.51	0.76	1179.08	1	14:49
0	0						
	(1B)003	JUNCTION	1.05	1.83	1181.26	1	15:10
0	0						
	(1B)004	JUNCTION	2.11	11.00	1190.50	1	05:06
0	584						
	(1B)005	JUNCTION	0.79	9.87	1191.00	1	05:34
0	140						
	(1B)006	JUNCTION	1.22	13.68	1195.85	1	05:24
0	277						
	(1B)009	JUNCTION	1.29	18.33	1201.16	1	05:24
0	220						
	(1B)010	JUNCTION	0.52	1.83	1187.26	1	11:01
0	0						
	(1B)011	JUNCTION	1.08	10.00	1196.63	1	05:23
0	341						
	(1B)013	JUNCTION	0.51	1.82	1189.76	1	05:57
0	0						
	(1B)014	JUNCTION	1.40	15.35	1204.49	1	05:22
0	329						
	(1C)001	JUNCTION	1.20	17.11	1206.78	1	05:30
0	253						
	(1C)001A	JUNCTION	0.87	13.37	1204.00	1	05:32
0	223						
	(1C)001C	JUNCTION	0.38	1.82	1198.82	1	06:09
0	0						
	(1C)001D	JUNCTION	0.94	15.70	1213.48	1	05:40
0	205						
	(1C)001E	JUNCTION	0.27	1.21	1202.17	1	05:45
0	0						

(1C)001F	JUNCTION	0.30	1.41	1204.92	1	05:44	0	0
(1C)001G	JUNCTION	0.10	0.21	1192.71	1	07:09	0	0
(1C)002	JUNCTION	0.21	0.91	1198.68	1	10:17	0	0
(1C)003	JUNCTION	0.15	0.19	1198.21	0	20:37	0	0
(1C)004	JUNCTION	0.15	0.19	1199.39	0	08:01	0	0
(1C)005	JUNCTION	0.15	0.20	1199.41	0	08:01	0	0
(1C)006	JUNCTION	0.08	0.10	1200.29	0	21:00	0	0
(1C)006A	JUNCTION	0.07	0.09	1201.61	0	20:31	0	0
(1C)007	JUNCTION	0.07	0.10	1201.82	0	19:01	0	0
(1C)009	JUNCTION	0.30	1.41	1205.89	1	05:42	0	0
(1C)010	JUNCTION	0.27	1.25	1207.78	1	05:42	0	0
(1C)011	JUNCTION	0.35	1.99	1209.34	1	08:52	0	0
(1C)012	JUNCTION	0.00	0.00	1213.57	0	00:00	0	0
(1C)015A	JUNCTION	0.74	12.27	1219.80	1	05:41	0	187
(1C)015B	JUNCTION	0.29	1.50	1211.61	1	06:05	0	0
(1C)015C	JUNCTION	0.32	1.82	1213.27	1	06:04	0	0
(1C)015D	JUNCTION	0.71	12.75	1225.76	1	05:40	0	176
(1C)016	JUNCTION	0.29	2.00	1216.45	1	05:45	0	0
(1C)016A	JUNCTION	0.28	1.80	1217.04	1	08:08	0	0
(1C)016B	JUNCTION	0.29	2.00	1218.58	1	05:42	0	0
(1C)016C	JUNCTION	0.71	16.94	1234.85	1	05:42	0	141
(1C)017	JUNCTION	0.07	0.09	1217.71	0	08:04	0	0
(1C)018	JUNCTION	0.07	0.09	1219.27	0	08:01	0	0
(1C)019	JUNCTION	0.07	0.09	1220.32	0	08:00	0	0
(1C)020	JUNCTION	0.06	0.07	1221.60	0	07:00	0	0
(1C)021	JUNCTION	2.28	10.58	1230.80	1	05:52	0	103
(1C)021A	JUNCTION	0.81	15.62	1236.60	1	05:33	0	181
(1C)021B	JUNCTION	0.76	17.83	1239.65	1	05:36	0	156
(1C)021C	JUNCTION	0.10	0.20	1223.18	1	08:00	0	0
(1C)021D	JUNCTION	0.10	0.20	1224.16	1	08:00	0	0
(1C)022	JUNCTION	0.15	0.54	1223.47	1	08:00		

0	0					
(1C)023	JUNCTION	0.14	0.54	1224.79	1	08:00
0	0					
(1C)024	JUNCTION	0.16	0.76	1225.92	1	11:22
0	0					
(1C)025	JUNCTION	0.98	12.67	1238.23	1	05:23
0	349					
(1C)027	JUNCTION	0.82	11.62	1239.56	1	05:26
0	306					
(1C)028	JUNCTION	0.76	10.71	1239.72	1	05:20
0	312					
(1C)041	JUNCTION	0.05	0.06	1203.89	0	07:00
0	0					
(1C)176	JUNCTION	0.20	1.00	1201.93	1	05:13
0	0					
(1C)177	JUNCTION	0.47	12.58	1216.51	1	06:00
0	121					
(1C)178	JUNCTION	0.97	14.25	1221.37	1	05:12
0	295					
(1C)179	JUNCTION	0.98	17.25	1227.38	1	05:20
0	254					
(1C)179A	JUNCTION	0.83	17.55	1227.78	1	05:34
0	208					
(1C)180	JUNCTION	0.14	14.92	1228.16	1	08:45
0	1					
(1C)180A	JUNCTION	0.13	1.00	1217.23	1	05:33
0	0					
(1C)181	JUNCTION	0.13	1.00	1220.17	1	05:31
0	0					
(1C)182	JUNCTION	0.54	12.00	1232.72	1	05:31
0	191					
(1D)001	JUNCTION	0.25	0.73	1173.71	1	10:09
0	0					
(1D)002	JUNCTION	0.25	0.83	1175.62	1	05:17
0	0					
(1D)003	JUNCTION	0.23	0.62	1176.96	1	05:43
0	0					
(1D)004	JUNCTION	0.26	0.76	1181.92	1	05:42
0	0					
(1D)005	JUNCTION	0.69	8.08	1191.18	1	05:13
0	296					
(1D)006	JUNCTION	0.23	0.52	1185.67	1	11:35
0	0					
(1D)007	JUNCTION	0.23	0.52	1189.50	1	11:34
0	0					
(1D)008	JUNCTION	0.29	0.75	1193.74	1	13:11
0	0					
(1D)009	JUNCTION	0.30	0.83	1195.51	1	05:12
0	0					
(1D)010	JUNCTION	1.24	13.04	1208.54	1	05:11
0	386					
(1D)011	JUNCTION	0.28	0.76	1196.98	1	10:58
0	0					
(1D)012	JUNCTION	1.04	11.51	1208.55	1	05:10
0	353					
(1D)013	JUNCTION	0.26	0.76	1204.94	1	05:56
0	0					
(1D)014	JUNCTION	0.63	6.35	1212.18	1	05:08
0	323					
(1D)015	JUNCTION	0.28	0.78	1208.03	1	06:15
0	0					

(1D)016	JUNCTION	0.52	10.29	1218.52	1	06:00	0	121
(1D)017	JUNCTION	1.18	9.75	1218.96	1	05:10	0	503
(1D)018	JUNCTION	1.56	13.83	1224.02	1	05:06	0	500
(1D)019	JUNCTION	0.24	0.83	1212.02	1	05:20	0	0
(1D)020	JUNCTION	1.45	16.45	1228.59	1	05:19	0	390
(1D)021	JUNCTION	1.43	17.21	1230.31	1	05:18	0	377
(1D)022	JUNCTION	1.37	16.91	1231.03	1	05:18	0	370
(1D)023	JUNCTION	1.21	14.72	1229.82	1	05:12	0	375
(1E)001	JUNCTION	0.16	1.00	1192.96	1	05:33	0	0
(1E)002	JUNCTION	0.16	1.00	1194.20	1	05:25	0	0
(1E)003	JUNCTION	0.42	6.75	1201.47	1	05:25	0	220
(1E)003A	JUNCTION	0.38	5.91	1201.91	1	05:22	0	220
(1E)005	JUNCTION	0.16	10.95	1208.55	1	08:41	0	3
(1E)006	JUNCTION	0.16	1.00	1200.00	1	05:26	0	0
(1E)007	JUNCTION	0.16	1.00	1201.04	1	05:23	0	0
(1E)008	JUNCTION	0.51	10.00	1211.70	1	05:20	0	196
(1E)009	JUNCTION	0.41	7.81	1210.34	1	05:20	0	190
(1F)001	JUNCTION	0.87	17.39	1212.62	1	05:35	0	206
(1F)003	JUNCTION	0.22	1.60	1200.80	1	06:13	0	0
(1F)004	JUNCTION	0.58	9.94	1209.72	1	05:31	0	208
(1F)005	JUNCTION	0.31	6.43	1206.31	1	05:41	0	120
(1F)006	JUNCTION	0.17	1.41	1201.52	1	07:21	0	0
(1F)008	JUNCTION	0.14	1.60	1202.02	1	06:14	0	0
(1F)008A	JUNCTION	0.25	7.27	1207.81	1	05:38	0	103
(1F)009	JUNCTION	0.12	1.60	1202.24	1	06:11	0	0
(1F)010	JUNCTION	0.23	7.96	1208.77	1	05:41	0	89
(1F)011	JUNCTION	0.04	0.05	1201.50	0	07:00	0	0
(1F)012A	JUNCTION	0.11	0.15	1202.62	0	08:00	0	0
(1F)013	JUNCTION	0.13	0.17	1203.97	0	08:04	0	0
(1F)014	JUNCTION	0.13	0.17	1204.07	0	21:00	0	0
(1F)015	JUNCTION	0.08	0.11	1205.09	0	08:00		

							0	0
(1F)016	JUNCTION	0.08	0.10	1205.85	0	07:00	0	0
(1F)017	JUNCTION	0.97	3.00	1203.94	1	05:40	0	0
(1F)017A	JUNCTION	1.39	17.37	1218.70	1	05:41	0	146
(1F)017B	JUNCTION	0.93	2.08	1203.56	1	07:08	0	0
(1F)017C	JUNCTION	1.09	3.00	1204.83	1	10:17	0	0
(1F)017D	JUNCTION	1.72	14.25	1216.20	1	05:41	0	279
(1F)017E	JUNCTION	0.98	3.00	1205.33	1	05:52	0	0
(1F)017F	JUNCTION	0.16	0.30	1203.50	1	12:36	0	0
(1F)017G	JUNCTION	0.23	0.45	1206.56	1	12:36	0	0
(1F)018	JUNCTION	0.31	0.74	1207.88	1	12:35	0	0
(1F)019	JUNCTION	0.31	0.83	1208.71	1	12:31	0	0
(1F)020	JUNCTION	0.33	0.83	1211.27	1	05:15	0	0
(1F)021	JUNCTION	0.96	8.00	1220.29	1	05:06	0	445
(1F)022	JUNCTION	0.28	0.57	1214.37	1	08:00	0	0
(1F)023	JUNCTION	0.27	0.54	1215.43	1	08:00	0	0
(1F)024	JUNCTION	0.06	0.08	1221.71	0	08:00	0	0
(1F)025	JUNCTION	0.06	0.08	1227.15	0	20:42	0	0
(1F)026	JUNCTION	0.10	0.13	1233.19	0	08:00	0	0
(1F)026A	JUNCTION	0.10	0.13	1233.76	0	20:37	0	0
(1F)027	JUNCTION	0.09	0.11	1234.34	0	20:32	0	0
(1F)028	JUNCTION	0.08	0.10	1234.84	0	20:29	0	0
(1F)029	JUNCTION	0.08	0.10	1235.43	0	08:01	0	0
(1F)029A	JUNCTION	0.08	0.10	1236.03	0	08:00	0	0
(1F)030	JUNCTION	0.08	0.10	1236.77	0	07:00	0	0
(1G)001	JUNCTION	1.30	14.39	1217.60	1	05:56	0	145
(1G)001A	JUNCTION	1.20	14.91	1218.51	1	06:05	0	113
(1G)002	JUNCTION	1.36	15.43	1219.50	1	06:06	0	109
(1G)003	JUNCTION	1.88	17.96	1222.30	1	05:37	0	263
(1G)004	JUNCTION	0.86	1.75	1206.42	1	07:11	0	0
(1G)005	JUNCTION	1.16	2.74	1207.91	1	06:09	0	0

(1G)006	JUNCTION	1.95	18.23	1223.50	1	05:36	0	256
(1G)007	JUNCTION	0.88	2.74	1208.39	1	08:24	0	0
(1G)008A	JUNCTION	0.89	3.00	1209.37	1	05:43	0	0
(1G)008B	JUNCTION	0.89	2.74	1210.01	1	06:07	0	0
(1G)008C	JUNCTION	1.37	18.85	1226.50	1	05:44	0	153
(1G)009A	JUNCTION	1.26	18.48	1226.50	1	05:45	0	140
(1G)009B	JUNCTION	1.26	18.23	1226.70	1	05:44	0	140
(1G)009C	JUNCTION	0.82	2.53	1211.45	1	06:20	0	0
(1G)009D	JUNCTION	0.85	3.00	1211.98	1	06:12	0	0
(1G)009E	JUNCTION	1.06	22.47	1231.70	1	06:19	0	55
(1G)010	JUNCTION	0.75	3.00	1212.71	1	06:56	0	0
(1G)011	JUNCTION	0.75	3.00	1213.07	1	06:58	0	0
(1G)012	JUNCTION	0.76	3.00	1213.60	1	06:52	0	0
(1G)013	JUNCTION	0.76	3.00	1214.10	1	06:44	0	0
(1G)014	JUNCTION	0.21	0.27	1220.21	1	08:01	0	0
(1G)014A	JUNCTION	0.21	0.27	1220.85	1	08:00	0	0
(1G)015	JUNCTION	0.21	0.27	1221.97	1	08:00	0	0
(1G)016	JUNCTION	0.21	0.27	1222.75	1	07:44	0	0
(1G)017	JUNCTION	0.19	0.25	1223.45	1	08:00	0	0
(1G)018	JUNCTION	0.19	0.24	1224.26	1	07:00	0	0
(1G)018A	JUNCTION	0.14	0.18	1224.37	1	21:01	0	0
(1G)020	JUNCTION	2.71	12.75	1238.54	1	05:03	0	959
(1G)045	JUNCTION	0.34	0.76	1228.51	1	05:57	0	0
(1G)046	JUNCTION	2.21	12.54	1241.28	1	05:12	0	801
(1G)047	JUNCTION	0.28	0.53	1229.62	1	07:00	0	0
(1G)048	JUNCTION	0.13	0.42	1230.72	1	06:31	0	0
(1G)049	JUNCTION	0.14	0.47	1231.33	1	06:30	0	0
(1G)050	JUNCTION	0.14	0.47	1231.72	1	06:30	0	0
(1G)051	JUNCTION	0.17	0.63	1232.30	1	06:31	0	0
(1G)052	JUNCTION	0.17	8.50	1240.58	1	16:45	0	1
(1G)053	JUNCTION	1.24	8.50	1241.41	1	05:03		

0	686						
	(1G)054	JUNCTION	0.11	8.50	1242.21	1	13:09
0	1						
	(1G)055	JUNCTION	0.11	0.67	1235.18	1	05:35
0	0						
	(1G)056	JUNCTION	0.84	9.00	1244.32	1	05:31
0	443						
	(1G)057	JUNCTION	0.10	0.67	1237.81	1	06:10
0	0						
	(1G)058	JUNCTION	0.10	0.67	1239.63	1	05:33
0	0						
	(1G)059	JUNCTION	0.10	0.67	1241.34	1	05:32
0	0						
	(1G)060	JUNCTION	0.09	0.67	1241.49	1	05:31
0	0						
	(1G)061	JUNCTION	0.82	10.00	1252.52	1	05:31
0	390						
	(1G)062	JUNCTION	0.09	0.67	1245.19	1	05:29
0	0						
	(1G)063	JUNCTION	0.09	0.67	1245.55	1	05:28
0	0						
	(1G)064	JUNCTION	0.09	0.67	1247.68	1	05:26
0	0						
	(1G)065	JUNCTION	0.09	0.67	1249.15	1	05:24
0	0						
	(1G)066	JUNCTION	0.09	0.67	1250.11	1	05:22
0	0						
	(1G)067	JUNCTION	0.09	0.67	1251.82	1	05:20
0	0						
	(1G)068	JUNCTION	0.10	10.15	1263.41	1	11:43
0	1						
	(1G)069	JUNCTION	0.10	10.15	1265.93	1	11:39
0	1						
	(1G)070	JUNCTION	0.09	0.67	1258.61	1	05:12
0	0						
	(1G)071	JUNCTION	0.80	10.15	1269.75	1	05:12
0	375						
	(1G)146	JUNCTION	0.00	0.00	1204.48	0	00:00
0	0						
	(1G)146A	JUNCTION	0.00	0.00	1204.74	0	00:00
0	0						
	(1G)162	JUNCTION	0.43	15.00	1232.52	1	21:03
0	3						
	(1G)162A	JUNCTION	0.42	15.00	1233.46	1	21:05
0	1						
	(1G)162B	JUNCTION	0.39	0.83	1219.99	1	21:03
0	0						
	(1G)162C	JUNCTION	0.42	0.83	1220.82	1	05:05
0	0						
	(1G)162D	JUNCTION	0.40	0.83	1216.76	1	21:04
0	0						
	(1G)243	JUNCTION	0.00	0.00	1229.12	0	00:00
0	0						
	(1H)001	JUNCTION	0.25	0.53	1216.49	1	07:12
0	0						
	(1H)004	JUNCTION	0.68	0.83	1219.09	0	08:09
0	0						
	(1H)005	JUNCTION	6.06	9.73	1228.01	0	06:08
0	3016						
	(1H)006	JUNCTION	0.28	0.60	1220.38	1	16:36
0	0						

(1H)007	JUNCTION	0.28	0.59	1221.28	1	16:35	0	0
(1H)008	JUNCTION	0.28	0.59	1222.45	1	07:00	0	0
(1H)009	JUNCTION	0.33	0.76	1222.76	1	05:43	0	0
(1H)010	JUNCTION	1.88	12.27	1234.66	1	05:16	0	680
(1H)011	JUNCTION	1.20	12.00	1235.00	1	05:33	0	434
(1H)038	JUNCTION	0.19	0.38	1219.19	1	07:00	0	0
(1H)039	JUNCTION	0.17	0.35	1224.38	1	06:06	0	0
(1H)040	JUNCTION	0.32	0.76	1229.22	1	06:06	0	0
(1H)041	JUNCTION	1.50	9.00	1238.00	1	05:11	0	725
(1H)042	JUNCTION	0.26	0.83	1231.68	1	14:56	0	0
(1H)043	JUNCTION	1.33	10.11	1241.45	1	05:19	0	578
(1H)044	JUNCTION	0.14	0.19	1232.81	0	08:00	0	0
(1H)045	JUNCTION	0.14	0.18	1233.74	0	07:00	0	0
(1J)001	JUNCTION	1.02	2.35	1195.31	1	08:03	0	0
(1J)002	JUNCTION	1.04	2.35	1196.37	1	08:02	0	0
(1J)003	JUNCTION	1.10	2.21	1196.99	1	08:01	0	0
(1J)004	JUNCTION	1.13	2.30	1197.84	1	08:00	0	0
(1J)005	JUNCTION	1.13	2.30	1198.60	1	08:00	0	0
(1J)006	JUNCTION	1.09	2.18	1199.20	1	07:00	0	0
(1J)007	JUNCTION	1.04	2.05	1199.57	1	10:58	0	0
(1J)008	JUNCTION	1.12	2.30	1200.15	1	10:58	0	0
(1J)009	JUNCTION	1.12	2.30	1200.53	1	10:57	0	0
(1J)010	JUNCTION	1.24	2.74	1201.56	1	05:56	0	0
(1J)011	JUNCTION	1.85	12.30	1211.35	1	05:34	0	324
(1J)012	JUNCTION	1.50	13.24	1212.80	1	05:42	0	186
(1J)013	JUNCTION	1.59	19.59	1219.66	1	05:42	0	154
(1J)014	JUNCTION	1.03	3.00	1203.42	1	05:42	0	0
(1J)041	JUNCTION	0.43	0.56	1201.46	1	08:02	0	0
(1J)042	JUNCTION	0.38	0.49	1204.65	1	08:01	0	0
(1J)042A	JUNCTION	0.38	0.49	1206.97	1	08:01	0	0
(1J)042B	JUNCTION	0.41	0.53	1210.63	1	08:00		

							0	0
(1J)043	JUNCTION	0.69	0.97	1214.03	1	08:00	0	0
(1J)044	JUNCTION	0.69	0.93	1214.78	1	20:02	0	0
(1J)045	JUNCTION	0.55	0.70	1215.18	1	08:00	0	0
(1J)046	JUNCTION	0.55	0.69	1215.38	1	19:35	0	0
(1J)047	JUNCTION	0.47	0.59	1215.38	1	08:00	0	0
(1J)048	JUNCTION	0.36	0.45	1215.79	1	08:00	0	0
(1J)050	JUNCTION	0.37	0.48	1217.37	1	22:46	0	0
(1J)050A	JUNCTION	0.37	0.48	1217.46	1	22:45	0	0
(1J)051	JUNCTION	0.78	1.15	1219.92	1	23:25	0	0
(1J)052	JUNCTION	2.81	10.80	1229.62	1	05:06	0	1060
(1J)053	JUNCTION	1.33	9.51	1228.48	1	05:22	0	504
(1J)054	JUNCTION	0.31	0.46	1220.76	1	07:28	0	0
(1J)054A	JUNCTION	0.66	1.14	1221.75	1	13:39	0	0
(1J)055	JUNCTION	2.75	23.66	1244.36	1	05:19	0	469
(1J)056	JUNCTION	0.41	0.75	1222.27	1	11:23	0	0
(1J)057	JUNCTION	0.41	0.75	1222.83	1	11:22	0	0
(1J)058	JUNCTION	0.49	0.96	1223.71	1	11:21	0	0
(1J)059	JUNCTION	0.55	1.15	1224.19	1	11:36	0	0
(1J)060	JUNCTION	1.24	10.58	1233.83	1	05:10	0	372
(1K)001	JUNCTION	0.51	13.83	1242.98	1	05:49	0	104
(1K)002	JUNCTION	0.22	0.37	1230.05	1	07:00	0	0
(1K)002A	JUNCTION	0.36	0.66	1230.79	1	06:23	0	0
(1K)003	JUNCTION	0.44	0.91	1231.42	1	11:04	0	0
(1K)004	JUNCTION	0.91	7.95	1239.06	1	05:14	0	336
(1K)005	JUNCTION	0.70	0.92	1232.89	0	08:11	0	0
(1K)006	JUNCTION	2.58	7.45	1239.43	0	07:12	0	1443
(1K)007	JUNCTION	0.41	1.00	1233.87	1	05:19	0	0
(1K)008	JUNCTION	1.14	11.04	1244.70	1	05:18	0	367
(1K)008A	JUNCTION	0.44	0.91	1235.01	1	06:25	0	0
(1K)009	JUNCTION	2.15	18.33	1252.79	1	05:22	0	495

(1K)010	JUNCTION	0.68	12.91	1248.15	1	06:02	0	120
(1K)011	JUNCTION	0.37	1.00	1236.70	1	07:00	0	0
(1K)012	JUNCTION	0.17	0.94	1237.52	1	13:04	0	0
(1K)013	JUNCTION	2.23	23.41	1260.59	1	05:13	0	460
(1K)014	JUNCTION	0.83	8.77	1246.43	1	05:14	0	427
(1M)000	JUNCTION	0.71	2.30	1213.82	1	07:02	0	0
(1M)001	JUNCTION	0.70	2.26	1216.81	1	07:01	0	0
(1M)001A	JUNCTION	0.70	2.25	1215.33	1	07:01	0	0
(1M)001B	JUNCTION	0.70	2.25	1214.29	1	07:02	0	0
(1M)002	JUNCTION	0.70	2.26	1217.71	1	07:00	0	0
(1M)003	JUNCTION	0.69	2.08	1218.13	1	07:00	0	0
(1M)010	JUNCTION	0.56	0.91	1221.25	1	06:26	0	0
(1M)011	JUNCTION	2.20	13.54	1234.84	1	05:16	0	658
(1M)013	JUNCTION	0.45	0.78	1223.36	1	08:08	0	0
(1M)014	JUNCTION	0.45	0.78	1224.39	1	08:06	0	0
(1M)015	JUNCTION	0.46	0.79	1225.45	1	08:03	0	0
(1M)016	JUNCTION	0.46	0.78	1226.62	1	08:02	0	0
(1M)017	JUNCTION	0.44	0.74	1226.71	1	08:02	0	0
(1M)018	JUNCTION	0.45	0.77	1227.26	1	08:01	0	0
(1M)019	JUNCTION	0.45	0.77	1228.07	1	08:00	0	0
(1M)021	JUNCTION	0.42	0.48	1229.59	0	19:18	0	0
(1M)022	JUNCTION	0.41	0.47	1230.22	0	19:17	0	0
(1M)023	JUNCTION	0.42	0.48	1230.88	0	19:16	0	0
(1M)024	JUNCTION	0.42	0.48	1232.28	0	19:14	0	0
(1M)025	JUNCTION	0.41	0.47	1233.17	0	19:13	0	0
(1M)026	JUNCTION	0.41	0.48	1233.99	0	19:11	0	0
(1M)027	JUNCTION	0.41	0.48	1235.34	0	19:09	0	0
(1M)028	JUNCTION	0.41	0.47	1236.32	0	07:06	0	0
(1M)035	JUNCTION	0.18	0.24	1219.66	1	07:59	0	0
(1M)036	JUNCTION	0.18	0.24	1220.11	1	08:00	0	0
(1M)037	JUNCTION	0.18	0.24	1220.69	1	07:59		

							0	0
(1M)038	JUNCTION	0.22	0.29	1221.29	1	08:00	0	0
(1M)039	JUNCTION	0.34	0.68	1223.05	1	13:27	0	0
(1M)040	JUNCTION	0.36	0.77	1223.79	1	13:23	0	0
(1M)041	JUNCTION	1.19	9.25	1233.29	1	05:12	0	496
(1M)092	JUNCTION	1.11	8.65	1233.72	1	05:11	0	490
(1M)093	JUNCTION	0.32	0.77	1226.00	1	13:23	0	0
(1M)094	JUNCTION	1.25	10.50	1237.25	1	05:06	0	485
(1M)116	JUNCTION	0.21	0.60	1227.54	1	10:48	0	0
(1M)117	JUNCTION	0.24	0.74	1227.91	1	10:47	0	0
(1M)118	JUNCTION	0.25	0.83	1228.59	1	05:15	0	0
(1M)119	JUNCTION	0.25	0.83	1229.75	1	05:10	0	0
(1M)120	JUNCTION	0.24	0.76	1229.86	1	10:43	0	0
(1M)121	JUNCTION	0.58	5.80	1236.02	1	05:07	0	336
(1M)122	JUNCTION	0.90	10.87	1241.70	1	05:07	0	328
(1M)123	JUNCTION	0.20	0.27	1232.00	1	07:59	0	0
(1M)124	JUNCTION	0.09	0.17	1233.10	0	08:04	0	0
(1M)125	JUNCTION	0.08	0.17	1233.77	1	08:02	0	0
(1M)126	JUNCTION	0.09	0.17	1234.36	0	08:01	0	0
(1M)127	JUNCTION	0.09	0.17	1235.68	1	08:00	0	0
(1M)128	JUNCTION	0.08	0.17	1236.36	0	08:09	0	0
(1M)129	JUNCTION	0.06	0.15	1237.27	0	20:29	0	0
(1M)130	JUNCTION	0.11	0.14	1237.49	0	08:00	0	0
(1M)131	JUNCTION	0.11	0.14	1238.02	0	20:31	0	0
(1M)132	JUNCTION	0.10	0.12	1239.06	0	20:25	0	0
(1M)133	JUNCTION	0.08	0.10	1240.04	0	07:00	0	0
(1M)161	JUNCTION	0.12	0.61	1236.61	1	06:03	0	0
(1M)162	JUNCTION	1.55	12.50	1250.27	1	05:03	0	606
(1M)163	JUNCTION	0.13	17.79	1257.35	1	14:59	0	1
(1M)164	JUNCTION	0.12	0.67	1242.03	1	05:11	0	0
(1M)165	JUNCTION	1.84	15.81	1259.00	1	05:09	0	571

(1M)278	JUNCTION	0.68	1.47	1218.50	1	07:56	0	0
(1M)279	JUNCTION	0.67	1.45	1218.95	1	07:56	0	0
(1M)279B	JUNCTION	0.65	1.40	1219.34	1	07:56	0	0
(1M)281	JUNCTION	0.69	2.00	1220.99	1	07:57	0	0
(1M)281B	JUNCTION	1.31	18.35	1238.00	1	05:41	0	136
(1M)282	JUNCTION	1.71	18.35	1238.50	1	05:46	0	256
(1M)283	JUNCTION	0.66	2.00	1222.70	1	05:57	0	0
(1M)284	JUNCTION	0.48	24.03	1252.50	1	08:17	0	3
(1M)285	JUNCTION	0.46	2.00	1231.45	1	05:44	0	0
(1M)285A	JUNCTION	0.47	2.00	1231.86	1	05:43	0	0
(1M)286	JUNCTION	1.21	27.12	1257.50	1	05:43	0	149
(1M)286A	JUNCTION	1.17	28.15	1259.20	1	05:44	0	139
(1M)287	JUNCTION	0.38	0.65	1232.37	1	08:14	0	0
(1M)288	JUNCTION	0.38	0.65	1233.12	1	08:12	0	0
(1M)288A	JUNCTION	0.38	0.65	1233.67	1	08:12	0	0
(1M)288B	JUNCTION	0.40	0.68	1234.34	1	08:11	0	0
(1M)288C	JUNCTION	0.40	0.69	1234.90	1	08:10	0	0
(1N)004	JUNCTION	1.16	17.39	1238.60	1	05:58	0	165
(1N)005	JUNCTION	1.02	13.00	1235.11	1	05:52	0	166
(1N)006	JUNCTION	1.28	22.14	1245.30	1	05:56	0	159
(1N)007	JUNCTION	1.15	17.91	1242.10	1	05:52	0	161
(1N)007D	JUNCTION	0.38	0.63	1225.10	1	17:13	0	0
(1N)007E	JUNCTION	0.45	0.83	1225.55	1	14:07	0	0
(1N)008	JUNCTION	0.93	5.42	1231.19	1	05:13	0	523
(1N)009	JUNCTION	0.45	0.83	1227.13	1	05:09	0	0
(1N)011	JUNCTION	0.72	3.44	1230.87	1	05:08	0	526
(1N)013	JUNCTION	0.86	4.85	1233.45	1	05:04	0	524
(1N)014	JUNCTION	0.99	6.75	1236.52	1	05:18	0	477
(1N)015	JUNCTION	0.42	0.83	1231.15	1	05:17	0	0
(1N)016	JUNCTION	0.42	6.54	1237.76	1	13:02	0	3
(1N)017	JUNCTION	1.09	8.00	1240.30	1	05:12		

0	473						
	(1N)018	JUNCTION	1.16	9.13	1242.01	1	05:13
0	459						
	(1N)019	JUNCTION	1.11	8.92	1242.36	1	05:10
0	463						
	(1N)020	JUNCTION	0.35	0.83	1235.34	1	05:11
0	0						
	(1N)021	JUNCTION	1.17	10.21	1245.79	1	05:09
0	443						
	(1N)022	JUNCTION	1.26	11.25	1247.89	1	05:04
0	447						
	(1N)023	JUNCTION	0.33	0.83	1238.56	1	05:16
0	0						
	(1N)024	JUNCTION	0.33	0.83	1239.61	1	05:13
0	0						
	(1N)025	JUNCTION	1.03	10.79	1250.97	1	05:11
0	356						
	(1N)045	JUNCTION	0.42	0.76	1228.72	1	17:11
0	0						
	(1N)046	JUNCTION	0.44	0.83	1230.38	1	05:00
0	0						
	(1N)047	JUNCTION	2.81	17.50	1248.18	1	04:58
0	715						
	(1N)109A	JUNCTION	0.48	20.24	1245.30	1	08:15
0	3						
	(1N)110	JUNCTION	0.46	2.00	1227.92	1	08:17
0	0						
	(1N)111A	JUNCTION	0.47	22.42	1249.20	1	08:14
0	3						
	(1N)112A	JUNCTION	0.45	2.00	1229.62	1	05:51
0	0						
	(1N)112B	JUNCTION	0.46	2.00	1230.10	1	08:19
0	0						
	(1O)001	JUNCTION	0.40	0.46	1236.70	0	07:05
0	0						
	(1O)001A	JUNCTION	0.40	0.46	1237.51	0	07:04
0	0						
	(1O)002	JUNCTION	0.32	0.37	1237.57	0	07:04
0	0						
	(1O)002A	JUNCTION	0.39	0.45	1237.79	0	07:04
0	0						
	(1O)003	JUNCTION	0.39	0.45	1238.45	0	07:03
0	0						
	(1O)004	JUNCTION	0.39	0.45	1239.00	0	07:02
0	0						
	(1O)005A	JUNCTION	0.39	0.44	1239.73	0	07:02
0	0						
	(1O)005B	JUNCTION	0.32	0.36	1239.84	2	18:13
0	0						
	(1O)005C	JUNCTION	0.31	0.35	1240.01	2	18:13
0	0						
	(1O)005D	JUNCTION	0.74	1.00	1240.82	0	07:02
0	0						
	(1O)005E	JUNCTION	0.00	0.00	1239.83	0	00:00
0	0						
	(1O)010	JUNCTION	0.00	0.00	1251.71	0	00:00
0	0						
	(1O)011	JUNCTION	0.00	0.00	1251.77	0	00:00
0	0						
	(1O)012	JUNCTION	0.00	0.00	1252.51	0	00:00
0	0						

(1O)013	JUNCTION	0.00	0.00	1253.50	0	00:00	0	0
(1O)014	JUNCTION	0.00	0.00	1253.87	0	00:00	0	0
(1O)015	JUNCTION	0.00	0.00	1255.16	0	00:00	0	0
(1O)016	JUNCTION	0.00	0.00	1256.10	0	00:00	0	0
(1O)017	JUNCTION	0.00	0.00	1257.34	0	00:00	0	0
(1O)018	JUNCTION	0.00	0.00	1258.62	0	00:00	0	0
(1O)019	JUNCTION	0.00	0.00	1260.25	0	00:00	0	0
(1O)020	JUNCTION	0.00	0.00	1261.74	0	00:00	0	0
(1O)021	JUNCTION	0.00	0.00	1262.57	0	00:00	0	0
(1O)072	JUNCTION	0.36	0.94	1239.10	1	08:03	0	0
(1O)157	JUNCTION	0.75	14.03	1265.80	1	05:38	0	178
(1O)300	JUNCTION	0.38	0.68	1235.52	1	08:10	0	0
(1O)301	JUNCTION	0.38	0.71	1236.33	1	08:06	0	0
(1O)302	JUNCTION	0.38	0.70	1237.15	1	08:05	0	0
(1O)303	JUNCTION	0.37	0.81	1238.12	1	08:03	0	0
(1O)304A	JUNCTION	0.15	0.58	1250.27	1	08:29	0	0
(1O)304B	JUNCTION	2.02	20.00	1260.00	1	05:10	0	424
(1O)305	JUNCTION	2.37	12.65	1261.20	1	05:05	0	693
(1O)305A	JUNCTION	0.88	1.83	1250.33	1	17:02	0	0
(1O)306	JUNCTION	0.49	12.61	1262.00	1	10:05	0	1
(1O)306A	JUNCTION	0.48	2.00	1252.23	1	05:28	0	0
(1O)307	JUNCTION	0.48	2.00	1252.66	1	05:27	0	0
(1O)308	JUNCTION	1.11	13.96	1265.13	1	05:28	0	267
(1O)308A	JUNCTION	0.33	2.00	1253.31	1	05:38	0	0
(1O)309	JUNCTION	0.61	13.14	1264.72	1	05:38	0	137
(1P)002	JUNCTION	0.55	1.00	1131.00	1	05:10	0	0
(1P)003	JUNCTION	1.61	12.25	1142.67	1	05:11	0	412
(1P)004	JUNCTION	3.23	12.50	1144.38	0	07:17	0	1106
(1P)005	JUNCTION	0.66	0.96	1135.46	0	08:05	0	0
(1P)006	JUNCTION	3.06	12.78	1149.40	0	07:17	0	1021
(1P)007	JUNCTION	0.64	1.00	1141.56	0	08:00		

0	0						
	(1P)008	JUNCTION	2.04	14.00	1157.00	1	05:03
0	537						
	(1P)008A	JUNCTION	0.40	1.00	1144.50	1	11:18
0	0						
	(1P)009	JUNCTION	1.27	11.67	1158.43	1	05:13
0	365						
	(1P)010	JUNCTION	0.45	0.61	1147.66	0	08:07
0	0						
	(1P)011	JUNCTION	0.44	0.59	1150.01	0	08:06
0	0						
	(1P)012	JUNCTION	0.44	0.60	1152.41	0	08:04
0	0						
	(1P)013	JUNCTION	0.44	0.60	1154.78	0	08:03
0	0						
	(1P)014	JUNCTION	0.44	0.60	1157.14	0	08:02
0	0						
	(1P)015	JUNCTION	0.47	0.66	1159.57	0	08:01
0	0						
	(1P)016	JUNCTION	0.47	0.66	1161.37	0	08:01
0	0						
	(1P)016A	JUNCTION	0.47	0.66	1162.21	0	08:00
0	0						
	(1P)017	JUNCTION	0.47	0.69	1162.57	0	08:00
0	0						
	(1P)018	JUNCTION	0.45	0.60	1164.37	0	07:00
0	0						
	(1P)024	JUNCTION	0.12	0.15	1164.24	0	07:00
0	0						
	(1P)042	JUNCTION	0.21	0.78	1134.06	1	12:01
0	0						
	(1P)042A	JUNCTION	1.13	12.37	1147.09	1	05:10
0	402						
	(1P)043	JUNCTION	1.26	13.92	1150.08	1	05:04
0	404						
	(1P)044	JUNCTION	0.00	0.00	1136.52	0	00:00
0	0						
	(1P)065	JUNCTION	0.06	0.08	1137.32	0	07:00
0	0						
	(1P)073	JUNCTION	0.04	0.05	1164.31	0	07:00
0	0						
	(1P)079	JUNCTION	0.04	0.05	1162.62	0	07:00
0	0						
	(2A)001	JUNCTION	1.23	12.25	1159.10	1	06:03
0	185						
	(2A)002	JUNCTION	0.59	1.72	1150.37	1	08:50
0	0						
	(2A)003	JUNCTION	0.62	1.81	1151.58	1	08:50
0	0						
	(2A)004	JUNCTION	0.62	1.82	1152.81	1	08:51
0	0						
	(2A)005	JUNCTION	0.80	3.00	1155.28	1	08:51
0	0						
	(2A)006	JUNCTION	1.28	15.99	1168.80	1	06:01
0	180						
	(2A)007	JUNCTION	0.78	3.00	1156.44	1	08:51
0	0						
	(2A)008	JUNCTION	0.80	3.00	1156.93	1	05:54
0	0						
	(2A)009	JUNCTION	0.80	3.00	1157.63	1	05:51
0	0						

(2A)010	JUNCTION	0.81	3.00	1158.34	1	05:48	0	0
(2A)011	JUNCTION	0.81	10.55	1166.60	1	08:47	0	2
(2A)012	JUNCTION	0.81	3.00	1159.66	1	05:43	0	0
(2A)013	JUNCTION	0.98	7.69	1164.95	1	05:41	0	180
(2A)014	JUNCTION	0.77	6.06	1164.00	1	05:44	0	34
(2A)015	JUNCTION	0.77	3.00	1161.17	1	05:43	0	0
(2A)016	JUNCTION	1.02	10.51	1169.00	1	05:42	0	167
(2A)017	JUNCTION	1.01	10.93	1170.05	1	05:42	0	160
(2A)018	JUNCTION	0.76	3.00	1162.49	1	05:46	0	0
(2A)019	JUNCTION	0.75	2.74	1162.59	1	08:16	0	0
(2A)020	JUNCTION	1.05	13.01	1173.70	1	05:45	0	146
(2A)021	JUNCTION	0.52	1.07	1163.54	1	07:26	0	0
(2A)022	JUNCTION	0.51	1.05	1165.40	1	07:24	0	0
(2A)023	JUNCTION	0.51	1.04	1166.31	1	07:24	0	0
(2A)024	JUNCTION	0.49	1.01	1166.75	1	07:24	0	0
(2A)025	JUNCTION	0.48	1.00	1167.00	1	07:23	0	0
(2A)026	JUNCTION	0.63	1.33	1167.72	1	07:23	0	0
(2A)027	JUNCTION	0.69	1.45	1168.54	1	07:22	0	0
(2A)028	JUNCTION	0.69	1.46	1168.91	1	07:21	0	0
(2A)029	JUNCTION	0.66	1.38	1169.18	1	07:20	0	0
(2A)030	JUNCTION	0.63	1.31	1169.51	1	07:19	0	0
(2A)031	JUNCTION	0.66	1.40	1170.91	1	07:18	0	0
(2A)032	JUNCTION	0.66	1.40	1171.09	1	07:17	0	0
(2A)033	JUNCTION	0.61	1.27	1171.33	1	07:17	0	0
(2A)034	JUNCTION	0.54	1.12	1171.41	1	07:16	0	0
(2A)035	JUNCTION	0.54	1.12	1173.15	1	07:15	0	0
(2A)036	JUNCTION	0.56	1.16	1174.93	1	07:14	0	0
(2A)037	JUNCTION	0.56	1.17	1176.67	1	07:12	0	0
(2A)038	JUNCTION	0.54	1.12	1178.36	1	07:11	0	0
(2A)039	JUNCTION	0.55	1.13	1179.92	1	07:10	0	0
(2A)040	JUNCTION	0.55	1.13	1181.35	1	07:09		

							0	0
(2A)041	JUNCTION	0.54	1.12	1183.07	1	07:07	0	0
(2A)042	JUNCTION	0.54	1.12	1184.67	1	07:06	0	0
(2A)043	JUNCTION	0.55	1.13	1186.51	1	07:05	0	0
(2A)044	JUNCTION	0.56	1.15	1187.85	1	07:04	0	0
(2A)045	JUNCTION	0.57	1.17	1189.07	1	07:03	0	0
(2A)046	JUNCTION	0.67	1.41	1190.81	1	07:02	0	0
(2A)047	JUNCTION	0.68	1.42	1191.42	1	07:00	0	0
(2A)049	JUNCTION	1.03	1.69	1193.16	1	07:15	0	0
(2A)050	JUNCTION	1.03	1.69	1193.98	1	07:13	0	0
(2A)051	JUNCTION	0.81	1.30	1194.99	1	07:12	0	0
(2A)052	JUNCTION	0.82	1.30	1196.39	1	07:11	0	0
(2A)053	JUNCTION	0.81	1.28	1197.42	1	07:10	0	0
(2A)054	JUNCTION	1.01	1.65	1200.84	1	07:09	0	0
(2A)055	JUNCTION	1.02	1.66	1201.51	1	07:08	0	0
(2A)056	JUNCTION	1.02	1.66	1202.33	1	07:07	0	0
(2A)057	JUNCTION	0.90	1.44	1203.44	1	07:05	0	0
(2A)058	JUNCTION	0.94	1.55	1204.65	1	07:03	0	0
(2A)059	JUNCTION	0.94	1.55	1205.77	1	07:02	0	0
(2A)060	JUNCTION	0.86	1.38	1207.12	1	07:01	0	0
(2A)061	JUNCTION	0.86	1.38	1208.35	1	07:00	0	0
(2A)062	JUNCTION	1.13	1.50	1210.76	1	10:20	0	0
(2A)063	JUNCTION	1.09	7.36	1219.37	1	05:41	0	279
(2A)064	JUNCTION	0.76	1.65	1215.58	1	07:00	0	0
(2A)065	JUNCTION	0.76	1.31	1217.18	1	09:00	0	0
(2A)066	JUNCTION	0.73	1.26	1226.27	1	08:59	0	0
(2A)067	JUNCTION	0.75	1.29	1227.08	1	08:59	0	0
(2A)068	JUNCTION	1.12	2.28	1229.30	1	06:44	0	0
(2A)069	JUNCTION	0.45	0.92	1206.74	1	09:51	0	0
(2C)001	JUNCTION	1.19	13.90	1220.00	1	05:06	0	288
(2C)002	JUNCTION	1.18	13.60	1220.00	1	05:02	0	289

(2C)003	JUNCTION	0.95	10.94	1218.00	1	05:02	0	268
(2C)004	JUNCTION	0.41	1.00	1208.78	1	05:22	0	0
(2C)005	JUNCTION	0.42	1.00	1209.49	1	08:43	0	0
(2C)006	JUNCTION	0.62	5.79	1214.81	1	05:17	0	210
(2C)007	JUNCTION	0.41	5.21	1214.71	1	08:38	0	2
(2C)008	JUNCTION	0.41	1.00	1210.91	1	05:13	0	0
(2D)001	JUNCTION	0.54	1.00	1212.09	1	05:33	0	0
(2D)001A	JUNCTION	0.84	5.83	1217.28	1	05:33	0	305
(2D)002	JUNCTION	0.46	7.00	1220.00	1	06:55	0	71
(2D)003	JUNCTION	0.47	8.17	1222.87	1	06:55	0	66
(2D)004	JUNCTION	0.29	0.44	1216.71	1	08:01	0	0
(2D)005	JUNCTION	0.28	0.42	1218.28	1	08:00	0	0
(2D)006	JUNCTION	0.29	0.43	1219.92	1	08:02	0	0
(2D)007	JUNCTION	0.30	0.45	1221.80	1	08:00	0	0
(2D)008	JUNCTION	0.30	0.45	1222.79	1	08:00	0	0
(2D)009	JUNCTION	0.35	0.66	1225.70	1	17:04	0	0
(2D)010	JUNCTION	3.26	20.56	1246.00	1	04:52	0	735
(2D)011	JUNCTION	2.97	19.88	1246.00	1	04:52	0	688
(2D)012	JUNCTION	0.24	0.34	1228.30	0	08:00	0	0
(2D)013	JUNCTION	0.24	0.32	1229.47	0	07:00	0	0
(2D)014	JUNCTION	0.00	0.00	1229.96	0	00:00	0	0
(2D)015	JUNCTION	0.00	0.00	1240.96	0	00:00	0	0
(2D)016	JUNCTION	0.00	0.00	1243.40	0	00:00	0	0
(2D)017	JUNCTION	0.00	0.00	1245.11	0	00:00	0	0
(2D)018	JUNCTION	0.00	0.00	1245.82	0	00:00	0	0
(2D)019	JUNCTION	0.00	0.00	1246.10	0	00:00	0	0
(2D)020	JUNCTION	0.00	0.00	1246.74	0	00:00	0	0
(2D)021	JUNCTION	0.00	0.00	1248.58	0	00:00	0	0
(2D)022	JUNCTION	0.00	0.00	1249.58	0	00:00	0	0
(2D)023	JUNCTION	0.00	0.00	1249.81	0	00:00	0	0
(2D)024	JUNCTION	0.00	0.00	1251.25	0	00:00		

							0	0
(2D)025	JUNCTION	0.00	0.00	1251.56	0	00:00	0	0
(2D)039	JUNCTION	0.19	0.30	1216.36	1	06:52	0	0
(2D)040	JUNCTION	2.59	21.42	1239.06	1	05:08	0	529
(2D)041	JUNCTION	0.33	0.83	1220.07	1	07:04	0	0
(2D)042	JUNCTION	0.35	24.71	1245.45	1	08:08	0	2
(2D)043	JUNCTION	0.33	0.83	1223.37	1	07:04	0	0
(2D)044	JUNCTION	0.33	0.83	1225.17	1	07:04	0	0
(2D)045	JUNCTION	0.35	0.76	1226.90	1	05:37	0	0
(2D)045A	JUNCTION	1.90	18.00	1244.86	1	05:01	0	456
(2D)046	JUNCTION	0.34	0.83	1228.59	1	05:08	0	0
(2D)046A	JUNCTION	108.36	1305.00	2533.58	1	05:06	0	418
(2D)241	JUNCTION	0.36	1.09	1214.96	1	07:13	0	0
(2D)242	JUNCTION	0.36	1.08	1215.99	1	07:12	0	0
(2D)243	JUNCTION	0.36	1.08	1216.91	1	07:10	0	0
(2D)245	JUNCTION	0.43	19.50	1237.00	1	06:51	0	20
(2D)246	JUNCTION	0.30	1.15	1219.42	1	07:05	0	0
(2D)247	JUNCTION	0.31	1.15	1220.20	1	07:03	0	0
(2D)248	JUNCTION	0.31	1.16	1221.03	1	07:02	0	0
(2D)249	JUNCTION	0.31	1.17	1221.90	1	07:01	0	0
(2D)250	JUNCTION	0.30	1.15	1222.37	1	07:00	0	0
(2D)251	JUNCTION	0.34	1.15	1223.07	1	07:00	0	0
(2D)252	JUNCTION	0.32	0.42	1223.43	1	08:13	0	0
(2D)253	JUNCTION	0.28	0.36	1223.85	1	08:12	0	0
(2D)254	JUNCTION	0.28	0.36	1224.79	1	08:11	0	0
(2D)255	JUNCTION	0.28	0.36	1225.67	1	08:08	0	0
(2D)256	JUNCTION	0.28	0.36	1226.44	1	08:07	0	0
(2D)257	JUNCTION	0.28	0.36	1227.08	1	08:06	0	0
(2D)258	JUNCTION	0.28	0.36	1227.76	1	08:05	0	0
(2D)259	JUNCTION	0.28	0.36	1228.48	1	08:04	0	0
(2D)260	JUNCTION	0.28	0.36	1229.11	1	08:03	0	0

(2D)261	JUNCTION	0.28	0.36	1229.82	1	08:02	0	0
(2D)262	JUNCTION	0.28	0.36	1230.97	1	08:00	0	0
(2D)263	JUNCTION	0.28	0.36	1232.00	0	08:04	0	0
(2D)264	JUNCTION	0.28	0.38	1232.94	0	08:02	0	0
(2D)265	JUNCTION	0.28	0.38	1233.69	0	08:01	0	0
(2D)266	JUNCTION	0.28	0.40	1234.61	0	08:00	0	0
(2D)267	JUNCTION	0.28	0.37	1235.55	0	07:00	0	0
(2E)001	JUNCTION	1.79	19.08	1246.54	1	05:39	0	201
(2E)002	JUNCTION	1.63	22.41	1250.66	1	05:39	0	161
(2E)003	JUNCTION	1.25	15.41	1244.63	1	05:51	0	101
(2E)004	JUNCTION	1.33	2.26	1231.84	1	14:56	0	0
(2E)005	JUNCTION	1.38	2.50	1232.22	1	05:46	0	0
(2E)006	JUNCTION	3.04	18.50	1248.46	1	05:42	0	522
(2E)007	JUNCTION	1.02	2.50	1233.16	1	05:54	0	0
(2E)008	JUNCTION	0.92	1.84	1233.21	1	09:51	0	0
(2E)009	JUNCTION	1.02	2.29	1234.37	1	09:50	0	0
(2E)010	JUNCTION	1.04	2.50	1235.29	1	05:46	0	0
(2E)011	JUNCTION	1.04	2.50	1235.85	1	05:43	0	0
(2E)012	JUNCTION	1.06	2.50	1236.40	1	05:41	0	0
(2E)013	JUNCTION	1.82	20.25	1254.87	1	05:42	0	215
(2E)014	JUNCTION	12.43	20.87	1255.99	1	05:36	0	221
(2E)043	JUNCTION	0.21	0.27	1247.78	0	07:00	0	0
(2F)001	JUNCTION	1.49	22.25	1258.02	1	05:53	0	117
(2F)002	JUNCTION	1.03	22.48	1258.90	1	08:03	0	1
(2F)003	JUNCTION	1.03	2.50	1239.57	1	05:36	0	0
(2F)004	JUNCTION	1.46	19.02	1256.40	1	05:36	0	132
(2F)005	JUNCTION	0.99	1.80	1239.53	1	07:00	0	0
(2F)006	JUNCTION	0.96	1.77	1239.64	1	12:20	0	0
(2F)007	JUNCTION	0.99	1.84	1240.15	1	12:19	0	0
(2F)008	JUNCTION	1.02	2.25	1240.73	1	12:20	0	0
(2F)009	JUNCTION	2.26	17.45	1256.00	1	05:32		

0	408						
	(2F)010	JUNCTION	1.16	17.58	1257.00	1	05:41
0	165						
	(2F)011	JUNCTION	1.11	16.28	1256.00	1	05:36
0	159						
	(2F)012	JUNCTION	0.65	1.07	1241.89	1	08:07
0	0						
	(2F)013	JUNCTION	0.65	1.07	1242.82	1	08:04
0	0						
	(2F)014	JUNCTION	0.65	1.06	1243.74	1	08:03
0	0						
	(2F)015	JUNCTION	0.65	1.07	1244.68	1	08:01
0	0						
	(2F)016	JUNCTION	0.65	1.07	1245.61	1	08:00
0	0						
	(2F)017	JUNCTION	0.66	1.07	1246.54	1	07:00
0	0						
	(2F)018	JUNCTION	0.65	1.05	1247.45	1	08:43
0	0						
	(2F)019	JUNCTION	0.65	1.07	1248.40	1	08:37
0	0						
	(2F)020	JUNCTION	0.65	1.07	1249.33	1	08:37
0	0						
	(2F)021	JUNCTION	0.65	1.06	1250.25	1	08:36
0	0						
	(2F)022	JUNCTION	0.67	1.00	1251.52	2	08:15
0	0						
	(2F)023	JUNCTION	1.11	22.17	1272.74	1	05:14
0	203						
	(2F)024	JUNCTION	0.41	1.00	1252.93	1	11:23
0	0						
	(2F)025	JUNCTION	1.80	19.94	1272.00	1	05:03
0	368						
	(2F)026	JUNCTION	0.34	0.45	1252.66	0	21:46
0	0						
	(2F)027	JUNCTION	0.34	0.46	1252.78	0	21:36
0	0						
	(2F)028	JUNCTION	0.34	0.46	1252.92	0	21:29
0	0						
	(2F)029	JUNCTION	0.34	0.46	1253.06	0	08:21
0	0						
	(2F)030	JUNCTION	0.34	0.47	1253.18	1	08:00
0	0						
	(2F)031	JUNCTION	0.34	0.48	1253.32	1	08:05
0	0						
	(2F)032	JUNCTION	0.34	0.51	1253.49	1	08:00
0	0						
	(2F)033	JUNCTION	0.34	0.45	1253.52	0	07:00
0	0						
	(2G)001	JUNCTION	0.71	1.00	1253.28	0	07:33
0	0						
	(2G)002	JUNCTION	4.70	16.58	1269.58	0	07:47
0	1288						
	(2G)002A	JUNCTION	3.96	17.21	1270.70	1	05:02
0	1016						
	(2G)003	JUNCTION	0.51	0.72	1254.53	1	08:00
0	0						
	(2G)004	JUNCTION	0.50	0.71	1256.13	1	07:01
0	0						
	(2G)005	JUNCTION	0.48	0.78	1257.82	1	08:01
0	0						

(2G)006	JUNCTION	0.47	0.83	1260.40	1	07:01	0	0
(2G)007	JUNCTION	0.50	0.83	1261.20	1	07:00	0	0
(2G)008	JUNCTION	1.57	10.46	1270.94	1	05:02	0	556
(2G)009	JUNCTION	1.28	10.12	1271.47	1	05:04	0	445
(2G)010	JUNCTION	0.42	0.53	1262.43	3	07:25	0	0
(2G)011	JUNCTION	0.54	0.77	1263.80	2	08:01	0	0
(2G)012	JUNCTION	0.56	0.83	1264.65	0	07:12	0	0
(2G)012A	JUNCTION	0.40	0.48	1264.76	0	19:16	0	0
(2G)013	JUNCTION	0.38	0.47	1265.57	0	19:16	0	0
(2G)013A	JUNCTION	0.36	0.44	1266.07	2	21:19	0	0
(2G)014	JUNCTION	0.59	0.83	1268.78	0	07:06	0	0
(2G)015	JUNCTION	3.03	9.29	1277.29	0	07:10	0	1447
(2G)016	JUNCTION	2.46	12.58	1281.20	1	04:59	0	815
(2G)016A	JUNCTION	1.95	13.25	1282.02	1	04:59	0	598
(2G)018	JUNCTION	1.77	12.46	1281.68	1	05:00	0	566
(2G)019	JUNCTION	1.37	9.15	1278.87	1	04:55	0	563
(2G)020	JUNCTION	1.09	9.42	1279.97	1	05:08	0	410
(2G)021	JUNCTION	1.15	10.46	1281.64	1	05:08	0	398
(2G)022	JUNCTION	1.03	8.83	1280.71	1	05:02	0	404
(2G)023	JUNCTION	0.97	8.17	1280.65	1	05:00	0	405
(2G)024	JUNCTION	0.87	6.87	1279.74	1	04:55	0	410
(2G)025	JUNCTION	0.74	7.08	1280.51	1	05:01	0	348
(2G)026	JUNCTION	0.42	5.62	1282.15	1	05:12	0	248
(2G)040	JUNCTION	1.89	16.00	1271.99	1	05:08	0	453
(2G)041	JUNCTION	0.50	0.71	1256.95	0	08:13	0	0
(2G)042	JUNCTION	0.50	0.71	1257.21	1	08:08	0	0
(2G)043	JUNCTION	0.50	0.71	1257.45	0	08:04	0	0
(2G)043A	JUNCTION	0.50	0.73	1257.61	1	08:02	0	0
(2G)044	JUNCTION	0.50	0.78	1257.82	1	08:00	0	0
(2G)045	JUNCTION	0.50	0.68	1257.87	0	07:00	0	0
(2G)359	JUNCTION	0.66	6.67	1280.89	1	05:00		

0	317						
(2H)001		JUNCTION	0.53	1.64	1250.54	1	11:00
0	0						
(2H)002		JUNCTION	0.55	1.75	1251.34	1	05:23
0	0						
(2H)003		JUNCTION	1.81	21.68	1272.00	1	05:25
0	320						
(2H)005		JUNCTION	0.55	1.75	1252.80	1	05:16
0	0						
(2H)006		JUNCTION	1.62	18.34	1270.00	1	05:14
0	327						
(2H)007		JUNCTION	1.44	16.73	1269.00	1	05:14
0	309						
(2H)008		JUNCTION	0.43	1.27	1254.76	1	09:44
0	0						
(2H)009		JUNCTION	0.44	1.30	1254.89	1	09:44
0	0						
(2H)010		JUNCTION	0.44	1.30	1255.00	1	09:44
0	0						
(2H)011		JUNCTION	0.49	1.60	1257.12	1	05:53
0	0						
(2H)012		JUNCTION	1.15	13.83	1270.00	1	05:13
0	272						
(2H)013		JUNCTION	0.77	16.91	1274.00	1	05:32
0	104						
(2H)014		JUNCTION	0.41	0.95	1258.68	1	08:01
0	0						
(2H)015		JUNCTION	0.49	1.23	1259.69	1	08:00
0	0						
(2H)016		JUNCTION	0.49	1.23	1260.23	1	07:56
0	0						
(2H)017		JUNCTION	0.41	0.96	1260.52	1	08:00
0	0						
(2H)017A		JUNCTION	0.42	0.99	1261.39	1	08:00
0	0						
(2H)018		JUNCTION	0.42	0.99	1261.69	1	08:00
0	0						
(2H)019		JUNCTION	0.42	1.00	1262.30	1	07:54
0	0						
(2H)020		JUNCTION	0.42	1.00	1262.40	1	07:53
0	0						
(2H)021		JUNCTION	0.40	0.93	1263.47	1	07:50
0	0						
(2H)022		JUNCTION	0.29	0.66	1265.88	1	10:06
0	0						
(2H)023		JUNCTION	0.30	0.70	1266.19	1	10:06
0	0						
(2H)024		JUNCTION	0.42	1.22	1269.40	1	10:15
0	0						
(2H)025		JUNCTION	0.90	9.26	1278.00	1	05:09
0	299						
(2H)026		JUNCTION	0.25	0.54	1265.48	1	08:03
0	0						
(2H)027		JUNCTION	0.25	0.54	1266.66	1	08:02
0	0						
(2H)028		JUNCTION	0.24	0.54	1267.82	1	08:01
0	0						
(2H)029		JUNCTION	0.26	0.58	1269.06	1	08:00
0	0						
(2H)030		JUNCTION	0.34	0.94	1270.34	1	11:53
0	0						

(2H)031	JUNCTION	0.82	7.20	1276.84	1	05:22	0	381
(2H)032	JUNCTION	0.55	7.73	1277.46	1	05:26	0	179
(2H)033	JUNCTION	0.23	0.72	1271.53	1	06:30	0	0
(2H)034	JUNCTION	0.23	0.53	1272.36	1	08:00	0	0
(2H)036	JUNCTION	0.23	0.52	1273.34	1	07:00	0	0
(2H)037	JUNCTION	0.22	0.52	1274.54	1	11:33	0	0
(2H)038	JUNCTION	0.22	0.52	1275.74	1	11:32	0	0
(2H)039	JUNCTION	0.25	0.60	1277.24	1	11:31	0	0
(2H)040	JUNCTION	0.25	0.60	1278.14	1	11:29	0	0
(2H)041	JUNCTION	0.23	0.52	1278.97	1	11:28	0	0
(2H)042	JUNCTION	0.25	0.59	1280.46	1	11:27	0	0
(2H)043	JUNCTION	0.25	0.59	1281.41	1	11:26	0	0
(2H)044	JUNCTION	0.24	0.55	1282.19	1	11:25	0	0
(2H)045	JUNCTION	0.23	0.55	1282.89	1	11:25	0	0
(2H)046	JUNCTION	0.33	0.96	1283.97	1	11:30	0	0
(2H)047	JUNCTION	1.53	16.92	1300.17	1	05:08	0	378
(2H)048	JUNCTION	0.26	0.92	1285.29	1	09:44	0	0
(2H)049	JUNCTION	0.86	12.17	1297.77	1	05:11	0	263
(2H)050	JUNCTION	0.25	0.58	1287.14	1	10:58	0	0
(2H)051	JUNCTION	0.25	0.58	1287.86	1	10:57	0	0
(2H)051A	JUNCTION	0.23	0.52	1288.58	1	10:57	0	0
(2H)052	JUNCTION	0.34	1.00	1290.23	1	11:04	0	0
(2H)053	JUNCTION	1.58	18.44	1307.98	1	05:02	0	355
(2H)054	JUNCTION	0.18	18.94	1308.99	1	06:42	0	10
(2H)054A	JUNCTION	0.32	19.10	1310.00	1	05:30	0	50
(2H)055	JUNCTION	0.14	0.83	1292.75	1	05:21	0	0
(2H)055A	JUNCTION	0.14	0.83	1293.29	1	05:20	0	0
(2H)056	JUNCTION	0.14	0.83	1294.94	1	05:18	0	0
(2H)057	JUNCTION	0.71	14.53	1309.34	1	05:18	0	209
(2H)058	JUNCTION	0.73	15.24	1310.52	1	05:17	0	209
(2H)285	JUNCTION	0.22	0.83	1290.81	1	05:07		

							0	0
(2H)286	JUNCTION	1.19	17.75	1308.37	1	05:06	0	290
(2H)287	JUNCTION	0.17	0.83	1292.52	1	05:39	0	0
(2H)288	JUNCTION	0.17	0.83	1293.92	1	05:35	0	0
(2H)289	JUNCTION	0.68	22.15	1316.58	1	05:33	0	122
(2H)290	JUNCTION	0.49	20.92	1315.98	1	05:32	0	115
(2I)001	JUNCTION	0.83	9.71	1279.00	1	05:08	0	275
(2I)001A	JUNCTION	1.00	10.90	1280.00	1	05:05	0	302
(2I)002	JUNCTION	0.31	1.14	1273.00	1	05:51	0	0
(2I)003	JUNCTION	0.69	8.80	1282.00	1	05:10	0	248
(2I)004	JUNCTION	0.70	9.30	1283.00	1	05:15	0	240
(2I)005	JUNCTION	0.70	9.46	1285.00	1	05:12	0	237
(2I)006	JUNCTION	0.18	1.25	1277.85	1	05:33	0	0
(2I)008	JUNCTION	0.49	12.00	1290.00	1	05:32	0	144
(2I)009	JUNCTION	0.14	0.97	1280.61	1	07:45	0	0
(2I)010	JUNCTION	0.14	0.95	1280.95	1	07:45	0	0
(2I)011	JUNCTION	0.14	0.95	1281.55	1	07:44	0	0
(2I)012	JUNCTION	0.13	0.96	1282.24	1	07:44	0	0
(2I)013	JUNCTION	0.14	1.14	1283.90	1	06:02	0	0
(2I)014	JUNCTION	0.34	8.61	1292.00	1	05:31	0	133
(2I)015	JUNCTION	0.00	0.00	1283.87	0	00:00	0	0
(2I)016	JUNCTION	0.00	0.00	1284.40	0	00:00	0	0
(2I)017	JUNCTION	0.00	0.00	1284.54	0	00:00	0	0
(2I)017A	JUNCTION	12.25	12.40	1297.00	0	01:00	0	4981
(2I)018	JUNCTION	1.08	11.66	1297.00	1	05:05	0	361
(2I)019	JUNCTION	0.28	0.92	1287.07	1	10:54	0	0
(2I)020	JUNCTION	1.36	16.52	1304.00	1	05:04	0	346
(2I)021	JUNCTION	0.94	15.44	1304.00	1	05:11	0	229
(2I)021A	JUNCTION	0.28	1.17	1290.03	1	05:30	0	0
(2I)021B	JUNCTION	0.73	14.54	1304.00	1	05:31	0	150
(2I)021C	JUNCTION	1.21	14.45	1304.00	1	05:09	0	330

(2I)022	JUNCTION	0.26	0.98	1290.62	1	10:29	0	0
(2I)023	JUNCTION	0.27	1.00	1291.72	1	05:08	0	0
(2I)024	JUNCTION	0.27	11.20	1303.00	1	10:22	0	2
(2I)025	JUNCTION	0.27	1.00	1293.88	1	05:03	0	0
(2I)025A	JUNCTION	0.79	9.38	1303.00	1	05:02	0	313
(2I)026	JUNCTION	0.22	1.00	1294.96	1	09:05	0	0
(2I)027	JUNCTION	0.23	1.00	1295.94	1	05:13	0	0
(2I)028	JUNCTION	0.73	11.90	1306.99	1	05:13	0	232
(2I)029	JUNCTION	0.64	12.10	1307.39	1	05:15	0	221
(2I)044	JUNCTION	0.23	1.00	1277.65	1	05:13	0	0
(2I)045	JUNCTION	0.23	10.43	1287.81	1	09:05	0	1
(2I)046	JUNCTION	0.23	1.00	1282.61	1	05:11	0	0
(2I)047	JUNCTION	0.23	1.00	1286.58	1	05:09	0	0
(2I)048	JUNCTION	0.23	1.00	1290.53	1	05:08	0	0
(2I)049	JUNCTION	0.93	16.16	1307.00	1	05:08	0	222
(2I)050	JUNCTION	0.26	1.00	1293.77	1	05:13	0	0
(2I)051	JUNCTION	0.27	14.56	1307.80	1	05:16	0	3
(2I)052	JUNCTION	0.24	1.00	1294.62	1	05:12	0	0
(2I)053	JUNCTION	0.24	13.21	1308.20	1	09:15	0	1
(2I)054	JUNCTION	0.76	11.84	1308.00	1	05:09	0	242
(2I)055	JUNCTION	0.61	10.74	1307.80	1	05:20	0	199
(2I)056	JUNCTION	0.20	9.55	1308.00	1	08:27	0	1
(2I)057	JUNCTION	0.20	1.00	1300.11	1	05:13	0	0
(2I)058	JUNCTION	0.20	11.57	1312.00	1	08:31	0	1
(2I)059	JUNCTION	0.56	10.24	1312.50	1	05:10	0	198
(2J)001	JUNCTION	0.81	2.25	1241.61	1	11:12	0	0
(2J)002	JUNCTION	0.82	2.25	1241.98	1	05:45	0	0
(2J)003	JUNCTION	0.83	2.25	1242.06	1	05:44	0	0
(2J)004	JUNCTION	1.63	17.96	1258.00	1	05:48	0	258
(2J)005	JUNCTION	0.80	2.25	1242.34	1	11:08	0	0
(2J)006	JUNCTION	0.82	2.25	1242.82	1	05:40		

0 0
(2J)007 JUNCTION 1.62 19.90 1261.00 1 05:54
0 227
(2J)008 JUNCTION 1.79 22.37 1264.00 1 05:35
0 244
(2J)009 JUNCTION 0.68 1.50 1243.35 1 11:19
0 0
(2J)010 JUNCTION 0.93 1.49 1243.58 1 11:18
0 0
(2J)011 JUNCTION 0.68 1.83 1244.49 1 11:00
0 0
(2J)012 JUNCTION 0.71 2.00 1245.17 1 05:42
0 0
(2J)013 JUNCTION 0.73 21.86 1266.00 1 11:01
0 5
(2J)014 JUNCTION 0.66 2.00 1246.99 1 11:00
0 0
(2J)015 JUNCTION 0.68 2.00 1247.91 1 05:41
0 0
(2J)016 JUNCTION 0.65 1.63 1248.44 1 08:02
0 0
(2J)017 JUNCTION 0.65 1.63 1249.35 1 11:02
0 0
(2J)018 JUNCTION 0.65 1.63 1249.51 1 11:01
0 0
(2J)019 JUNCTION 0.72 1.63 1250.53 1 12:56
0 0
(2J)020 JUNCTION 21.42 21.69 1264.00 0 01:04
0 4977
(2J)021 JUNCTION 0.41 0.75 1246.95 1 21:27
0 0
(2J)022 JUNCTION 3.72 17.63 1264.00 1 05:06
0 982
(2J)023 JUNCTION 3.35 16.65 1264.00 1 05:02
0 924
(2J)026 JUNCTION 1.43 16.79 1266.00 1 05:03
0 367
(2J)027 JUNCTION 0.07 0.83 1251.25 1 05:09
0 0
(2J)028 JUNCTION 1.12 18.94 1270.00 1 05:09
0 291
(2J)029 JUNCTION 1.05 17.83 1270.00 1 05:06
0 289
(2J)030 JUNCTION 0.05 0.67 1254.53 1 05:25
0 0
(2J)031 JUNCTION 0.05 0.67 1256.10 1 05:10
0 0
(2J)032 JUNCTION 0.73 13.22 1270.00 1 05:07
0 271
(2J)033 JUNCTION 0.00 0.00 1258.11 0 00:00
0 0
(2J)040 JUNCTION 0.37 0.76 1249.71 1 13:14
0 0
(2J)041 JUNCTION 0.38 0.83 1250.20 1 05:21
0 0
(2J)042 JUNCTION 0.38 0.83 1252.57 1 05:13
0 0
(2J)043 JUNCTION 0.37 0.83 1252.90 1 12:47
0 0
(2J)044 JUNCTION 1.06 8.52 1261.21 1 05:16
0 448

(2J)045	JUNCTION	0.37	0.83	1253.95	1	05:11	0	0
(2J)045A	JUNCTION	1.06	8.47	1262.00	1	05:09	0	452
(2J)046	JUNCTION	0.37	0.83	1254.87	1	05:07	0	0
(2J)047	JUNCTION	1.26	11.04	1266.00	1	05:05	0	440
(2J)048	JUNCTION	0.31	0.54	1256.42	1	20:06	0	0
(2J)049	JUNCTION	0.29	0.51	1256.53	1	20:06	0	0
(2J)050	JUNCTION	0.29	0.52	1257.52	1	20:05	0	0
(2J)051	JUNCTION	0.30	0.62	1258.16	1	20:05	0	0
(2J)052	JUNCTION	0.32	0.67	1258.85	1	05:10	0	0
(2J)053	JUNCTION	2.44	12.58	1271.31	1	05:10	0	896
(2J)054	JUNCTION	1.92	10.09	1270.28	1	05:08	0	860
(2J)055	JUNCTION	1.23	6.42	1267.53	1	05:08	0	817
(2J)056	JUNCTION	1.06	5.33	1267.07	1	05:05	0	819
(2J)057	JUNCTION	0.17	0.24	1262.54	0	08:00	0	0
(2J)060	JUNCTION	0.17	0.22	1263.64	0	07:00	0	0
(2K)001	JUNCTION	2.49	21.95	1271.00	1	05:25	0	437
(2K)002	JUNCTION	0.38	0.93	1255.70	1	08:00	0	0
(2K)003	JUNCTION	0.40	1.02	1257.08	1	10:02	0	0
(2K)004	JUNCTION	0.40	1.02	1258.16	1	10:02	0	0
(2K)005	JUNCTION	0.40	1.01	1259.23	1	09:57	0	0
(2K)006	JUNCTION	0.40	1.00	1260.48	1	09:57	0	0
(2K)007	JUNCTION	0.40	0.99	1262.12	1	09:56	0	0
(2K)008	JUNCTION	0.40	1.00	1263.27	1	09:57	0	0
(2K)009	JUNCTION	0.40	1.03	1264.44	1	09:56	0	0
(2K)010	JUNCTION	0.43	1.16	1265.71	1	10:12	0	0
(2K)011	JUNCTION	0.84	8.31	1274.00	1	05:13	0	289
(2K)012	JUNCTION	0.41	1.14	1267.97	1	05:54	0	0
(2K)013	JUNCTION	0.90	10.29	1278.00	1	05:11	0	270
(2K)014	JUNCTION	0.90	9.58	1278.00	1	05:09	0	279
(2K)015	JUNCTION	1.08	8.98	1278.00	1	05:12	0	414
(2K)016	JUNCTION	0.37	1.00	1271.08	1	10:19		

							0	0
(2K)017	JUNCTION	0.39	1.00	1271.60	1	05:14	0	0
(2K)018	JUNCTION	0.89	9.00	1280.60	1	05:10	0	314
(2K)018A	JUNCTION	0.82	8.12	1280.12	1	05:10	0	309
(2K)019	JUNCTION	0.68	6.80	1279.50	1	05:10	0	275
(2K)020	JUNCTION	0.40	1.00	1274.70	1	11:53	0	0
(2K)021	JUNCTION	0.90	7.17	1280.97	1	05:12	0	402
(2K)022	JUNCTION	0.35	0.89	1275.89	1	10:09	0	0
(2K)022A	JUNCTION	0.37	1.00	1276.40	1	05:12	0	0
(2K)023	JUNCTION	0.37	1.00	1277.20	1	05:10	0	0
(2K)024	JUNCTION	0.37	1.00	1278.00	1	10:07	0	0
(2K)024A	JUNCTION	0.85	9.00	1286.10	1	05:09	0	299
(2K)025	JUNCTION	0.79	9.18	1287.68	1	05:08	0	269
(2K)026	JUNCTION	0.33	0.77	1280.59	1	11:41	0	0
(2K)027	JUNCTION	0.37	0.93	1285.13	1	11:41	0	0
(2K)028	JUNCTION	0.38	1.00	1286.03	1	05:08	0	0
(2K)029	JUNCTION	1.07	10.00	1296.00	1	05:04	0	386
(2K)030	JUNCTION	0.33	1.00	1287.96	1	05:26	0	0
(2K)031	JUNCTION	0.33	12.90	1301.00	1	10:58	0	2
(2K)032	JUNCTION	0.32	1.00	1290.21	1	05:16	0	0
(2K)033	JUNCTION	1.17	13.70	1304.00	1	05:13	0	336
(2K)033A	JUNCTION	0.92	11.23	1302.19	1	05:41	0	300
(2K)034	JUNCTION	0.81	9.70	1301.09	1	05:46	0	291
(2K)035	JUNCTION	0.31	1.00	1293.49	1	05:32	0	0
(2K)036	JUNCTION	0.31	1.00	1294.59	1	05:25	0	0
(2K)037	JUNCTION	0.94	11.29	1306.00	1	05:22	0	307
(2K)038	JUNCTION	0.21	1.00	1296.09	1	05:20	0	0
(2K)039	JUNCTION	0.21	1.00	1296.96	1	05:17	0	0
(2K)040	JUNCTION	0.21	1.00	1297.66	1	05:13	0	0
(2K)041	JUNCTION	0.21	11.99	1309.50	1	10:11	0	1
(2K)042	JUNCTION	0.87	12.18	1310.20	1	05:09	0	297

(2K)043	JUNCTION	0.19	1.00	1299.87	1	05:33	0	0
(2K)044	JUNCTION	0.20	12.28	1312.00	1	09:24	0	1
(2K)045	JUNCTION	0.19	1.00	1301.58	1	05:25	0	0
(2K)046	JUNCTION	0.20	1.00	1302.43	1	05:22	0	0
(2K)047	JUNCTION	0.20	11.72	1314.00	1	09:13	0	1
(2K)048	JUNCTION	0.20	1.00	1304.14	1	05:14	0	0
(2K)049	JUNCTION	0.20	11.21	1315.20	1	09:05	0	1
(2K)050	JUNCTION	0.20	1.00	1305.68	1	05:07	0	0
(2K)051	JUNCTION	0.19	1.00	1306.36	1	05:04	0	0
(2K)052	JUNCTION	0.62	10.35	1316.40	1	05:02	0	231
(2K)314	JUNCTION	0.19	0.76	1251.40	1	06:31	0	0
(2K)315	JUNCTION	2.12	17.08	1268.60	1	05:12	0	595
(2K)316	JUNCTION	0.19	0.83	1253.23	1	05:12	0	0
(2K)317	JUNCTION	1.68	14.67	1267.43	1	05:12	0	545
ForcedMain	JUNCTION	9.88	10.00	1158.50	0	01:00	0	4981
(PLANT)	OUTFALL	0.00	0.00	1145.00	0	00:00	0	0
(1C)026	DIVIDER	0.16	0.77	1227.64	1	10:46	0	0
(1F)012	DIVIDER	0.11	0.15	1202.45	0	08:01	0	0
(1G)019	DIVIDER	0.42	0.76	1225.85	1	05:35	0	0
(2A)048	DIVIDER	2.23	2.41	1193.06	1	07:00	0	0
(2C)009	DIVIDER	0.88	9.83	1220.49	1	05:11	0	202
(2D)244	DIVIDER	1.62	1.72	1218.89	1	06:51	0	0
(1M)012	DIVIDER	0.46	0.79	1222.23	1	07:59	0	0
(2J)025	DIVIDER	5.06	17.72	1266.00	1	05:34	0	337
(1C)001B	DIVIDER	1.09	1.20	1194.70	1	07:00	0	0
(1M)020	DIVIDER	4.07	4.15	1232.20	1	07:59	0	0
(1A)STOR	STORAGE	0.00	0.00	1100.00	0	00:00	0	0
(1A)DIV	STORAGE	0.00	0.00	1147.99	0	00:00	0	0
(2A)000	STORAGE	13.58	29.00	1159.00	1	06:14	0	226
NorthEnidStorage	STORAGE	0.00	0.00	1239.83	0	00:00	0	4981
(1O)304C	STORAGE	2.90	9.39	1249.22	1	17:16		

							0	0
LiftStation	STORAGE	7.18	22.00	1146.35	1	05:29	0	528
(1O)304	STORAGE	0.25	3.45	1242.26	1	08:00	0	0
(1C)Storage	STORAGE	0.13	0.27	1191.57	1	09:05	0	0
PlantStorage	STORAGE	1.26	2.20	1154.20	3	00:31	0	0

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Node Flow Summary
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Node	Type	Maximum Lateral Inflow GPM	Maximum Total Inflow GPM	Time of Max Occurrence days	Time of Max Occurrence hr:min	Maximum Flooding Overflow GPM	Time of Max Occurrence days	Time of Max Occurrence hr:min
(1A)000	JUNCTION	0.00	3540.94	3	07:09	0.00		
(1A)000A	JUNCTION	0.00	3541.00	3	07:08	0.00		
(1A)000B	JUNCTION	0.00	3541.08	0	07:30	0.00		
(1A)001	JUNCTION	1.95	6953.57	1	07:00	3419.17	1	07:00
(1A)002	JUNCTION	0.00	7160.28	1	07:05	193.80	1	07:05
(1A)003	JUNCTION	0.00	7162.46	1	07:04	0.00		
(1A)004	JUNCTION	5.24	7165.45	1	07:02	0.00		
(1A)005	JUNCTION	0.00	7164.18	1	07:01	0.00		
(1A)006	JUNCTION	0.00	7168.40	1	07:00	0.00		
(1A)007	JUNCTION	2442.83	7173.75	1	07:00	0.00		
(1A)008	JUNCTION	0.00	4746.70	1	17:13	0.00		
(1A)009	JUNCTION	0.00	4734.81	1	17:12	0.00		
(1A)010	JUNCTION	0.00	4730.92	1	07:09	0.00		
(1A)011	JUNCTION	0.00	5228.20	1	07:10	497.28	1	07:10
(1A)012	JUNCTION	0.00	9957.57	1	06:56	4729.37	1	06:57
(1A)013	JUNCTION	0.00	12163.88	1	06:37	2206.30	1	06:38
(1A)014	JUNCTION	10488.93	15016.99	1	07:00	2821.16	1	07:00
(1A)015	JUNCTION	6.42	4532.59	1	10:13	0.00		
(1A)016	JUNCTION	0.00	4531.70	1	10:11	0.00		
(1A)017	JUNCTION	0.00	4549.71	1	10:09	0.00		
(1A)018	JUNCTION	0.00	3778.87	1	00:20	0.00		
(1A)019	JUNCTION	0.00	5126.58	0	20:41	1354.88	0	20:41
(1A)020	JUNCTION	0.00	5129.30	2	08:25	0.00		
(1A)021	JUNCTION	0.00	5127.07	2	20:06	0.00		
(1A)022	JUNCTION	0.00	5133.80	2	21:45	0.00		

(1A)023	JUNCTION	0.15	5133.46	2	21:44	0.00		
(1A)024	JUNCTION	0.00	5128.17	2	20:04	0.00		
(1A)024A	JUNCTION	0.00	11468.04	1	06:38	6346.76	1	06:38
(1A)025	JUNCTION	0.00	10068.26	1	06:38	0.00		
(1A)026	JUNCTION	9.30	11452.53	1	07:19	1395.53	1	07:19
(1A)027	JUNCTION	7721.96	12033.11	1	07:00	592.40	1	07:00
(1A)028	JUNCTION	0.00	4316.47	3	08:24	0.00		
(1A)029	JUNCTION	0.00	4316.51	3	08:23	0.00		
(1A)030	JUNCTION	0.00	4316.76	3	08:21	0.00		
(1A)031	JUNCTION	0.00	4316.97	3	08:19	0.00		
(1A)032	JUNCTION	0.00	4317.20	3	08:17	0.00		
(1A)033	JUNCTION	0.00	4318.09	2	22:36	0.00		
(1A)034	JUNCTION	0.00	4322.60	3	08:53	0.00		
(1A)035	JUNCTION	0.00	4323.08	2	09:17	0.00		
(1A)035A	JUNCTION	0.00	4320.49	0	08:35	0.00		
(1A)036	JUNCTION	0.00	4329.97	2	22:33	0.00		
(1A)037	JUNCTION	0.00	4319.39	0	08:09	0.00		
(1A)038	JUNCTION	0.00	8919.34	1	07:00	4607.95	1	07:00
(1A)039	JUNCTION	0.00	6781.11	1	06:14	0.00		
(1A)040	JUNCTION	0.00	7078.84	1	05:51	297.73	1	05:52
(1A)041	JUNCTION	0.00	12512.32	1	09:11	5418.72	1	09:09
(1A)042	JUNCTION	5.50	12026.49	1	07:42	341.03	1	07:42
(1B)001	JUNCTION	0.00	1401.12	1	14:49	0.00		
(1B)002	JUNCTION	0.00	1400.27	1	14:49	0.00		
(1B)003	JUNCTION	0.00	1399.16	1	15:10	0.00		
(1B)004	JUNCTION	0.00	7387.08	1	05:35	5988.69	1	05:35
(1B)005	JUNCTION	8474.22	13441.02	1	07:00	6022.42	1	07:00
(1B)006	JUNCTION	0.00	5090.50	1	05:43	123.70	1	05:44
(1B)009	JUNCTION	3649.08	8490.47	1	07:00	3386.65	1	07:00
(1B)010	JUNCTION	67.01	4856.20	1	07:00	0.00		
(1B)011	JUNCTION	0.00	5090.05	1	10:50	298.69	1	10:50
(1B)013	JUNCTION	0.00	5085.72	1	05:57	0.00		
(1B)014	JUNCTION	25358.09	30682.39	1	07:00	25548.52	1	07:00
(1C)001	JUNCTION	7.71	6599.14	1	07:59	1264.07	1	07:59
(1C)001A	JUNCTION	12567.90	17139.93	1	07:00	12143.67	1	07:00
(1C)001C	JUNCTION	0.00	4757.27	1	06:09	0.00		
(1C)001D	JUNCTION	0.00	5778.59	1	05:46	1021.31	1	05:46
(1C)001E	JUNCTION	0.00	5778.58	1	05:45	0.00		
(1C)001F	JUNCTION	0.00	5779.01	1	05:44	0.00		
(1C)001G	JUNCTION	0.00	195.69	1	07:09	0.00		
(1C)002	JUNCTION	12.18	1409.27	1	07:59	0.00		
(1C)003	JUNCTION	13.41	35.45	0	20:38	0.00		
(1C)004	JUNCTION	4.63	22.04	0	20:36	0.00		
(1C)005	JUNCTION	0.00	17.69	0	08:01	0.00		
(1C)006	JUNCTION	1.95	17.60	0	21:00	0.00		

(1C)006A	JUNCTION	0.00	15.47	0	20:31	0.00		
(1C)007	JUNCTION	9.30	15.47	0	20:32	0.00		
(1C)009	JUNCTION	0.00	5786.41	1	05:42	0.00		
(1C)010	JUNCTION	0.00	5798.76	1	05:42	0.00		
(1C)011	JUNCTION	0.00	5778.58	1	05:41	0.00		
(1C)012	JUNCTION	0.00	0.00	0	00:00	0.00		
(1C)015A	JUNCTION	29.14	6369.69	1	07:00	579.43	1	07:00
(1C)015B	JUNCTION	0.00	6340.56	1	06:05	0.00		
(1C)015C	JUNCTION	0.00	6340.56	1	06:04	0.00		
(1C)015D	JUNCTION	8736.36	14369.16	1	07:00	8011.84	1	07:00
(1C)016	JUNCTION	3.08	5635.62	1	07:59	0.00		
(1C)016A	JUNCTION	1.54	5657.50	1	08:08	0.00		
(1C)016B	JUNCTION	0.00	5620.21	1	06:11	0.00		
(1C)016C	JUNCTION	0.00	7561.21	1	06:11	1941.00	1	06:12
(1C)017	JUNCTION	0.00	11.45	0	08:04	0.00		
(1C)018	JUNCTION	0.00	11.24	0	08:01	0.00		
(1C)019	JUNCTION	3.08	11.41	0	08:00	0.00		
(1C)020	JUNCTION	7.71	7.71	0	07:00	0.00		
(1C)021	JUNCTION	10613.58	12714.28	1	07:00	5144.38	1	07:00
(1C)021A	JUNCTION	0.00	2504.89	1	06:03	753.03	1	06:03
(1C)021B	JUNCTION	9473.29	9551.42	1	07:00	7028.94	1	07:00
(1C)021C	JUNCTION	0.00	78.51	1	08:00	0.00		
(1C)021D	JUNCTION	0.00	78.42	1	08:00	0.00		
(1C)022	JUNCTION	6.94	352.11	1	07:53	0.00		
(1C)023	JUNCTION	0.00	346.08	1	08:00	0.00		
(1C)024	JUNCTION	9.30	345.17	1	07:00	0.00		
(1C)025	JUNCTION	0.00	434.44	1	08:00	97.42	1	08:00
(1C)027	JUNCTION	6.94	498.97	1	07:00	4.05	1	07:00
(1C)028	JUNCTION	6388.79	6388.79	1	07:00	5889.69	1	07:00
(1C)041	JUNCTION	6.17	6.17	0	07:00	0.00		
(1C)176	JUNCTION	4.37	1364.22	1	08:00	0.00		
(1C)177	JUNCTION	7.24	1361.93	1	07:00	1.92	1	07:00
(1C)178	JUNCTION	10096.40	11458.78	1	07:00	10094.10	1	07:00
(1C)179	JUNCTION	9146.69	10230.66	1	07:00	8861.23	1	07:00
(1C)179A	JUNCTION	0.00	1358.90	1	08:51	267.82	1	07:31
(1C)180	JUNCTION	4.37	1362.45	1	08:45	2.28	1	08:46
(1C)180A	JUNCTION	4.37	1354.08	1	08:48	0.00		
(1C)181	JUNCTION	4.37	1345.25	1	07:00	0.00		
(1C)182	JUNCTION	8951.35	8951.35	1	07:00	7599.83	1	07:00
(1D)001	JUNCTION	3.49	790.17	1	10:09	0.00		
(1D)002	JUNCTION	0.00	748.18	1	05:44	0.00		
(1D)003	JUNCTION	0.00	748.18	1	05:43	0.00		
(1D)004	JUNCTION	0.00	748.18	1	05:42	0.00		
(1D)005	JUNCTION	4827.11	5367.60	1	07:00	4614.89	1	07:00
(1D)006	JUNCTION	0.00	540.73	1	11:35	0.00		

(1D)007	JUNCTION	0.00	540.75	1	11:34	0.00		
(1D)008	JUNCTION	0.00	547.32	1	13:11	0.00		
(1D)009	JUNCTION	0.00	540.49	1	05:45	0.00		
(1D)010	JUNCTION	0.00	574.58	1	10:59	33.53	1	10:59
(1D)011	JUNCTION	0.00	573.90	1	11:00	0.00		
(1D)012	JUNCTION	18.96	624.92	1	07:00	52.07	1	07:00
(1D)013	JUNCTION	0.00	605.96	1	05:56	0.00		
(1D)014	JUNCTION	6455.43	6925.33	1	07:00	6316.07	1	07:00
(1D)015	JUNCTION	6.06	471.53	1	07:00	0.00		
(1D)016	JUNCTION	8.12	468.98	1	07:00	2.68	1	07:00
(1D)017	JUNCTION	10.79	476.84	1	07:00	15.97	1	07:00
(1D)018	JUNCTION	14882.85	15354.31	1	07:00	14873.02	1	07:00
(1D)019	JUNCTION	0.00	472.27	1	11:48	0.00		
(1D)020	JUNCTION	25.79	499.94	1	07:00	28.49	1	07:00
(1D)021	JUNCTION	17.88	488.33	1	07:00	14.18	1	07:00
(1D)022	JUNCTION	6.06	476.34	1	07:00	5.89	1	07:00
(1D)023	JUNCTION	10889.86	10889.86	1	07:00	10407.72	1	07:00
(1E)001	JUNCTION	0.00	804.18	1	09:10	0.00		
(1E)002	JUNCTION	0.00	787.91	1	06:39	0.00		
(1E)003	JUNCTION	0.00	802.73	1	06:23	14.83	1	06:23
(1E)003A	JUNCTION	1651.96	2434.79	1	07:00	1626.61	1	07:00
(1E)005	JUNCTION	2.31	805.13	1	08:45	9.25	1	08:45
(1E)006	JUNCTION	0.00	802.86	1	08:38	0.00		
(1E)007	JUNCTION	0.00	780.91	1	06:46	0.00		
(1E)008	JUNCTION	0.00	836.74	1	08:33	54.42	1	05:56
(1E)009	JUNCTION	6901.30	6901.30	1	07:00	6061.23	1	07:00
(1F)001	JUNCTION	17.78	2796.41	1	07:13	56.43	1	07:13
(1F)003	JUNCTION	7.24	2778.63	1	07:00	0.00		
(1F)004	JUNCTION	16711.14	18207.24	1	07:00	15423.39	1	07:00
(1F)005	JUNCTION	0.00	1744.78	1	07:21	247.95	1	07:22
(1F)006	JUNCTION	19.06	1748.93	1	07:21	0.00		
(1F)008	JUNCTION	1.75	1720.11	1	07:00	0.00		
(1F)008A	JUNCTION	0.00	2040.67	1	07:00	322.28	1	07:01
(1F)009	JUNCTION	2.31	2040.63	1	07:00	0.00		
(1F)010	JUNCTION	3218.47	3220.54	1	07:00	1175.39	1	07:00
(1F)011	JUNCTION	2.98	2.98	0	07:00	0.00		
(1F)012A	JUNCTION	0.00	39.01	0	08:00	0.00		
(1F)013	JUNCTION	14.28	36.53	0	20:42	0.00		
(1F)014	JUNCTION	0.00	24.28	0	08:01	0.00		
(1F)015	JUNCTION	0.00	26.07	0	08:00	0.00		
(1F)016	JUNCTION	22.25	22.25	0	07:00	0.00		

(1F)017	JUNCTION	0.00	11916.31	1	05:42	0.00		
(1F)017A	JUNCTION	9798.33	19147.32	1	07:00	7200.91	1	07:00
(1F)017B	JUNCTION	0.00	9350.81	1	07:08	0.00		
(1F)017C	JUNCTION	10.23	9350.81	1	07:00	0.00		
(1F)017D	JUNCTION	0.00	11873.94	1	05:57	2327.39	1	05:57
(1F)017E	JUNCTION	0.00	11638.69	1	07:04	0.00		
(1F)017F	JUNCTION	0.00	589.65	1	12:36	0.00		
(1F)017G	JUNCTION	1.34	594.11	1	12:36	0.00		
(1F)018	JUNCTION	1.08	602.09	1	12:35	0.00		
(1F)019	JUNCTION	0.00	609.62	1	12:31	0.00		
(1F)020	JUNCTION	0.00	567.63	1	06:12	0.00		
(1F)021	JUNCTION	14076.91	14508.11	1	07:00	13932.41	1	07:00
(1F)022	JUNCTION	0.00	439.69	1	08:00	0.00		
(1F)023	JUNCTION	0.00	439.71	1	08:00	0.00		
(1F)024	JUNCTION	0.00	24.94	0	08:00	0.00		
(1F)025	JUNCTION	2.72	24.56	0	20:42	0.00		
(1F)026	JUNCTION	0.00	22.72	0	08:00	0.00		
(1F)026A	JUNCTION	5.50	21.84	0	20:37	0.00		
(1F)027	JUNCTION	2.21	16.34	0	20:32	0.00		
(1F)028	JUNCTION	2.21	14.13	0	20:29	0.00		
(1F)029	JUNCTION	0.00	12.79	0	08:01	0.00		
(1F)029A	JUNCTION	0.00	14.10	0	08:00	0.00		
(1F)030	JUNCTION	11.92	11.92	0	07:00	0.00		
(1G)001	JUNCTION	2.06	11988.21	1	07:00	919.55	1	07:00
(1G)001A	JUNCTION	0.00	12122.64	1	07:54	99.47	1	07:55
(1G)002	JUNCTION	6996.22	15531.03	1	07:00	3411.14	1	07:00
(1G)003	JUNCTION	20682.60	26886.63	1	07:00	18286.69	1	07:00
(1G)004	JUNCTION	0.00	6204.93	1	07:11	0.00		
(1G)005	JUNCTION	4.63	6204.93	1	07:00	0.00		
(1G)006	JUNCTION	0.00	10728.55	1	08:26	4512.44	1	07:33
(1G)007	JUNCTION	0.00	10874.41	1	08:24	0.00		
(1G)008A	JUNCTION	0.87	10712.75	1	07:00	0.00		
(1G)008B	JUNCTION	0.00	10711.88	1	06:07	0.00		
(1G)008C	JUNCTION	5.14	12279.05	1	07:00	1567.17	1	07:00
(1G)009A	JUNCTION	4.52	12325.59	1	05:46	25.03	1	05:46
(1G)009B	JUNCTION	13981.58	24822.53	1	07:00	12487.28	1	07:00
(1G)009C	JUNCTION	3.08	10888.19	1	06:20	0.00		
(1G)009D	JUNCTION	0.00	10743.59	1	06:19	0.00		
(1G)009E	JUNCTION	0.00	12547.92	1	07:10	1575.96	1	07:10
(1G)010	JUNCTION	3.85	11972.07	1	07:09	0.00		
(1G)011	JUNCTION	0.00	11887.47	1	07:08	0.00		
(1G)012	JUNCTION	5.55	11618.08	1	07:07	0.00		
(1G)013	JUNCTION	0.00	11461.19	1	07:03	0.00		
(1G)014	JUNCTION	1.95	106.20	1	20:04	0.00		
(1G)014A	JUNCTION	0.00	106.34	1	08:00	0.00		
(1G)015	JUNCTION	0.00	106.80	1	08:00	0.00		
(1G)016	JUNCTION	16.50	104.25	1	07:44	0.00		
(1G)017	JUNCTION	0.00	92.56	1	08:00	0.00		
(1G)018	JUNCTION	39.93	87.75	1	07:00	0.00		

(1G)018A	JUNCTION	0.00	47.95	1	21:01	0.00
(1G)020	JUNCTION	17034.00	17567.32	1	07:00	17021.82
1 07:00						
(1G)045	JUNCTION	15.47	536.28	1	07:00	0.00
(1G)046	JUNCTION	15856.39	16169.85	1	07:00	15617.46
1 07:00						
(1G)047	JUNCTION	111.45	334.56	1	07:00	0.00
(1G)048	JUNCTION	0.00	223.57	1	06:31	0.00
(1G)049	JUNCTION	0.00	223.60	1	06:30	0.00
(1G)050	JUNCTION	0.00	223.62	1	06:30	0.00
(1G)051	JUNCTION	0.00	223.53	1	06:29	0.00
(1G)052	JUNCTION	0.00	223.85	1	16:45	0.16
1 16:45						
(1G)053	JUNCTION	18221.38	18444.91	1	07:00	18195.89
1 07:00						
(1G)054	JUNCTION	0.00	223.63	1	13:09	0.05
1 13:09						
(1G)055	JUNCTION	0.00	223.53	1	07:04	0.00
(1G)056	JUNCTION	0.00	337.50	1	06:20	113.54
1 06:21						
(1G)057	JUNCTION	0.00	336.74	1	12:06	0.00
(1G)058	JUNCTION	0.00	336.63	1	06:35	0.00
(1G)059	JUNCTION	0.00	336.30	1	06:20	0.00
(1G)060	JUNCTION	0.00	336.98	1	07:15	0.00
(1G)061	JUNCTION	0.00	369.61	1	05:33	31.42
1 07:17						
(1G)062	JUNCTION	0.00	368.40	1	06:24	0.00
(1G)063	JUNCTION	0.00	369.15	1	06:33	0.00
(1G)064	JUNCTION	0.00	369.15	1	06:29	0.00
(1G)065	JUNCTION	0.00	369.15	1	06:26	0.00
(1G)066	JUNCTION	0.00	369.15	1	06:25	0.00
(1G)067	JUNCTION	0.00	369.15	1	06:24	0.00
(1G)068	JUNCTION	0.00	369.32	1	11:43	0.09
1 11:43						
(1G)069	JUNCTION	0.00	369.30	1	11:39	0.08
1 11:39						
(1G)070	JUNCTION	0.00	369.15	1	05:54	0.00
(1G)071	JUNCTION	9318.53	9318.53	1	07:00	8940.63
1 07:00						
(1G)146	JUNCTION	0.00	0.00	0	00:00	0.00
(1G)146A	JUNCTION	0.00	0.00	0	00:00	0.00
(1G)162	JUNCTION	5.03	503.19	1	21:07	11.15
1 21:08						
(1G)162A	JUNCTION	0.00	501.86	1	21:05	1.63
1 21:05						
(1G)162B	JUNCTION	0.00	493.85	1	21:03	0.00
(1G)162C	JUNCTION	0.00	468.73	1	05:36	0.00
(1G)162D	JUNCTION	0.00	488.46	1	21:13	0.00
(1G)243	JUNCTION	0.00	0.00	0	00:00	0.00
(1H)001	JUNCTION	10.33	414.72	1	07:13	0.00
(1H)004	JUNCTION	0.00	71.85	0	22:14	0.00
(1H)005	JUNCTION	0.00	457.46	1	16:37	385.57
1 08:02						
(1H)006	JUNCTION	0.00	457.35	1	16:36	0.00
(1H)007	JUNCTION	0.00	457.57	1	16:35	0.00
(1H)008	JUNCTION	0.00	457.25	1	07:00	0.00
(1H)009	JUNCTION	1.29	457.23	1	07:00	0.00
(1H)010	JUNCTION	0.00	1171.03	1	05:33	715.08
1 05:33						
(1H)011	JUNCTION	15338.07	15338.07	1	07:00	14130.05
1 07:00						

(1H)038	JUNCTION	6.58	404.39	1	07:00	0.00
(1H)039	JUNCTION	0.00	397.82	1	06:06	0.00
(1H)040	JUNCTION	0.00	397.82	1	06:06	0.00
(1H)041	JUNCTION	0.00	685.90	1	05:29	288.08
1 05:29						
(1H)042	JUNCTION	0.00	685.90	1	05:19	0.00
(1H)043	JUNCTION	19581.73	19632.50	1	07:00	18906.63
1 07:00						
(1H)044	JUNCTION	2.21	67.83	0	08:00	0.00
(1H)045	JUNCTION	60.12	60.12	0	07:00	0.00
(1J)001	JUNCTION	0.00	12021.59	1	08:03	0.00
(1J)002	JUNCTION	0.00	12021.81	1	08:02	0.00
(1J)003	JUNCTION	0.77	9282.11	1	08:01	0.00
(1J)004	JUNCTION	0.00	9282.42	1	08:00	0.00
(1J)005	JUNCTION	0.00	9282.80	1	08:00	0.00
(1J)006	JUNCTION	27.59	9280.24	1	07:00	0.00
(1J)007	JUNCTION	0.00	9257.01	1	10:58	0.00
(1J)008	JUNCTION	0.00	9264.07	1	10:58	0.00
(1J)009	JUNCTION	0.00	9258.75	1	10:57	0.00
(1J)010	JUNCTION	0.00	9252.65	1	05:56	0.00
(1J)011	JUNCTION	10524.93	21882.46	1	07:00	12621.55
1 07:00						
(1J)012	JUNCTION	0.00	11917.35	1	06:05	589.25
1 06:06						
(1J)013	JUNCTION	0.00	12906.85	1	08:08	843.16
1 08:03						
(1J)014	JUNCTION	0.00	12772.46	1	08:07	0.00
(1J)041	JUNCTION	0.00	849.76	1	08:02	0.00
(1J)042	JUNCTION	0.00	853.00	1	08:01	0.00
(1J)042A	JUNCTION	0.00	856.10	1	08:01	0.00
(1J)042B	JUNCTION	0.00	861.55	1	08:00	0.00
(1J)043	JUNCTION	0.00	878.86	1	08:00	0.00
(1J)044	JUNCTION	225.22	838.32	1	20:02	0.00
(1J)045	JUNCTION	0.00	616.93	1	08:00	0.00
(1J)046	JUNCTION	58.06	613.10	1	19:35	0.00
(1J)047	JUNCTION	0.00	560.08	1	08:00	0.00
(1J)048	JUNCTION	0.00	564.74	1	08:00	0.00
(1J)050	JUNCTION	113.46	555.04	1	19:00	0.00
(1J)050A	JUNCTION	0.00	371.40	1	22:45	0.00
(1J)051	JUNCTION	0.00	370.22	1	23:25	0.00
(1J)052	JUNCTION	0.00	1069.13	1	05:23	699.27
1 05:24						
(1J)053	JUNCTION	18439.36	18882.64	1	07:00	17777.95
1 07:00						
(1J)054	JUNCTION	0.00	443.28	1	07:28	0.00
(1J)054A	JUNCTION	0.00	444.05	1	13:39	0.00
(1J)055	JUNCTION	0.00	640.69	1	11:25	197.40
1 11:25						
(1J)056	JUNCTION	0.00	641.09	1	11:23	0.00
(1J)057	JUNCTION	0.00	641.87	1	11:22	0.00
(1J)058	JUNCTION	0.00	643.97	1	11:21	0.00
(1J)059	JUNCTION	0.00	640.08	1	11:36	0.00
(1J)060	JUNCTION	0.00	3780.44	1	05:49	3140.81
1 05:50						
(1K)001	JUNCTION	6352.82	6962.94	1	07:00	3170.08
1 07:00						
(1K)002	JUNCTION	0.00	610.93	1	07:00	0.00
(1K)002A	JUNCTION	9.30	610.76	1	07:00	0.00
(1K)003	JUNCTION	0.00	601.57	1	11:04	0.00
(1K)004	JUNCTION	8610.08	8838.13	1	07:00	8227.93
1 07:00						

(1K)005	JUNCTION	12.95	231.96	2	07:10	0.00		
(1K)006	JUNCTION	4.63	679.45	1	12:08	456.22	1	12:09
(1K)007	JUNCTION	1.75	669.11	1	07:00	0.00		
(1K)008	JUNCTION	5938.22	6466.07	1	07:00	5794.56	1	07:00
(1K)008A	JUNCTION	10.43	529.58	1	07:00	0.00		
(1K)009	JUNCTION	6.94	656.20	1	07:59	137.05	1	07:59
(1K)010	JUNCTION	4.63	700.30	1	08:00	45.28	1	07:40
(1K)011	JUNCTION	208.98	689.92	1	07:29	0.00		
(1K)012	JUNCTION	0.00	481.79	1	13:05	0.00		
(1K)013	JUNCTION	0.00	599.00	1	06:09	118.07	1	06:09
(1K)014	JUNCTION	17143.86	17143.86	1	07:00	16524.64	1	07:00
(1M)000	JUNCTION	0.00	11481.16	1	07:02	0.00		
(1M)001	JUNCTION	0.00	11499.67	1	07:01	0.00		
(1M)001A	JUNCTION	0.00	11490.19	1	07:01	0.00		
(1M)001B	JUNCTION	0.00	11481.73	1	07:02	0.00		
(1M)002	JUNCTION	0.00	11505.87	1	07:00	0.00		
(1M)003	JUNCTION	5499.77	11526.41	1	07:00	0.00		
(1M)010	JUNCTION	0.00	690.40	1	06:26	0.00		
(1M)011	JUNCTION	0.00	1032.63	1	07:59	342.22	1	07:59
(1M)013	JUNCTION	0.00	608.40	1	08:08	0.00		
(1M)014	JUNCTION	0.00	609.06	1	08:06	0.00		
(1M)015	JUNCTION	0.00	610.06	1	08:03	0.00		
(1M)016	JUNCTION	0.00	609.49	1	08:02	0.00		
(1M)017	JUNCTION	0.00	609.55	1	08:02	0.00		
(1M)018	JUNCTION	0.00	610.78	1	08:01	0.00		
(1M)019	JUNCTION	0.00	613.30	1	08:00	0.00		
(1M)021	JUNCTION	0.00	288.56	0	19:18	0.00		
(1M)022	JUNCTION	5.81	288.74	0	19:17	0.00		
(1M)023	JUNCTION	0.00	283.02	0	19:16	0.00		
(1M)024	JUNCTION	0.00	283.26	0	19:14	0.00		
(1M)025	JUNCTION	0.00	283.89	0	19:13	0.00		
(1M)026	JUNCTION	0.00	284.25	0	19:11	0.00		
(1M)027	JUNCTION	0.00	284.89	0	19:09	0.00		
(1M)028	JUNCTION	0.00	285.17	0	07:06	0.00		
(1M)035	JUNCTION	2.72	85.18	1	07:59	0.00		
(1M)036	JUNCTION	0.00	82.78	1	08:00	0.00		
(1M)037	JUNCTION	3.49	82.47	1	07:59	0.00		
(1M)038	JUNCTION	0.00	79.02	1	08:00	0.00		
(1M)039	JUNCTION	7.71	504.68	1	07:00	0.00		
(1M)040	JUNCTION	0.00	497.90	1	13:26	0.00		
(1M)041	JUNCTION	23.69	515.29	1	07:00	18.32	1	07:00
(1M)092	JUNCTION	12.49	521.05	1	07:00	29.16	1	07:01
(1M)093	JUNCTION	23.69	508.19	1	07:00	0.00		
(1M)094	JUNCTION	10983.21	11477.92	1	07:00	10975.76	1	07:00
(1M)116	JUNCTION	0.00	510.73	1	10:48	0.00		
(1M)117	JUNCTION	0.00	514.82	1	10:47	0.00		
(1M)118	JUNCTION	0.00	504.41	1	10:53	0.00		
(1M)119	JUNCTION	1.18	496.15	1	10:43	0.00		
(1M)120	JUNCTION	0.00	494.65	1	10:43	0.00		
(1M)121	JUNCTION	0.00	520.57	1	05:35	26.81	1	05:35

(1M)122	JUNCTION	11688.18	11785.55	1	07:00	11255.71	1	07:00
(1M)123	JUNCTION	2.31	106.86	1	07:59	0.00		
(1M)124	JUNCTION	0.00	40.04	0	08:04	0.00		
(1M)125	JUNCTION	0.00	40.24	1	08:02	0.00		
(1M)126	JUNCTION	0.00	40.36	0	08:01	0.00		
(1M)127	JUNCTION	0.00	40.28	1	08:00	0.00		
(1M)128	JUNCTION	6.68	43.34	0	08:09	0.00		
(1M)129	JUNCTION	3.49	33.04	0	20:29	0.00		
(1M)130	JUNCTION	0.00	30.32	0	08:00	0.00		
(1M)131	JUNCTION	7.55	29.54	0	20:31	0.00		
(1M)132	JUNCTION	8.12	21.99	0	20:25	0.00		
(1M)133	JUNCTION	13.87	13.87	0	07:00	0.00		
(1M)161	JUNCTION	0.00	336.98	1	06:03	0.00		
(1M)162	JUNCTION	10739.83	11076.18	1	07:00	10731.66	1	07:00
(1M)163	JUNCTION	0.00	337.45	1	14:59	0.23	1	14:59
(1M)164	JUNCTION	0.00	336.98	1	06:10	0.00		
(1M)165	JUNCTION	11576.09	11576.09	1	07:00	11226.22	1	07:00
(1M)278	JUNCTION	11.61	6031.25	1	07:56	0.00		
(1M)279	JUNCTION	0.00	6019.64	1	07:56	0.00		
(1M)279B	JUNCTION	0.00	6019.65	1	07:56	0.00		
(1M)281	JUNCTION	0.00	6019.65	1	07:56	0.00		
(1M)281B	JUNCTION	6117.92	9816.50	1	07:00	3857.93	1	07:00
(1M)282	JUNCTION	0.00	5473.49	1	08:39	1683.32	1	08:46
(1M)283	JUNCTION	1.75	4575.26	1	08:41	0.00		
(1M)284	JUNCTION	0.00	4382.93	1	08:17	122.56	1	08:17
(1M)285	JUNCTION	0.00	4261.39	1	08:15	0.00		
(1M)285A	JUNCTION	0.00	4170.12	1	06:11	0.00		
(1M)286	JUNCTION	0.00	4665.42	1	06:10	495.31	1	06:10
(1M)286A	JUNCTION	10602.34	11545.38	1	07:00	6874.77	1	07:00
(1M)287	JUNCTION	0.00	987.29	1	08:14	0.00		
(1M)288	JUNCTION	0.00	987.51	1	08:12	0.00		
(1M)288A	JUNCTION	0.00	998.31	1	08:12	0.00		
(1M)288B	JUNCTION	0.00	1007.72	1	08:11	0.00		
(1M)288C	JUNCTION	0.00	1047.73	1	08:10	0.00		
(1N)004	JUNCTION	5.81	4619.97	1	08:39	38.33	1	07:00
(1N)005	JUNCTION	6.58	4744.32	1	07:00	136.55	1	07:00
(1N)006	JUNCTION	9.04	4788.14	1	07:00	50.39	1	07:00
(1N)007	JUNCTION	2.88	5211.06	1	08:30	427.03	1	08:16
(1N)007D	JUNCTION	0.00	506.74	1	17:13	0.00		
(1N)007E	JUNCTION	0.00	497.21	1	06:05	0.00		
(1N)008	JUNCTION	4.26	512.62	1	14:04	8.66	1	14:05
(1N)009	JUNCTION	7.71	501.10	1	07:00	0.00		
(1N)011	JUNCTION	12.38	508.45	1	07:00	15.06	1	07:00
(1N)013	JUNCTION	10570.40	11062.59	1	07:00	10556.31	1	07:00
(1N)014	JUNCTION	10.07	521.71	1	13:10	22.99		

							1	13:11
(1N)015	JUNCTION	2.57	500.28	1	07:00	0.00		
(1N)016	JUNCTION	0.00	498.37	1	13:03	0.44	1	13:03
(1N)017	JUNCTION	0.00	518.54	1	12:52	20.80	1	12:52
(1N)018	JUNCTION	103.33	561.29	1	07:00	43.25	1	07:00
(1N)019	JUNCTION	0.00	531.82	1	12:30	68.04	1	12:31
(1N)020	JUNCTION	4.11	500.58	1	07:00	0.00		
(1N)021	JUNCTION	8.48	504.78	1	07:00	8.31	1	07:00
(1N)022	JUNCTION	9443.63	9934.64	1	07:00	9427.22	1	07:00
(1N)023	JUNCTION	0.00	494.74	1	11:25	0.00		
(1N)024	JUNCTION	0.00	491.91	1	11:20	0.00		
(1N)025	JUNCTION	7467.44	7467.44	1	07:00	6953.62	1	07:00
(1N)045	JUNCTION	0.00	519.65	1	17:11	0.00		
(1N)046	JUNCTION	0.00	501.22	1	05:55	0.00		
(1N)047	JUNCTION	35521.17	35521.17	1	07:00	34949.56	1	07:00
(1N)109A	JUNCTION	0.00	4230.15	1	08:15	17.18	1	08:15
(1N)110	JUNCTION	3.91	4280.21	1	08:26	0.00		
(1N)111A	JUNCTION	0.00	4418.00	1	08:19	100.08	1	08:15
(1N)112A	JUNCTION	0.00	4194.69	1	08:18	0.00		
(1N)112B	JUNCTION	0.00	4204.38	1	08:17	0.00		
(1O)001	JUNCTION	7.71	285.70	0	07:05	0.00		
(1O)001A	JUNCTION	0.00	278.09	0	07:04	0.00		
(1O)002	JUNCTION	8.12	278.81	0	07:04	0.00		
(1O)002A	JUNCTION	0.00	270.74	0	07:04	0.00		
(1O)003	JUNCTION	0.00	271.13	0	07:03	0.00		
(1O)004	JUNCTION	7.97	271.89	0	07:02	0.00		
(1O)005A	JUNCTION	24.92	264.09	0	07:02	0.00		
(1O)005B	JUNCTION	0.00	241.15	2	18:13	0.00		
(1O)005C	JUNCTION	0.00	242.30	2	18:13	0.00		
(1O)005D	JUNCTION	0.00	243.59	0	19:02	0.00		
(1O)005E	JUNCTION	0.00	0.00	0	00:00	0.00		
(1O)010	JUNCTION	0.00	0.00	0	00:00	0.00		
(1O)011	JUNCTION	0.00	0.00	0	00:00	0.00		
(1O)012	JUNCTION	0.00	0.00	0	00:00	0.00		
(1O)013	JUNCTION	0.00	0.00	0	00:00	0.00		
(1O)014	JUNCTION	0.00	0.00	0	00:00	0.00		
(1O)015	JUNCTION	0.00	0.00	0	00:00	0.00		
(1O)016	JUNCTION	0.00	0.00	0	00:00	0.00		
(1O)017	JUNCTION	0.00	0.00	0	00:00	0.00		
(1O)018	JUNCTION	0.00	0.00	0	00:00	0.00		
(1O)019	JUNCTION	0.00	0.00	0	00:00	0.00		
(1O)020	JUNCTION	0.00	0.00	0	00:00	0.00		
(1O)021	JUNCTION	0.00	0.00	0	00:00	0.00		
(1O)072	JUNCTION	16.86	1876.45	1	08:03	0.00		
(1O)157	JUNCTION	21903.13	21903.13	1	07:00	17257.78	1	07:00
(1O)300	JUNCTION	16.75	1101.57	1	08:10	0.00		
(1O)301	JUNCTION	0.00	1157.91	1	08:06	0.00		
(1O)302	JUNCTION	14.70	1131.91	1	08:05	0.00		
(1O)303	JUNCTION	2.72	1471.86	1	08:03	0.00		
(1O)304A	JUNCTION	0.00	1863.50	1	08:29	0.00		

(1O)304B	JUNCTION	0.00	1296.81	1	08:33	399.63	1	08:24
(1O)305	JUNCTION	26578.39	31253.17	1	07:00	30031.09	1	07:00
(1O)305A	JUNCTION	69.57	1252.48	1	07:13	0.00		
(1O)306	JUNCTION	17.78	4694.94	1	10:05	4.07	1	10:05
(1O)306A	JUNCTION	2.36	4660.06	1	07:00	0.00		
(1O)307	JUNCTION	0.00	4657.70	1	05:47	0.00		
(1O)308	JUNCTION	8128.32	16987.12	1	07:00	12314.03	1	07:00
(1O)308A	JUNCTION	0.00	4608.07	1	05:40	0.00		
(1O)309	JUNCTION	14748.80	14748.80	1	07:00	10212.28	1	07:00
(1P)002	JUNCTION	0.00	1630.85	1	05:11	0.00		
(1P)003	JUNCTION	0.00	1656.42	1	11:49	22.15	1	11:49
(1P)004	JUNCTION	0.00	1161.48	0	21:05	87.42	0	21:05
(1P)005	JUNCTION	0.00	1159.35	0	21:03	0.00		
(1P)006	JUNCTION	0.00	1232.06	1	21:00	67.78	1	13:59
(1P)007	JUNCTION	0.00	1224.73	0	08:00	0.00		
(1P)008	JUNCTION	412.26	2453.91	1	07:00	1230.87	1	07:00
(1P)008A	JUNCTION	0.00	2041.64	1	05:14	0.00		
(1P)009	JUNCTION	17556.38	18199.92	1	07:00	16124.45	1	07:00
(1P)010	JUNCTION	0.00	809.49	0	08:07	0.00		
(1P)011	JUNCTION	5.14	811.23	0	08:06	0.00		
(1P)012	JUNCTION	0.00	811.74	0	08:04	0.00		
(1P)013	JUNCTION	0.00	817.28	0	08:03	0.00		
(1P)014	JUNCTION	0.00	822.99	0	08:02	0.00		
(1P)015	JUNCTION	0.00	832.23	0	08:01	0.00		
(1P)016	JUNCTION	0.00	827.86	0	08:01	0.00		
(1P)016A	JUNCTION	0.00	833.91	0	08:00	0.00		
(1P)017	JUNCTION	9.04	879.77	0	08:00	0.00		
(1P)018	JUNCTION	721.50	721.50	0	07:00	0.00		
(1P)024	JUNCTION	51.54	51.54	0	07:00	0.00		
(1P)042	JUNCTION	0.00	583.99	1	11:48	0.00		
(1P)042A	JUNCTION	0.00	591.43	1	11:56	8.06	1	06:12
(1P)043	JUNCTION	14239.20	14246.23	1	07:00	13636.03	1	07:00
(1P)044	JUNCTION	0.00	0.00	0	00:00	0.00		
(1P)065	JUNCTION	10.33	10.33	0	07:00	0.00		
(1P)073	JUNCTION	6.27	6.27	0	07:00	0.00		
(1P)079	JUNCTION	5.70	5.70	0	07:00	0.00		
(2A)001	JUNCTION	0.00	9981.89	1	08:50	331.88	1	08:50
(2A)002	JUNCTION	0.00	9834.10	1	08:50	0.00		
(2A)003	JUNCTION	0.00	9841.85	1	08:50	0.00		
(2A)004	JUNCTION	0.00	9867.21	1	08:51	0.00		
(2A)005	JUNCTION	0.00	9826.94	1	06:37	0.00		
(2A)006	JUNCTION	0.00	10453.43	1	08:52	529.08	1	09:01
(2A)007	JUNCTION	0.00	10395.05	1	09:00	0.00		
(2A)008	JUNCTION	0.00	10324.72	1	08:58	0.00		
(2A)009	JUNCTION	0.00	10299.21	1	08:55	0.00		
(2A)010	JUNCTION	0.00	10021.88	1	08:49	0.00		
(2A)011	JUNCTION	0.00	10205.11	1	08:47	93.93		

1	08:47					
(2A)012	JUNCTION	0.00	9937.19	1	06:29	0.00
(2A)013	JUNCTION	0.00	12017.61	1	07:02	2067.70
1	07:02					
(2A)014	JUNCTION	1084.57	12238.85	1	05:44	165.55
1	07:00					
(2A)015	JUNCTION	8.68	11089.80	1	07:00	0.00
(2A)016	JUNCTION	0.00	11871.40	1	06:11	767.89
1	06:11					
(2A)017	JUNCTION	8995.11	20063.76	1	07:00	8185.08
1	07:00					
(2A)018	JUNCTION	0.00	11068.65	1	06:34	0.00
(2A)019	JUNCTION	0.00	11085.53	1	08:16	0.00
(2A)020	JUNCTION	26543.41	30726.97	1	07:00	19620.16
1	07:00					
(2A)021	JUNCTION	0.00	4249.39	1	07:26	0.00
(2A)022	JUNCTION	0.00	4250.10	1	07:24	0.00
(2A)023	JUNCTION	0.00	4250.37	1	07:24	0.00
(2A)024	JUNCTION	0.00	4250.38	1	07:24	0.00
(2A)025	JUNCTION	0.00	4250.36	1	07:23	0.00
(2A)026	JUNCTION	0.00	4250.51	1	07:23	0.00
(2A)027	JUNCTION	0.00	4251.84	1	07:22	0.00
(2A)028	JUNCTION	0.00	4252.42	1	07:21	0.00
(2A)029	JUNCTION	0.00	4252.99	1	07:20	0.00
(2A)030	JUNCTION	0.00	4253.53	1	07:19	0.00
(2A)031	JUNCTION	0.00	4255.02	1	07:18	0.00
(2A)032	JUNCTION	0.00	4255.35	1	07:17	0.00
(2A)033	JUNCTION	0.00	4255.75	1	07:17	0.00
(2A)034	JUNCTION	1.03	4255.81	1	07:16	0.00
(2A)035	JUNCTION	0.00	4256.16	1	07:15	0.00
(2A)036	JUNCTION	0.00	4257.99	1	07:14	0.00
(2A)037	JUNCTION	0.00	4259.99	1	07:12	0.00
(2A)038	JUNCTION	0.00	4261.78	1	07:11	0.00
(2A)039	JUNCTION	0.00	4264.25	1	07:10	0.00
(2A)040	JUNCTION	0.00	4263.48	1	07:09	0.00
(2A)041	JUNCTION	0.00	4262.12	1	07:07	0.00
(2A)042	JUNCTION	0.00	4263.83	1	07:06	0.00
(2A)043	JUNCTION	0.00	4266.23	1	07:05	0.00
(2A)044	JUNCTION	0.00	4270.63	1	07:04	0.00
(2A)045	JUNCTION	0.00	4271.35	1	07:03	0.00
(2A)046	JUNCTION	0.00	4271.71	1	07:02	0.00
(2A)047	JUNCTION	0.00	4275.09	1	07:00	0.00
(2A)049	JUNCTION	0.00	5557.50	1	07:15	0.00
(2A)050	JUNCTION	0.00	5557.61	1	07:13	0.00
(2A)051	JUNCTION	0.00	5557.68	1	07:12	0.00
(2A)052	JUNCTION	0.00	5557.76	1	07:11	0.00
(2A)053	JUNCTION	0.00	5557.83	1	07:10	0.00
(2A)054	JUNCTION	0.00	5557.87	1	07:09	0.00
(2A)055	JUNCTION	0.00	5558.13	1	07:08	0.00
(2A)056	JUNCTION	0.00	5558.48	1	07:07	0.00
(2A)057	JUNCTION	0.00	5558.18	1	07:05	0.00
(2A)058	JUNCTION	0.00	5009.27	1	07:03	0.00
(2A)059	JUNCTION	0.00	5009.35	1	07:02	0.00
(2A)060	JUNCTION	0.00	5009.54	1	07:01	0.00
(2A)061	JUNCTION	0.00	5009.55	1	07:00	0.00
(2A)062	JUNCTION	0.00	5009.43	1	07:00	0.00
(2A)063	JUNCTION	0.00	9170.41	1	07:00	4289.59
1	07:01					
(2A)064	JUNCTION	2358.02	7504.05	1	07:00	0.00
(2A)065	JUNCTION	0.00	5146.39	1	09:00	0.00
(2A)066	JUNCTION	0.00	5146.53	1	08:59	0.00

(2A)067	JUNCTION	0.00	5148.56	1	08:59	0.00		
(2A)068	JUNCTION	0.00	5146.03	1	06:44	0.00		
(2A)069	JUNCTION	0.00	550.03	1	09:52	0.00		
(2C)001	JUNCTION	0.00	556.44	1	05:48	7.45	1	05:49
(2C)002	JUNCTION	0.00	660.58	1	09:37	103.17	1	06:00
(2C)003	JUNCTION	8080.93	8712.58	1	07:00	8046.24	1	07:00
(2C)004	JUNCTION	0.00	643.63	1	08:43	0.00		
(2C)005	JUNCTION	0.00	632.87	1	08:43	0.00		
(2C)006	JUNCTION	0.00	668.60	1	08:45	33.21	1	06:17
(2C)007	JUNCTION	0.00	677.95	1	08:38	5.04	1	08:39
(2C)008	JUNCTION	0.00	665.88	1	08:40	0.00		
(2D)001	JUNCTION	0.00	466.33	1	06:53	0.00		
(2D)001A	JUNCTION	0.00	895.98	1	08:18	428.85	1	07:47
(2D)002	JUNCTION	0.00	908.95	1	07:47	13.77	1	07:48
(2D)003	JUNCTION	457.05	968.07	1	07:00	56.11	1	07:00
(2D)004	JUNCTION	0.00	311.87	1	08:01	0.00		
(2D)005	JUNCTION	0.00	313.14	1	08:00	0.00		
(2D)006	JUNCTION	21.27	310.53	1	07:59	0.00		
(2D)007	JUNCTION	0.00	289.82	1	08:00	0.00		
(2D)008	JUNCTION	0.00	289.73	1	08:00	0.00		
(2D)009	JUNCTION	6.68	289.26	1	07:00	0.00		
(2D)010	JUNCTION	0.00	313.00	1	05:22	30.43	1	05:22
(2D)011	JUNCTION	39388.45	39514.51	1	07:00	39169.05	1	07:00
(2D)012	JUNCTION	0.26	167.39	0	08:00	0.00		
(2D)013	JUNCTION	153.74	153.74	0	07:00	0.00		
(2D)014	JUNCTION	0.00	0.00	0	00:00	0.00		
(2D)015	JUNCTION	0.00	0.00	0	00:00	0.00		
(2D)016	JUNCTION	0.00	0.00	0	00:00	0.00		
(2D)017	JUNCTION	0.00	0.00	0	00:00	0.00		
(2D)018	JUNCTION	0.00	0.00	0	00:00	0.00		
(2D)019	JUNCTION	0.00	0.00	0	00:00	0.00		
(2D)020	JUNCTION	0.00	0.00	0	00:00	0.00		
(2D)021	JUNCTION	0.00	0.00	0	00:00	0.00		
(2D)022	JUNCTION	0.00	0.00	0	00:00	0.00		
(2D)023	JUNCTION	0.00	0.00	0	00:00	0.00		
(2D)024	JUNCTION	0.00	0.00	0	00:00	0.00		
(2D)025	JUNCTION	0.00	0.00	0	00:00	0.00		
(2D)039	JUNCTION	0.00	206.30	1	06:52	0.00		
(2D)040	JUNCTION	0.00	541.60	1	08:17	205.60	1	08:17
(2D)041	JUNCTION	0.00	533.99	1	07:13	0.00		
(2D)042	JUNCTION	0.00	541.31	1	08:08	4.12	1	08:09
(2D)043	JUNCTION	0.00	539.62	1	08:01	0.00		
(2D)044	JUNCTION	0.00	504.41	1	12:36	0.00		
(2D)045	JUNCTION	5.14	503.56	1	07:00	0.00		
(2D)045A	JUNCTION	12173.05	12691.51	1	07:00	12185.08	1	07:00
(2D)046	JUNCTION	2.57	518.84	1	07:00	0.00		
(2D)046A	JUNCTION	12867.95	12867.95	1	07:00	12322.09	1	07:00

(2D)241	JUNCTION	0.00	1691.78	1	07:13	0.00		
(2D)242	JUNCTION	0.00	1681.76	1	07:12	0.00		
(2D)243	JUNCTION	0.00	1676.52	1	07:10	0.00		
(2D)245	JUNCTION	0.00	1804.26	1	07:06	259.12	1	07:06
(2D)246	JUNCTION	0.00	1812.58	1	07:05	0.00		
(2D)247	JUNCTION	0.00	1820.28	1	07:03	0.00		
(2D)248	JUNCTION	0.00	1827.66	1	07:02	0.00		
(2D)249	JUNCTION	0.00	1835.87	1	07:01	0.00		
(2D)250	JUNCTION	0.00	1849.42	1	07:00	0.00		
(2D)251	JUNCTION	1649.98	1847.60	1	07:00	0.00		
(2D)252	JUNCTION	0.00	246.22	1	08:13	0.00		
(2D)253	JUNCTION	0.00	246.34	1	08:12	0.00		
(2D)254	JUNCTION	0.00	246.20	1	08:11	0.00		
(2D)255	JUNCTION	0.00	246.07	1	08:08	0.00		
(2D)256	JUNCTION	0.00	246.03	1	08:07	0.00		
(2D)257	JUNCTION	0.00	246.32	1	08:06	0.00		
(2D)258	JUNCTION	0.00	246.51	1	08:05	0.00		
(2D)259	JUNCTION	0.00	247.08	1	08:04	0.00		
(2D)260	JUNCTION	0.00	247.08	1	08:03	0.00		
(2D)261	JUNCTION	0.00	247.39	1	08:02	0.00		
(2D)262	JUNCTION	0.00	247.83	1	08:00	0.00		
(2D)263	JUNCTION	18.04	247.85	0	08:04	0.00		
(2D)264	JUNCTION	0.00	240.36	0	08:02	0.00		
(2D)265	JUNCTION	0.00	247.65	0	08:01	0.00		
(2D)266	JUNCTION	0.00	265.93	0	08:00	0.00		
(2D)267	JUNCTION	227.38	227.38	0	07:00	0.00		
(2E)001	JUNCTION	0.00	6560.14	1	08:29	1409.82	1	06:38
(2E)002	JUNCTION	0.00	11022.88	1	05:51	4467.04	1	05:52
(2E)003	JUNCTION	14480.31	18013.98	1	07:00	6952.04	1	07:00
(2E)004	JUNCTION	0.00	3604.29	1	14:56	0.00		
(2E)005	JUNCTION	0.00	3536.36	1	14:52	0.00		
(2E)006	JUNCTION	0.00	6276.52	1	09:55	2650.68	1	09:55
(2E)007	JUNCTION	0.00	5963.78	1	09:52	0.00		
(2E)008	JUNCTION	0.00	5975.27	1	09:51	0.00		
(2E)009	JUNCTION	0.00	6126.92	1	09:50	0.00		
(2E)010	JUNCTION	0.00	6063.07	1	09:57	0.00		
(2E)011	JUNCTION	0.00	6037.05	1	09:41	0.00		
(2E)012	JUNCTION	0.00	5931.28	1	09:57	0.00		
(2E)013	JUNCTION	0.00	5937.41	1	06:25	17.13	1	06:25
(2E)014	JUNCTION	10677.67	16517.65	1	07:00	10573.00	1	07:00
(2E)043	JUNCTION	133.34	133.34	0	07:00	0.00		
(2F)001	JUNCTION	0.00	5818.48	1	08:11	37.65	1	08:11
(2F)002	JUNCTION	0.00	5838.51	1	08:03	11.68	1	08:03
(2F)003	JUNCTION	0.00	5751.88	1	06:09	0.00		
(2F)004	JUNCTION	3806.74	8469.56	1	06:30	2717.11	1	06:30
(2F)005	JUNCTION	147.17	4691.45	1	07:00	0.00		
(2F)006	JUNCTION	0.00	4591.76	1	12:20	0.00		
(2F)007	JUNCTION	0.00	4546.15	1	12:19	0.00		
(2F)008	JUNCTION	0.00	4544.29	1	05:32	0.00		
(2F)009	JUNCTION	0.00	10323.81	1	05:57	5768.11	1	05:57

(2F)010	JUNCTION	16817.97	18850.34	1	07:00	12648.29	1	07:00
(2F)011	JUNCTION	2298.31	3754.62	1	07:00	1714.60	1	07:00
(2F)012	JUNCTION	0.00	1459.98	1	08:07	0.00		
(2F)013	JUNCTION	0.00	1460.10	1	08:04	0.00		
(2F)014	JUNCTION	0.00	1460.29	1	08:03	0.00		
(2F)015	JUNCTION	0.00	1460.72	1	08:01	0.00		
(2F)016	JUNCTION	0.00	1461.91	1	08:00	0.00		
(2F)017	JUNCTION	15.83	1459.37	1	07:00	0.00		
(2F)018	JUNCTION	0.00	1445.82	1	08:43	0.00		
(2F)019	JUNCTION	0.00	1445.04	1	08:37	0.00		
(2F)020	JUNCTION	0.00	1447.22	1	08:37	0.00		
(2F)021	JUNCTION	0.00	1447.14	1	08:36	0.00		
(2F)022	JUNCTION	0.00	1443.55	1	06:35	0.00		
(2F)023	JUNCTION	5282.13	5492.52	1	06:30	4841.04	1	06:30
(2F)024	JUNCTION	0.00	210.70	1	11:35	0.00		
(2F)025	JUNCTION	7730.84	7774.80	1	07:00	7562.16	1	07:00
(2F)026	JUNCTION	0.00	87.97	0	21:46	0.00		
(2F)027	JUNCTION	0.00	88.37	0	21:36	0.00		
(2F)028	JUNCTION	0.00	88.73	0	21:29	0.00		
(2F)029	JUNCTION	0.00	90.16	0	08:21	0.00		
(2F)030	JUNCTION	0.00	93.68	1	08:00	0.00		
(2F)031	JUNCTION	0.00	95.54	1	08:05	0.00		
(2F)032	JUNCTION	0.00	107.82	1	08:00	0.00		
(2F)033	JUNCTION	86.94	86.94	0	07:00	0.00		
(2G)001	JUNCTION	0.00	795.54	0	21:06	0.00		
(2G)002	JUNCTION	9733.36	10540.03	1	07:00	9740.82	1	07:00
(2G)002A	JUNCTION	0.00	1625.50	1	08:00	816.97	1	08:01
(2G)003	JUNCTION	0.00	640.69	1	08:00	0.00		
(2G)004	JUNCTION	55.65	639.23	1	07:01	0.00		
(2G)005	JUNCTION	0.00	612.25	1	08:01	0.00		
(2G)006	JUNCTION	14.90	603.05	1	08:00	0.00		
(2G)007	JUNCTION	47.02	560.62	1	07:00	0.00		
(2G)008	JUNCTION	0.00	638.01	1	05:25	123.37	1	05:25
(2G)009	JUNCTION	17620.41	18000.18	1	07:00	17351.55	1	07:00
(2G)010	JUNCTION	0.00	406.17	3	07:25	0.00		
(2G)011	JUNCTION	9.66	408.78	0	19:18	0.00		
(2G)012	JUNCTION	0.00	378.25	2	19:21	0.00		
(2G)012A	JUNCTION	0.00	378.48	0	19:16	0.00		
(2G)013	JUNCTION	0.00	379.00	0	19:16	0.00		
(2G)013A	JUNCTION	28.36	381.13	0	19:16	0.00		
(2G)014	JUNCTION	0.00	349.17	0	07:09	0.00		
(2G)015	JUNCTION	10.07	399.80	2	07:32	49.90	2	07:32
(2G)016	JUNCTION	108.22	474.19	1	07:00	85.18	1	07:00
(2G)016A	JUNCTION	0.00	393.83	1	05:44	27.86	1	05:45
(2G)018	JUNCTION	27.85	411.34	1	07:00	17.51	1	07:00
(2G)019	JUNCTION	23242.96	23626.32	1	07:00	23222.27	1	07:00
(2G)020	JUNCTION	3.85	390.41	1	07:00	7.05	1	07:00

(2G)021	JUNCTION	3.85	390.19	1	07:00	3.64	1	07:00
(2G)022	JUNCTION	6.17	392.40	1	07:00	6.06	1	07:00
(2G)023	JUNCTION	5.81	390.00	1	07:00	3.77	1	07:00
(2G)024	JUNCTION	0.00	605.28	1	05:03	221.09	1	05:04
(2G)025	JUNCTION	0.00	1258.22	1	06:25	651.71	1	06:25
(2G)026	JUNCTION	12520.45	12520.45	1	07:00	11637.81	1	07:00
(2G)040	JUNCTION	36750.02	36952.19	1	07:00	35928.02	1	07:00
(2G)041	JUNCTION	0.00	262.20	0	08:13	0.00		
(2G)042	JUNCTION	0.00	263.81	1	08:08	0.00		
(2G)043	JUNCTION	0.00	265.85	0	08:04	0.00		
(2G)043A	JUNCTION	0.00	271.89	1	08:02	0.00		
(2G)044	JUNCTION	0.00	296.58	1	08:00	0.00		
(2G)045	JUNCTION	250.45	250.45	0	07:00	0.00		
(2G)359	JUNCTION	14646.10	14646.10	1	07:00	14243.05	1	07:00
(2H)001	JUNCTION	0.00	2530.38	1	11:00	0.00		
(2H)002	JUNCTION	13.51	2485.98	1	07:00	0.00		
(2H)003	JUNCTION	0.00	2507.52	1	10:52	34.55	1	10:52
(2H)005	JUNCTION	0.00	2501.16	1	10:48	0.00		
(2H)006	JUNCTION	0.00	2766.03	1	05:58	268.27	1	05:58
(2H)007	JUNCTION	4400.73	7306.95	1	07:00	4533.23	1	07:00
(2H)008	JUNCTION	0.00	2910.04	1	09:44	0.00		
(2H)009	JUNCTION	0.00	2911.93	1	09:44	0.00		
(2H)010	JUNCTION	0.00	2918.42	1	09:44	0.00		
(2H)011	JUNCTION	0.00	2906.23	1	05:53	0.00		
(2H)012	JUNCTION	24898.92	27577.16	1	07:00	24650.26	1	07:00
(2H)013	JUNCTION	3530.23	4983.65	1	06:00	2303.25	1	06:00
(2H)014	JUNCTION	2.72	1465.88	1	07:59	0.00		
(2H)015	JUNCTION	0.00	1463.50	1	08:00	0.00		
(2H)016	JUNCTION	3.08	1463.16	1	07:56	0.00		
(2H)017	JUNCTION	0.00	1460.67	1	08:00	0.00		
(2H)017A	JUNCTION	6.17	1460.08	1	07:55	0.00		
(2H)018	JUNCTION	0.00	1454.19	1	08:00	0.00		
(2H)019	JUNCTION	3.85	1453.91	1	07:54	0.00		
(2H)020	JUNCTION	1.18	1450.06	1	07:54	0.00		
(2H)021	JUNCTION	1.18	1448.88	1	07:50	0.00		
(2H)022	JUNCTION	0.00	1008.67	1	10:06	0.00		
(2H)023	JUNCTION	0.00	1010.18	1	10:06	0.00		
(2H)024	JUNCTION	0.00	1008.27	1	10:16	0.00		
(2H)025	JUNCTION	0.00	1017.06	1	10:12	9.93	1	05:50
(2H)026	JUNCTION	1.95	441.33	1	07:49	0.00		
(2H)027	JUNCTION	0.00	439.79	1	08:02	0.00		
(2H)028	JUNCTION	0.00	439.99	1	08:01	0.00		
(2H)029	JUNCTION	0.00	440.94	1	08:00	0.00		
(2H)030	JUNCTION	11.61	439.38	1	07:00	0.00		
(2H)031	JUNCTION	0.00	541.79	1	05:26	114.02	1	05:27
(2H)032	JUNCTION	7.71	2143.39	1	06:30	1600.35		

1 06:30							
	(2H)033	JUNCTION	1717.73	2137.22	1	06:30	0.00
	(2H)034	JUNCTION	0.00	420.45	1	08:00	0.00
	(2H)036	JUNCTION	3.24	420.12	1	07:00	0.00
	(2H)037	JUNCTION	0.00	417.26	1	11:33	0.00
	(2H)038	JUNCTION	0.00	417.24	1	11:32	0.00
	(2H)039	JUNCTION	0.00	417.25	1	11:31	0.00
	(2H)040	JUNCTION	0.00	417.27	1	11:29	0.00
	(2H)041	JUNCTION	0.00	417.33	1	11:28	0.00
	(2H)042	JUNCTION	0.00	417.59	1	11:27	0.00
	(2H)043	JUNCTION	0.00	417.40	1	11:26	0.00
	(2H)044	JUNCTION	0.00	417.49	1	11:25	0.00
	(2H)045	JUNCTION	0.00	417.74	1	11:25	0.00
	(2H)046	JUNCTION	0.00	417.10	1	11:31	0.00
	(2H)047	JUNCTION	0.00	739.15	1	06:26	322.26
1 06:26							
	(2H)048	JUNCTION	0.00	740.13	1	09:44	0.00
	(2H)049	JUNCTION	7117.06	7477.05	1	07:00	6731.04
1 07:00							
	(2H)050	JUNCTION	0.00	360.54	1	10:58	0.00
	(2H)051	JUNCTION	0.00	361.36	1	10:57	0.00
	(2H)051A	JUNCTION	0.00	361.52	1	10:57	0.00
	(2H)052	JUNCTION	0.00	360.24	1	11:09	0.00
	(2H)053	JUNCTION	0.00	1058.09	1	07:53	697.58
1 07:53							
	(2H)054	JUNCTION	0.00	553.84	1	06:42	0.17
1 06:42							
	(2H)054A	JUNCTION	3.85	556.99	1	05:42	3.00
1 05:42							
	(2H)055	JUNCTION	0.00	554.64	1	05:42	0.00
	(2H)055A	JUNCTION	0.00	554.64	1	05:42	0.00
	(2H)056	JUNCTION	0.00	554.64	1	05:45	0.00
	(2H)057	JUNCTION	4.63	558.14	1	07:00	3.51
1 07:00							
	(2H)058	JUNCTION	4802.74	4802.74	1	07:00	4241.89
1 07:00							
	(2H)285	JUNCTION	8.12	504.51	1	07:00	0.00
	(2H)286	JUNCTION	10430.50	10924.51	1	07:00	10420.87
1 07:00							
	(2H)287	JUNCTION	0.00	495.27	1	07:42	0.00
	(2H)288	JUNCTION	0.00	494.18	1	07:39	0.00
	(2H)289	JUNCTION	50.25	548.68	1	07:31	53.93
1 07:00							
	(2H)290	JUNCTION	1296.96	1296.96	1	07:00	798.43
1 07:00							
	(2I)001	JUNCTION	3960.63	5597.15	1	07:00	4166.61
1 07:00							
	(2I)001A	JUNCTION	0.00	1419.61	1	05:09	403.31
1 05:09							
	(2I)002	JUNCTION	13.41	1639.08	1	07:00	0.00
	(2I)003	JUNCTION	4992.11	6559.07	1	07:00	4930.87
1 07:00							
	(2I)004	JUNCTION	0.00	1633.82	1	09:14	62.04
1 09:08							
	(2I)005	JUNCTION	0.00	2953.72	1	08:02	1299.00
1 08:02							
	(2I)006	JUNCTION	0.00	1626.05	1	08:00	0.00
	(2I)008	JUNCTION	1501.81	2895.66	1	07:00	1268.85
1 07:00							
	(2I)009	JUNCTION	3.49	1396.68	1	07:45	0.00
	(2I)010	JUNCTION	0.00	1394.25	1	07:45	0.00

(2I)011	JUNCTION	6.58	1395.18	1	07:44	0.00		
(2I)012	JUNCTION	0.00	1391.66	1	07:44	0.00		
(2I)013	JUNCTION	0.00	1385.97	1	06:02	0.00		
(2I)014	JUNCTION	4838.60	4838.60	1	07:00	3447.53	1	07:00
(2I)015	JUNCTION	0.00	0.00	0	00:00	0.00		
(2I)016	JUNCTION	0.00	0.00	0	00:00	0.00		
(2I)017	JUNCTION	0.00	0.00	0	00:00	0.00		
(2I)017A	JUNCTION	6.17	710.19	1	07:00	0.00		
(2I)018	JUNCTION	0.00	863.46	1	10:49	158.58	1	10:49
(2I)019	JUNCTION	0.00	862.71	1	10:54	0.00		
(2I)020	JUNCTION	11371.51	12140.27	1	07:00	11268.26	1	07:00
(2I)021	JUNCTION	0.00	1139.34	1	05:35	370.29	1	05:35
(2I)021A	JUNCTION	0.00	1141.61	1	06:02	0.00		
(2I)021B	JUNCTION	2181.83	2800.61	1	07:00	1653.88	1	07:00
(2I)021C	JUNCTION	0.00	768.19	1	10:30	143.08	1	10:30
(2I)022	JUNCTION	0.00	765.33	1	10:30	0.00		
(2I)023	JUNCTION	0.00	764.11	1	10:26	0.00		
(2I)024	JUNCTION	0.00	765.04	1	10:22	0.81	1	10:23
(2I)025	JUNCTION	0.00	759.11	1	05:44	0.00		
(2I)025A	JUNCTION	17154.00	17882.13	1	07:00	17111.19	1	07:00
(2I)026	JUNCTION	0.00	768.03	1	09:05	0.00		
(2I)027	JUNCTION	0.00	728.13	1	05:14	0.00		
(2I)028	JUNCTION	56.42	847.58	1	07:00	117.98	1	07:00
(2I)029	JUNCTION	7850.55	7850.55	1	07:00	7048.08	1	07:00
(2I)044	JUNCTION	0.00	1392.70	1	08:54	0.00		
(2I)045	JUNCTION	0.00	1403.65	1	09:05	0.22	1	09:05
(2I)046	JUNCTION	0.00	1401.75	1	08:55	0.00		
(2I)047	JUNCTION	0.00	1400.38	1	05:44	0.00		
(2I)048	JUNCTION	0.00	1400.38	1	05:09	0.00		
(2I)049	JUNCTION	12425.06	13264.83	1	06:30	11859.17	1	06:30
(2I)050	JUNCTION	0.00	885.68	1	05:16	0.00		
(2I)051	JUNCTION	22.40	892.95	1	05:16	3.99	1	05:16
(2I)052	JUNCTION	0.00	887.47	1	06:01	0.00		
(2I)053	JUNCTION	0.00	889.05	1	09:15	0.79	1	09:15
(2I)054	JUNCTION	7931.13	8818.59	1	07:00	7928.65	1	07:00
(2I)055	JUNCTION	36.07	921.75	1	07:00	34.28	1	07:00
(2I)056	JUNCTION	0.00	887.67	1	08:27	0.10	1	08:27
(2I)057	JUNCTION	0.00	887.47	1	06:15	0.00		
(2I)058	JUNCTION	0.00	888.51	1	08:31	0.52	1	08:32
(2I)059	JUNCTION	10160.43	10160.43	1	06:30	9270.19	1	06:30
(2J)001	JUNCTION	0.00	4177.86	1	11:35	0.00		
(2J)002	JUNCTION	0.00	4150.08	1	10:02	0.00		

(2J)003	JUNCTION	0.00	4153.24	1	10:01	0.00		
(2J)004	JUNCTION	0.00	4259.24	1	11:28	84.84	1	11:29
(2J)005	JUNCTION	0.00	4248.52	1	11:28	0.00		
(2J)006	JUNCTION	0.00	4208.91	1	11:25	0.00		
(2J)007	JUNCTION	0.00	4207.00	1	11:05	0.32	1	11:05
(2J)008	JUNCTION	7797.91	11726.87	1	07:00	7519.02	1	07:00
(2J)009	JUNCTION	0.00	4012.43	1	11:19	0.00		
(2J)010	JUNCTION	0.00	4037.72	1	11:18	0.00		
(2J)011	JUNCTION	35.45	4021.96	1	11:00	0.00		
(2J)012	JUNCTION	0.00	3927.13	1	11:15	0.00		
(2J)013	JUNCTION	0.00	4071.35	1	11:01	116.19	1	11:03
(2J)014	JUNCTION	0.00	3901.93	1	11:00	0.00		
(2J)015	JUNCTION	0.00	3697.82	1	08:03	0.00		
(2J)016	JUNCTION	0.00	3697.80	1	08:02	0.00		
(2J)017	JUNCTION	0.00	3699.77	1	11:02	0.00		
(2J)018	JUNCTION	0.00	3701.83	1	11:01	0.00		
(2J)019	JUNCTION	0.00	1213.86	1	12:56	0.00		
(2J)020	JUNCTION	27.59	391.24	1	07:17	308.11	1	07:17
(2J)021	JUNCTION	6.11	363.65	1	07:00	0.00		
(2J)022	JUNCTION	0.00	390.91	1	18:03	32.64	1	18:03
(2J)023	JUNCTION	0.00	831.44	1	05:34	441.27	1	05:34
(2J)026	JUNCTION	9999.67	10477.98	1	07:00	9980.04	1	07:00
(2J)027	JUNCTION	0.00	479.02	1	09:59	0.00		
(2J)028	JUNCTION	0.00	492.72	1	06:06	14.41	1	06:07
(2J)029	JUNCTION	7656.49	7959.90	1	07:00	7462.23	1	07:00
(2J)030	JUNCTION	0.00	316.96	1	09:42	0.00		
(2J)031	JUNCTION	0.00	303.41	1	06:09	0.00		
(2J)032	JUNCTION	5342.10	5342.10	1	07:00	5033.06	1	07:00
(2J)033	JUNCTION	0.00	0.00	0	00:00	0.00		
(2J)040	JUNCTION	6.83	491.28	1	13:14	0.00		
(2J)041	JUNCTION	0.00	479.90	1	13:10	0.00		
(2J)042	JUNCTION	0.00	475.08	1	07:12	0.00		
(2J)043	JUNCTION	7.71	475.08	1	07:00	0.00		
(2J)044	JUNCTION	7.61	492.12	1	12:37	17.50	1	12:38
(2J)045	JUNCTION	4.26	464.51	1	07:00	0.00		
(2J)045A	JUNCTION	0.00	477.03	1	12:57	15.61	1	07:32
(2J)046	JUNCTION	5.81	475.86	1	07:00	0.00		
(2J)047	JUNCTION	12051.33	12371.70	1	07:00	11891.07	1	07:00
(2J)048	JUNCTION	14.28	328.48	1	20:06	0.00		
(2J)049	JUNCTION	0.00	314.61	1	20:06	0.00		
(2J)050	JUNCTION	5.40	319.83	1	20:05	0.00		
(2J)051	JUNCTION	0.00	316.99	1	20:05	0.00		
(2J)052	JUNCTION	0.00	305.55	1	20:08	0.00		
(2J)053	JUNCTION	14.28	325.09	1	07:00	19.72	1	07:00
(2J)054	JUNCTION	10.43	324.06	1	07:00	13.26	1	07:00

(2J)055	JUNCTION	0.00	314.46	1	05:31	0.82	1	05:31
(2J)056	JUNCTION	23268.99	23322.20	1	07:00	22964.18	1	07:00
(2J)057	JUNCTION	0.00	76.07	0	08:00	0.00		
(2J)060	JUNCTION	64.95	64.95	0	07:00	0.00		
(2K)001	JUNCTION	54.11	1780.01	1	07:31	568.41	1	07:32
(2K)002	JUNCTION	38.64	1309.89	1	07:30	0.00		
(2K)003	JUNCTION	2.31	1271.25	1	07:00	0.00		
(2K)004	JUNCTION	0.00	1269.34	1	10:02	0.00		
(2K)005	JUNCTION	0.00	1269.74	1	09:57	0.00		
(2K)006	JUNCTION	0.00	1270.09	1	09:57	0.00		
(2K)007	JUNCTION	0.00	1269.70	1	09:56	0.00		
(2K)008	JUNCTION	0.00	1273.65	1	09:57	0.00		
(2K)009	JUNCTION	0.00	1275.74	1	09:56	0.00		
(2K)010	JUNCTION	0.00	1270.94	1	09:57	0.00		
(2K)011	JUNCTION	3.24	1376.03	1	09:40	104.52	1	09:40
(2K)012	JUNCTION	0.00	1368.91	1	05:54	0.00		
(2K)013	JUNCTION	6708.72	7637.93	1	07:00	6261.88	1	07:00
(2K)014	JUNCTION	6094.12	6790.49	1	07:00	5854.44	1	07:00
(2K)015	JUNCTION	0.00	860.24	1	10:19	160.23	1	10:20
(2K)016	JUNCTION	2.31	863.53	1	10:19	0.00		
(2K)017	JUNCTION	1.54	821.60	1	07:00	0.00		
(2K)018	JUNCTION	2.31	866.36	1	07:00	46.30	1	07:00
(2K)018A	JUNCTION	0.00	945.34	1	05:31	79.55	1	05:32
(2K)019	JUNCTION	4039.75	4753.91	1	07:00	3802.64	1	07:00
(2K)020	JUNCTION	0.00	714.16	1	05:12	0.00		
(2K)021	JUNCTION	3.49	866.55	1	10:10	148.25	1	10:10
(2K)022	JUNCTION	3.08	876.75	1	10:09	0.00		
(2K)022A	JUNCTION	0.00	860.25	1	10:08	0.00		
(2K)023	JUNCTION	0.00	842.01	1	10:07	0.00		
(2K)024	JUNCTION	0.00	840.34	1	05:09	0.00		
(2K)024A	JUNCTION	24.72	938.09	1	07:00	96.04	1	07:00
(2K)025	JUNCTION	7791.76	8444.34	1	07:00	7526.03	1	07:00
(2K)026	JUNCTION	0.00	666.72	1	11:41	0.00		
(2K)027	JUNCTION	0.77	663.43	1	11:41	0.00		
(2K)028	JUNCTION	0.00	652.01	1	06:31	0.00		
(2K)029	JUNCTION	15708.43	16364.02	1	07:00	15703.91	1	07:00
(2K)030	JUNCTION	0.00	657.11	1	11:05	0.00		
(2K)031	JUNCTION	0.00	662.86	1	10:58	5.27	1	10:58
(2K)032	JUNCTION	2.88	656.14	1	07:00	0.00		
(2K)033	JUNCTION	4951.75	5587.18	1	07:00	4931.26	1	07:00
(2K)033A	JUNCTION	1.95	646.71	1	10:33	11.19	1	10:34
(2K)034	JUNCTION	0.00	678.05	1	10:33	30.17	1	10:34
(2K)035	JUNCTION	0.00	663.19	1	10:32	0.00		

(2K)036	JUNCTION	0.00	648.37	1	10:22	0.00		
(2K)037	JUNCTION	78.31	725.14	1	07:00	77.19	1	07:00
(2K)038	JUNCTION	0.00	648.06	1	05:47	0.00		
(2K)039	JUNCTION	0.00	648.06	1	05:47	0.00		
(2K)040	JUNCTION	0.00	648.06	1	05:47	0.00		
(2K)041	JUNCTION	0.00	649.12	1	10:11	0.53	1	10:11
(2K)042	JUNCTION	6427.89	7072.12	1	07:00	6412.11	1	07:00
(2K)043	JUNCTION	0.00	648.02	1	05:59	0.00		
(2K)044	JUNCTION	0.00	648.56	1	09:24	0.25	1	09:24
(2K)045	JUNCTION	0.00	648.06	1	05:56	0.00		
(2K)046	JUNCTION	0.00	648.06	1	05:54	0.00		
(2K)047	JUNCTION	0.00	648.18	1	09:13	0.06	1	09:13
(2K)048	JUNCTION	0.00	648.06	1	05:54	0.00		
(2K)049	JUNCTION	0.00	648.82	1	09:05	0.38	1	09:05
(2K)050	JUNCTION	0.00	648.06	1	05:54	0.00		
(2K)051	JUNCTION	0.00	648.06	1	06:05	0.00		
(2K)052	JUNCTION	12943.14	12943.14	1	06:30	12292.43	1	06:30
(2K)314	JUNCTION	0.00	416.01	1	06:31	0.00		
(2K)315	JUNCTION	0.00	503.62	1	14:31	83.01	1	14:31
(2K)316	JUNCTION	0.00	497.63	1	05:31	0.00		
(2K)317	JUNCTION	10619.73	10619.73	1	07:00	10106.27	1	07:00
ForcedMain	JUNCTION	0.00	1200.00	1	05:08	1051.22	1	05:09
(PLANT)	OUTFALL	0.00	6000.00	1	06:03	0.00		
(1C)026	DIVIDER	15.47	510.38	1	07:00	0.00		
(1F)012	DIVIDER	0.00	38.25	0	08:01	0.00		
(1G)019	DIVIDER	0.00	516.56	1	05:35	0.00		
(2A)048	DIVIDER	857.12	6410.82	1	07:00	0.00		
(2C)009	DIVIDER	2907.20	3373.53	1	07:00	2564.31	1	07:00
(2D)244	DIVIDER	0.00	1879.55	1	06:51	0.00		
(1M)012	DIVIDER	0.00	1111.60	1	07:59	0.00		
(2J)025	DIVIDER	0.00	963.21	1	07:59	7.63	1	07:59
(1C)001B	DIVIDER	11.61	4768.88	1	07:00	0.00		
(1M)020	DIVIDER	54.26	671.77	1	07:59	0.00		
(1A)STOR	STORAGE	0.00	0.00	0	00:00	0.00		
(1A)DIV	STORAGE	0.00	0.00	0	00:00	0.00		
(2A)000	STORAGE	0.00	13199.01	1	08:57	3198.27	1	08:57
NorthEnidStorage	STORAGE	0.00	1780.84	1	17:16	925.01	1	05:17
(1O)304C	STORAGE	0.00	715.04	1	08:03	0.00		
LiftStation	STORAGE	0.00	1632.03	1	05:12	430.87	1	12:03
(1O)304	STORAGE	0.00	1253.33	1	07:00	0.00		
(1C)Storage	STORAGE	0.00	195.69	1	07:09	0.00		
PlantStorage	STORAGE	0.00	4000.00	1	05:53	0.00		

****
Storage Volume Summary

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Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days	Time of Max Occurrence hr:min	Maximum Outflow GPM
(1A)STOR	0.000	0	0.000	0	0	00:00	0.00
(1A)DIV	0.000	0	0.000	0	0	00:00	0.00
(2A)000	1.092	12	9.032	100	1	06:14	10000.00
NorthEnidStorage	0.000	0	0.000	0	0	00:00	0.00
(1O)304C	0.031	12	0.112	43	1	17:16	2006.84
LiftStation	0.568	31	1.828	100	1	05:29	1200.00
(1O)304	0.002	1	0.037	15	1	08:00	3727.00
(1C)Storage	0.342	1	0.964	2	1	09:05	195.56
PlantStorage	179.539	8	316.422	15	3	00:31	0.00

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow GPM	Max. Flow GPM
(PLANT)	98.82	4554.57	6000.00
System	98.82	4554.57	6000.00

****
Link Flow Summary
****

Link	Type	Maximum Flow GPM	Time of Max Occurrence days hr:min	Maximum Velocity ft/sec	Max/ Full Flow	Max/ Full Depth	Total Minutes Surcharged

(1A)000A	CONDUIT	3540.94	3	07:09	5.53	0.18	0.29	0
(1A)000B	CONDUIT	3541.00	3	07:08	3.29	0.39	0.43	0
(1A)001	CONDUIT	3541.08	0	07:30	1.44	1.08	0.95	4170
(1A)002	CONDUIT	6951.62	1	06:51	2.81	1.08	1.00	67
(1A)003	CONDUIT	7160.28	1	07:05	4.30	0.67	0.60	0
(1A)004	CONDUIT	7162.46	1	07:04	3.55	0.85	0.71	0
(1A)005	CONDUIT	7160.20	1	07:02	3.95	0.75	0.65	0
(1A)006	CONDUIT	7164.18	1	07:01	4.96	0.56	0.53	0
(1A)007	CONDUIT	7168.40	1	07:00	4.79	0.58	0.55	0
(1A)008	CONDUIT	4739.47	1	17:14	4.34	0.38	0.43	0
(1A)009	CONDUIT	4746.70	1	17:13	3.12	0.60	0.56	0
(1A)010	CONDUIT	4734.81	1	17:12	4.18	0.40	0.44	0
(1A)011	CONDUIT	4730.92	1	07:09	1.95	1.08	0.95	942
(1A)012	CONDUIT	5228.20	1	07:10	2.13	1.08	0.95	666
(1A)013	CONDUIT	9957.57	1	06:56	4.04	1.08	0.95	198
(1A)014	CONDUIT	12163.88	1	06:37	4.93	1.08	1.00	121
(1A)015	CONDUIT	4532.40	1	10:13	4.45	0.35	0.41	0
(1A)016	CONDUIT	4528.67	1	10:13	3.09	0.57	0.54	0
(1A)017	CONDUIT	4531.70	1	10:11	2.61	0.71	0.62	0
(1A)018	CONDUIT	3774.29	1	00:21	3.99	0.41	0.45	0
(1A)019	CONDUIT	3778.87	1	00:20	1.85	1.08	0.96	4031
(1A)020	CONDUIT	5126.58	0	20:41	4.57	0.51	0.51	0
(1A)021	CONDUIT	5129.30	2	08:25	4.08	0.60	0.56	0
(1A)022	CONDUIT	5127.07	2	20:06	4.97	0.46	0.48	0
(1A)023	CONDUIT	5133.80	2	21:45	3.94	0.63	0.57	0
(1A)024	CONDUIT	5133.35	2	08:23	4.67	0.51	0.51	0
(1A)024A	CONDUIT	5128.17	2	20:04	2.52	1.08	0.95	1959
(1A)025	CONDUIT	10069.65	1	06:38	13.95	0.28	0.36	0
(1A)026	CONDUIT	10068.26	1	06:38	4.94	1.08	0.95	108

(1A)027	CONDUIT	11443.23	1	07:19	5.60	1.08	
0.96	61						
(1A)028	CONDUIT	4316.28	3	08:26	2.74	0.79	
0.67	0						
(1A)029	CONDUIT	4316.47	3	08:24	3.80	0.52	
0.51	0						
(1A)030	CONDUIT	4316.51	3	08:23	2.64	0.83	
0.70	0						
(1A)031	CONDUIT	4316.76	3	08:21	3.26	0.64	
0.58	0						
(1A)032	CONDUIT	4316.97	3	08:19	3.06	0.69	
0.61	0						
(1A)033	CONDUIT	4317.20	3	08:17	3.13	0.67	
0.60	0						
(1A)034	CONDUIT	4318.09	2	22:36	2.55	0.87	
0.72	0						
(1A)035	CONDUIT	4322.60	3	08:53	3.54	0.58	
0.54	0						
(1A)035A	CONDUIT	4323.08	2	09:17	2.63	0.84	
0.70	0						
(1A)036	CONDUIT	4320.49	0	08:35	4.00	0.49	
0.49	0						
(1A)037	CONDUIT	4329.97	2	22:33	3.21	0.67	
0.60	0						
(1A)038	CONDUIT	4319.39	0	08:09	2.13	1.08	
0.95	1992						
(1A)039	CONDUIT	6791.30	1	13:10	4.23	0.82	
0.69	0						
(1A)040	CONDUIT	6781.11	1	06:14	3.33	1.08	
0.95	507						
(1A)041	CONDUIT	7078.84	1	05:51	3.47	1.08	
0.95	478						
(1A)042	CONDUIT	11685.46	1	06:17	3.98	1.08	
0.95	251						
(1B)001	CONDUIT	1400.21	1	14:49	6.04	0.11	
0.22	0						
(1B)002	CONDUIT	1401.12	1	14:49	2.95	0.29	
0.37	0						
(1B)003	CONDUIT	1400.27	1	14:49	2.86	0.31	
0.38	0						
(1B)004	CONDUIT	1399.16	1	15:10	1.08	1.08	
0.95	608						
(1B)005	CONDUIT	7387.08	1	05:35	5.66	1.08	
1.00	154						
(1B)006	CONDUIT	4972.76	1	11:15	3.83	1.08	
0.96	354						
(1B)009	CONDUIT	5090.50	1	05:43	3.91	1.08	
0.95	350						
(1B)010	CONDUIT	4859.76	1	08:00	5.11	0.74	
0.64	0						
(1B)011	CONDUIT	4798.26	1	11:02	3.69	1.08	
0.95	351						
(1B)013	CONDUIT	5090.05	1	10:50	4.58	0.90	
0.74	0						
(1B)014	CONDUIT	5085.72	1	05:57	3.91	1.08	
0.95	342						
(1C)001	CONDUIT	5324.31	1	05:30	4.08	1.08	
1.00	266						
(1C)001A	CONDUIT	4987.15	1	06:03	3.83	1.08	
0.95	231						
(1C)001B	CONDUIT	4573.36	1	07:00	7.76	0.39	

							0.44	0
(1C)001BO	CONDUIT	195.69	1	07:09	2.78	0.02	0.10	0
(1C)001C	CONDUIT	4757.27	1	06:10	6.96	0.48	0.49	0
(1C)001D	CONDUIT	4757.27	1	06:09	3.66	1.08	0.95	214
(1C)001E	CONDUIT	5778.59	1	05:46	8.03	0.51	0.51	0
(1C)001F	CONDUIT	5778.58	1	05:45	6.49	0.68	0.60	0
(1C)001G	CONDUIT	195.69	1	07:09	2.61	0.02	0.10	0
(1C)002	CONDUIT	1409.27	1	07:59	6.44	0.67	0.60	0
(1C)003	CONDUIT	37.01	0	08:00	0.94	0.11	0.22	0
(1C)004	CONDUIT	22.42	0	08:00	1.23	0.04	0.13	0
(1C)005	CONDUIT	17.60	0	08:01	0.42	0.12	0.23	0
(1C)006	CONDUIT	17.69	0	08:01	1.06	0.03	0.12	0
(1C)006A	CONDUIT	16.07	0	08:00	1.16	0.02	0.11	0
(1C)007	CONDUIT	15.47	0	20:31	1.01	0.03	0.11	0
(1C)009	CONDUIT	5779.01	1	05:44	5.44	0.85	0.71	0
(1C)010	CONDUIT	5786.41	1	05:42	7.10	0.61	0.56	0
(1C)011	CONDUIT	5798.76	1	05:42	6.26	0.71	0.62	0
(1C)012	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1C)015A	CONDUIT	5778.58	1	05:41	4.37	1.08	1.00	193
(1C)015B	CONDUIT	6341.24	1	08:36	5.76	0.88	0.73	0
(1C)015C	CONDUIT	6340.56	1	06:05	5.62	0.91	0.75	0
(1C)016	CONDUIT	5903.53	1	08:05	4.66	1.06	0.92	142
(1C)016A	CONDUIT	5621.75	1	07:06	5.05	0.91	0.75	0
(1C)016B	CONDUIT	5656.56	1	08:08	4.40	1.07	0.94	148
(1C)016C	CONDUIT	5620.21	1	06:11	4.32	1.08	0.95	150
(1C)017	CONDUIT	11.41	0	08:04	2.40	0.00	0.02	0
(1C)018	CONDUIT	11.45	0	08:04	0.91	0.02	0.10	0
(1C)019	CONDUIT	11.24	0	08:01	0.89	0.02	0.10	0
(1C)01D	CONDUIT	6340.56	1	06:04	4.86	1.08	0.95	185
(1C)020	CONDUIT	9.53	0	08:00	1.02	0.02	0.09	0
(1C)021	CONDUIT	7561.21	1	06:11	5.80	1.08	0.95	112

(1C)021A	CONDUIT	1754.45	1	08:39	2.41	1.08	0.95	188
(1C)021B	CONDUIT	2504.89	1	06:03	3.42	1.08	0.95	161
(1C)021C	CONDUIT	78.46	1	08:02	1.32	0.04	0.13	0
(1C)021D	CONDUIT	78.51	1	08:00	1.28	0.04	0.13	0
(1C)022	CONDUIT	352.31	1	08:00	2.33	0.66	0.60	0
(1C)023	CONDUIT	346.06	1	08:00	2.07	0.76	0.65	0
(1C)024	CONDUIT	346.08	1	08:00	2.16	0.72	0.63	0
(1C)025	CONDUIT	336.39	1	11:22	1.50	1.08	0.95	362
(1C)026	CONDUIT	434.44	1	08:00	2.16	0.95	0.77	0
(1C)026A	CONDUIT	78.42	1	08:00	2.33	0.02	0.09	0
(1C)027	CONDUIT	495.70	1	05:26	2.20	1.08	0.95	327
(1C)028	CONDUIT	492.03	1	06:16	2.19	1.08	0.95	326
(1C)041	CONDUIT	7.51	0	08:00	1.10	0.01	0.07	0
(1C)176	CONDUIT	1365.61	1	10:17	4.22	1.08	0.96	304
(1C)177	CONDUIT	1361.55	1	08:00	4.19	1.08	0.97	304
(1C)178	CONDUIT	1354.69	1	05:43	4.16	1.08	0.95	303
(1C)179	CONDUIT	1362.38	1	05:49	4.19	1.08	0.95	262
(1C)179A	CONDUIT	1083.97	1	05:34	3.27	1.08	1.00	216
(1C)180	CONDUIT	1358.90	1	08:51	4.19	1.08	0.95	197
(1C)180A	CONDUIT	1359.79	1	08:45	4.27	1.08	0.95	196
(1C)181	CONDUIT	1351.41	1	08:48	4.17	1.08	0.95	197
(1C)182	CONDUIT	1340.88	1	05:33	4.12	1.08	1.00	197
(1C)Storage	CONDUIT	195.56	1	09:06	2.49	0.16	0.27	0
(1D)001	CONDUIT	778.02	1	10:09	5.51	0.62	0.57	0
(1D)002	CONDUIT	788.04	1	10:09	3.58	1.06	0.91	292
(1D)003	CONDUIT	748.18	1	05:44	3.84	0.91	0.75	0
(1D)004	CONDUIT	748.18	1	05:43	4.77	0.70	0.62	0
(1D)005	CONDUIT	748.18	1	05:42	3.33	1.08	0.95	322
(1D)006	CONDUIT	540.67	1	11:36	3.45	0.70	0.62	0
(1D)007	CONDUIT	540.73	1	11:35	3.44	0.71	0.62	0
(1D)008	CONDUIT	540.75	1	11:34	3.53	0.71		

0.62	0						
(1D)009		CONDUIT	547.32	1	13:11	2.46	1.07
0.94	486						
(1D)010		CONDUIT	540.49	1	05:45	2.41	1.08
0.95	512						
(1D)011		CONDUIT	574.58	1	10:59	3.95	0.63
0.58	0						
(1D)012		CONDUIT	573.90	1	11:00	2.55	1.08
0.95	408						
(1D)013		CONDUIT	606.67	1	10:30	4.74	0.54
0.52	0						
(1D)014		CONDUIT	605.96	1	05:56	2.70	1.08
0.95	353						
(1D)015		CONDUIT	471.85	1	08:00	2.42	0.92
0.76	0						
(1D)016		CONDUIT	466.72	1	08:00	2.09	1.08
0.96	518						
(1D)017		CONDUIT	461.12	1	13:43	2.06	1.08
0.95	517						
(1D)018		CONDUIT	466.12	1	13:36	2.09	1.08
0.95	513						
(1D)019		CONDUIT	473.43	1	11:57	2.11	1.08
0.95	398						
(1D)020		CONDUIT	472.27	1	11:48	2.09	1.08
0.95	398						
(1D)021		CONDUIT	474.14	1	06:16	2.11	1.08
0.95	393						
(1D)022		CONDUIT	470.45	1	06:17	2.09	1.08
0.95	390						
(1D)023		CONDUIT	470.75	1	11:37	2.09	1.08
0.95	388						
(1E)001		CONDUIT	826.86	1	09:11	2.65	1.06
0.92	217						
(1E)002		CONDUIT	804.18	1	09:10	2.50	1.08
0.94	227						
(1E)003		CONDUIT	787.91	1	06:39	2.49	1.08
0.95	229						
(1E)003A		CONDUIT	802.73	1	06:23	2.49	1.08
0.95	227						
(1E)005		CONDUIT	792.72	1	08:49	2.50	1.08
0.95	198						
(1E)006		CONDUIT	803.71	1	08:45	2.52	1.08
0.94	197						
(1E)007		CONDUIT	802.86	1	08:38	2.50	1.08
0.94	197						
(1E)008		CONDUIT	780.91	1	06:46	2.47	1.08
0.95	202						
(1E)009		CONDUIT	836.74	1	08:33	2.58	1.08
0.95	195						
(1F)001		CONDUIT	2739.98	1	06:02	3.75	1.08
0.95	217						
(1F)003		CONDUIT	2778.65	1	08:00	5.64	0.45
0.47	0						
(1F)004		CONDUIT	2771.39	1	06:13	2.79	1.08
0.95	215						
(1F)005		CONDUIT	1497.77	1	07:45	1.50	1.08
0.95	126						
(1F)006		CONDUIT	1744.78	1	07:21	2.16	0.85
0.71	0						
(1F)008		CONDUIT	1729.86	1	07:21	1.90	0.98
0.80	0						

(1F)008A	CONDUIT	1718.36	1	06:14	1.73	1.08	0.95	116
(1F)009	CONDUIT	2040.67	1	07:00	3.80	0.50	0.50	0
(1F)010	CONDUIT	2038.32	1	06:11	2.05	1.08	0.95	95
(1F)011	CONDUIT	3.74	0	08:00	0.52	0.00	0.03	0
(1F)012	CONDUIT	0.12	0	01:00	0.00	0.00	0.00	0
(1F)012A	CONDUIT	38.25	0	08:01	0.90	0.01	0.08	0
(1F)012O	CONDUIT	38.02	0	08:02	2.07	0.00	0.05	0
(1F)013	CONDUIT	39.01	0	08:00	1.04	0.01	0.08	0
(1F)014	CONDUIT	23.68	0	08:04	0.52	0.03	0.11	0
(1F)015	CONDUIT	24.28	0	08:01	1.10	0.01	0.07	0
(1F)016	CONDUIT	26.07	0	08:00	1.21	0.01	0.07	0
(1F)017	CONDUIT	12004.39	1	08:07	4.10	1.08	0.95	156
(1F)017A	CONDUIT	11916.31	1	05:42	4.06	1.08	1.00	169
(1F)017B	CONDUIT	9350.81	1	07:08	3.99	0.83	0.69	0
(1F)017C	CONDUIT	9350.81	1	07:08	4.17	0.79	0.67	0
(1F)017D	CONDUIT	9340.59	1	05:41	3.18	1.08	1.00	296
(1F)017E	CONDUIT	11873.94	1	05:57	4.12	1.07	0.94	173
(1F)017F	CONDUIT	589.27	1	12:33	5.34	0.08	0.20	0
(1F)017G-1	CONDUIT	589.65	1	12:36	5.15	0.09	0.20	0
(1F)018	CONDUIT	593.30	1	12:36	2.98	0.20	0.30	0
(1F)019	CONDUIT	601.43	1	12:35	2.75	1.06	0.93	6
(1F)020	CONDUIT	609.62	1	12:31	2.72	1.08	0.91	436
(1F)021	CONDUIT	567.63	1	06:12	2.52	1.08	0.95	510
(1F)022	CONDUIT	440.06	1	08:01	2.48	0.81	0.68	0
(1F)023	CONDUIT	439.69	1	08:00	2.60	0.76	0.65	0
(1F)024	CONDUIT	24.99	1	08:00	2.06	0.02	0.10	0
(1F)025	CONDUIT	24.94	0	08:00	2.10	0.02	0.10	0
(1F)026	CONDUIT	22.10	0	21:01	2.03	0.02	0.09	0
(1F)026A	CONDUIT	22.72	0	08:00	0.95	0.06	0.16	0
(1F)027	CONDUIT	16.62	0	08:00	0.87	0.04	0.13	0
(1F)028	CONDUIT	14.57	0	08:00	0.83	0.03		

							0.13	0
(1F)029	CONDUIT	12.40	0	08:03	0.81	0.03	0.12	0
(1F)029A	CONDUIT	12.79	0	08:01	0.81	0.03	0.12	0
(1F)030	CONDUIT	14.10	0	08:00	0.98	0.03	0.12	0
(1G)001	CONDUIT	11068.65	1	06:47	3.78	1.08	0.95	185
(1G)001A	CONDUIT	11986.15	1	06:06	4.10	1.08	1.00	142
(1G)002	CONDUIT	12122.64	1	07:54	4.12	1.08	0.96	140
(1G)003	CONDUIT	8534.81	1	06:11	2.91	1.08	0.95	284
(1G)004	CONDUIT	6204.94	1	08:00	3.24	0.64	0.58	0
(1G)005	CONDUIT	6204.93	1	07:11	3.87	0.51	0.51	0
(1G)006	CONDUIT	6200.31	1	06:09	2.11	1.08	0.95	284
(1G)007	CONDUIT	10728.55	1	08:26	4.80	0.80	0.68	0
(1G)008	CONDUIT	10874.41	1	08:24	3.73	1.08	0.95	163
(1G)008C	CONDUIT	10711.88	1	06:07	3.65	1.08	0.95	164
(1G)009	CONDUIT	10711.88	1	06:08	5.44	0.67	0.60	0
(1G)009A	CONDUIT	12273.91	1	05:46	4.20	1.08	0.97	148
(1G)009B	CONDUIT	12322.83	1	05:46	4.24	1.08	1.00	147
(1G)009C	CONDUIT	10758.66	1	07:14	4.09	0.97	0.80	0
(1G)009D	CONDUIT	10885.71	1	06:20	3.89	1.02	0.92	59
(1G)009E	CONDUIT	10743.59	1	06:19	3.66	1.08	1.00	86
(1G)010	CONDUIT	12074.20	1	07:10	4.19	1.08	0.93	12
(1G)011	CONDUIT	11968.21	1	07:09	4.15	1.07	0.93	10
(1G)012	CONDUIT	11887.47	1	07:08	4.11	1.07	0.93	16
(1G)013	CONDUIT	11612.53	1	07:07	4.02	1.07	0.94	22
(1G)014	CONDUIT	106.20	1	20:05	4.67	0.05	0.15	0
(1G)014A	CONDUIT	104.95	1	08:01	1.57	0.22	0.32	0
(1G)015	CONDUIT	106.34	1	08:00	1.56	0.23	0.33	0
(1G)016	CONDUIT	106.80	1	08:00	1.60	0.23	0.32	0
(1G)017	CONDUIT	90.45	1	08:00	1.54	0.19	0.29	0
(1G)018	CONDUIT	92.56	1	08:00	1.62	0.20	0.29	0
(1G)018A	CONDUIT	47.90	1	21:01	1.68	0.07	0.17	0

(1G)019	CONDUIT	468.73	1	05:36	4.57	0.40	0.44	0
(1G)019O	CONDUIT	47.95	1	21:01	1.21	0.11	0.22	0
(1G)020	CONDUIT	516.56	1	05:35	2.28	1.08	0.95	978
(1G)045	CONDUIT	536.28	1	07:13	3.56	0.67	0.60	0
(1G)046	CONDUIT	520.81	1	05:57	2.31	1.08	0.95	841
(1G)047	CONDUIT	334.56	1	07:11	2.13	0.74	0.64	0
(1G)048	CONDUIT	223.58	1	06:33	1.84	0.50	0.50	0
(1G)049	CONDUIT	223.57	1	06:31	1.79	0.52	0.51	0
(1G)050	CONDUIT	223.60	1	06:30	1.58	0.61	0.56	0
(1G)051	CONDUIT	223.62	1	06:30	1.60	0.60	0.56	0
(1G)052	CONDUIT	223.53	1	06:29	1.55	1.08	0.96	705
(1G)053	CONDUIT	223.85	1	16:45	1.55	1.08	0.95	705
(1G)054	CONDUIT	223.82	1	13:14	1.56	1.08	0.96	454
(1G)055	CONDUIT	223.63	1	13:09	1.56	1.08	0.96	454
(1G)056	CONDUIT	223.53	1	07:04	1.55	1.08	0.95	454
(1G)057	CONDUIT	337.50	1	06:20	2.41	1.08	0.95	358
(1G)058	CONDUIT	336.74	1	12:06	2.37	1.08	0.95	360
(1G)059	CONDUIT	336.63	1	06:35	2.35	1.08	0.95	390
(1G)060	CONDUIT	336.30	1	06:20	2.30	1.08	1.00	398
(1G)061	CONDUIT	336.98	1	07:15	2.34	1.08	0.95	398
(1G)062	CONDUIT	369.61	1	05:33	2.59	1.08	0.95	373
(1G)063	CONDUIT	368.40	1	06:24	2.54	1.08	1.00	391
(1G)064	CONDUIT	369.15	1	06:33	2.60	1.08	0.96	389
(1G)065	CONDUIT	369.15	1	06:29	2.57	1.08	0.96	389
(1G)066	CONDUIT	369.15	1	06:26	2.56	1.08	0.96	389
(1G)067	CONDUIT	369.15	1	06:25	2.56	1.08	0.96	389
(1G)068	CONDUIT	369.15	1	06:24	2.57	1.08	0.96	389
(1G)069	CONDUIT	369.32	1	11:43	2.57	1.08	0.96	388
(1G)070	CONDUIT	369.30	1	11:39	2.56	1.08	0.96	388
(1G)071	CONDUIT	369.15	1	05:54	2.55	1.08	0.95	387
(1G)146	CONDUIT	0.00	0	00:00	0.00	0.00		

							0.00	0
(1G)146A	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1G)162	CONDUIT	488.46	1	21:13	2.17	1.08	0.94	962
(1G)162A	CONDUIT	499.14	1	21:07	2.23	1.08	0.92	956
(1G)162B	CONDUIT	501.86	1	21:05	2.27	1.06	0.90	2
(1G)162C	CONDUIT	493.85	1	21:03	2.21	1.07	0.92	958
(1G)162D	CONDUIT	490.13	1	21:13	8.79	0.17	0.28	0
(1G)243	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1H)001	CONDUIT	415.29	1	08:00	2.56	0.73	0.63	0
(1H)004	CONDUIT	71.79	2	23:12	2.65	0.04	0.13	0
(1H)005	CONDUIT	71.85	0	22:14	0.35	1.08	0.95	3292
(1H)006	CONDUIT	457.46	1	16:37	2.43	0.88	0.73	0
(1H)007	CONDUIT	457.35	1	16:36	2.58	0.82	0.69	0
(1H)008	CONDUIT	457.57	1	16:35	2.51	0.85	0.71	0
(1H)009	CONDUIT	457.25	1	07:00	2.68	0.77	0.66	0
(1H)010	CONDUIT	455.94	1	05:43	2.01	1.08	0.95	706
(1H)011	CONDUIT	1171.03	1	05:33	5.08	1.08	1.00	451
(1H)038	CONDUIT	404.39	1	07:13	3.73	0.43	0.46	0
(1H)039	CONDUIT	397.92	1	17:15	4.17	0.36	0.41	0
(1H)040	CONDUIT	397.82	1	06:06	7.90	0.15	0.26	0
(1H)041	CONDUIT	397.82	1	06:06	1.76	1.08	0.95	749
(1H)042	CONDUIT	685.90	1	05:29	4.02	0.48	0.49	0
(1H)043	CONDUIT	685.90	1	05:19	3.02	1.08	1.00	597
(1H)044	CONDUIT	67.09	0	08:00	1.73	0.12	0.23	0
(1H)045	CONDUIT	66.48	0	08:00	1.87	0.12	0.22	0
(1J)001	CONDUIT	12021.46	1	08:04	5.09	0.83	0.70	0
(1J)002	CONDUIT	12021.59	1	08:03	4.52	0.96	0.78	0
(1J)003	CONDUIT	9281.83	1	08:02	4.12	0.79	0.67	0
(1J)004	CONDUIT	9281.64	1	08:01	3.71	0.89	0.74	0
(1J)005	CONDUIT	9282.42	1	08:00	3.56	0.94	0.77	0
(1J)006	CONDUIT	9282.80	1	08:00	3.77	0.88	0.73	0

(1J)007	CONDUIT	9255.56	1	10:58	4.02	0.81	0.68	0
(1J)008	CONDUIT	9257.01	1	10:58	4.75	0.66	0.59	0
(1J)009	CONDUIT	9264.07	1	10:58	3.56	0.93	0.77	0
(1J)010	CONDUIT	9258.75	1	10:57	4.08	0.80	0.68	0
(1J)011	CONDUIT	9252.65	1	05:56	3.15	1.08	0.95	345
(1J)012	CONDUIT	11328.10	1	06:10	3.87	1.08	0.95	262
(1J)013	CONDUIT	11917.35	1	06:05	4.05	1.08	0.95	203
(1J)014	CONDUIT	12906.85	1	08:08	4.58	1.05	0.93	146
(1J)041	CONDUIT	846.88	1	08:02	3.59	0.41	0.45	0
(1J)042	CONDUIT	849.76	1	08:02	4.48	0.30	0.38	0
(1J)042A	CONDUIT	853.00	1	08:01	4.33	0.32	0.39	0
(1J)042B	CONDUIT	856.10	1	08:01	4.81	0.28	0.36	0
(1J)043	CONDUIT	861.55	1	08:00	3.94	0.37	0.42	0
(1J)044	CONDUIT	878.86	1	08:00	2.05	0.94	0.74	0
(1J)045	CONDUIT	616.09	1	08:00	1.84	0.27	0.35	0
(1J)046	CONDUIT	616.93	1	08:00	1.56	0.33	0.40	0
(1J)047	CONDUIT	558.50	1	08:00	1.76	0.24	0.34	0
(1J)048	CONDUIT	560.08	1	08:00	3.37	0.10	0.21	0
(1J)050	CONDUIT	564.74	1	08:00	2.63	0.15	0.26	0
(1J)050A	CONDUIT	370.65	1	22:46	1.57	0.16	0.27	0
(1J)051	CONDUIT	371.40	1	22:45	2.40	0.09	0.20	0
(1J)052	CONDUIT	370.22	1	23:25	0.73	1.08	0.95	1104
(1J)053	CONDUIT	1069.13	1	05:23	2.10	1.08	1.00	523
(1J)054	CONDUIT	444.04	1	13:08	2.49	0.28	0.36	0
(1J)054A	CONDUIT	443.28	1	07:28	2.44	0.28	0.36	0
(1J)055	CONDUIT	444.05	1	13:39	0.88	1.08	0.95	504
(1J)056	CONDUIT	640.69	1	11:25	2.01	0.61	0.56	0
(1J)057	CONDUIT	641.09	1	11:23	1.86	0.68	0.60	0
(1J)058	CONDUIT	641.87	1	11:22	2.08	0.59	0.55	0
(1J)059	CONDUIT	643.97	1	11:21	1.44	0.93	0.76	0
(1J)060	CONDUIT	640.08	1	11:36	1.26	1.08		

							0.95	389
(1K)001	CONDUIT	3780.44	1	05:49	7.43	1.08	1.00	110
(1K)002	CONDUIT	610.96	1	07:00	4.51	0.19	0.29	0
(1K)002A	CONDUIT	610.93	1	07:00	4.51	0.19	0.29	0
(1K)003	CONDUIT	601.46	1	06:23	2.45	0.77	0.66	0
(1K)004	CONDUIT	601.57	1	11:04	1.86	1.08	0.95	353
(1K)005	CONDUIT	233.63	1	08:00	1.71	0.37	0.42	0
(1K)006	CONDUIT	219.01	2	07:10	0.68	1.08	0.95	1541
(1K)007	CONDUIT	676.63	1	12:08	2.10	1.07	0.94	416
(1K)008	CONDUIT	667.36	1	06:23	2.05	1.08	0.95	432
(1K)008A	CONDUIT	529.58	1	07:09	2.54	0.63	0.57	0
(1K)009	CONDUIT	519.15	1	06:25	1.60	1.08	0.95	513
(1K)010	CONDUIT	649.26	1	08:01	2.00	1.08	0.95	457
(1K)011	CONDUIT	697.47	1	08:00	2.23	1.07	0.94	61
(1K)012	CONDUIT	484.06	1	12:53	1.90	0.81	0.68	0
(1K)013	CONDUIT	481.79	1	13:05	1.49	1.08	0.95	473
(1K)014	CONDUIT	599.00	1	06:09	1.85	1.08	0.95	440
(1M)000	CONDUIT	11461.19	1	07:03	4.41	0.93	0.77	0
(1M)000A	CONDUIT	11481.16	1	07:02	7.22	0.50	0.50	0
(1M)000B	CONDUIT	11481.73	1	07:02	4.54	0.91	0.75	0
(1M)001	CONDUIT	11490.19	1	07:01	5.76	0.68	0.60	0
(1M)002	CONDUIT	11499.67	1	07:01	4.52	0.92	0.75	0
(1M)003	CONDUIT	11505.87	1	07:00	4.94	0.82	0.69	0
(1M)010	CONDUIT	690.40	1	06:26	2.75	0.12	0.23	0
(1M)011	CONDUIT	690.40	1	06:26	2.13	1.08	0.95	687
(1M)012	CONDUIT	1032.63	1	07:59	3.45	0.97	0.79	0
(1M)012O	CONDUIT	79.02	1	08:00	1.05	0.26	0.35	0
(1M)013	CONDUIT	608.30	1	08:10	2.07	0.96	0.78	0
(1M)014	CONDUIT	608.40	1	08:08	2.08	0.95	0.78	0
(1M)015	CONDUIT	609.06	1	08:06	2.08	0.95	0.78	0
(1M)016	CONDUIT	610.06	1	08:03	2.07	0.96	0.78	0

(1M)017	CONDUIT	609.49	1	08:02	3.51	0.49	0.49	0
(1M)018	CONDUIT	609.55	1	08:02	2.18	0.90	0.74	0
(1M)019	CONDUIT	610.78	1	08:01	2.12	0.94	0.77	0
(1M)020	CONDUIT	613.30	1	08:00	2.14	0.94	0.77	0
(1M)020O	CONDUIT	64.83	1	07:59	2.22	0.07	0.18	0
(1M)021	CONDUIT	288.23	0	19:20	1.98	0.63	0.57	0
(1M)022	CONDUIT	288.56	0	19:18	2.05	0.60	0.56	0
(1M)023	CONDUIT	282.94	0	19:17	2.05	0.59	0.55	0
(1M)024	CONDUIT	283.02	0	19:16	1.96	0.63	0.57	0
(1M)024A	CONDUIT	283.26	0	19:14	2.00	0.61	0.56	0
(1M)025	CONDUIT	283.89	0	19:13	2.00	0.61	0.56	0
(1M)027	CONDUIT	284.25	0	19:11	2.00	0.62	0.57	0
(1M)028	CONDUIT	284.89	0	19:09	2.01	0.62	0.57	0
(1M)035	CONDUIT	85.45	1	08:00	1.35	0.12	0.24	0
(1M)036	CONDUIT	82.75	1	08:00	1.33	0.12	0.23	0
(1M)037	CONDUIT	82.78	1	08:00	1.47	0.17	0.28	0
(1M)038	CONDUIT	79.01	1	08:01	1.44	0.17	0.28	0
(1M)039	CONDUIT	504.68	1	07:05	3.39	0.65	0.59	0
(1M)040	CONDUIT	498.80	1	13:27	2.35	1.00	0.82	0
(1M)041	CONDUIT	497.90	1	13:26	2.21	1.08	0.95	511
(1M)092	CONDUIT	491.61	1	06:04	2.18	1.08	0.95	507
(1M)093	CONDUIT	508.56	1	07:00	3.56	0.61	0.57	0
(1M)094	CONDUIT	485.07	1	13:23	2.15	1.08	0.95	500
(1M)116	CONDUIT	508.80	1	10:48	2.99	0.77	0.66	0
(1M)117	CONDUIT	510.73	1	10:48	2.72	0.87	0.72	0
(1M)118	CONDUIT	514.82	1	10:47	2.34	1.06	0.92	335
(1M)119	CONDUIT	504.41	1	10:53	2.24	1.08	0.94	344
(1M)120	CONDUIT	495.43	1	10:43	3.04	0.73	0.63	0
(1M)121	CONDUIT	494.65	1	10:43	2.20	1.08	0.95	345
(1M)122	CONDUIT	520.57	1	05:35	2.30	1.08	0.95	338
(1M)123	CONDUIT	107.43	1	08:00	1.55	0.23		

							0.33	0
(1M)124	CONDUIT	40.04	0	08:07	1.22	0.09	0.20	0
(1M)125	CONDUIT	40.04	0	08:04	1.20	0.09	0.20	0
(1M)126	CONDUIT	40.24	1	08:02	1.25	0.08	0.19	0
(1M)127	CONDUIT	40.36	0	08:01	1.35	0.09	0.20	0
(1M)128	CONDUIT	40.28	1	08:00	1.33	0.08	0.19	0
(1M)129	CONDUIT	39.26	0	08:09	2.26	0.09	0.18	0
(1M)130	CONDUIT	30.06	1	08:00	0.29	0.00	0.00	0
(1M)131	CONDUIT	30.32	0	08:00	1.16	0.06	0.17	0
(1M)132	CONDUIT	22.93	0	08:01	1.06	0.05	0.15	0
(1M)133	CONDUIT	16.48	0	08:00	1.09	0.04	0.12	0
(1M)161	CONDUIT	337.99	1	15:09	3.98	0.56	0.53	0
(1M)162	CONDUIT	336.98	1	06:03	2.33	1.08	0.95	622
(1M)163	CONDUIT	336.98	1	06:01	2.34	1.08	0.96	590
(1M)164	CONDUIT	337.45	1	14:59	2.34	1.08	0.96	589
(1M)165	CONDUIT	336.98	1	06:10	2.33	1.08	0.95	589
(1M)278	CONDUIT	6040.29	1	07:57	3.96	0.48	0.49	0
(1M)279	CONDUIT	6019.64	1	07:56	3.99	0.47	0.48	0
(1M)279B	CONDUIT	6019.64	1	07:56	4.17	0.44	0.47	0
(1M)281	CONDUIT	6019.65	1	07:56	4.65	0.39	0.43	0
(1M)281B	CONDUIT	5934.49	1	05:42	4.54	1.08	1.00	151
(1M)282	CONDUIT	3698.58	1	06:25	2.84	1.08	0.95	298
(1M)283	CONDUIT	4783.09	1	08:39	3.81	1.06	0.92	165
(1M)284	CONDUIT	4204.38	1	08:17	3.25	1.08	0.95	157
(1M)285	CONDUIT	4382.93	1	08:17	3.46	1.08	0.92	153
(1M)285A	CONDUIT	4261.39	1	08:15	3.33	1.06	0.93	154
(1M)286	CONDUIT	4170.12	1	06:11	3.20	1.08	0.95	158
(1M)287	CONDUIT	979.25	1	08:15	2.50	0.23	0.32	0
(1M)2876A	CONDUIT	4665.42	1	06:10	3.59	1.08	0.95	147
(1M)288	CONDUIT	987.29	1	08:14	2.51	0.23	0.32	0
(1M)288A	CONDUIT	987.51	1	08:12	2.56	0.22	0.32	0

(1M)288B	CONDUIT	998.31	1	08:12	2.58	0.23	0.32	0
(1M)288C	CONDUIT	1007.72	1	08:11	2.46	0.25	0.34	0
(1N)004	CONDUIT	4574.19	1	08:41	3.61	1.08	1.00	177
(1N)005	CONDUIT	4616.42	1	08:39	3.63	1.08	0.95	176
(1N)006	CONDUIT	4737.74	1	06:34	3.79	1.08	0.95	172
(1N)007	CONDUIT	4779.10	1	06:31	3.73	1.08	0.95	171
(1N)007D	CONDUIT	506.53	1	17:13	2.57	0.92	0.76	0
(1N)007E	CONDUIT	497.21	1	06:05	2.73	0.85	0.71	0
(1N)008	CONDUIT	497.21	1	06:05	2.21	1.08	0.95	544
(1N)009	CONDUIT	510.02	1	14:04	2.29	1.06	0.93	538
(1N)011	CONDUIT	494.08	1	14:07	2.19	1.08	0.95	543
(1N)013	CONDUIT	496.07	1	06:07	2.21	1.08	0.95	539
(1N)014	CONDUIT	492.37	1	13:24	2.19	1.08	0.95	491
(1N)015	CONDUIT	515.56	1	13:10	2.32	1.06	0.93	476
(1N)016	CONDUIT	498.26	1	13:03	2.22	1.08	0.96	486
(1N)017	CONDUIT	498.37	1	13:03	2.21	1.08	0.95	486
(1N)018	CONDUIT	518.54	1	12:52	2.29	1.08	0.95	478
(1N)019	CONDUIT	457.95	1	05:49	2.03	1.08	0.95	475
(1N)020	CONDUIT	531.82	1	12:30	2.38	1.07	0.91	441
(1N)021	CONDUIT	496.78	1	12:46	2.20	1.08	0.95	462
(1N)022	CONDUIT	496.31	1	06:01	2.21	1.08	0.95	460
(1N)023	CONDUIT	496.40	1	11:28	2.21	1.08	0.95	373
(1N)024	CONDUIT	494.74	1	11:25	2.20	1.08	0.95	373
(1N)025	CONDUIT	491.91	1	11:20	2.26	1.08	0.95	373
(1N)045	CONDUIT	506.74	1	17:13	3.55	0.65	0.58	0
(1N)046	CONDUIT	519.65	1	17:11	2.36	1.08	0.93	735
(1N)047	CONDUIT	501.22	1	05:55	2.55	1.08	0.95	746
(1N)109A	CONDUIT	4210.87	1	08:30	3.27	1.08	0.95	157
(1N)110	CONDUIT	4230.15	1	08:15	4.10	0.84	0.70	0
(1N)111A	CONDUIT	4277.82	1	08:26	3.33	1.08	0.95	155
(1N)112A	CONDUIT	4418.00	1	08:19	3.49	1.07		

							0.91	145
(1N)112B	CONDUIT	4194.69	1	08:18	3.83	0.90	0.74	0
(1O)001	CONDUIT	285.17	0	07:06	2.08	0.58	0.55	0
(1O)001A	CONDUIT	277.99	0	07:05	2.05	0.59	0.55	0
(1O)002	CONDUIT	278.09	0	07:04	2.69	0.40	0.44	0
(1O)002A	CONDUIT	270.69	0	07:04	2.70	0.38	0.43	0
(1O)003	CONDUIT	270.74	0	07:04	2.05	0.56	0.54	0
(1O)004	CONDUIT	271.13	0	07:03	2.06	0.57	0.54	0
(1O)005A	CONDUIT	263.92	0	07:02	2.09	0.56	0.53	0
(1O)005B	CONDUIT	241.05	2	18:13	2.09	0.28	0.36	0
(1O)005C	CONDUIT	241.15	2	18:13	2.22	0.26	0.35	0
(1O)005D	CONDUIT	242.30	2	18:13	2.25	0.26	0.35	0
(1O)005E	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1O)010	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1O)011	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1O)012	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1O)013	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1O)014	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1O)015	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1O)016	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1O)017	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1O)018	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1O)019	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1O)020	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1O)021	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1O)072	CONDUIT	1470.20	1	08:03	3.72	0.34	0.36	0
(1O)157	CONDUIT	4608.07	1	05:40	3.54	1.08	1.00	185
(1O)300	CONDUIT	1047.73	1	08:10	2.69	0.24	0.33	0
(1O)301	CONDUIT	1091.34	1	08:10	2.87	0.24	0.33	0
(1O)302	CONDUIT	1157.91	1	08:06	3.08	0.27	0.34	0
(1O)303	CONDUIT	1122.94	1	08:05	3.18	0.26	0.34	0

(1O)304	CONDUIT	1866.15	1	08:03	7.34	0.45	0.39	0
(1O)304A	CONDUIT	1296.81	1	08:33	20.77	0.44	0.49	0
(1O)304B	CONDUIT	715.04	1	08:03	3.59	1.04	0.90	129
(1O)304C	CONDUIT	243.59	0	19:02	0.87	1.08	1.00	1601
(1O)305	CONDUIT	1184.94	1	17:02	0.91	1.08	0.95	722
(1O)305A	CONDUIT	1253.33	1	07:00	13.01	0.03	0.12	0
(1O)306	CONDUIT	4684.71	1	10:09	3.62	1.08	0.95	280
(1O)306A	CONDUIT	4684.09	1	10:05	3.62	1.08	0.95	280
(1O)307	CONDUIT	4657.70	1	05:48	3.59	1.07	0.95	279
(1O)308	CONDUIT	4657.70	1	05:47	3.57	1.08	0.95	280
(1O)308A	CONDUIT	4534.34	1	08:40	3.59	1.04	1.00	181
(1O)309	CONDUIT	4504.59	1	05:40	3.51	1.08	1.00	144
(1P)003	CONDUIT	1630.85	1	05:11	4.93	1.08	1.00	439
(1P)004	CONDUIT	1074.32	0	21:22	3.40	1.08	0.95	1238
(1P)005	CONDUIT	1161.48	0	21:05	4.35	0.89	0.73	0
(1P)006	CONDUIT	1159.35	0	21:03	3.59	1.08	0.95	1107
(1P)007	CONDUIT	1232.06	1	21:00	4.80	0.84	0.70	0
(1P)008	CONDUIT	1224.73	0	08:00	3.88	1.08	0.95	1043
(1P)008A	CONDUIT	2052.73	1	05:14	7.03	0.94	0.77	0
(1P)009	CONDUIT	2041.64	1	05:14	6.25	1.08	1.00	382
(1P)010	CONDUIT	809.44	0	08:07	3.60	0.69	0.61	0
(1P)011	CONDUIT	809.49	0	08:07	3.84	0.65	0.59	0
(1P)012	CONDUIT	808.09	0	08:06	3.84	0.66	0.59	0
(1P)013	CONDUIT	811.74	0	08:04	3.84	0.66	0.59	0
(1P)014	CONDUIT	817.28	0	08:03	3.87	0.67	0.59	0
(1P)015	CONDUIT	822.99	0	08:02	3.93	0.67	0.59	0
(1P)016	CONDUIT	832.23	0	08:01	3.61	0.78	0.65	0
(1P)016A	CONDUIT	827.86	0	08:01	3.58	0.77	0.66	0
(1P)017	CONDUIT	826.72	0	08:00	3.51	0.77	0.67	0
(1P)018	CONDUIT	805.86	0	08:00	4.07	0.75	0.60	0
(1P)024	CONDUIT	62.00	0	08:00	2.06	0.06		

							0.15	0
(1P)042	CONDUIT	583.91	1	11:49	4.74	0.51	0.50	0
(1P)042A	CONDUIT	583.99	1	11:48	2.60	1.08	0.95	417
(1P)043	CONDUIT	591.43	1	11:56	2.62	1.08	0.95	415
(1P)044	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(1P)065	CONDUIT	12.91	0	08:00	1.14	0.02	0.10	0
(1P)073	CONDUIT	7.73	0	08:00	1.20	0.01	0.05	0
(1P)079	CONDUIT	6.39	0	08:00	1.09	0.01	0.05	0
(2A)001	CONDUIT	9664.61	1	08:57	3.32	1.08	0.95	193
(2A)002	CONDUIT	9833.11	1	08:50	11.86	0.21	0.31	0
(2A)003	CONDUIT	9834.10	1	08:50	5.27	0.63	0.57	0
(2A)004	CONDUIT	9841.85	1	08:50	5.00	0.68	0.60	0
(2A)005	CONDUIT	9867.21	1	08:51	5.04	0.68	0.61	0
(2A)006	CONDUIT	9826.94	1	06:37	3.38	1.08	0.95	188
(2A)007	CONDUIT	10453.43	1	08:52	3.87	1.02	0.87	3
(2A)008	CONDUIT	10395.05	1	09:00	3.63	1.08	0.93	183
(2A)009	CONDUIT	10324.72	1	08:58	3.59	1.08	0.93	184
(2A)010	CONDUIT	10299.21	1	08:55	3.54	1.08	0.93	185
(2A)011	CONDUIT	10021.88	1	08:49	3.44	1.08	0.95	189
(2A)012	CONDUIT	10205.11	1	08:47	3.52	1.07	0.93	186
(2A)013	CONDUIT	9937.19	1	06:29	3.41	1.08	0.95	190
(2A)014	CONDUIT	12017.61	1	07:02	4.16	1.08	0.97	166
(2A)015	CONDUIT	11396.34	1	08:28	4.15	1.03	0.91	163
(2A)016	CONDUIT	11083.59	1	05:44	3.79	1.08	1.00	173
(2A)017	CONDUIT	11871.40	1	06:11	4.06	1.08	0.95	167
(2A)018	CONDUIT	11068.65	1	06:34	3.82	1.07	0.95	154
(2A)019	CONDUIT	11068.65	1	06:34	4.28	0.93	0.76	0
(2A)020	CONDUIT	11085.53	1	08:16	3.80	1.08	0.95	155
(2A)021	CONDUIT	4248.80	1	07:27	4.16	0.27	0.36	0
(2A)022	CONDUIT	4249.39	1	07:26	4.28	0.26	0.35	0
(2A)023	CONDUIT	4250.10	1	07:24	4.32	0.26	0.35	0

(2A)024	CONDUIT	4250.37	1	07:24	4.54	0.24	0.34	0
(2A)025	CONDUIT	4250.38	1	07:24	4.87	0.22	0.32	0
(2A)026	CONDUIT	4250.36	1	07:23	4.61	0.24	0.33	0
(2A)027	CONDUIT	4250.51	1	07:23	3.12	0.41	0.44	0
(2A)028	CONDUIT	4251.84	1	07:22	2.79	0.47	0.48	0
(2A)029	CONDUIT	4252.42	1	07:21	2.98	0.43	0.46	0
(2A)030	CONDUIT	4252.99	1	07:20	3.19	0.40	0.44	0
(2A)031	CONDUIT	4253.53	1	07:19	3.47	0.35	0.41	0
(2A)032	CONDUIT	4255.02	1	07:18	2.93	0.44	0.47	0
(2A)033	CONDUIT	4255.35	1	07:17	3.33	0.37	0.42	0
(2A)034	CONDUIT	4255.75	1	07:17	3.92	0.30	0.37	0
(2A)035	CONDUIT	4254.78	1	07:16	3.94	0.30	0.37	0
(2A)036	CONDUIT	4256.16	1	07:15	3.95	0.30	0.37	0
(2A)037	CONDUIT	4257.99	1	07:14	3.75	0.32	0.39	0
(2A)038	CONDUIT	4259.99	1	07:12	4.00	0.29	0.37	0
(2A)039	CONDUIT	4261.78	1	07:11	3.95	0.30	0.37	0
(2A)040	CONDUIT	4264.25	1	07:10	3.92	0.30	0.38	0
(2A)041	CONDUIT	4263.48	1	07:09	3.96	0.30	0.37	0
(2A)042	CONDUIT	4262.12	1	07:07	3.96	0.30	0.37	0
(2A)043	CONDUIT	4263.83	1	07:06	4.15	0.28	0.36	0
(2A)044	CONDUIT	4266.23	1	07:05	3.90	0.30	0.38	0
(2A)045	CONDUIT	4270.63	1	07:04	3.81	0.31	0.38	0
(2A)046	CONDUIT	4271.35	1	07:03	3.75	0.32	0.39	0
(2A)047	CONDUIT	4271.71	1	07:02	2.92	0.45	0.47	0
(2A)048	CONDUIT	4275.09	1	07:00	2.90	0.46	0.47	0
(2A)0480	CONDUIT	2138.23	1	07:00	9.99	0.64	0.58	0
(2A)049	CONDUIT	5557.42	1	07:17	3.16	0.57	0.54	0
(2A)050	CONDUIT	5557.50	1	07:15	3.02	0.61	0.56	0
(2A)051	CONDUIT	5557.61	1	07:13	4.28	0.38	0.43	0
(2A)052	CONDUIT	5557.68	1	07:12	4.23	0.39	0.43	0
(2A)053	CONDUIT	5557.76	1	07:11	4.29	0.38		

							0.43	0
(2A)054	CONDUIT	5557.83	1	07:10	6.24	0.23	0.32	0
(2A)055	CONDUIT	5557.87	1	07:09	3.11	0.59	0.55	0
(2A)056	CONDUIT	5558.13	1	07:08	3.10	0.59	0.55	0
(2A)057	CONDUIT	5558.48	1	07:07	3.70	0.46	0.48	0
(2A)058	CONDUIT	5009.19	1	07:05	3.45	0.45	0.47	0
(2A)059	CONDUIT	5009.27	1	07:03	3.53	0.70	0.62	0
(2A)060	CONDUIT	5009.35	1	07:02	4.33	0.54	0.52	0
(2A)061	CONDUIT	5009.54	1	07:01	4.05	0.59	0.55	0
(2A)062	CONDUIT	5009.55	1	07:00	4.72	0.49	0.49	0
(2A)063	CONDUIT	4868.40	1	05:42	6.62	1.08	1.00	319
(2A)064	CONDUIT	7503.11	1	07:00	4.88	0.77	0.66	0
(2A)065	CONDUIT	5152.13	1	09:01	4.42	0.54	0.52	0
(2A)066	CONDUIT	5146.39	1	09:00	7.83	0.25	0.34	0
(2A)067	CONDUIT	5146.53	1	08:59	4.62	0.51	0.51	0
(2A)068	CONDUIT	5148.56	1	08:59	4.49	0.53	0.52	0
(2A)069	CONDUIT	551.40	1	09:51	8.85	0.12	0.23	0
(2C)001	CONDUIT	550.03	1	09:52	1.69	1.08	0.95	303
(2C)002	CONDUIT	556.44	1	05:48	1.71	1.08	0.95	300
(2C)003	CONDUIT	660.58	1	09:37	2.03	1.08	0.95	277
(2C)004	CONDUIT	668.24	1	08:51	2.08	1.08	0.92	207
(2C)005	CONDUIT	643.63	1	08:43	2.07	1.02	0.87	5
(2C)006	CONDUIT	632.87	1	08:43	1.95	1.08	0.95	219
(2C)007	CONDUIT	668.60	1	08:45	2.06	1.08	0.95	211
(2C)008	CONDUIT	677.95	1	08:38	2.11	1.07	0.93	209
(2C)009	CONDUIT	665.88	1	08:40	2.05	1.08	0.95	212
(2C)009O	CONDUIT	141.03	1	07:00	2.80	0.27	0.36	0
(2D)001	CONDUIT	491.97	1	10:47	1.52	1.08	0.92	316
(2D)001A	CONDUIT	466.33	1	06:53	1.44	1.08	0.95	351
(2D)002	CONDUIT	895.98	1	08:18	2.79	1.08	0.95	88
(2D)003	CONDUIT	908.95	1	07:47	2.80	1.08	0.95	85

(2D)004	CONDUIT	311.78	1	08:02	2.12	0.39	0.44	0
(2D)005	CONDUIT	311.87	1	08:01	2.23	0.37	0.42	0
(2D)006	CONDUIT	313.14	1	08:00	2.32	0.35	0.41	0
(2D)007	CONDUIT	289.70	1	08:02	2.01	0.38	0.43	0
(2D)008	CONDUIT	289.82	1	08:00	1.90	0.42	0.45	0
(2D)009	CONDUIT	289.73	1	08:00	3.02	0.66	0.59	0
(2D)010	CONDUIT	282.89	1	17:11	1.93	1.08	0.96	859
(2D)011	CONDUIT	313.00	1	05:22	2.14	1.08	0.95	719
(2D)012	CONDUIT	166.84	0	08:00	2.37	0.49	0.48	0
(2D)013	CONDUIT	167.24	0	08:00	2.55	0.50	0.48	0
(2D)014	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(2D)015	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(2D)016	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(2D)017	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(2D)018	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(2D)019	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(2D)020	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(2D)021	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(2D)022	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(2D)023	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(2D)024	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(2D)025	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(2D)039	CONDUIT	206.15	1	06:53	2.64	0.28	0.36	0
(2D)040	CONDUIT	332.38	1	14:10	1.49	1.08	0.95	546
(2D)041	CONDUIT	541.60	1	08:17	2.52	1.07	0.92	33
(2D)042	CONDUIT	533.99	1	07:13	2.46	1.08	0.94	441
(2D)043	CONDUIT	541.31	1	08:08	2.50	1.08	0.93	60
(2D)044	CONDUIT	539.62	1	08:01	2.43	1.07	0.91	54
(2D)045	CONDUIT	504.41	1	12:36	2.40	1.00	0.82	1
(2D)045A	CONDUIT	498.42	1	05:37	2.22	1.08	0.95	470
(2D)046	CONDUIT	542.45	1	12:06	2.43	1.07		

							0.92	419
(2D)046A	CONDUIT	516.27	1	05:45	2.33	1.08	0.95	433
(2D)241	CONDUIT	1681.97	1	07:14	4.12	0.52	0.51	0
(2D)242	CONDUIT	1691.78	1	07:13	2.80	0.87	0.72	0
(2D)243	CONDUIT	1681.76	1	07:12	2.82	0.87	0.72	0
(2D)244	CONDUIT	1676.52	1	07:10	3.17	0.75	0.65	0
(2D)244O	CONDUIT	206.30	1	06:52	3.98	0.15	0.26	0
(2D)245	CONDUIT	1547.71	1	06:51	2.16	1.08	0.95	29
(2D)246	CONDUIT	1804.26	1	07:06	2.87	0.92	0.76	0
(2D)247	CONDUIT	1812.58	1	07:05	2.86	0.93	0.76	0
(2D)248	CONDUIT	1820.28	1	07:03	2.95	0.91	0.74	0
(2D)249	CONDUIT	1827.66	1	07:02	2.88	0.95	0.77	0
(2D)250	CONDUIT	1835.87	1	07:01	2.99	0.89	0.73	0
(2D)251	CONDUIT	1849.42	1	07:00	2.93	0.93	0.76	0
(2D)252	CONDUIT	246.22	1	08:15	1.79	0.37	0.42	0
(2D)253	CONDUIT	246.22	1	08:13	1.71	0.12	0.24	0
(2D)254	CONDUIT	246.34	1	08:12	1.72	0.12	0.24	0
(2D)255	CONDUIT	246.20	1	08:11	1.72	0.12	0.24	0
(2D)256	CONDUIT	246.07	1	08:08	1.72	0.12	0.24	0
(2D)257	CONDUIT	246.03	1	08:07	1.71	0.12	0.24	0
(2D)258	CONDUIT	246.32	1	08:06	1.71	0.12	0.24	0
(2D)259	CONDUIT	246.51	1	08:05	1.72	0.12	0.24	0
(2D)260	CONDUIT	247.08	1	08:04	1.72	0.12	0.24	0
(2D)261	CONDUIT	247.08	1	08:03	1.73	0.12	0.24	0
(2D)262	CONDUIT	247.39	1	08:02	1.76	0.12	0.24	0
(2D)263	CONDUIT	247.83	1	08:00	1.77	0.13	0.24	0
(2D)264	CONDUIT	236.83	0	08:04	1.76	0.12	0.23	0
(2D)265	CONDUIT	240.36	0	08:02	1.80	0.20	0.30	0
(2D)266	CONDUIT	247.65	0	08:01	1.88	0.20	0.30	0
(2D)267	CONDUIT	265.93	0	08:00	2.18	0.22	0.29	0
(2E)001	CONDUIT	5146.03	1	06:44	2.54	1.08	0.95	225

(2E)002	CONDUIT	6560.14	1	08:29	3.24	1.08	0.95	173
(2E)003	CONDUIT	11022.88	1	05:51	5.41	1.08	1.00	108
(2E)004	CONDUIT	3534.79	1	14:23	2.78	0.63	0.58	0
(2E)005	CONDUIT	3604.29	1	14:56	1.79	1.07	0.94	545
(2E)006	CONDUIT	3536.36	1	14:52	1.75	1.08	0.95	555
(2E)007	CONDUIT	6276.52	1	09:55	3.14	1.08	0.92	230
(2E)008	CONDUIT	5963.78	1	09:52	4.46	0.67	0.60	0
(2E)009	CONDUIT	5975.27	1	09:51	3.62	0.89	0.74	0
(2E)010	CONDUIT	6126.92	1	09:50	3.16	1.08	0.93	251
(2E)011	CONDUIT	6063.07	1	09:57	3.07	1.08	0.94	253
(2E)012	CONDUIT	6037.05	1	09:41	3.00	1.07	0.94	248
(2E)013	CONDUIT	5931.28	1	09:57	2.92	1.08	0.95	264
(2E)014	CONDUIT	5937.41	1	06:25	2.92	1.08	0.95	260
(2E)043	CONDUIT	134.18	0	08:00	2.01	0.16	0.27	0
(2F)001	CONDUIT	5749.12	1	07:48	2.84	1.08	0.96	156
(2F)002	CONDUIT	5818.48	1	08:11	2.89	1.08	0.95	152
(2F)003	CONDUIT	5838.51	1	08:03	2.88	1.08	0.95	150
(2F)004	CONDUIT	5751.88	1	06:09	2.82	1.08	0.95	153
(2F)005	CONDUIT	4704.12	1	08:00	2.80	0.87	0.72	0
(2F)006	CONDUIT	4573.47	1	12:21	2.78	0.84	0.70	0
(2F)007	CONDUIT	4591.76	1	12:20	2.82	0.85	0.70	0
(2F)008	CONDUIT	4546.15	1	12:19	2.68	0.89	0.74	0
(2F)009	CONDUIT	4544.29	1	05:32	2.74	1.08	1.00	433
(2F)010	CONDUIT	6172.98	1	05:41	8.33	1.08	1.00	175
(2F)011	CONDUIT	2032.38	1	05:38	2.77	1.08	1.00	180
(2F)012	CONDUIT	1459.89	1	08:09	2.57	0.79	0.67	0
(2F)013	CONDUIT	1459.98	1	08:07	2.42	0.86	0.71	0
(2F)014	CONDUIT	1460.10	1	08:04	2.45	0.84	0.70	0
(2F)015	CONDUIT	1460.29	1	08:03	2.47	0.83	0.70	0
(2F)016	CONDUIT	1460.72	1	08:01	2.42	0.86	0.71	0
(2F)017	CONDUIT	1461.91	1	08:00	2.42	0.86		

							0.71	0
(2F)018	CONDUIT	1445.66	1	08:44	2.44	0.84	0.70	0
(2F)019	CONDUIT	1445.82	1	08:43	2.44	0.84	0.70	0
(2F)020	CONDUIT	1445.04	1	08:37	2.40	0.86	0.71	0
(2F)021	CONDUIT	1447.22	1	08:37	2.43	0.85	0.71	0
(2F)022	CONDUIT	1447.14	1	08:36	2.84	0.70	0.61	0
(2F)023	CONDUIT	649.49	1	05:14	1.97	1.08	1.00	209
(2F)024	CONDUIT	212.06	1	11:10	1.63	0.34	0.40	0
(2F)025	CONDUIT	210.70	1	11:35	0.67	1.08	0.95	383
(2F)026	CONDUIT	87.83	0	22:01	0.58	0.42	0.45	0
(2F)027	CONDUIT	87.97	0	21:46	0.58	0.42	0.45	0
(2F)028	CONDUIT	88.37	0	21:36	0.59	0.43	0.45	0
(2F)029	CONDUIT	88.73	0	21:29	0.59	0.43	0.45	0
(2F)030	CONDUIT	90.16	0	08:21	0.60	0.43	0.46	0
(2F)031	CONDUIT	93.68	1	08:00	0.62	0.45	0.46	0
(2F)032	CONDUIT	95.54	1	08:05	0.64	0.46	0.46	0
(2F)033	CONDUIT	107.82	1	08:00	0.75	0.52	0.45	0
(2G)001	CONDUIT	816.46	3	08:11	2.56	1.08	0.94	1462
(2G)002	CONDUIT	795.54	0	21:06	2.44	1.08	0.96	1511
(2G)002A	CONDUIT	806.68	1	05:25	2.47	1.08	0.96	1321
(2G)003	CONDUIT	637.29	1	08:00	2.38	0.86	0.71	0
(2G)004	CONDUIT	640.69	1	08:00	2.43	0.86	0.71	0
(2G)005	CONDUIT	598.15	1	08:03	2.47	0.80	0.68	0
(2G)006	CONDUIT	612.25	1	08:01	2.75	1.08	0.92	60
(2G)007	CONDUIT	593.95	1	08:00	2.70	1.06	0.91	58
(2G)008	CONDUIT	513.60	1	05:02	2.25	1.08	1.00	623
(2G)009	CONDUIT	638.01	1	05:25	2.82	1.08	0.95	477
(2G)010	CONDUIT	402.88	3	07:25	2.49	0.73	0.64	0
(2G)011	CONDUIT	406.17	3	07:25	2.60	0.72	0.62	0
(2G)012	CONDUIT	399.31	0	21:20	1.79	1.08	0.92	757
(2G)012A	CONDUIT	378.25	2	19:21	2.59	0.64	0.58	0

(2G)013	CONDUIT	378.48	0	19:16	2.73	0.60	0.56	0
(2G)013A	CONDUIT	379.00	0	19:16	3.23	0.47	0.49	0
(2G)014	CONDUIT	352.84	2	21:19	2.81	0.54	0.52	0
(2G)015	CONDUIT	349.17	0	07:09	1.57	1.08	1.00	1559
(2G)016	CONDUIT	389.74	0	21:02	1.76	1.08	0.95	1221
(2G)016A	CONDUIT	365.98	1	05:18	1.61	1.08	0.95	627
(2G)018	CONDUIT	393.83	1	05:44	1.75	1.08	0.95	598
(2G)019	CONDUIT	383.49	1	05:52	1.70	1.08	0.95	591
(2G)020	CONDUIT	384.07	1	11:44	1.73	1.08	0.95	430
(2G)021	CONDUIT	386.55	1	06:09	1.72	1.08	0.95	428
(2G)022	CONDUIT	386.49	1	12:03	1.72	1.08	0.95	426
(2G)023	CONDUIT	386.23	1	06:02	1.72	1.08	0.95	424
(2G)024	CONDUIT	384.19	1	05:39	1.71	1.08	0.95	422
(2G)025	CONDUIT	605.28	1	05:03	2.68	1.08	1.00	357
(2G)026	CONDUIT	866.92	1	05:42	3.84	1.08	0.95	255
(2G)040	CONDUIT	988.20	1	06:12	3.05	1.08	0.95	470
(2G)041	CONDUIT	260.92	0	08:18	1.04	0.84	0.70	0
(2G)042	CONDUIT	262.20	0	08:13	1.06	0.85	0.70	0
(2G)043	CONDUIT	263.81	1	08:08	1.07	0.85	0.70	0
(2G)043A	CONDUIT	265.85	0	08:04	1.06	0.86	0.70	0
(2G)044	CONDUIT	271.89	1	08:02	1.09	0.88	0.71	0
(2G)045	CONDUIT	296.58	1	08:00	1.24	0.96	0.68	0
(2G)359	CONDUIT	391.31	1	06:25	1.74	1.08	0.95	328
(2H)001	CONDUIT	2490.23	1	11:01	2.99	0.88	0.73	0
(2H)002	CONDUIT	2530.38	1	11:00	2.57	1.08	0.94	337
(2H)003	CONDUIT	2473.11	1	10:57	2.51	1.08	0.95	339
(2H)005	CONDUIT	2507.52	1	10:52	2.54	1.08	0.95	337
(2H)006	CONDUIT	2501.16	1	10:48	2.51	1.08	0.95	336
(2H)007	CONDUIT	2766.03	1	05:58	2.78	1.08	0.95	325
(2H)008	CONDUIT	2910.80	1	09:45	3.71	0.81	0.68	0
(2H)009	CONDUIT	2910.04	1	09:44	3.47	0.88		

							0.73	0
(2H)010	CONDUIT	2911.93	1	09:44	3.39	0.90	0.74	0
(2H)011	CONDUIT	2918.42	1	09:44	3.68	0.83	0.69	0
(2H)012	CONDUIT	2906.23	1	05:53	2.92	1.08	0.95	291
(2H)013	CONDUIT	2679.54	1	07:22	2.69	1.08	0.95	114
(2H)014	CONDUIT	1465.88	1	07:59	3.16	0.61	0.57	0
(2H)015	CONDUIT	1463.47	1	08:01	2.78	0.72	0.63	0
(2H)016	CONDUIT	1463.50	1	08:00	2.13	1.00	0.82	0
(2H)017	CONDUIT	1460.42	1	08:00	4.40	0.39	0.44	0
(2H)017A	CONDUIT	1460.67	1	08:00	2.74	0.73	0.64	0
(2H)018	CONDUIT	1454.06	1	08:00	2.62	0.77	0.66	0
(2H)019	CONDUIT	1454.19	1	08:00	2.68	0.75	0.65	0
(2H)020	CONDUIT	1450.06	1	07:54	2.57	0.79	0.67	0
(2H)021	CONDUIT	1448.98	1	08:00	2.83	0.70	0.62	0
(2H)022	CONDUIT	1008.88	1	10:07	3.41	0.55	0.53	0
(2H)023	CONDUIT	1008.67	1	10:06	3.46	0.54	0.52	0
(2H)024	CONDUIT	1010.18	1	10:06	3.23	0.60	0.56	0
(2H)025	CONDUIT	1008.27	1	10:16	2.00	1.08	0.95	310
(2H)026	CONDUIT	441.51	1	08:00	2.96	0.40	0.44	0
(2H)027	CONDUIT	439.71	1	08:03	2.25	0.57	0.54	0
(2H)028	CONDUIT	439.79	1	08:02	2.28	0.57	0.54	0
(2H)029	CONDUIT	439.99	1	08:01	2.32	0.56	0.53	0
(2H)030	CONDUIT	440.94	1	08:00	2.07	0.64	0.58	0
(2H)031	CONDUIT	428.33	1	11:54	1.32	1.08	0.95	395
(2H)032	CONDUIT	541.79	1	05:26	1.66	1.08	1.00	196
(2H)033	CONDUIT	2137.18	1	06:30	7.85	0.87	0.72	0
(2H)034	CONDUIT	420.37	1	08:00	2.21	0.56	0.53	0
(2H)036	CONDUIT	420.45	1	08:00	2.25	0.54	0.52	0
(2H)037	CONDUIT	417.18	1	11:37	2.42	0.49	0.49	0
(2H)038	CONDUIT	417.26	1	11:33	2.25	0.54	0.52	0
(2H)039	CONDUIT	417.24	1	11:32	2.40	0.49	0.50	0

(2H)040	CONDUIT	417.25	1	11:31	1.91	0.67	0.60	0
(2H)041	CONDUIT	417.27	1	11:29	2.25	0.54	0.52	0
(2H)042	CONDUIT	417.33	1	11:28	2.66	0.43	0.46	0
(2H)043	CONDUIT	417.59	1	11:27	1.95	0.65	0.59	0
(2H)044	CONDUIT	417.40	1	11:26	2.11	0.58	0.55	0
(2H)045	CONDUIT	417.49	1	11:25	2.13	0.58	0.55	0
(2H)046	CONDUIT	417.74	1	11:25	2.25	0.54	0.52	0
(2H)047	CONDUIT	417.10	1	11:31	1.29	1.08	0.95	384
(2H)048	CONDUIT	739.15	1	06:26	4.03	0.53	0.52	0
(2H)049	CONDUIT	740.13	1	09:44	2.28	1.08	0.95	276
(2H)050	CONDUIT	360.45	1	11:01	1.74	0.63	0.57	0
(2H)051	CONDUIT	360.54	1	10:58	1.71	0.64	0.58	0
(2H)051A	CONDUIT	361.36	1	10:57	1.95	0.54	0.52	0
(2H)052	CONDUIT	361.52	1	10:57	2.24	0.45	0.47	0
(2H)053	CONDUIT	360.24	1	11:09	1.14	1.08	0.95	365
(2H)054	CONDUIT	553.61	1	06:18	2.49	1.08	1.00	218
(2H)054A	CONDUIT	553.84	1	06:42	2.47	1.08	0.96	218
(2H)055	CONDUIT	554.63	1	05:42	2.49	1.08	0.96	218
(2H)055A	CONDUIT	554.64	1	05:42	2.46	1.08	0.96	218
(2H)056	CONDUIT	554.64	1	05:42	2.50	1.08	0.97	217
(2H)057	CONDUIT	554.64	1	05:45	2.47	1.08	0.94	216
(2H)058	CONDUIT	553.52	1	05:19	2.47	1.08	1.00	216
(2H)285	CONDUIT	511.39	1	09:59	2.31	1.06	0.93	294
(2H)286	CONDUIT	496.39	1	05:40	2.20	1.08	0.95	298
(2H)287	CONDUIT	495.41	1	07:46	2.25	1.08	0.95	126
(2H)288	CONDUIT	495.27	1	07:42	2.25	1.08	0.95	126
(2H)289	CONDUIT	494.18	1	07:39	2.24	1.08	0.95	127
(2H)290	CONDUIT	498.43	1	07:31	2.22	1.08	0.95	121
(2I)001	CONDUIT	1419.61	1	05:09	2.78	1.08	1.00	280
(2I)001A	CONDUIT	1017.06	1	10:12	2.01	1.08	0.95	309
(2I)002	CONDUIT	1639.08	1	07:13	4.65	0.69		

							0.61	0
(2I)003	CONDUIT	1625.67	1	05:50	3.20	1.08	0.95	259
(2I)004	CONDUIT	1566.96	1	05:15	3.08	1.08	1.00	249
(2I)005	CONDUIT	1633.82	1	09:14	3.22	1.08	0.95	244
(2I)006	CONDUIT	1654.45	1	08:02	3.27	1.08	0.94	150
(2I)008	CONDUIT	1626.05	1	08:00	3.21	1.08	0.95	150
(2I)009	CONDUIT	1397.47	1	07:46	3.08	0.95	0.78	0
(2I)010	CONDUIT	1393.19	1	07:45	3.16	0.91	0.75	0
(2I)011	CONDUIT	1394.25	1	07:45	3.12	0.93	0.76	0
(2I)012	CONDUIT	1388.60	1	07:44	3.13	0.92	0.76	0
(2I)013	CONDUIT	1391.66	1	07:44	3.10	0.94	0.77	0
(2I)014	CONDUIT	1385.97	1	06:02	2.73	1.08	0.95	139
(2I)015	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(2I)016	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(2I)017	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(2I)018	CONDUIT	704.33	1	11:11	2.17	1.08	0.95	368
(2I)019	CONDUIT	863.46	1	10:49	2.68	0.62	0.57	0
(2I)020	CONDUIT	862.71	1	10:54	2.66	1.08	0.95	352
(2I)021	CONDUIT	768.76	1	06:10	2.36	1.08	0.95	263
(2I)021A	CONDUIT	1139.34	1	05:35	2.59	1.07	1.00	159
(2I)021B	CONDUIT	1141.61	1	06:02	2.58	1.08	0.95	159
(2I)021C	CONDUIT	618.78	1	05:38	1.40	1.08	0.95	336
(2I)022	CONDUIT	768.19	1	10:30	2.36	0.74	0.64	0
(2I)023	CONDUIT	765.33	1	10:30	2.40	1.08	0.95	321
(2I)024	CONDUIT	764.11	1	10:26	2.38	1.08	0.95	321
(2I)025	CONDUIT	765.04	1	10:22	2.37	1.08	0.95	320
(2I)025A	CONDUIT	759.11	1	05:44	2.34	1.08	0.95	321
(2I)026	CONDUIT	782.67	1	09:06	2.51	1.06	0.92	2
(2I)027	CONDUIT	768.03	1	09:05	2.41	1.08	0.92	232
(2I)028	CONDUIT	728.13	1	05:14	2.23	1.08	1.00	239
(2I)029	CONDUIT	791.16	1	05:16	2.42	1.08	1.00	227

(2I)044	CONDUIT	1374.63	1	09:06	4.38	1.06	0.93	19
(2I)045	CONDUIT	1392.70	1	08:54	4.36	1.07	1.00	233
(2I)046	CONDUIT	1403.65	1	09:05	4.36	1.08	0.95	232
(2I)047	CONDUIT	1401.75	1	08:55	4.42	1.08	0.95	233
(2I)048	CONDUIT	1400.38	1	05:44	4.33	1.08	0.95	233
(2I)049	CONDUIT	1400.38	1	05:09	4.29	1.08	1.00	233
(2I)050	CONDUIT	886.16	1	09:24	2.80	1.08	0.93	250
(2I)051	CONDUIT	885.68	1	05:16	2.73	1.08	0.95	249
(2I)052	CONDUIT	879.27	1	05:16	2.74	1.07	1.00	249
(2I)053	CONDUIT	887.47	1	06:01	2.75	1.08	0.96	248
(2I)054	CONDUIT	889.05	1	09:15	2.74	1.08	0.95	248
(2I)055	CONDUIT	887.47	1	05:49	2.78	1.08	0.95	205
(2I)056	CONDUIT	887.47	1	06:14	2.81	1.08	0.96	203
(2I)057	CONDUIT	887.67	1	08:27	2.75	1.08	0.96	203
(2I)058	CONDUIT	887.47	1	06:15	2.76	1.08	0.96	203
(2I)059	CONDUIT	888.51	1	08:31	2.78	1.08	0.95	203
(2J)001	CONDUIT	4183.14	1	11:14	3.18	0.88	0.72	0
(2J)002	CONDUIT	4177.86	1	11:35	2.59	1.08	0.95	346
(2J)003	CONDUIT	4150.08	1	10:02	2.60	1.06	0.94	343
(2J)004	CONDUIT	4153.24	1	10:01	2.57	1.08	0.97	347
(2J)005	CONDUIT	4259.24	1	11:28	2.78	0.99	0.81	0
(2J)006	CONDUIT	4248.52	1	11:28	2.64	1.08	0.95	341
(2J)007	CONDUIT	4208.91	1	11:25	2.58	1.08	0.96	342
(2J)008	CONDUIT	4207.00	1	11:05	2.58	1.08	0.95	344
(2J)009	CONDUIT	3995.82	1	11:19	3.20	0.78	0.66	0
(2J)010	CONDUIT	4012.43	1	11:19	3.25	0.77	0.66	0
(2J)011	CONDUIT	3954.59	1	11:18	4.07	0.78	0.66	0
(2J)012	CONDUIT	4000.30	1	11:00	3.14	1.08	0.93	326
(2J)013	CONDUIT	3927.13	1	11:15	3.04	1.08	0.94	330
(2J)014	CONDUIT	3949.25	1	11:01	3.23	1.05	0.90	5
(2J)015	CONDUIT	3901.93	1	11:00	3.03	1.07		

							0.92	321
(2J)016	CONDUIT	3697.82	1	08:03	3.04	1.00	0.82	0
(2J)017	CONDUIT	3697.80	1	08:02	3.24	0.93	0.76	0
(2J)018	CONDUIT	3699.77	1	11:02	3.01	1.00	0.82	0
(2J)019	CONDUIT	1217.59	1	12:41	2.56	0.43	0.45	0
(2J)020	CONDUIT	83.13	0	01:53	0.43	1.08	0.94	4980
(2J)021	CONDUIT	363.84	1	08:00	3.75	0.50	0.50	0
(2J)022	CONDUIT	357.53	1	05:06	1.94	1.08	1.00	1007
(2J)023	CONDUIT	390.91	1	18:03	1.73	1.08	0.96	980
(2J)024	CONDUIT	831.44	1	05:34	3.67	1.08	1.00	368
(2J)025O	CONDUIT	122.46	1	07:59	7.53	0.03	0.12	0
(2J)026	CONDUIT	482.18	1	11:16	2.15	1.08	0.95	376
(2J)027	CONDUIT	491.84	1	10:06	2.21	1.08	0.94	296
(2J)028	CONDUIT	479.02	1	09:59	2.12	1.08	0.95	298
(2J)029	CONDUIT	492.72	1	06:06	2.19	1.08	0.95	295
(2J)030	CONDUIT	327.94	1	09:44	2.34	1.08	0.91	250
(2J)031	CONDUIT	316.96	1	09:42	2.20	1.08	0.93	273
(2J)032	CONDUIT	303.41	1	06:09	2.11	1.08	0.95	279
(2J)033	CONDUIT	0.00	0	00:00	0.00	0.00	0.00	0
(2J)040	CONDUIT	481.92	1	07:59	2.84	0.81	0.68	0
(2J)041	CONDUIT	487.11	1	13:14	2.22	1.08	0.94	478
(2J)042	CONDUIT	479.90	1	13:10	2.13	1.08	0.95	483
(2J)043	CONDUIT	475.08	1	07:12	2.28	1.00	0.82	0
(2J)044	CONDUIT	468.26	1	05:16	2.07	1.08	0.95	488
(2J)045	CONDUIT	487.47	1	12:37	2.25	1.06	0.91	450
(2J)045A	CONDUIT	460.25	1	05:36	2.05	1.08	0.95	487
(2J)046	CONDUIT	477.03	1	12:57	2.15	1.06	0.94	465
(2J)047	CONDUIT	470.06	1	06:02	2.08	1.08	0.95	473
(2J)048	CONDUIT	326.85	1	08:00	1.99	0.74	0.64	0
(2J)049	CONDUIT	314.19	1	20:06	2.38	0.55	0.53	0
(2J)050	CONDUIT	314.61	1	20:06	2.03	0.70	0.61	0

(2J)051	CONDUIT	314.43	1	20:05	2.02	0.72	0.62	0
(2J)052	CONDUIT	316.99	1	20:05	2.21	1.08	0.93	917
(2J)053	CONDUIT	305.55	1	20:08	2.10	1.08	0.97	938
(2J)054	CONDUIT	310.81	1	06:10	2.15	1.08	0.95	901
(2J)055	CONDUIT	313.63	1	05:46	2.17	1.08	0.95	879
(2J)056	CONDUIT	314.46	1	05:31	2.16	1.08	0.95	877
(2J)057	CONDUIT	71.31	0	08:00	1.58	0.25	0.34	0
(2J)058	CONDUIT	76.07	0	08:00	1.82	0.28	0.34	0
(2K)001	CONDUIT	1213.86	1	12:56	1.22	1.08	0.95	454
(2K)002	CONDUIT	1310.04	1	08:00	5.40	0.42	0.45	0
(2K)003	CONDUIT	1271.53	1	08:00	2.90	0.90	0.74	0
(2K)004	CONDUIT	1269.33	1	10:02	2.66	0.99	0.81	0
(2K)005	CONDUIT	1269.34	1	10:02	2.68	0.98	0.81	0
(2K)006	CONDUIT	1269.74	1	09:57	2.72	0.97	0.80	0
(2K)007	CONDUIT	1270.09	1	09:57	3.08	0.84	0.70	0
(2K)008	CONDUIT	1269.70	1	09:56	2.75	0.97	0.79	0
(2K)009	CONDUIT	1273.65	1	09:57	2.83	0.94	0.77	0
(2K)010	CONDUIT	1275.74	1	09:56	2.70	1.00	0.82	1
(2K)011	CONDUIT	1270.94	1	09:57	2.51	1.08	0.95	306
(2K)012	CONDUIT	1374.05	1	09:40	2.93	0.98	0.80	0
(2K)013	CONDUIT	1368.91	1	05:54	2.69	1.08	0.95	289
(2K)014	CONDUIT	929.21	1	05:31	2.84	1.08	0.95	305
(2K)015	CONDUIT	696.37	1	05:56	2.15	1.08	0.95	423
(2K)016	CONDUIT	860.24	1	10:19	2.81	1.03	0.87	4
(2K)017	CONDUIT	862.12	1	10:19	2.71	1.06	0.91	310
(2K)018	CONDUIT	820.06	1	05:55	2.52	1.08	0.95	400
(2K)018A	CONDUIT	864.04	1	05:12	2.65	1.08	1.00	351
(2K)019	CONDUIT	945.34	1	05:31	2.89	1.08	0.95	305
(2K)020	CONDUIT	716.75	1	11:53	2.77	0.85	0.71	0
(2K)021	CONDUIT	714.16	1	05:12	2.18	1.08	1.00	408
(2K)022	CONDUIT	864.42	1	10:10	2.96	0.98		

							0.79	0
(2K)022A	CONDUIT	874.87	1	10:09	2.78	1.06	0.92	299
(2K)023	CONDUIT	860.25	1	10:08	2.66	1.08	0.94	312
(2K)024	CONDUIT	842.01	1	10:07	2.92	0.96	0.79	0
(2K)024A	CONDUIT	840.34	1	05:09	2.54	1.08	1.00	346
(2K)025	CONDUIT	913.37	1	05:54	2.81	1.08	0.95	291
(2K)026	CONDUIT	653.11	1	11:30	2.35	0.91	0.75	0
(2K)027	CONDUIT	666.72	1	11:41	7.66	0.19	0.30	0
(2K)028	CONDUIT	662.96	1	11:41	2.05	1.08	0.94	394
(2K)029	CONDUIT	652.01	1	06:31	2.02	1.08	0.95	396
(2K)030	CONDUIT	659.74	1	11:08	2.08	1.08	0.95	341
(2K)031	CONDUIT	657.11	1	11:05	2.09	1.08	0.96	340
(2K)032	CONDUIT	662.86	1	10:58	2.09	1.08	0.95	340
(2K)033	CONDUIT	653.27	1	06:49	2.07	1.08	0.95	342
(2K)033A	CONDUIT	635.43	1	06:51	2.00	1.08	0.95	313
(2K)034	CONDUIT	645.51	1	10:33	2.00	1.08	0.97	310
(2K)035	CONDUIT	678.05	1	10:33	2.12	1.08	0.92	301
(2K)036	CONDUIT	663.19	1	10:32	2.07	1.08	0.94	308
(2K)037	CONDUIT	648.37	1	10:22	2.05	1.08	0.95	313
(2K)038	CONDUIT	648.27	1	10:26	2.01	1.08	0.96	306
(2K)039	CONDUIT	648.06	1	05:47	2.05	1.08	0.96	306
(2K)040	CONDUIT	648.06	1	05:47	2.02	1.08	0.96	305
(2K)041	CONDUIT	648.06	1	05:47	2.03	1.08	0.96	305
(2K)042	CONDUIT	649.12	1	10:11	2.00	1.08	0.95	304
(2K)043	CONDUIT	649.02	1	09:31	2.11	1.08	0.96	236
(2K)044	CONDUIT	648.02	1	05:59	2.09	1.08	0.96	236
(2K)045	CONDUIT	648.56	1	09:24	2.10	1.08	0.96	236
(2K)046	CONDUIT	648.06	1	05:56	2.09	1.08	0.96	237
(2K)047	CONDUIT	648.06	1	05:54	2.08	1.08	0.96	236
(2K)048	CONDUIT	648.18	1	09:13	2.08	1.08	0.96	237
(2K)049	CONDUIT	648.06	1	05:54	2.07	1.08	0.96	237

```
  (2K)050              CONDUIT    648.82     1  09:05       2.05     1.08
0.96         237
  (2K)051              CONDUIT    648.06     1  05:54       2.04     1.08
0.96         235
  (2K)052              CONDUIT    648.06     1  06:05       3.44     1.08
0.95         236
  (2K)314              CONDUIT    417.56     1  15:06       2.57     0.73
0.63           0
  (2K)315              CONDUIT    416.01     1  06:31       1.85     1.08
0.95         619
  (2K)316              CONDUIT    503.62     1  14:31       2.25     1.07
0.94         563
  (2K)317              CONDUIT    497.63     1  05:31       2.19     1.08
0.95         567
  FordedMain2          CONDUIT    148.78     0  10:10       0.98     1.08
0.93        4981
  Line2ToPlant         CONDUIT   3540.80     3  07:10       3.67     0.32
0.39           0
  NorthEnid            CONDUIT      0.00     0  00:00       0.00     0.00
0.00           0
  1                    CONDUIT   1632.03     1  05:12      15.02     0.26
0.35           0
  PUMP1@(2A)000-(PLANT) PUMP      6000.00     1  06:03                1.00
289
  ForcedMain           PUMP      1200.00     1  05:08                1.00
635
  OverflowPump         PUMP      4000.00     1  05:53                1.00
341
  (IO)304C-O           ORIFICE   1780.84     1  17:16
0.00           0
  WEIR1@(1A)DIV-(1A)STOR WEIR         0.00     0  00:00
0.00           0
  (1O)304-1            WEIR      1863.50     1  08:29
0.00           0
```

```
  *******************************
  Highest Flow Instability Indexes
  *******************************
  Link (1O)304-1 (136)
  Link (1O)304A (136)
  Link (1O)303 (136)
  Link (1O)304 (136)
  Link (1O)072 (136)


  *************************
  Routing Time Step Summary
  *************************
  Minimum Time Step           :    30.00 sec
  Average Time Step           :    29.65 sec
  Maximum Time Step           :    30.00 sec
  Percent in Steady State     :     0.00
  Average Iterations per Step :     1.17


  Analysis begun on:  Mon Aug 11 13:58:14 2008
  Analysis ended on:  Mon Aug 11 13:58:36 2008
  Total elapsed time: 00:00:22
```

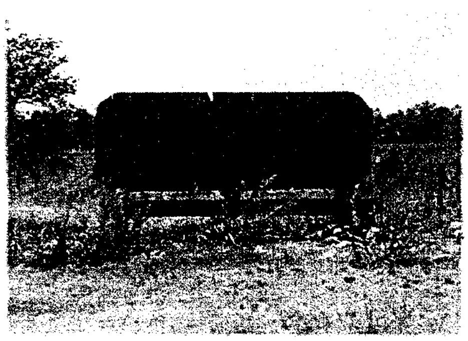
TM 2-7

FEBRUARY 2007 EVALUATION OF SANITARY SEWER PIPELINE EXTENSION FOR THE OKLAHOMA ETHANOL PLANT

ENVIROTECH
ENGINEERING & CONSULTING, INC.

EVALUATION OF SANITARY SEWER PIPELINE EXTENSION

OKLAHOMA ETHANOL PLANT



FEBRUARY 2007

C.A. 1960—Expiration Date 06/30/08
06169-00-OEG

TABLE OF CONTENTS

1. PREFACE

The original concept for sanitary sewer service to the proposed Oklahoma Ethanol Plant was based on the possibility of connecting to the nearest available existing sanitary sewer pipeline. This was presented to ENVIROTECH ENGINEERING & CONSULTING, INC. early in the proposal process as a lift station at the plant on 16TH Street that would pump through a force main into the existing 8-in.-dia. sanitary sewer pipeline just east of 11TH Street. The associated construction cost estimate presented by the City was approximately $450,000.00. Subsequent to further evaluation, ENVIROTECH discovered that the existing 8-in.-dia. sanitary sewer line was fed by businesses north and south of Willow Road westward to 4TH Street and the neighborhood northeast of Willow Road and 4TH Street. This line then entered a 10-in.-dia. line that extends south on 4TH Street to a larger collector south. Since the design requirement for 300,000-gpd requires nearly all of an 8-in.-dia. line, it was determined that the existing 8-in.-dia. line was already at full capacity. At this point, the City began to search for alternate routes to convey the sanitary sewer flow from the Oklahoma Ethanol Plant into the existing sanitary sewer collection system.

To implement the referenced search for alternate routes, an evaluation for using the existing 24-in.-dia. collectors at the intersections of Washington Street and Willow Road as well as Elm and 16TH Streets (referred to as Options 1 and 2, respectively) was conducted. Utilizing this process, additional prospective alignments that could include other existing and future businesses in the NE/quadrant of Enid were analyzed. These additional alignments evaluated in this report include the 30TH Street Option 3, 42ND Street Option 4, and 54TH Street Option 5. This report summarizes the results of these evaluations and provides a recommended alignment as well as estimated costs for all options ranging from $867,700.00 to $3,044,200.00.

2. INTRODUCTION

ENVIROTECH ENGINEERING & CONSULTING, INC., evaluated several alternative routes for a proposed sanitary sewer pipeline for the new Oklahoma Ethanol Plant to be constructed on north 16TH Street (approximately 1,000-ft. north of Willow Avenue) in Enid, Oklahoma. An overview of the plant location and sanitary sewer pipeline routing is graphically depicted on *Figure 1*. It is our understanding that the sanitary sewer flow *initial* design requirement is a 144,000-gpd capacity, but the design will encompass a *future* maximum flow of 300,000-gpd. In addition, this capacity shall be limited to 85% maximum capacity of the selected sanitary sewer pipeline. It has also been proposed that the site may require construction of a sanitary sewer lift station, if necessary.

The Oklahoma Ethanol Plant sanitary sewer flow shall be collected at a common point on-site within the road easement of 16TH Street within a paved section along the east side of the proposed facility. The plant facility will be comprised of several buildings and it is anticipated that the main service connection location (or lift station) will be approximately 800- to 1,000-ft. north of Willow Avenue. The plant site is a triangular-shaped piece of property abutting the City boundary on the north edge (i.e. 1/2-mi. north) of Willow Avenue and abutting the ADM grain elevators on the south edge that runs northwest. For purposes of this analysis, a sanitary sewer service is estimated to originate at the mash/prep buildings at a grade of 1,244-ft. It is assumed a sanitary sewer service line will exit the

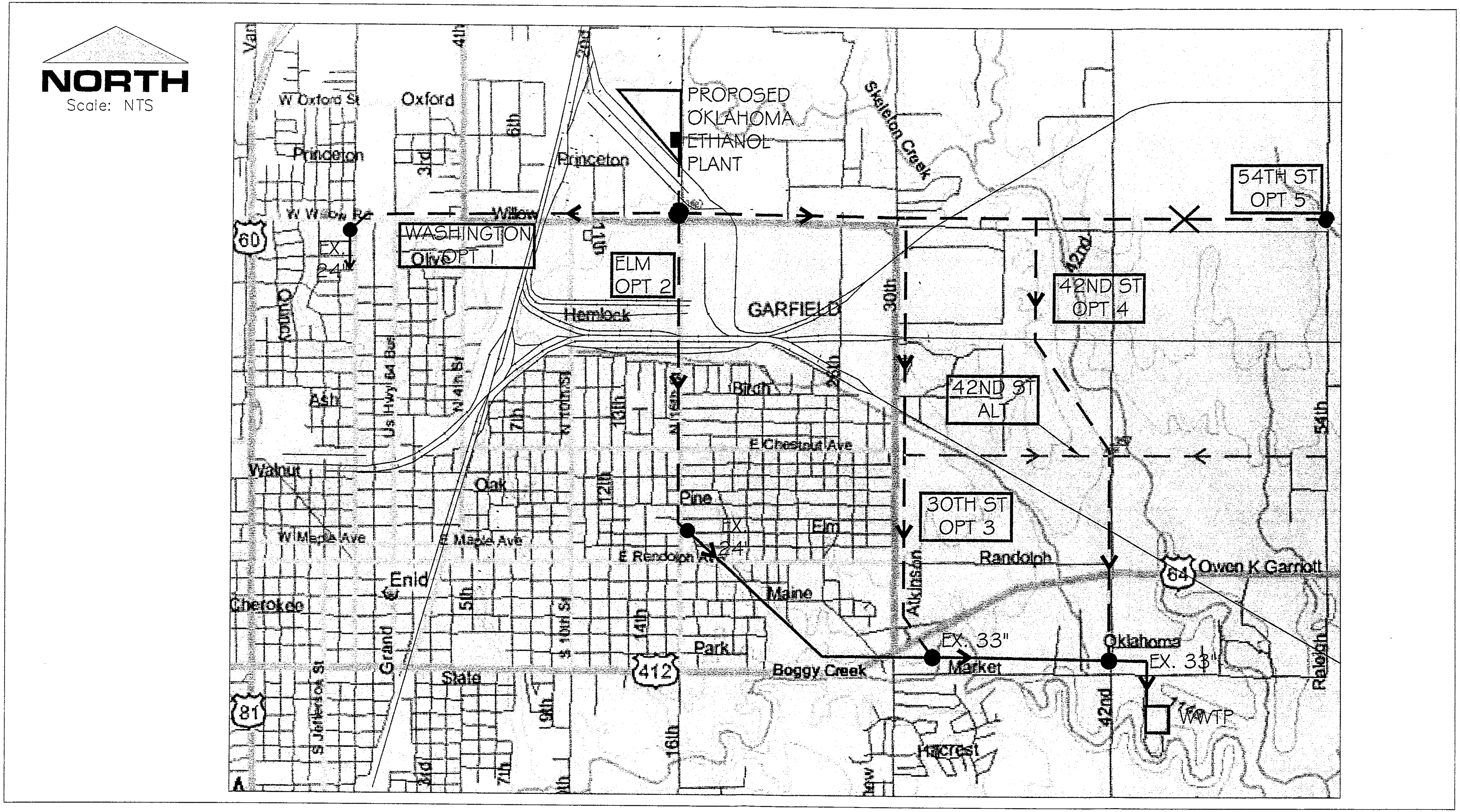


FIG. 1

OKLAHOMA ETHANOL PLANT
SANITARY SEWER OPTIONS

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building at 1,240-ft. and slope 2% to the west edge of 16TH Street, resulting in an invert of 1,236-ft. This will be the starting point for purposes of analyzing either a gravity flow or forced main flow into the Enid sanitary sewer system, as graphically depicted on *Figure 2*

3. BASIS OF SANITARY SEWER ALIGNMENT OPTIONS

The several alignment options considered would terminate in a larger existing main trunk line in Enid. This evaluation will provide necessary information to the City of Enid for determining the sanitary sewer line construction that affords the most cost-effective solution while providing a maximum contribution to current and future development potential. All options evaluated in this report shall commence at the proposed Oklahoma Ethanol Plant site and proceed down the west side of 16TH Street and pass under three (3) sets of railroad tracks that service the ADM grain elevators. No new railroad tracks are anticipated at this location. From the point at 16TH Street and Willow Road, the various sanitary sewer alignment options will proceed as outlined below and graphically depicted on *Figure 2*.

3.1 **Option 1 - Washington Street.** Proceed along Willow Avenue approximately 9,000-ft. to the west where it would connect to an existing 24-in.-dia. sanitary sewer main collector at Washington Street.

3.2 **Option 2 - Elm Street.** Proceed south on 16TH Street approximately 8,450-ft. where it would pass under the Burlington Northern 22-track switching yard before terminating at the 24-in.-dia. main collector on Elm Street.

3.3 **Option 3 - 30TH Street.** Proceed east along the north side of Willow Avenue and pass under one (1) set of railroad tracks and 30TH Street before turning south under Willow Avenue. The pipeline would then proceed along the east side of 30TH Street and cross several pipelines and three (3) railroad tracks before turning southeast under U.S. Highway 412 and terminating at the existing 33-in. main collector near Market and 30th Streets. The length of this pipeline is estimated to be 16,500-ft.

3.4 **Option 4 - 42ND Street.** Proceed east along the north side of Willow Avenue and pass under one (1) set of railroad tracks and 30TH Street before turning south along the west bank of Skeleton Creek. At this point, the pipeline would intersect 42ND Street and pass south to the main sewer collector north of the wastewater treatment plant (WWTP) for a total estimated length of 20,300-ft.

3.5 **Option 5 - 54TH Street.** Proceed east from 16TH Street along the north side of Willow Avenue and pass under one (1) set of railroad tracks and 30TH Street before turning south along 30TH Street, east on Chestnut Avenue, and south on 42ND Street, terminating at the existing 33-in. sewer main north of East Market Avenue for a total estimated length of 20,700-ft.

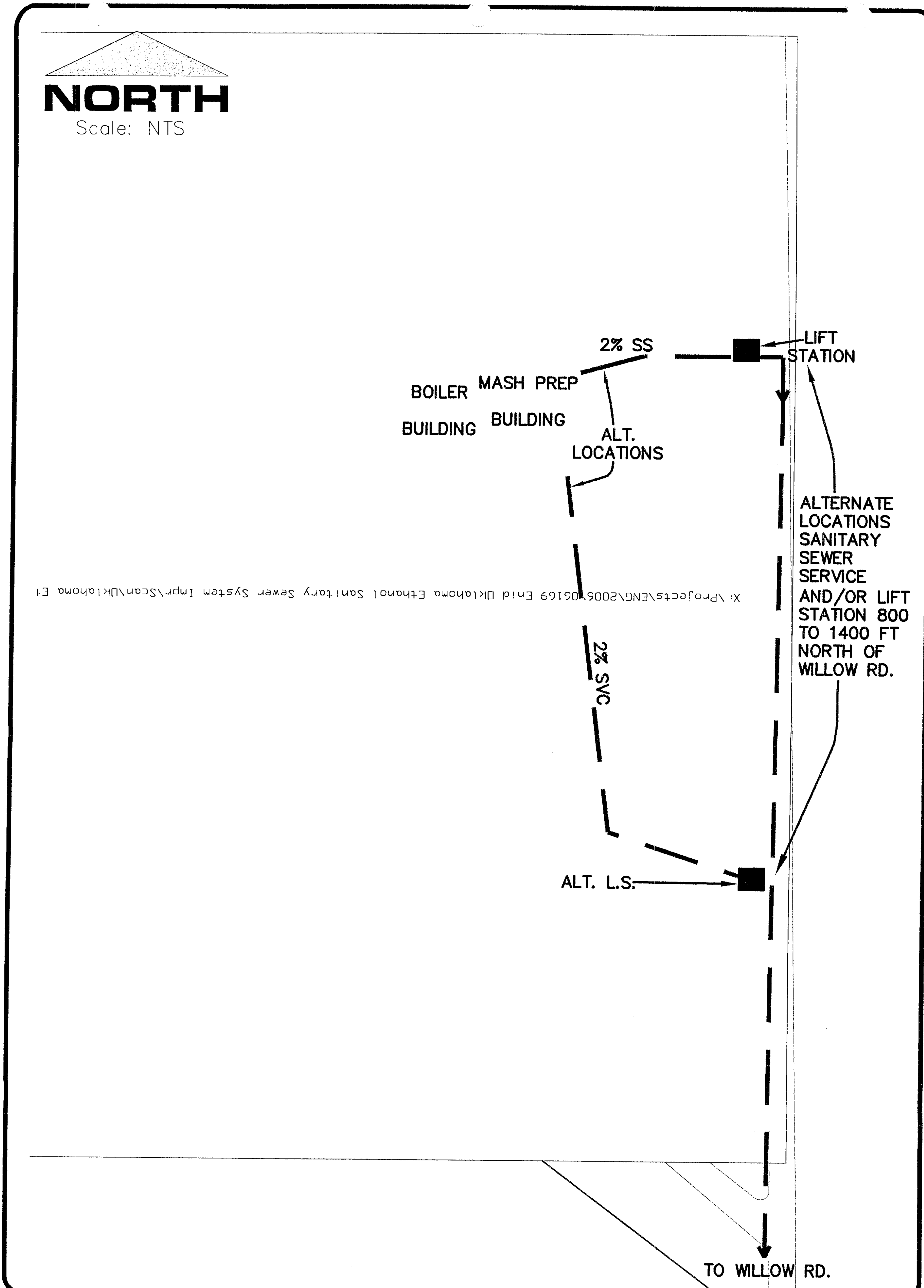

FIG. 2
OKLAHOMA ETHANOL PLANT SANITARY SEWER ACCESS

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4. OPTION ANALYSES

The following option analyses includes all general obstacles and perceived pros and cons as well as cost estimates for each option. In addition, each route was analyzed for possible use of a gravity line versus a lift station, even though a gravity line may be fairly deep in some cases. Primary obstacles are state highways, pipelines, and railroad tracks that must be bored under and require steel casing, with the exception of casing for pipelines.

Sanitary sewer line information for invert elevations was obtained from the Enid Sanitary Sewer Atlas and other "As-Built" information provided by the City of Enid's engineering department. Flow calculations of pipe sizes used in the following analysis are provided in *Appendix A*. These calculations clearly show that the pipe sizes evaluated will carry the required design flows and the capacity of existing collector mains.

The required design flow is 300,000 or 208-gpm at 85% flow of the selected sanitary sewer pipe diameter. For instance, a 10-in.-dia. pipe with a 2-fps (0.004 ft/ft) flow would convey 1.1-cfs or .711-mgd. At 85%, this pipe size would convey 0.604-mgd, or twice the required 0.3-mgd. Similarly, an 8-in.-dia. pipe would convey at least 383-mgd that would meet the design requirements. The minimum pipe slopes allowed by the Oklahoma Department of Environmental Quality (ODEQ) were used to minimize depth-of-sewer as well as provide a profile within the limits of the elevation at the Ethanol Plant and the City's existing receiving manhole. In some instances, a larger pipe diameter than needed has been proposed to minimize the slope due to obstacles or depth of excavation. Only the lowest slope pipe within a proposed option will be elaborated on with regard to flow capacity.

For information purposes, the following flows were estimated based on the minimum slope allowed by ODEQ.

Pipe Diameter (in.)	Area (sf)	Q(mgd) 85%	Q(mgd)	Slope (ft/ft)
8	.35	.450	.383	0.004
10	.55	.711	.604	0.0029
12	.79	1.02	.867	0.0022
15	2.45	1.58	1.343	0.0017
18	1.77	2.28	1.938	0.0015
24	3.14	4.10	3.485	0.0012

4.1 Option 1 - Washington Street Analysis. The alignment to the west of 16TH Street for an approximate total length of 9,000-ft. will pass underneath the Union Pacific railroad tracks west of 10TH Street. The pipeline would then proceed to Manhole No. IM288C that connects to the existing 24-in. sanitary sewer collector that flows south on Washington Street, as graphically depicted on *Figure 3*. The vertical alignment (i.e., profile) graphically depicted on

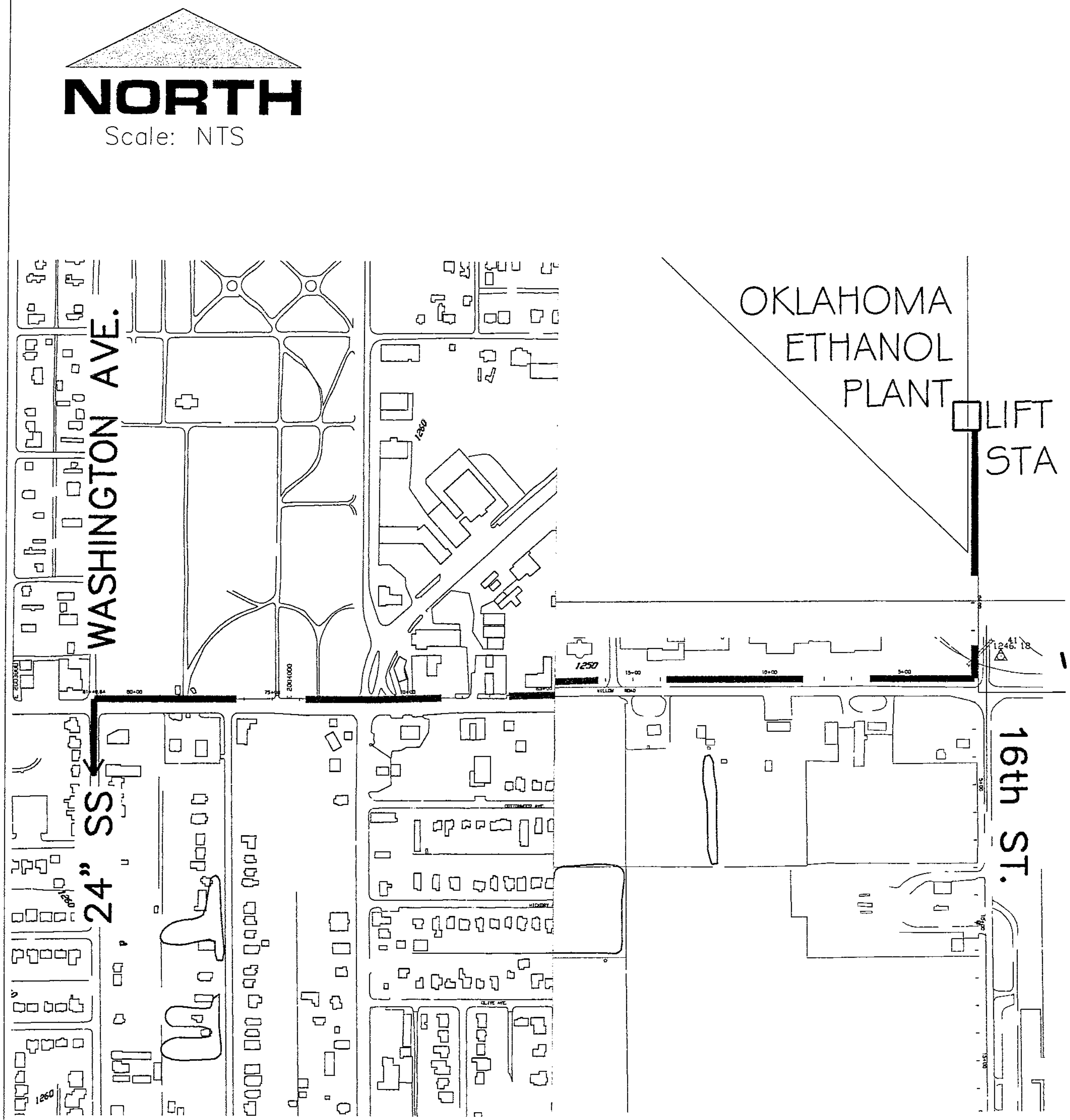

FIG. 3

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Figure 4 shows that installation of a gravity sewer pipeline from 16TH Street at the maximum percent slope of 0.30% (0.29% allowed by ODEQ for a 10-in. line) would terminate approximately 17-ft. below the flow line invert of the 24-in. sanitary sewer line at Washington Street. The ground level at that point rises approximately 12-ft. higher westward which accounts for such a deep gravity flow line connection.

Therefore, an alternative alignment, graphically depicted on *Figure 4,* utilizes a 10-in. gravity line starting at the Washington Street invert elevation of 1,239.17-ft. and proceeding upward and easterly along Willow Avenue to a point approximately 1,700-ft. east and approximately 3-ft. below grade. Although it could be more practical to use an 8-in.-dia. line, it would intercept the Washington Street manhole at a lower depth. The remaining pipeline to the ethanol plant would be comprised of a force main and lift station at the plant, as graphically depicted on *Figure 4*. Due to an existing water main and improvements at Willow Avenue, it is likely that construction of a sanitary sewer pipeline would be more appropriate on the north side of the road. A layout plan graphically depicted on *Figure 5* reflects the final proposed sanitary sewer pipeline. Both railroad and Oklahoma Department of Transportation (ODOT) permits would be required for this route as well as several main intersection crossings.

The flow capacity of an 8-in. line graphically depicted on *Figure 4* corresponds to a 0.29% slope that could convey .383-gpm of sanitary sewer flow (at 85% capacity) that exceeds the design requirement of 300,000-gpd for the ethanol plant sanitary sewer pipeline. The existing 24-in. sanitary sewer main collector at Washington Street and Willow was constructed in the past few years to alleviate inflow and infiltration problems, afford additional service to that area, and provide some capacity for future development in that vicinity of the City. The flow capacity for the 24-in.-dia. line is estimated to be approximately 3.6-mgd. Channeling an additional 300,000-gpd from the east side of the City certainly reduces, and could jeopardize the capacity, of that line. Upgrading that system later would most likely outweigh the benefit and cost to construct the needed sewer pipeline for the ethanol plant in a different location. Furthermore, the Washington Street option would result in routing the sanitary sewer flow an additional 2-mi. in the wrong direction from the WWTP. The estimated cost for this option is $ 867,700.00, as summarized in *Table 1*.

4.2 Option 2 - Elm Street Analysis. Aligning a sanitary sewer pipeline directly south on 16TH Street to the existing 24-in. collector at Elm Street is graphically depicted on *Figure 6*. A series of approximately 22 railroad tracks would need to be bored under. In addition, the remaining portion of 16TH Street is fairly narrow and traverses a residential area. There is an existing waterline along the west side of 16TH Street and waterline crossings at all streets that must be avoided. Furthermore, the first block north of Elm Street will require replacement of an existing manhole and 10-in. line to achieve the depth needed for flow. Power poles exist directly south of Chestnut Avenue behind the curb on both sides of the street. It is most likely that a sanitary sewer pipeline may need to be bored almost the entire length of the residential area. Comparative cost estimates are provided for trenching the entire job or boring the residential area and trenching the remainder. Both railroad and Oklahoma

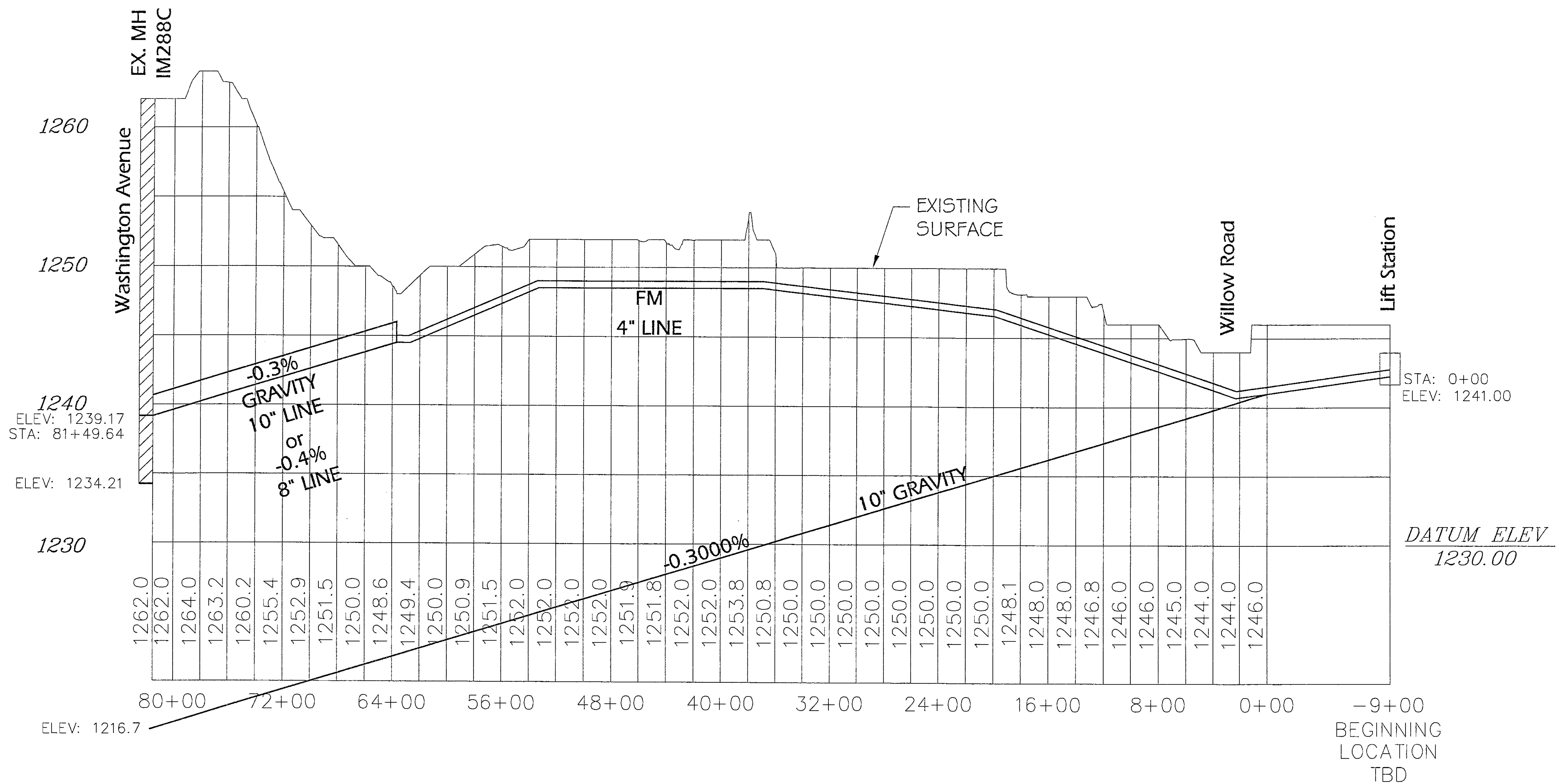

FIG. 4

PROFILE
WASHINGTON AVENUE OPTION 1

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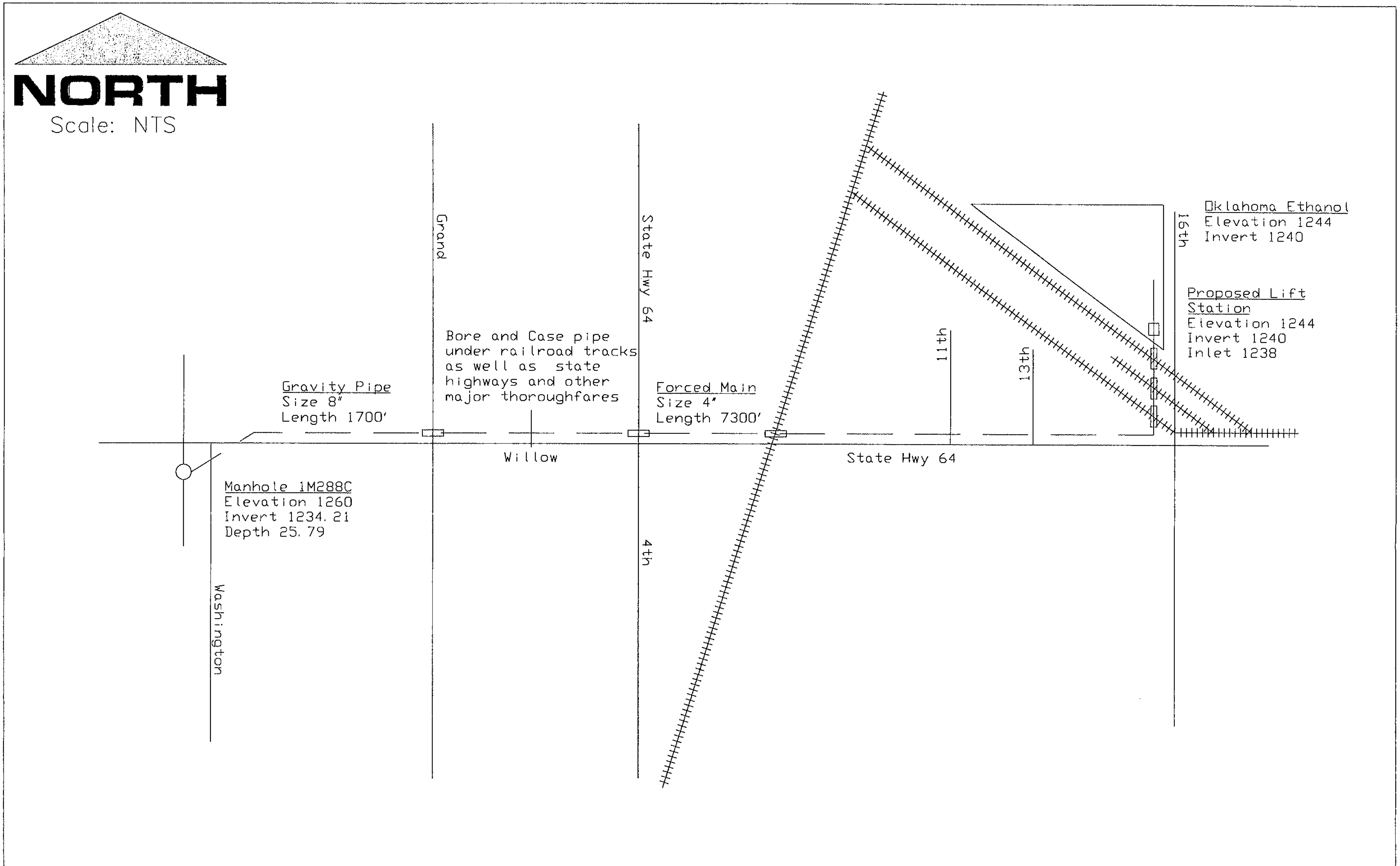

FIG. 5

LAYOUT PLAN
WASHINGTON AVENUE OPTION 1

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Table 1

City of Enid
Oklahoma Ethanol Sewer Extension
Preliminary Engineers Cost Estimate

Option 1 - Washington Ave.

December 18, 2006

No.	Item	Unit	Quantity	Rate	Total
1	Mobilization	Ea	1	$6,000.00	$6,000.00
2	4" FM Sanitary Sewer bore and pipe, complete	LF	1200	$50.00	$60,000.00
3	12" steel casing w/4" FM waterline, bored	LF	800	$100.00	$80,000.00
4	4" FM Sanitary Sewer trench, complete	LF	6100	$30.00	$183,000.00
5	8" D.I.P. Sanitary Sewer bore and pipe, deep, complete	LF	1700	$200.00	$340,000.00
6	14" steel casing w/8" DIP waterline, bored	LF	300	$300.00	$90,000.00
7	4 ft dia Sanitary Sewer Manhole 8 ft deep complete	Ea	25	$3,000.00	$75,000.00
8	Additional depth for 4 ft dia. Manhole	Ft	200	$30.00	$6,000.00
10	Concrete/asphalt repair (bore pits, etc)	SF	1500	$7.00	$10,500.00
11	Project sign, complete, in place	Ea.	2	$600.00	$1,200.00
12	Traffic control, complete, in place	L.S.	1	$1,000.00	$1,000.00
13	Lift Station w/ Telemetry	L.S.	1	$150,000.00	$150,000.00
	Subtotal Construction Cost				**$1,002,700.00**

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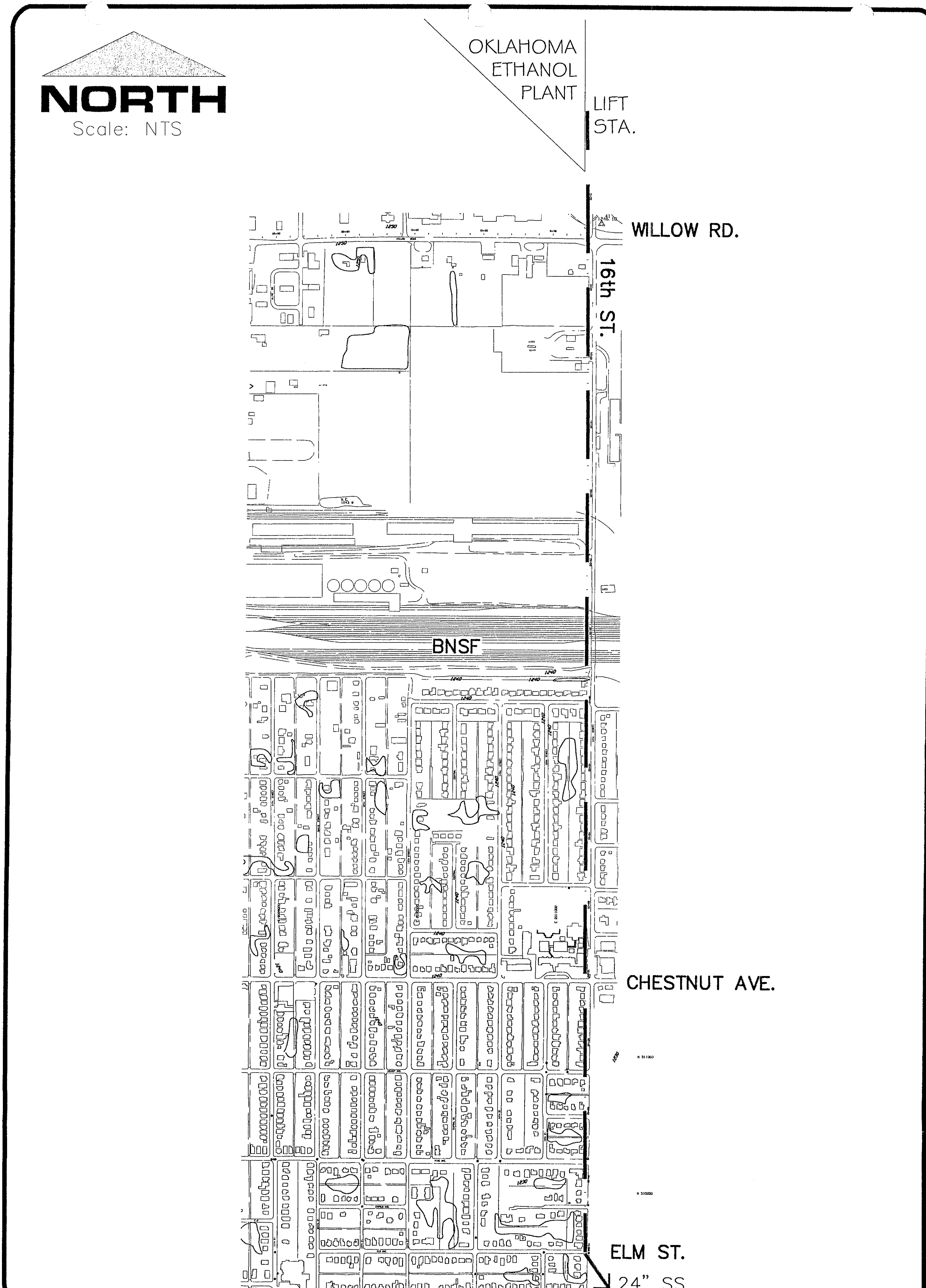

FIG. 6

PLAN VIEW
ELM STREET OPTION 2

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Department of Transportation (ODOT) permits would be required for this route as well as several main intersection crossings.

The vertical alignment (profile) graphically depicted on *Figure 7* indicates that the pipeline could possibly be constructed as gravity flow. The number of manholes and final location of existing utilities may nonetheless necessitate a lift station. The flow capacity of the 8-in. line depicted on *Figure 7* corresponds to a slope of .0038-ft/ft. that could convey .39-mgd of sanitary sewer flow (at 85% capacity) that exceeds the design requirement of 300,000-gpd for the ethanol plant sanitary sewer line. It is proposed to use a larger 10-in.-dia. pipe to reduce construction costs by decreasing the trenching depth.

However, the issue of flow pertains to the receiving 24-in. pipeline constructed in the 1997 time frame to relieve flow the Phillips Tributary. The existing 24-in. collector at Elm Street was constructed at the minimal grade of 0.0025-ft/ft between Elm Street and the City's 30-in. collector on Owen K. Garriott Road. Based on our calculations, the 24-in. pipe has the capacity to accommodate 5.4-mgd (3,750-gpm) at that slope and at 85%, normal sewage flow has been observed to half fill this pipe. Flow measurements are being pursued to obtain actual storm flow conditions that may provide evidence that the 24-in. pipeline does not have the capacity to accommodate an additional 300,000-gal. of flow.

Since there is a 500,000-gal. storage tank at 19TH and Randolph Streets to assist in dissipating storm surge flow, it is possible that the 24-in. sanitary sewer relief pipeline may be a likely candidate for accepting the additional 300,000-gpd flow anticipated from the sanitary sewer pipeline extending to the Oklahoma Ethanol Plant.

Again, the existing 24-in. sanitary sewer main at Elm Street was constructed to alleviate inflow and infiltration problems, afford additional service to that area, and provide some capacity for future development in that vicinity of the City. Channeling an additional 300,000-gpd to the east side of the City certainly reduces, and could jeopardize the capacity, of that line. Upgrading that system at a later date would most likely outweigh the benefit and cost to construct the needed sanitary sewer pipeline for the ethanol plant in a different location.

A layout plan graphically depicted on *Figure 8* shows the final proposed sewer line. The estimated cost for trenching and boring is $1,148,800.00, as summarized in *Table 2a*. An alternative cost of $1,069,800.00 for trenching the entire job is provided in *Table 2b*.

4.3 **Option 3 - 30TH Street Analysis.** Routing a sanitary sewer pipeline along 30TH Street could possibly be accomplished with a 16,500-ft.-long gravity line connecting to the existing 33-in. main feeder to the WWTP, as graphically depicted on *Figure 9*. The profile (vertical alignment) is graphically depicted on *Figure 10* that shows varying slopes of sanitary sewer pipeline in order to minimize the pipe size and line depth. Several pipeline markings that cross this route would need to be verified before final acceptance of the alignment. The Magellan Company surveyor was on-site in November 2006 and reported that the two (2) northernmost pipelines were 2.5- to 3-ft. below the edge of the road, as graphically depicted

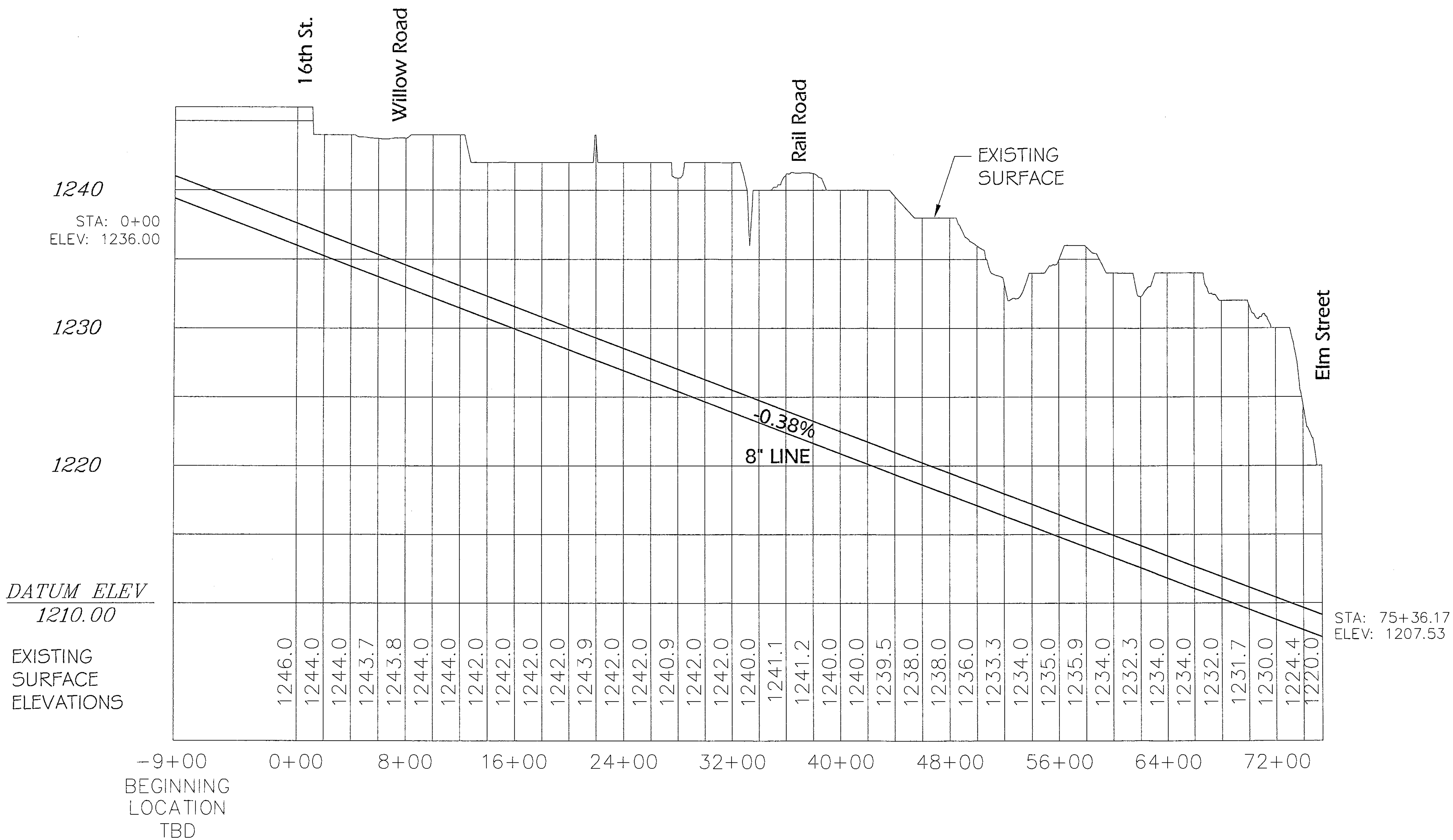

FIG. 7

PROFILE
ELM STREET OPTION 2

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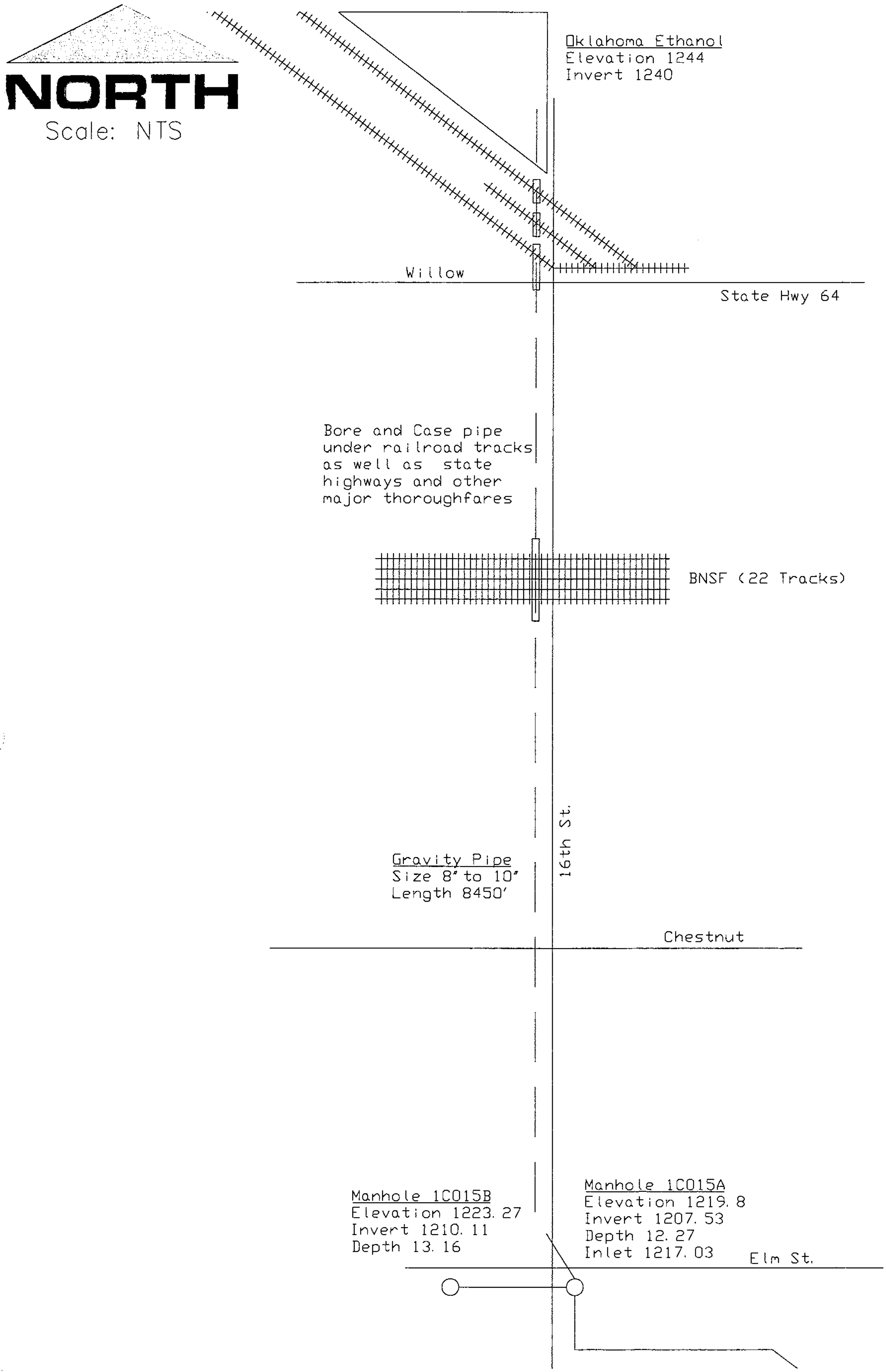

FIG. 8
LAYOUT PLAN
ELM STREET OPTION 2

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Table 2a

City of Enid
Oklahoma Ethanol Sewer Extension
Preliminary Engineers Cost Estimate

Option 2 - Elm St

"TRENCH-AND-BORE" METHOD

December 18, 2006

No.	Item	Unit	Quantity	Rate	Total
1	Mobilization	Ea	1	$6,000.00	$6,000.00
2	8" D.I.P. Sanitary Sewer, trench and pipe, complete	LF	3500	$70.00	$245,000.00
3	8" D.I.P. Sanitary Sewer bore and pipe, complete	LF	4100	$150.00	$615,000.00
4	14" steel casing w/8" DIP waterline, bored	LF	850	$250.00	$212,500.00
5	4 ft dia Sanitary Sewer Manhole 8 ft deep complete	Ea	23	$3,000.00	$69,000.00
6	Additional depth for 4 ft dial Manhole	Ft	120	$30.00	$3,600.00
7	Concrete/asphalt repair (bore pits, etc)	SF	4000	$7.00	$28,000.00
8	Remove & replace 4" pavement, complete, in place	SF	1000	$10.00	$10,000.00
9	Project sign, complete, in place	Ea.	2	$600.00	$1,200.00
10	Traffic control, complete, in place	L.S.	1	$1,000.00	$1,000.00
	Subtotal Construction Cost				**$1,191,300.00**

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Table 2b

City of Enid
Oklahoma Ethanol Sewer Extension
Preliminary Engineers Cost Estimate

Option 2 - Elm St

"ALL TRENCH" METHOD

December 18, 2006

No.	Item	Unit	Quantity	Rate	Total
1	Mobilization	Ea	1	$6,000.00	$6,000.00
2	8" D.I.P. Sanitary Sewer, trench and pipe, complete	LF	7600	$70.00	$532,000.00
3	Compaction	CY	3700	$20.00	$74,000.00
4	14" steel casing w/8" DIP waterline, bored	LF	850	$250.00	$212,500.00
5	Pressure/Vacuum Relief Valves	LS	1	$3,000.00	$3,000.00
6	4 ft dia Sanitary Sewer Manhole 8 ft deep complete	Ea	23	$3,000.00	$69,000.00
7	Additional depth for 4 ft dial Manhole	Ft	120	$30.00	$3,600.00
8	Concrete/asphalt repair	SF	20000	$10.00	$200,000.00
9	Remove & replace 4" pavement, complete, in place	SF	1000	$10.00	$10,000.00
10	Project sign, complete, in place	Ea.	2	$600.00	$1,200.00
11	Traffic control, complete, in place	L.S.	1	$1,000.00	$1,000.00
	Subtotal Construction Cost				**$1,112,300.00**

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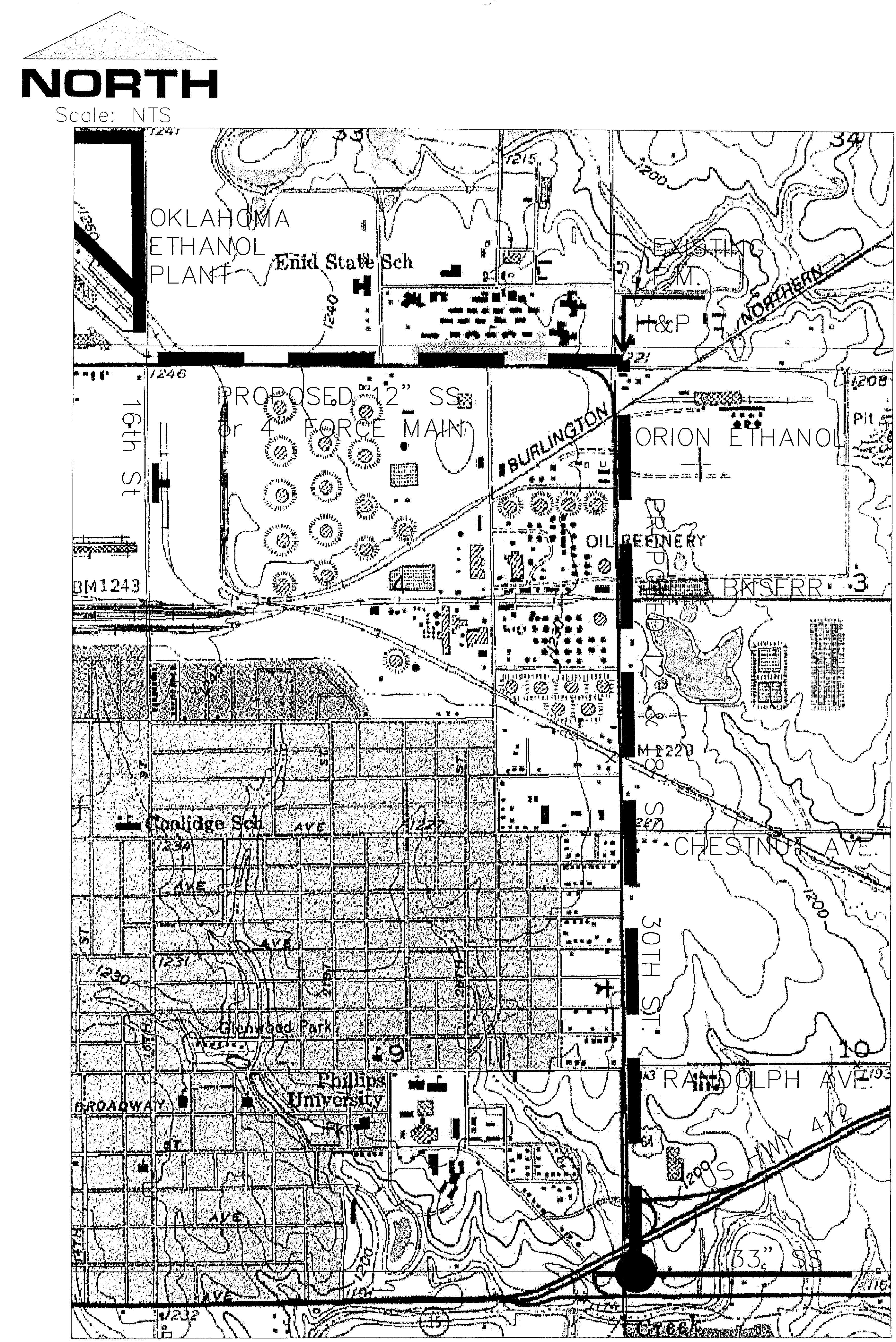

FIG. 9

PLAN VIEW

30TH STREET OPTION 3

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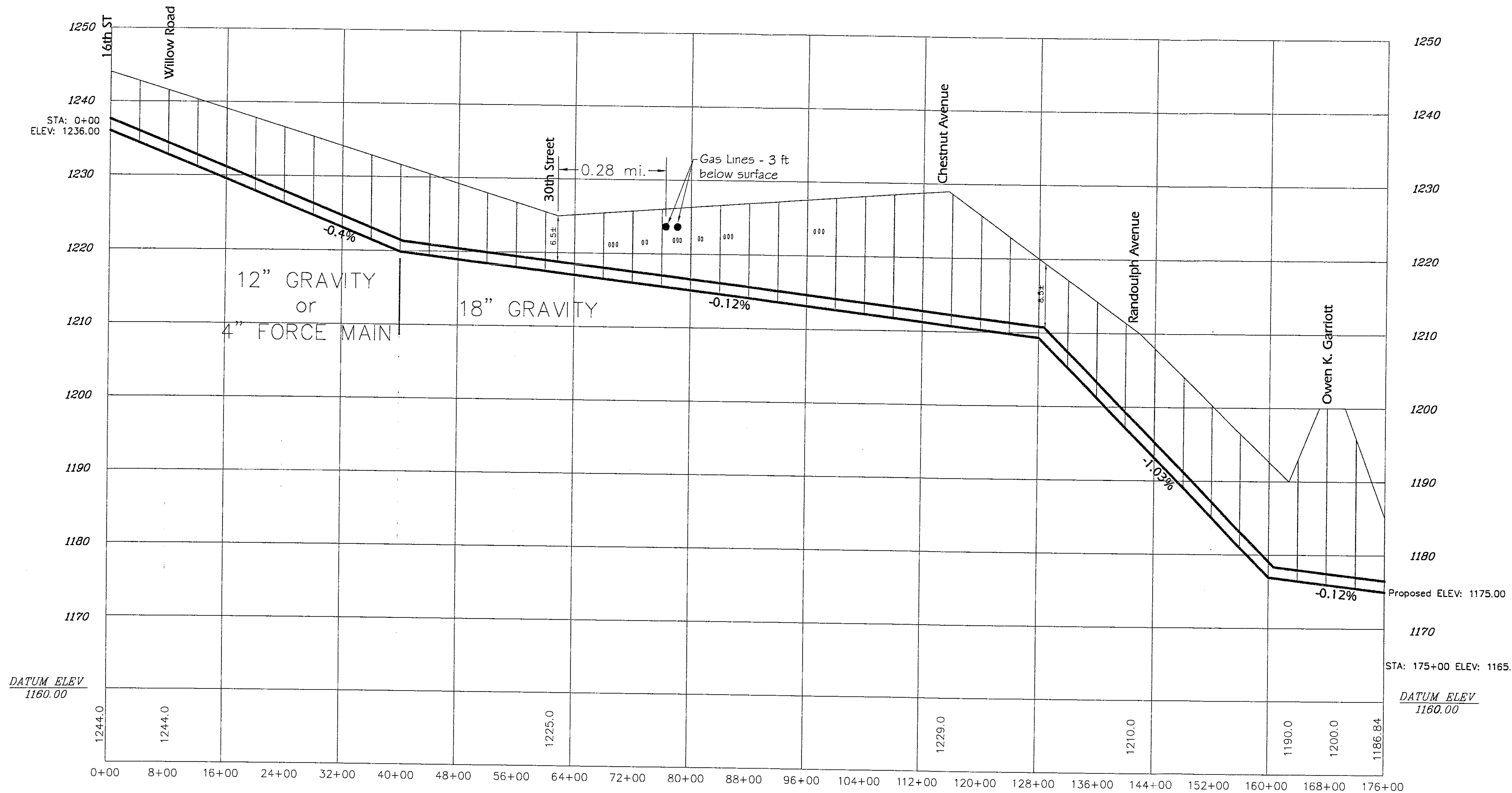

FIG. 10

PROFILE
30TH STREET OPTION 3

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on *Figure 10.* Since the sanitary sewer pipeline reaches deeper depths as the line proceeds south, it is anticipated that the issue of pipelines may be overcome. Again, these would need to be surveyed and otherwise accurately located for depth before proceeding further with this option. An advantage of a deeper sanitary sewer pipeline is that it would allow for better access for facilities located farther east from 30TH Street. Both railroad and Oklahoma Department of Transportation (ODOT) permits would be required for this route as well as several main intersection crossings.

As previously mentioned, an "all-gravity" option would encompass a 12-in.-dia. pipe along Willow Road with a minimum flow of 0.9-mgd to serve existing and future development on both sides of Willow Road. The minimum slope of 0.12% shown on a portion of the profile (for a 24-in. pipe) is required to reduce depth of the overall excavation. The flow afforded by the 24-in.-dia. pipe would be 3.5-mgd at 85% capacity. Upon further analysis of sanitary sewer loading for this line, the sewer size could be increased or reduced which would also change the minimum slope.

An alternative option of "pump and gravity" could reduce the overall cost. This would encompass a lift station and force main along Willow Road and a 12-in.-dia. line south to the Oklahoma Ethanol Plant with an 18-in.-dia. line to the existing 33-in. sewer main near 30TH and Market Streets.

In addition, the actual depth and final slope would be dictated by the number of manholes required by ODEQ, which is typically every 400-ft. This would account for an additional drop of 0.1-ft./manhole, or several feet that could be adjusted by using an appropriate minimum pipe diameter.

This option could offer sanitary sewer service to facilities along 30TH Street to include the Hamm & Phillips facility on the NE/corner of 30TH Street and Willow Avenue; the Johnson Grain Elevators with an existing septic system; and other possible connections along both sides of 30TH Street to Highway 412. This could eliminate the lift station at the Hamm & Phillips facility and reduce maintenance and operating costs for the City of Enid. Due to the number of actual service connections required, the final sanitary sewer design may be deeper than shown and possibly require a sanitary sewer lift station at the Oklahoma Ethanol Plant. For instance, the "As-Built" plans for the 1994 Halliburton 4-in. sanitary sewer force main on the east side of 30TH Street to Chestnut Avenue indicate that pipe crossings are more shallow than the proposed pipe profile graphically depicted on *Figure 10.* The existing lift station invert is at 1,215.46-ft. and the proposed sanitary sewer is shown at almost the same elevation. While it would be impractical to lower the main sanitary sewer much deeper than that along 30TH Street, only a portion of the force main would need to remain intact to its connection at 30TH Street and Willow Road, and the remaining 1-mi. of force main could be deleted.

A layout plan graphically depicted on *Figure 11* shows the final proposed sanitary sewer pipeline. The actual pipeline impact would need to be more accurately ascertained. The

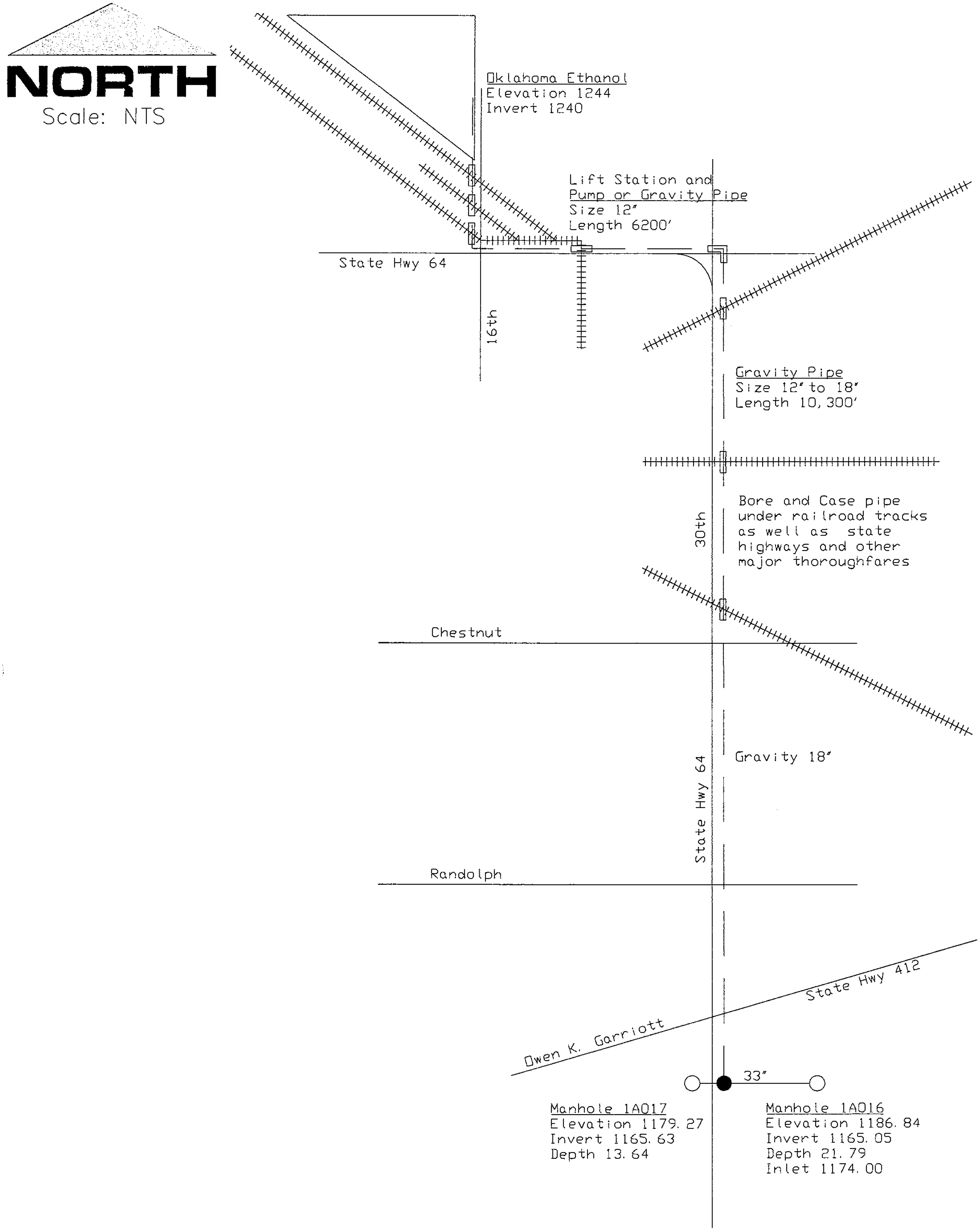

FIG. 11
LAYOUT PLAN
30TH STREET OPTION 3

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cost to bore and case under four (4) railroad crossings, drainage ditches, and Highway 412 and associated exit ramps will add to the fee significantly.

The extension of the sanitary sewer pipeline along the 30TH Street route will capitalize the 2-mi. of sanitary sewer construction otherwise considered on 16TH Street. This will include the additional cost for 1-mi. of sanitary sewer pipeline along Willow Avenue and the additional distance imposed by a line length equal to the distance from Elm Street to Manhole No. 1A016 on the existing 33-in. main sanitary sewer trunk. The primary emphasis will be to provide access for industry along Willow Road and the 30TH Street corridor.

This alignment would also facilitate future expansion of the collection system by constructing a separate branch pipeline from the south end of the proposed 30TH Street pipeline to a possible future WWTP expansion. The estimated cost for the Option 3 "all-gravity" flow alternative is $2,388,700.00, as summarized in *Table 3a*. The estimated cost for the Option 3 "pump and gravity" alternative is $1,680,950.00, as summarized in *Table 3b*.

4.4 Option 4 - 42ND Street Analysis. This route, graphically depicted on *Figure 12,* must traverse the west bank of Skeleton Creek until it intersects 42ND Street and travels south to the existing 33-in. pipeline. The vertical alignment (profile), graphically depicted on *Figure 13,* indicates the possibility of an approximate 0.0030% pipe slope between the 30TH Street and Willow Road intersection to the point of entrance into the existing 33-in. sewer main at 30th and Market Streets. Due to the length of this alignment, the required pipe size may need to be increased to 18-in. at the south end to convey, at minimum, 2-mgd at 85% flow. The pipeline depth is approximately 10-ft., but reaches 26-ft. at the railroad. The west bank of the creek is uneven and could result in exposed lines unless they are deepened or set back at the top of the bank. In addition, this route encompasses two (2) railroad crossings as well Highway 412. Both railroad and Oklahoma Department of Transportation (ODOT) permits would be required for this route as well as several main intersection crossings.

This alignment, as shown, would obviously not provide service along the 30TH Street corridor. Such service would need to either access existing sanitary sewer pipelines in the residential area to the west of 30TH Street or stretch east to the 42ND Street alignment that could result in long service lines. Another alternative would be to consider combining the 30TH Street Option 3 to Chestnut Avenue and construct a sewer line east to the 42ND Street alignment, as graphically depicted on *Figure 14*. At this point, the connection at 30TH Street would be approximately 20-ft.-deep (El. 1,212). This would need to pass under the BNS&F and Skeleton Creek at 1,190-ft. and tie to the 42ND Street line at 1,170-ft. This constitutes an approximate 0.01% slope.

Further evaluation of the 42ND Street collector will need to be supported with additional information concerning possible development in this area. The possibility of flow from 54TH Street to 42ND Street along Chestnut Avenue is explained in the following Option 5.

Table 3a

City of Enid
Oklahoma Ethanol Sewer Extension
Preliminary Engineers Cost Estimate

Option 3 - 30th St

"ALL GRAVITY" FLOW

December 18, 2006

No.	Item	Unit	Quantity	Rate	Total
1	Mobilization	Ea	1	$6,000.00	$6,000.00
2	12" D.I.P. Sanitary Sewer, trench and pipe, complete	LF	5500	$80.00	$440,000.00
3	12" D.I.P. Sanitary Sewer bore and pipe, complete	LF	250	$200.00	$50,000.00
4	20" steel casing w/ 12" DIP waterline, bored	LF	450	$350.00	$157,500.00
5	18" D.I.P. Sanitary Sewer, trench and pipe, complete	LF	10400	$150.00	$1,560,000.00
6	18" D.I.P. Sanitary Sewer bore and pipe, complete	LF	200	$250.00	$50,000.00
7	26" steel casing w/ 18" DIP waterline, bored	LF	800	$400.00	$320,000.00
8	Sanitary Sewer Manhole 8 ft deep complete	Ea	47	$3,000.00	$141,000.00
9	Additional depth for 4 ft dial Manhole	Ft	150	$30.00	$4,500.00
10	Remove & replace 4" pavement, complete, in place	SF	1000	$10.00	$10,000.00
11	Project sign, complete, in place	Ea.	2	$600.00	$1,200.00
12	Traffic control, complete, in place	L.S.	1	$1,000.00	$1,000.00
	Subtotal Construction Cost				**$2,741,200.00**

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Table 3b

City of Enid
Oklahoma Ethanol Sewer Extension
Preliminary Engineers Cost Estimate

Option 3 - 30th St

"PUMP-AND-GRAVITY" METHOD

December 18, 2006

"PUMP-AND-GRAVITY" METHOD

No.	Item	Unit	Quantity	Rate	Total
1	Mobilization	Ea	1	$6,000.00	$6,000.00
2	4" FM Sanitary Sewer, trench and pipe, complete	LF	5500	$20.00	$110,000.00
3	4" FM Sanitary Sewer bore and pipe, complete	LF	250	$50.00	$12,500.00
4	12" steel casing w/ 4" DIP waterline, bored	LF	450	$100.00	$45,000.00
5	12" D.I.P. Sanitary Sewer, trench and pipe, complete	LF	2700	$80.00	$216,000.00
6	20" steel casing w/12"DIP waterlline, bored	LF	300	$350.00	$105,000.00
7	18" D.I.P. Sanitary Sewer, trench and pipe, complete	LF	7800	$150.00	$1,170,000.00
8	18" D.I.P. Sanitary Sewer bore and pipe, complete	LF	100	$250.00	$25,000.00
9	26" steel casing w/ 18" DIP waterline, bored	LF	500	$300.00	$150,000.00
10	Sanitary Sewer Manhole 8 ft deep complete	Ea	32	$3,000.00	$96,000.00
11	Lift Station complete	LS	1	$150,000.00	$150,000.00
12	Additional depth for 4 ft dial Manhole	Ft	150	$30.00	$4,500.00
13	Remove & replace 4" pavement, complete, in place	SF	1000	$10.00	$10,000.00
14	Project sign, complete, in place	Ea.	2	$600.00	$1,200.00
15	Traffic control, complete, in place	L.S.	1	$1,000.00	$1,000.00
	Subtotal Construction Cost				**$2,102,200.00**

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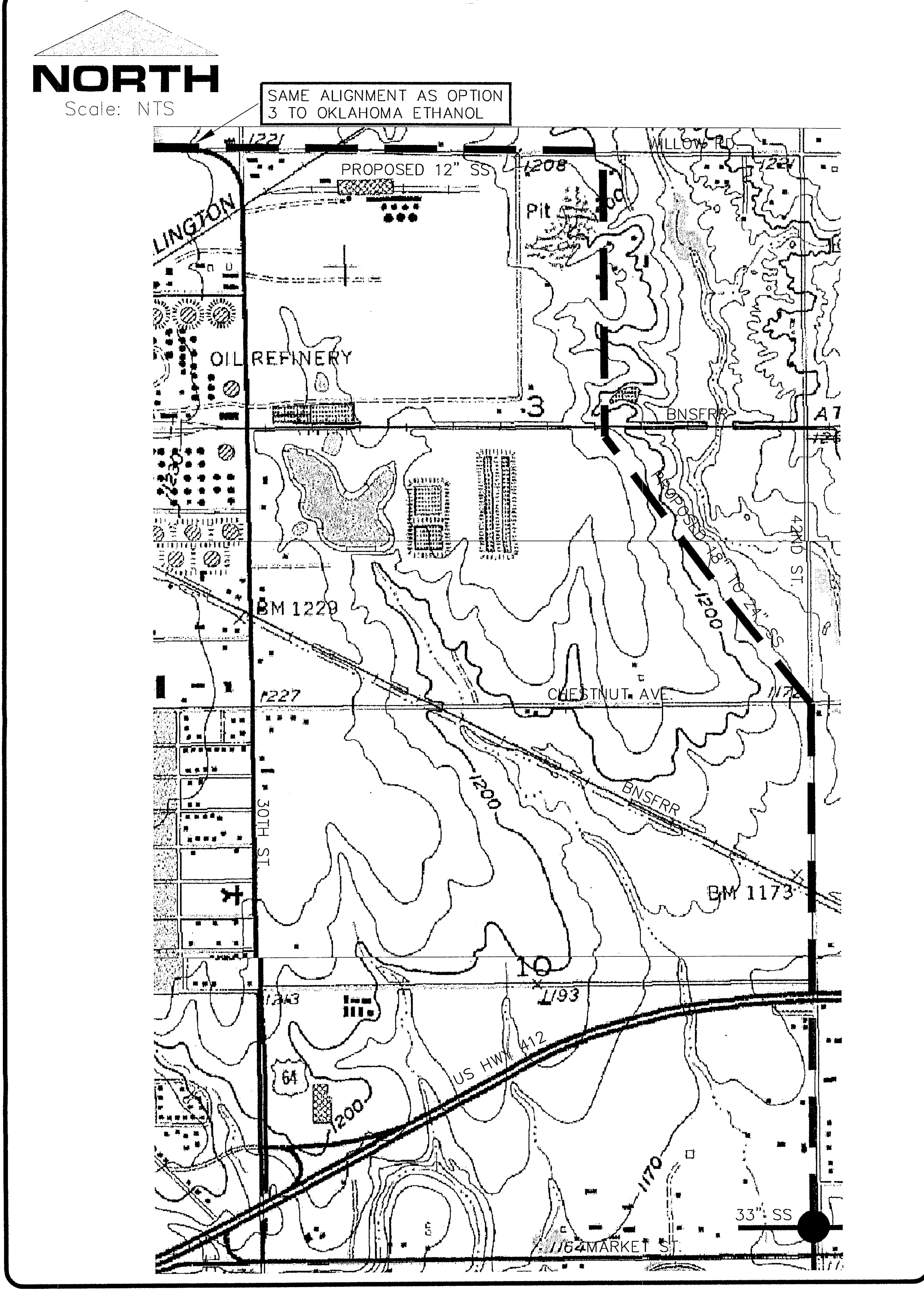

FIG. 12

PLAN VIEW
42ND ST OPTION 4

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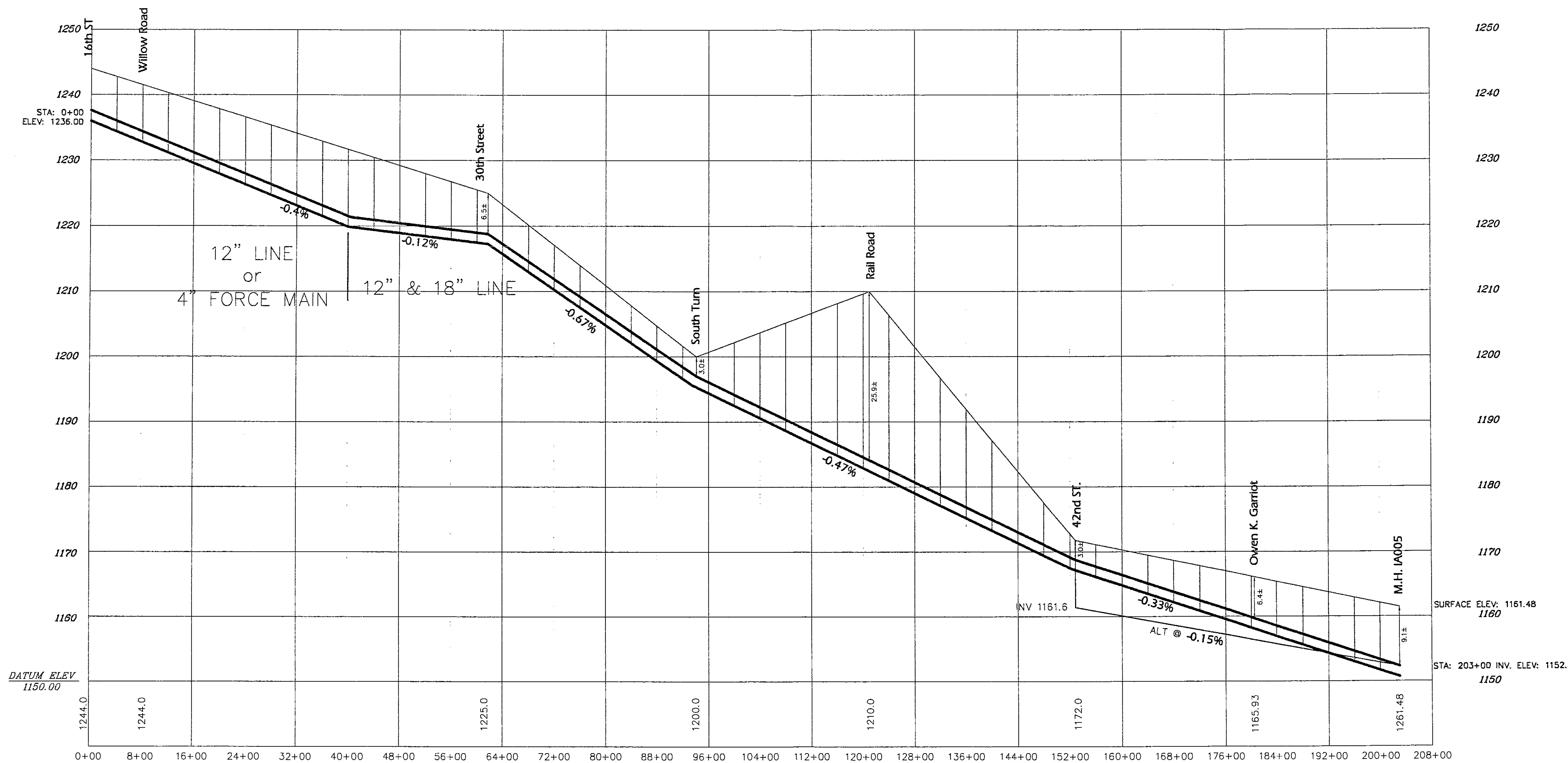

FIG. 13

PROFILE
42ND STREET OPTION 4

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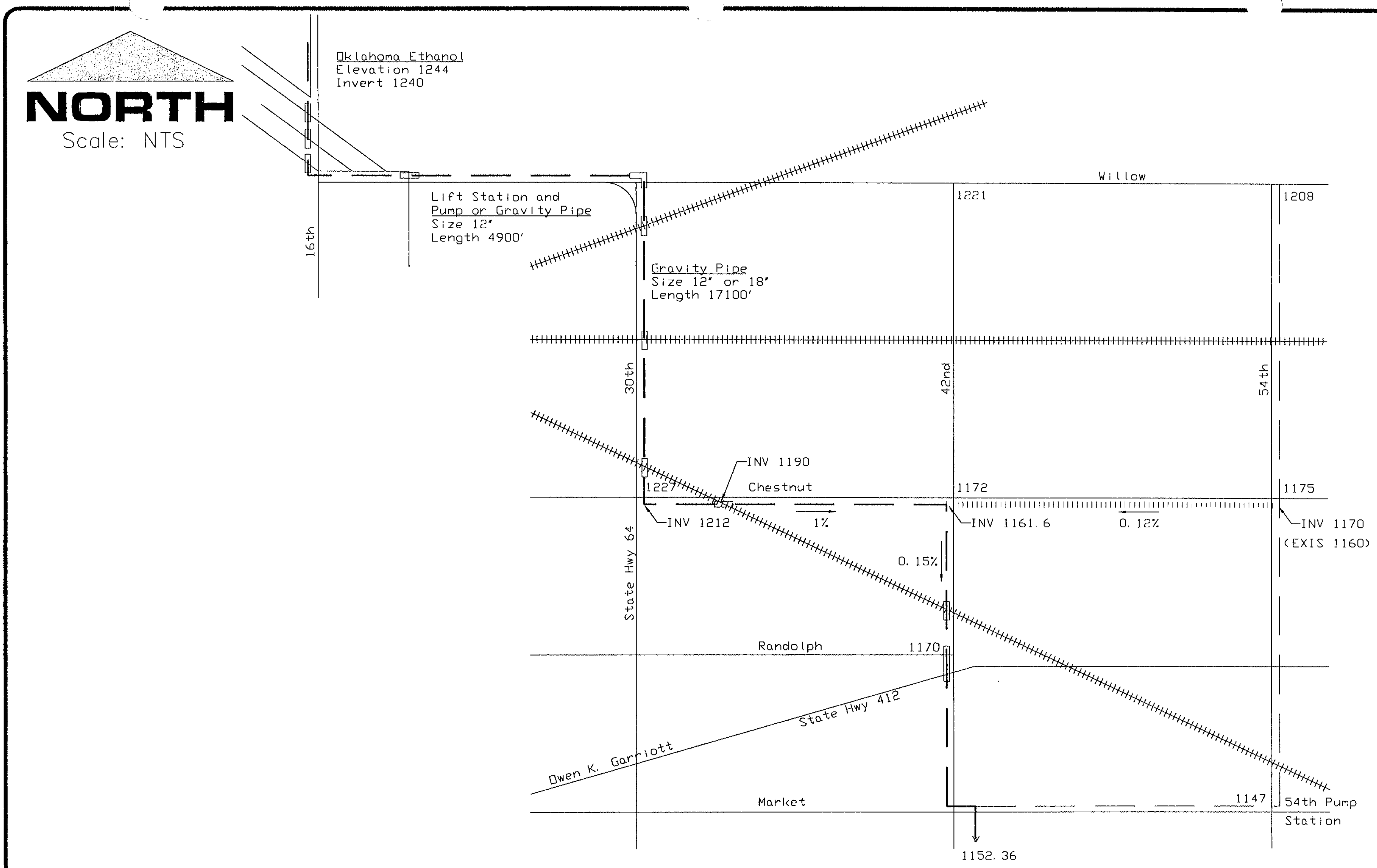

FIG. 14

LAYOUT PLAN
ALTERNATE 42ND STREET OPTION

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The estimated cost for this option, graphically depicted on *Figure 13,* is $3,044,200.00, as summarized in *Table 4.*

4.5 **Option 5 - 54TH Street Analysis.** Based on the results of a summary evaluation of routing the sanitary sewer pipeline to 54TH Street along Willow Road, it has been determined that this option is not feasible due to the crossing of Skeleton Creek west of 42ND Street that precludes flow upward on the east side.

However, there is a possibility of directing sewage from 54TH Street and Chestnut Avenue west to the 42ND Street Option 4 alignment. Reducing the slope of the sewer south of Chestnut on 42ND Street to 0.12% or 0.15% would provide the depth needed at 42ND Street and Chestnut Avenue to allow sewage flow from 54TH Street, as graphically depicted on *Figure 14*. This is based on an approximate sewer depth of 6- to 7-ft. at 54TH and Chestnut. Since the actual sewer depth at this intersection is 15-ft., this option would only be useful for new connections in this area. This helps demonstrate a backbone for sanitary sewer collection for the greater area of northeast Enid.

This line would cost approximately $600,000.00 more than the 30TH Street "all-gravity" Option 3 for a total estimated cost of $3,000,000.00. This would encompass approximately 22,000-ft. of sanitary sewer line from the Oklahoma Ethanol Plant to the 33-in. main trunk line at Market Street.

5. CONCLUSIONS AND RECOMMENDATIONS

Based on current information regarding maximum capacity, Options 1 and 2 for Washington Street and Elm Street routing, respectively, may impact the usefulness and purpose of the 24-in. collector pipelines. In addition, Option 1 requires reverse routing of sanitary sewer flows.

Based on the analyses and associated cost estimates, the most likely candidates for routing and conveying flows up to 300,000-gpd from the future Oklahoma Ethanol sanitary sewer collection pipeline appear to be Options 2 and 3 (16TH Street and 30TH Street, respectively.) Although Option 2 (16TH Street) is less expensive, it may impact the capability of the existing 24-in. collector line to less than acceptable levels.

The 30TH Street Option 3 should provide the necessary capacity for several existing facilities as well as future development. The length of Hamm & Phillips' force main could be reduced to a short segment to 30TH Street. In addition, this option offers the flexibility of adding a branch line east along Chestnut Avenue as well as a separate feeder at the 33-in. pipeline.

It appears that an evaluation of the developmental possibilities of Option 4 (42ND Street corridor) need to be further studied in order to determine the advantage of constructing a sanitary sewer collector along this route. However, this option presents an opportunity to combine it with Option 3 plus a cross-link on Chestnut Avenue to provide another method of access to future developers along Chestnut Avenue. In addition, it could afford an opportunity to redirect sanitary sewer flow from

Table 4

City of Enid
Oklahoma Ethanol Sewer Extension
Preliminary Engineers Cost Estimate

Option 4 - 42nd St

December 18, 2006

No.	Item	Unit	Quantity	Rate	Total
1	Mobilization	Ea	1	$6,000.00	$6,000.00
2	12" D.I.P. Sanitary Sewer, trench and pipe, complete	LF	4250	$80.00	$340,000.00
3	12" D.I.P. Sanitary Sewer bore and pipe, complete	LF	650	$100.00	$65,000.00
4	20" steel casing w/ 12" DIP waterline, bored	LF	400	$200.00	$80,000.00
5	18" D.I.P. Sanitary Sewer, trench and pipe, complete	LF	12300	$150.00	$1,845,000.00
6	18" D.I.P. Sanitary Sewer bore and pipe, complete	LF	2700	$250.00	$675,000.00
7	26" steel casing w/ 18" DIP waterline, bored	LF	400	$300.00	$120,000.00
8	4 ft dia Sanitary Sewer Manhole 8 ft deep complete	Ea	55	$3,000.00	$165,000.00
9	Additional depth for 4 ft dial Manhole	Ft	100	$30.00	$3,000.00
10	Remove & replace 4" pavement, complete, in place	SF	1000	$10.00	$10,000.00
11	Compaction, complete, in place	CY	100	$20.00	$2,000.00
12	Project sign, complete, in place	Ea.	2	$600.00	$1,200.00
13	Traffic control, complete, in place	L.S.	1	$1,000.00	$1,000.00
14	Lift Station w/ Telemetry	L.S.	1	$150,000.00	$150,000.00
	Subtotal Construction Cost				**$3,463,200.00**

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54TH Street by gravity and therefore, reduce the demand and need to upgrade the 54TH Street pump station.

Option 5 (54TH Street) is not a probable candidate due to the creek depression west of 42ND Street and an uphill slope eastward.

Therefore, it is ENVIROTECH'S recommendation that further consideration be given to **Option 3** to provide an overall solution for sanitary sewer collection requirements for current and future development of the northeast portion of Enid. Option 4 should be further evaluated as part of other 54TH Street sanitary sewer line issues. Investment in Option 2 could diminish the capability of the existing 24-in. collector and result in unanticipated upgrade costs in the future. In order to finalize a decision for Option 3, further investigation is recommended to determine exact locations of utilities, drainage, and other physical obstacles existing on this route.

A summary of the estimated costs for Options 1 through 4 is presented in *Table 5*.

Table 5

City of Enid
Oklahoma Ethanol Sewer Extension
Preliminary Engineers Cost Estimate

Summary of Options

December 18, 2006

Description	Method	Table	Est. Cost
Option 1 - Washington Ave.	"PUMP-AND-GRAVITY"	1	$867,700.00
Option 2 - Elm St	"Gravity - TRENCH-AND-BORE"	2a	$1,148,800.00
Option 2 - Elm St	"Gravity - ALL TRENCH"	2b	$1,069,800.00
Option 3 - 30th St	"ALL GRAVITY" FLOW	3a	$2,388,700.00
Option 3 - 30th St	"PUMP-AND-GRAVITY"	3b	$1,680,950.00
Option 4 - 42nd St	"PUMP-AND-GRAVITY"	4	$3,044,200.00

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APPENDIX A.

SANITARY SEWER FLOW CALCULATIONS

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Table
Rating Table for Circular Channel

Washington - Elm st. option
30th St option

Project Description	
Project File	x:\projects\eng\2006\oklaho~1\pipefl~1.fm2
Worksheet	36"
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data		
Mannings Coefficient	0.016	
Channel Slope	0.004000 ft/ft	
Diameter	10.00	in

Input Data	Minimum	Maximum	Increment
Depth	0.0	10.0	1.0 in

Rating Table

Depth (in)	Discharge (cfs)	Velocity (ft/s)
0.0	0.00	0.00
1.0	0.02	0.83
2.0	0.10	1.27
3.0	0.22	1.60
4.0	0.38	1.86
5.0	0.56	2.06
6.0	0.76	2.21
7.0	0.94	2.31
8.0	1.10	2.35
9.0	1.20	2.32
10.0	1.13	2.06

1.20 cfs = 538.6 gal/min = 775 580 gal/day

Table
Rating Table for Circular Channel

Project Description	
Project File	x:\projects\eng\2006\oklaho~1\pipefl~1.fm2
Worksheet	36"
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data	
Mannings Coefficient	0.016
Channel Slope	0.002900 ft/ft
Diameter	10.00 in

Input Data	Minimum	Maximum	Increment
Depth	0.0	10.0	1.0 in

Rating Table

Depth (in)	Discharge (cfs)	Velocity (ft/s)	
0.0	0.00	0.00	
1.0	0.02	0.71	
2.0	0.08	1.08	
3.0	0.19	1.36	
4.0	0.32	1.59	
5.0	0.48	1.76	
6.0	0.64	1.88	
7.0	0.80	1.97	
8.0	0.94	2.00	→ .604 MGD
9.0	1.02	1.98	
10.0	0.96	1.76	

1.02 cfs = 457.8 gal/min = 659243 gal/day

Table
Rating Table for Circular Channel

24" COLLECTOR
OPT 1 & 2

Project Description	
Project File	x:\projects\eng\2006\oklaho~1\pipefl~1.fm2
Worksheet	36"
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data		
Mannings Coefficient	0.016	
Channel Slope	0.000800	ft/ft
Diameter	24.00	in

Input Data			
	Minimum	Maximum	Increment
Depth	0.0	24.0	1.0 in

Rating Table

Depth (in)	Discharge (cfs)	Velocity (ft/s)
0.0	0.00	0.00
1.0	0.02	0.38
2.0	0.07	0.59
3.0	0.17	0.76
4.0	0.31	0.91
5.0	0.49	1.04
6.0	0.71	1.16
7.0	0.96	1.26
8.0	1.25	1.36
9.0	1.56	1.45
10.0	1.89	1.52
11.0	2.24	1.59
12.0	2.60	1.65
13.0	2.97	1.71
14.0	3.34	1.76
15.0	3.71	1.80
16.0	4.08	1.83
17.0	4.42	1.86
18.0	4.74	1.88
19.0	5.03	1.89
20.0	5.27	1.89
21.0	5.46	1.87
22.0	5.57	1.85
23.0	5.57	1.80
24.0	5.20	1.65

5.57 cfs = 2499.99 gal/min = 3.60 x10[6] gal/day

Table
Rating Table for Circular Channel

30" MAIN COLLECTOR
OPT 2

Project Description	
Project File	x:\projects\eng\2006\oklaho~1\pipefl~1.fm2
Worksheet	36"
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data		
Mannings Coefficient	0.016	
Channel Slope	0.001000	ft/ft
Diameter	30.00	in

Input Data	Minimum	Maximum	Increment
Depth	0.0	30.0	1.0 in

Rating Table

Depth (in)	Discharge (cfs)	Velocity (ft/s)
0.0	0.00	0.00
1.0	0.02	0.42
2.0	0.09	0.66
3.0	0.22	0.86
4.0	0.40	1.03
5.0	0.64	1.18
6.0	0.92	1.32
7.0	1.26	1.45
8.0	1.64	1.56
9.0	2.06	1.67
10.0	2.53	1.76
11.0	3.02	1.85
12.0	3.55	1.94
13.0	4.10	2.01
14.0	4.68	2.08
15.0	5.27	2.15
16.0	5.87	2.20
17.0	6.48	2.26
18.0	7.08	2.30
19.0	7.68	2.34
20.0	8.26	2.38
21.0	8.82	2.40
22.0	9.36	2.43
23.0	9.85	2.44
24.0	10.30	2.45

Table

Rating Table for Circular Channel

Rating Table

Depth (in)	Discharge (cfs)	Velocity (ft/s)
25.0	10.69	2.45
26.0	11.01	2.44
27.0	11.23	2.41
28.0	11.33	2.38
29.0	11.25	2.32
30.0	10.54	2.15

11.33 cfs = 5085.26 gal/min = 7.32 x10⁶ gal/day

Table

Rating Table for Circular Channel

33" MAIN COLLECTO

Project Description	
Project File	x:\projects\eng\2006\oklaho~1\pipefl~1.fm2
Worksheet	36"
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data		
Mannings Coefficient	0.016	
Channel Slope	0.001000	ft/ft
Diameter	33.00	in

Input Data	Minimum	Maximum	Increment
Depth	0.0	33.0	1.0 in

Rating Table

Depth (in)	Discharge (cfs)	Velocity (ft/s)
0.0	0.00	0.00
1.0	0.02	0.42
2.0	0.10	0.67
3.0	0.23	0.86
4.0	0.42	1.04
5.0	0.67	1.19
6.0	0.98	1.33
7.0	1.34	1.46
8.0	1.75	1.57
9.0	2.21	1.68
10.0	2.71	1.79
11.0	3.26	1.88
12.0	3.84	1.97
13.0	4.45	2.05
14.0	5.09	2.12
15.0	5.76	2.19
16.0	6.45	2.26
17.0	7.14	2.32
18.0	7.85	2.37
19.0	8.56	2.42
20.0	9.27	2.46
21.0	9.97	2.50
22.0	10.65	2.53
23.0	11.31	2.56
24.0	11.94	2.58

Table

Rating Table for Circular Channel

Rating Table		
Depth (in)	Discharge (cfs)	Velocity (ft/s)
25.0	12.53	2.60
26.0	13.08	2.61
27.0	13.57	2.61
28.0	13.98	2.60
29.0	14.31	2.59
30.0	14.54	2.56
31.0	14.62	2.52
32.0	14.48	2.46
33.0	13.59	2.29

14.62 cfs = 6561.91 gal/min = 9.45×10^6 gal/day

Table
Rating Table for Circular Channel

36" MAIN COLLECTOR

Project Description	
Project File	x:\projects\eng\2006\oklaho~1\pipefl~1.fm2
Worksheet	36"
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data		
Mannings Coefficient	0.016	
Channel Slope	0.001000	ft/ft
Diameter	36.00	in

Input Data	Minimum	Maximum	Increment
Depth	0.0	36.0	1.0 in

Rating Table

Depth (in)	Discharge (cfs)	Velocity (ft/s)
0.0	0.00	0.00
1.0	0.02	0.42
2.0	0.10	0.67
3.0	0.24	0.87
4.0	0.45	1.04
5.0	0.71	1.19
6.0	1.03	1.34
7.0	1.42	1.47
8.0	1.86	1.59
9.0	2.35	1.70
10.0	2.89	1.80
11.0	3.48	1.90
12.0	4.11	1.99
13.0	4.78	2.08
14.0	5.48	2.16
15.0	6.22	2.23
16.0	6.98	2.30
17.0	7.77	2.36
18.0	8.57	2.42
19.0	9.38	2.48
20.0	10.20	2.53
21.0	11.02	2.57
22.0	11.84	2.62
23.0	12.64	2.65
24.0	13.43	2.68

Table
Rating Table for Circular Channel

Rating Table

Depth (in)	Discharge (cfs)	Velocity (ft/s)
25.0	14.20	2.71
26.0	14.93	2.73
27.0	15.63	2.75
28.0	16.27	2.76
29.0	16.86	2.76
30.0	17.38	2.76
31.0	17.82	2.75
32.0	18.16	2.74
33.0	18.38	2.71
34.0	18.43	2.67
35.0	18.23	2.60
36.0	17.14	2.42

18.43 cfs = 8271.96 gal/min = 1.19×10^7 gal/day

Table
Rating Table for Circular Channel

24" MAIN COLLECTOR
OPT 2 ELM ST.

Project Description	
Project File	c:\program files\academic\fmw\project2.fm2
Worksheet	Elm Street Option 2
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data		
Mannings Coefficient	0.016	
Channel Slope	0.002500 ft/ft	
Diameter	24.00	in

Input Data			
	Minimum	Maximum	Increment
Depth	0.0	24.0	2.0 in

Rating Table

Depth (in)	Discharge (cfs)	Velocity (ft/s)	
0.0	0.00	0.00	
2.0	0.13	1.04	
4.0	0.55	1.61	
6.0	1.26	2.05	
8.0	2.20	2.40	
10.0	3.34	2.69	
12.0	4.59	2.93	
14.0	5.91	3.11	
16.0	7.20	3.24	
18.0	8.38	3.32	→ 85% ÷1.55 => 5.4 MGD => 3750 gpm
20.0	9.32	3.33	
22.0	9.85	3.27	→ ÷1.55 cfs/mgd => 6.4 MGD => 4413 gpm
24.0	9.19	2.93	

Culvert Calculator Report
NOC Sewer Run at Elm

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	23.00 ft	Headwater Depth/ Height	1.50
Computed Headwater Elevation	23.00 ft	Discharge	13.705 cfs
Inlet Control HW Elev	22.11 ft	Tailwater Elevation	20.00 ft
Outlet Control HW Elev	23.00 ft	Control Type	Outlet Control

8. PMCD

Grades			
Upstream Invert	20.00 ft	Downstream Invert	19.00 ft
Length	400.00 ft	Constructed Slope	0.002500 ft/ft

Hydraulic Profile			
Profile	CompositeM2Pressure	Depth, Downstream	1.33 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	1.33 ft
Velocity Downstream	6.16 ft/s	Critical Slope	0.007954 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.015
Section Material	Concrete	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	23.00 ft	Upstream Velocity Head	0.30 ft
Ke	0.50	Entrance Loss	0.15 ft

Inlet Control Properties			
Inlet Control HW Elev	22.11 ft	Flow Control	Unsubmerged
Inlet Type	Square edge w/headwall	Area Full	3.1 ft²
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

Culvert Calculator Report
NOC Sewer Run at Elm

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	22.00 ft	Headwater Depth/ Height	1.00
Computed Headwater Elevation	22.00 ft	Discharge	10.375 cfs
Inlet Control HW Elev	21.73 ft	Tailwater Elevation	20.00 ft
Outlet Control HW Elev	22.00 ft	Control Type	Outlet Control

Grades			
Upstream Invert	20.00 ft	Downstream Invert	19.00 ft
Length	400.00 ft	Constructed Slope	0.002500 ft/ft

Hydraulic Profile			
Profile	M2	Depth, Downstream	1.15 ft
Slope Type	Mild	Normal Depth	1.77 ft
Flow Regime	Subcritical	Critical Depth	1.15 ft
Velocity Downstream	5.53 ft/s	Critical Slope	0.007013 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.015
Section Material	Concrete	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	22.00 ft	Upstream Velocity Head	0.21 ft
Ke	0.50	Entrance Loss	0.10 ft

Inlet Control Properties			
Inlet Control HW Elev	21.73 ft	Flow Control	Unsubmerged
Inlet Type	Square edge w/headwall	Area Full	3.1 ft^2
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

Culvert Calculator Report
NOC Sewer Run at Elm

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	22.00 ft	Headwater Depth/ Height	1.00
Computed Headwater Elevation	22.00 ft	Discharge	9.176 cfs
Inlet Control HW Elev	21.60 ft	Tailwater Elevation	21.00 ft
Outlet Control HW Elev	22.00 ft	Control Type	Outlet Control

5.9MGD

Grades			
Upstream Invert	20.00 ft	Downstream Invert	19.00 ft
Length	400.00 ft	Constructed Slope	0.002500 ft/ft

Hydraulic Profile			
Profile	M1	Depth, Downstream	2.00 ft
Slope Type	Mild	Normal Depth	1.54 ft
Flow Regime	Subcritical	Critical Depth	1.08 ft
Velocity Downstream	2.92 ft/s	Critical Slope	0.006743 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.015
Section Material	Concrete	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	22.00 ft	Upstream Velocity Head	0.15 ft
Ke	0.50	Entrance Loss	0.08 ft

Inlet Control Properties			
Inlet Control HW Elev	21.60 ft	Flow Control	Unsubmerged
Inlet Type	Square edge w/headwall	Area Full	3.1 ft^2
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

Culvert Calculator Report
NOC Sewer Run

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	1,190.00 ft	Headwater Depth/ Height	0.72
Computed Headwater Elevation	1,176.28 ft	Discharge	1,900 gal/min
Inlet Control HW Elev	1,176.09 ft	Tailwater Elevation	1,176.09 ft
Outlet Control HW Elev	1,176.28 ft	Control Type	Outlet Control

2.7MGD

Grades			
Upstream Invert	1,174.85 ft	Downstream Invert	1,174.09 ft
Length	265.00 ft	Constructed Slope	0.002868 ft/ft

Hydraulic Profile			
Profile	M1	Depth, Downstream	2.00 ft
Slope Type	Mild	Normal Depth	0.88 ft
Flow Regime	Subcritical	Critical Depth	0.72 ft
Velocity Downstream	1.35 ft/s	Critical Slope	0.005995 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.015
Section Material	Concrete	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	1,176.28 ft	Upstream Velocity Head	0.05 ft
Ke	0.50	Entrance Loss	0.03 ft

Inlet Control Properties			
Inlet Control HW Elev	1,176.09 ft	Flow Control	Unsubmerged
Inlet Type	Square edge w/headwall	Area Full	3.1 ft²
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

Culvert Calculator Report
NOC Sewer Run

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	1,176.85 ft	Headwater Depth/ Height	1.00
Computed Headwater Elevation	1,176.85 ft	Discharge	4,190 gal/min
Inlet Control HW Elev	1,176.47 ft	Tailwater Elevation	1,176.09 ft
Outlet Control HW Elev	1,176.85 ft	Control Type	Outlet Control

Grades			
Upstream Invert	1,174.85 ft	Downstream Invert	1,174.09 ft
Length	265.00 ft	Constructed Slope	0.002868 ft/ft

Hydraulic Profile			
Profile	M1	Depth, Downstream	2.00 ft
Slope Type	Mild	Normal Depth	1.47 ft
Flow Regime	Subcritical	Critical Depth	1.09 ft
Velocity Downstream	2.97 ft/s	Critical Slope	0.006777 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.015
Section Material	Concrete	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev	1,176.85 ft	Upstream Velocity Head	0.16 ft
Ke	0.50	Entrance Loss	0.08 ft

Inlet Control Properties			
Inlet Control HW Elev	1,176.47 ft	Flow Control	Unsubmerged
Inlet Type	Square edge w/headwall	Area Full	3.1 ft²
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

Table

Rating Table for Circular Channel

ELM St. opt 2

Project Description	
Project File	x:\projects\eng\2006\oklaho~1\pipefl~1.fm2
Worksheet	36"
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data	
Mannings Coefficient	0.016
Channel Slope	0.004000 ft/ft
Diameter	8.00 in

Input Data

	Minimum	Maximum	Increment
Depth	0.0	8.0	1.0 in

Rating Table

Depth (in)	Discharge (cfs)	Velocity (ft/s)
0.0	0.00	0.00
1.0	0.02	0.82
2.0	0.09	1.25
3.0	0.19	1.55
4.0	0.31	1.78
5.0	0.44	1.93
6.0	0.57	2.02
7.0	0.65	2.01
8.0	0.62	1.78

0.65 cfs = 291.74 gal/min = 420106 gal/day

APPENDICES

APPENDIX TM 3-1

COST ANALYSIS WORKSHEETS

CITY OF ENID WASTEWATER FACILITY PLAN

TABLE 1

CAPITAL COST ESTIMATES

Sep-06

OPTION 1A: 14 MGD NEW PLANT, CONVENTIONAL ACTIVATED SLUDGE PROCESS

Unit Description	Unit Size/ Design Capacity	Number of Units	Estimated Cost in 2006 Dollars
Improvements at 2010			
Mobilization	-	-	860,800
Sitework	-	-	2,458,400
Headworks			
Screening	28 MGD	-	510,400
Grit Removal	28 MGD	-	783,100
Parshal Flume	28 MGD	-	240,500
Liftstation	28 MGD	-	1,383,900
Primary Clarifiers	90 ft. Dia	2	1,794,600
Aeration Basin	200' L x 50' W x 16.5' D	4	8,115,200
Secondary Clarifiers	100 ft. Dia	3	3,322,900
Nitrification Basin	14 MGD	-	4,643,300
Tertiary clarifiers	100 ft. Dia	3	3,322,900
Disinfection system	28 MGD	-	1,382,000
Electrical	-	-	2,519,600
Instrumentation & Controls	-	-	1,339,400
Piping	-	-	3,739,100
Influent / Effluent outfall	2300 LF, 36"	-	750,000
SUB TOTAL			**37,166,100**
Non-Construction Cost (15%)			5,575,000
Contingency (15%)			5,575,000
TOTAL			**48,316,100**
Improvements at 2020			
Mobilization	-	-	200,000
Sitework	-	-	300,000
Aerobic Digesters	60 ft. Dia	2	1,295,800
Dewatering System	4 MGD	-	1,200,300
Electrical	-	-	250,000
Instrumentation & Controls	-	-	150,000
Piping	-	-	400,000
SUB TOTAL			**3,796,100**
Non-Construction Cost (15%)			569,500
Contingency (15%)			569,500
TOTAL			**4,935,100**

CITY OF ENID WASTEWATER FACILITY PLAN

TABLE 2

CAPITAL COST ESTIMATES

Sep-06

OPTION 1B: 14 MGD NEW PLANT, SBR (SEQUENTIAL BATCH REACTOR) PROCESS

Unit Description	Unit Size/ Design Capacity	Number of Units	Estimated Cost in 2006 Dollars
Improvements at 2010			
Mobilization	-	-	860,800
Sitework	-	-	2,458,400
Headworks			
Screening	28 MGD	-	510,400
Grit Removal	28 MGD	-	783,100
Parshal Flume	28 MGD	-	240,500
Liftstation	28 MGD	-	1,383,900
SBR Reactors	140' L x 98' W x 22' D	8	18,960,200
Sludge Holding Basins	70' L x 35' W x 12' D	2	1,174,100
Disinfection System	40 MGD	-	1,975,300
Electrical	-	-	2,519,600
Instrumentation & Controls	-	-	1,339,400
Piping	-	-	2,875,600
Influent / Effluent outfall	2300 LF, 36"	-	750,000
SUB TOTAL			**35,831,300**
Non-Construction Cost (15%)			5,374,700
Contingency (15%)			5,374,700
TOTAL			**46,580,700**
Improvements at 2020			
Mobilization	-	-	200,000
Sitework	-	-	300,000
Aerobic Digesters	60 ft. Dia	2	1,295,800
Dewatering System	4 MGD	-	1,200,300
Electrical	-	-	250,000
Instrumentation & Controls	-	-	150,000
Piping	-	-	400,000
SUB TOTAL			**3,796,100**
Non-Construction Cost (15%)			569,500
Contingency (15%)			569,500
TOTAL			**4,935,100**

CITY OF ENID WASTEWATER FACILITY PLAN

TABLE 3

CAPITAL COST ESTIMATES

Sep-06

OPTION 3A: 12 MGD NEW PLANT, CONVENTIONAL ACTIVATED SLUDGE PROCESS WITH EXPANSION TO 14 MGD CAPACITY

Unit Description	Unit Size/ Design Capacity	Number of Units	Estimated Cost in 2006 Dollars
Improvements at 2010			
Mobilization	-	-	773,900
Sitework	-	-	2,220,600
Headworks			
Screening	28 MGD	-	510,400
Grit Removal	28 MGD	-	783,100
Parshal Flume	28 MGD	-	240,500
Liftstation	28 MGD	-	1,383,900
Primary Clarifiers	90 ft. Dia	2	1,794,600
Aeration Basin	180' L x 45' W x 17.20' D	4	6,852,200
Secondary Clarifiers	90 ft. Dia	3	2,691,900
Nitrification Basin	12 MGD	-	4,085,500
Tertiary clarifiers	90 ft. Dia	3	2,691,900
Disinfection System	28 MGD	-	1,382,000
Electrical	-	-	2,251,500
Instrumentation & Controls	-	-	1,187,700
Piping	-	-	3,320,600
Influent / Effluent outfall	2300 LF, 36"	-	750,000
SUB TOTAL			**32,920,300**
Non-Construction Cost (15%)			4,938,100
Contingency (15%)			4,938,100
TOTAL			**42,796,500**
Improvements at 2020			
Mobilization	-	-	224,800
Sitework	-	-	680,600
Aeration Basin	180' L x 30' W x 17.20' D	4	1,142,100
Secondary Clarifiers	80 ft. Dia	1	709,000
Nitrification Basin	2 MGD	-	821,400
Tertiary clarifiers	80 ft. Dia	1	709,000
Aerobic Digesters	60 ft. Dia	2	1,295,800
Dewatering System	4 MGD	-	1,200,300
Electrical	-	-	608,800
Instrumentation & Controls	-	-	293,600
Piping	-	-	835,700
SUB TOTAL			**8,521,100**
Non-Construction Cost (15%)			1,278,200
Contingency (15%)			1,278,200
TOTAL			**11,077,500**

CITY OF ENID WASTEWATER FACILITY PLAN

TABLE 4

CAPITAL COST ESTIMATES

Sep-06

OPTION 3B: 12 MGD NEW PLANT, SBR (SEQUENTIAL BATCH REACTOR) PROCESS WITH EXPANSION TO 14 MGD CAPACITY

Unit Description	Unit Size/ Design Capacity	Number of Units of Units	Estimated Cost in 2006 Dollars
Improvements at 2010			
Mobilization	-	-	773,900
Sitework	-	-	2,220,600
Headworks			
Screening	28 MGD	-	510,400
Grit Removal	28 MGD	-	783,100
Parshal Flume	28 MGD	-	240,500
Liftstation	28 MGD	-	1,383,900
SBR Reactors	140' L x 98' W x 22' D	7	16,590,200
Sludge Holding Basins	70' L x 35' W x 12' D	2	1,174,100
Disinfection System	40 MGD	-	1,975,300
Electrical	-	-	2,251,500
Instrumentation & Controls	-	-	1,187,700
Piping	-	-	2,560,000
Influent / Effluent outfall	2300 LF, 36"	-	750,000
SUB TOTAL			**32,401,200**
Non-Construction Cost (15%)			4,860,200
Contingency (15%)			4,860,200
TOTAL			**42,121,600**
Improvements at 2020			
Mobilization	-	-	224,800
Sitework	-	-	680,600
SBR Reactors	140' L x 98' W x 22' D	1	2,370,100
Aerobic Digesters	60 ft. Dia	2	1,295,800
Dewatering System	4 MGD	-	1,200,300
Electrical	-	-	608,800
Instrumentation & Controls	-	-	293,600
Piping	-	-	580,000
SUB TOTAL			**7,254,000**
Non-Construction Cost (15%)			1,088,100
Contingency (15%)			1,088,100
TOTAL			**9,430,200**

CITY OF ENID WASTEWATER FACILITY PLAN

TABLE 5

CAPITAL COST ESTIMATES

Sep-06

OPTION 4A: USING EXISTING TREATMENT FACILITY AND BUILDING A 7 MGD NEW PLANT, CONVENTIONAL ACTIVATED SLUDGE PROCESS WITH EXPANSION TO 14 MGD CAPACITY

Unit Description	Unit Size/ Design Capacity	Number of Units	Estimated Cost in 2006 Dollars
Improvements at 2010			
Mobilization	-	-	533,600
Sitework	-	-	1,555,900
Headworks			
Screening	28 MGD	-	510,400
Grit Removal	28 MGD	-	783,100
Parshal Flume	28 MGD	-	240,500
Liftstation	28 MGD	-	1,383,900
Primary Clarifiers	70 ft. Dia	2	1,085,700
Aeration Basin	150' L x 75' W x 15' D	2	4,149,900
Secondary Clarifiers	90 ft. Dia	2	1,794,600
Nitrification Basin	7 MGD	-	2,721,100
Tertiary clarifiers	90 ft. Dia	2	1,794,600
Disinfection System	28 MGD	-	882,000
Improvements to Existing WWTP	-	-	2,737,700
Electrical	-	-	1,519,000
Instrumentation & Controls	-	-	780,000
Piping	-	-	2,192,700
Influent / Effluent outfall	2300 LF, 36"	-	750,000
SUB TOTAL			**25,414,700**
Non-Construction Cost (15%)			3,812,300
Contingency (15%)			3,812,300
TOTAL			**33,039,300**
Improvements at 2020			
Mobilization	-	-	533,600
Sitework	-	-	1,555,900
Primary Clarifiers	70 ft. Dia	2	1,085,700
Aeration Basin	150' L x 75' W x 15' D	2	4,149,900
Secondary Clarifiers	90 ft. Dia	2	1,794,600
Nitrification Basin	7 MGD	-	1,921,700
Tertiary clarifiers	90 ft. Dia	2	1,794,600
Disinfection System	-	-	500,000
Aerobic Digesters	60 ft. Dia	2	1,295,800
Dewatering System	4 MGD	-	1,200,300
Electrical	-	-	1,519,000
Instrumentation & Controls	-	-	780,000
Piping	-	-	2,192,700
SUB TOTAL			**20,323,800**
Non-Construction Cost (15%)			3,048,600
Contingency (15%)			3,048,600
TOTAL			**26,421,000**

CITY OF ENID WASTEWATER FACILITY PLAN

TABLE 6

CAPITAL COST ESTIMATES

Sep-06

OPTION 4B: USING EXISTING TREATMENT FACILITY AND BUILDING A 7 MGD NEW PLANT, SBR (SEQUENTIAL BATCH REACTOR) PROCESS WITH EXPANSION TO 14 MGD CAPACITY

Unit Description	Unit Size/ Design Capacity	Number of Units	Estimated Cost in 2006 Dollars
Improvements at 2010			
Mobilization	-	-	533,600
Sitework	-	-	1,555,900
Headworks			
Screening	28 MGD	-	510,400
Grit Removal	28 MGD	-	783,100
Parshal Flume	28 MGD	-	240,500
Liftstation	28 MGD	-	1,383,900
SBR Reactors	140' L x 98' W x 22' D	4	9,480,100
Sludge Holding Basins	70' L x 35' W x 12' D	1	587,100
Disinfection System	40 MGD	-	1,975,300
Improvements to Existing WWTP	-	-	2,737,700
Electrical	-	-	1,519,000
Instrumentation & Controls	-	-	780,000
Piping	-	-	1,725,300
Influent / Effluent outfall	2300 LF, 36"	-	750,000
SUB TOTAL			**24,561,900**
Non-Construction Cost (15%)			3,684,300
Contingency (15%)			3,684,300
TOTAL			**31,930,500**
Improvements at 2020			
Mobilization	-	-	553,600
Sitework	-	-	1,555,900
SBR Reactors	140' L x 98' W x 22' D	4	9,480,100
Sludge Holding Basins	70' L x 35' W x 12' D	1	587,100
Aerobic Digesters	60 ft. Dia	2	1,295,800
Dewatering System	4 MGD	-	1,200,300
Electrical	-	-	1,519,000
Instrumentation & Controls	-	-	780,000
Piping	-	-	1,510,000
SUB TOTAL			**18,481,800**
Non-Construction Cost (15%)			2,772,300
Contingency (15%)			2,772,300
TOTAL			**24,026,400**

CITY OF ENID WASTEWATER FACILITY PLAN **TABLE 7**

Operations & Maintenance Costs September-06

Unit Component	Base Year Labor Rate ($/hr)	Annual Operations Costs: Operations Labor* (man-hours)	Operations Labor ($)	Maintenance Labor* (man-hours)	Maintenance Labor ($)	Additional Energy Costs ($)	Materials and Supply Costs** ($)	Total Annual Costs ($)
OPTION 1 A				Between 2010 - 2020				
Influent Pumping	$ 11.00	700	$ 7,700	600	$ 6,600	$ 122,400	$ 12,300	$ 149,000
Preliminary treatment	$ 11.00	2700	$ 29,700	1300	$ 14,300	$ -	$ 17,100	$ 61,100
Primary sedimentation	$ 11.00	1300	$ 14,300	700	$ 7,700	$ -	$ 9,800	$ 31,800
Activated sludge Process	$ 11.00	4300	$ 47,300	2800	$ 30,800	$ 424,200	$ 34,200	$ 536,500
Secondary Clarifiers	$ 11.00	1800	$ 19,800	1000	$ 11,000	$ -	$ 17,600	$ 48,400
Nitrification Basin	$ 11.00	3500	$ 38,500	2100	$ 23,100	$ 228,500	$ 34,200	$ 324,300
Tertiary clarifiers	$ 11.00	1800	$ 19,800	1000	$ 11,000	$ -	$ 17,600	$ 48,400
Desinfection	$ 11.00	140	$ 1,540	140	$ 1,540	$ 68,600	$ 18,000	$ 89,680
Digestion	$ 11.00	1800	$ 19,800	1300	$ 14,300	$ 130,600	$ 24,500	$ 189,200
Dewatering	$ 11.00	6000	$ 66,000	700	$ 7,700	$ -	$ 165,600	$ 239,300
							Total:	$ 1,717,680
OPTION 1A				Between 2020 - 2030*				
Digestion	$ 11.00	1000	$ 11,000	600	$ 6,600	$ 22,900	$ 12,300	$ 52,800
Dewatering	$ 11.00	3000	$ 33,000	400	$ 4,400	$ -	$ 80,600	$ 118,000
							Total:	$ 1,888,480
OPTION 1B				Between 2010 - 2020				
Influent Pumping	$ 11.00	700	$ 7,700	600	$ 6,600	$ 122,400	$ 12,300	$ 149,000
Preliminary treatment	$ 11.00	2700	$ 29,700	1300	$ 14,300	$ -	$ 17,100	$ 61,100
Sequential Batch Reactor	$ 11.00	5500	$ 60,500	3600	$ 39,600	$ 548,200	$ 34,200	$ 682,500
Sludge Holding Basin	$ 11.00	1000	$ 11,000	550	$ 6,050	$ -	$ 14,200	$ 31,250
Desinfection	$ 11.00	140	$ 1,540	140	$ 1,540	$ 68,600	$ 18,000	$ 89,680
Digestion	$ 11.00	1800	$ 19,800	1300	$ 14,300	$ 130,600	$ 24,500	$ 189,200
Dewatering	$ 11.00	6000	$ 66,000	700	$ 7,700	$ -	$ 165,600	$ 239,300
							Total:	$ 1,442,030
OPTION 1B				Between 2020 - 2030*				
Digestion	$ 11.00	1000	$ 11,000	600	$ 6,600	$ 22,900	$ 12,300	$ 52,800
Dewatering	$ 11.00	3000	$ 33,000	400	$ 4,400	$ -	$ 80,600	$ 118,000
							Total:	$ 1,612,830

* O&M Costs for the period 2020 - 2030 includes annual O&M costs estimated for the period 2010 - 2020 plus additional O&M costs resulting from expansion in 2020

CITY OF ENID WASTEWATER FACILITY PLAN — **TABLE 8**

Operations & Maintenance Costs — September-06

Unit Component	Base Year Labor Rate ($/hr)	Annual Operations Costs						
		Operations Labor* (man-hours)	Operations Labor ($)	Maintenance Labor* (man-hours)	Maintenance Labor ($)	Additional Energy Costs ($)	Materials and Supply Costs** ($)	Total Annual Costs ($)
OPTION 3A				Between 2010 - 2020				
Influent Pumping	$ 11.00	650	$ 7,150	550	$ 6,050	$ 81,600	$ 9,300	$ 104,100
Preliminary treatment	$ 11.00	2300	$ 25,300	1100	$ 12,100	$ -	$ 14,700	$ 52,100
Primary sedimentation	$ 11.00	1200	$ 13,200	650	$ 7,150	$ -	$ 10,000	$ 30,350
Activated sludge Process	$ 11.00	4000	$ 44,000	2500	$ 27,500	$ 359,000	$ 29,300	$ 459,800
Secondary Clarifiers	$ 11.00	1700	$ 18,700	850	$ 9,350	$ -	$ 13,200	$ 41,250
Nitrification Basin	$ 11.00	3000	$ 33,000	2000	$ 22,000	$ 195,800	$ 29,300	$ 280,100
Tertiary clarifiers	$ 11.00	1700	$ 18,700	850	$ 9,350	$ -	$ 13,200	$ 41,250
Desinfection	$ 11.00	120	$ 1,320	120	$ 1,320	$ 58,800	$ 15,400	$ 76,840
Digestion	$ 11.00	1800	$ 19,800	1300	$ 14,300	$ 130,600	$ 24,500	$ 189,200
Dewatering	$ 11.00	6000	$ 66,000	700	$ 7,700	$ -	$ 165,600	$ 239,300
							Total:	$ 1,514,290
OPTION 3A				Between 2020 - 2030*				
							Total:	$ 1,888,480
OPTION 3B				Between 2010 - 2020				
Influent Pumping	$ 11.00	650	$ 7,150	550	$ 6,050	$ 81,600	$ 9,300	$ 104,100
Preliminary treatment	$ 11.00	2300	$ 25,300	1100	$ 12,100	$ -	$ 14,700	$ 52,100
Sequential Batch Reactor	$ 11.00	5000	$ 55,000	3000	$ 33,000	$ 479,700	$ 29,300	$ 597,000
Sludge Holding Basin	$ 11.00	1000	$ 11,000	550	$ 6,050	$ -	$ 14,200	$ 31,250
Desinfection	$ 11.00	120	$ 1,320	120	$ 1,320	$ 58,800	$ 15,400	$ 76,840
Digestion	$ 11.00	1800	$ 19,800	1300	$ 14,300	$ 130,600	$ 24,500	$ 189,200
Dewatering	$ 11.00	6000	$ 66,000	700	$ 7,700	$ -	$ 165,600	$ 239,300
							Total:	$ 1,289,790
OPTION 3B				Between 2020 - 2030*				
							Total:	$ 1,612,830

* O&M Costs for the period 2020 - 2030 includes annual O&M costs estimated for the period 2010 - 2020 plus additional O&M costs resulting from expansion in 2020

CITY OF ENID WASTEWATER FACILITY PLAN **TABLE 9**

Operations & Maintenance Costs **September-06**

Unit Component	Base Year Labor Rate ($/hr)	Annual Operations Costs: Operations Labor* (man-hours)	Operations Labor ($)	Maintenance Labor* (man-hours)	Maintenance Labor ($)	Additional Energy Costs ($)	Materials and Supply Costs** ($)	Total Annual Costs ($)
OPTION 4A				Between 2010 - 2020				
Influent Pumping	$ 11.00	650	$ 7,150	550	$ 6,050	$ 81,600	$ 9,300	$ 104,100
Preliminary treatment	$ 11.00	2300	$ 25,300	1100	$ 12,100	$ -	$ 14,700	$ 52,100
Primary sedimentation	$ 11.00	1100	$ 12,100	600	$ 6,600	$ -	$ 10,800	$ 29,500
Activated sludge Process	$ 11.00	4500	$ 49,500	2900	$ 31,900	$ 339,400	$ 44,500	$ 465,300
Secondary Clarifiers	$ 11.00	1850	$ 20,350	990	$ 10,890	$ -	$ 17,400	$ 48,640
Nitrification Basin	$ 11.00	4100	$ 45,100	2800	$ 30,800	$ 244,800	$ 44,500	$ 365,200
Tertiary clarifiers	$ 11.00	2250	$ 24,750	1180	$ 12,980	$ -	$ 20,000	$ 57,730
Desinfection	$ 11.00	120	$ 1,320	120	$ 1,320	$ 58,800	$ 15,400	$ 76,840
Digestion	$ 11.00	1800	$ 19,800	1300	$ 14,300	$ 130,600	$ 24,500	$ 189,200
Dewatering	$ 11.00	6000	$ 66,000	700	$ 7,700	$ -	$ 165,600	$ 239,300
							Total:	$ 1,627,910
OPTION 4A				Between 2020 - 2030*				
							Total:	$ 1,888,480
OPTION 4B				Between 2010 - 2020				
Influent Pumping	$ 11.00	650	$ 7,150	550	$ 6,050	$ 81,600	$ 9,300	$ 104,100
Preliminary treatment	$ 11.00	2300	$ 25,300	1100	$ 12,100	$ -	$ 14,700	$ 52,100
Primary sedimentation	$ 11.00	650	$ 7,150	350	$ 3,850	$ -	$ 4,400	$ 15,400
Activated sludge Process	$ 11.00	2500	$ 27,500	1500	$ 16,500	$ 195,800	$ 20,000	$ 259,800
Secondary Clarifiers	$ 11.00	900	$ 9,900	500	$ 5,500	$ -	$ 7,400	$ 22,800
Nitrification Basin	$ 11.00	2600	$ 28,600	1700	$ 18,700	$ 130,600	$ 20,000	$ 197,900
Tertiary clarifiers	$ 11.00	1300	$ 14,300	700	$ 7,700	$ -	$ 10,800	$ 32,800
Sequential Batch Reactor	$ 11.00	3600	$ 39,600	2100	$ 23,100	$ 274,100	$ 24,500	$ 361,300
Sludge Holding Basin	$ 11.00	750	$ 8,250	350	$ 3,850	$ -	$ 13,700	$ 25,800
Desinfection	$ 11.00	120	$ 1,320	120	$ 1,320	$ 58,800	$ 15,400	$ 76,840
Digestion	$ 11.00	1800	$ 19,800	1300	$ 14,300	$ 130,600	$ 24,500	$ 189,200
Dewatering	$ 11.00	6000	$ 66,000	700	$ 7,700	$ -	$ 165,600	$ 239,300
							Total:	$ 1,577,340
OPTION 4B				Between 2020 - 2030*				
							Total:	$ 1,612,830

* O&M Costs for the period 2020 - 2030 includes annual O&M costs estimated for the period 2010 - 2020 plus additional O&M costs resulting from expansion in 2020

CITY OF ENID WASTEWATER FACILITY PLAN

TABLE 10

Sep-06

PRESENT WORTH COST ANALYSIS

OPTION	DESCRIPTION	CAPITAL COST		O & M COST		PRESENT WORTH COST AT 2006
		2010	2020	2010 - 2020	2020 - 2030	
1A	14 MGD New Plant Conventional Activated Sludge Process	$ 48,316,100	$ 4,935,100	$ 1,717,680	$ 1,888,480	**$ 62,646,975**
1B	14 MGD New Plant SBR Process	$ 46,580,700	$ 4,935,100	$ 1,442,030	$ 1,612,830	**$ 58,184,959**
3A	12 MGD New Plant Conventional Activated Sludge Process W/ Expansion to 14 MGD	$ 42,796,500	$ 11,077,500	$ 1,514,290	$ 1,888,480	**$ 59,985,628**
3B	12 MGD New Plant SBR Process W/ Expansion to 14 MGD	$ 42,121,600	$ 9,430,200	$ 1,289,790	$ 1,612,830	**$ 55,862,804**
4A	7 MGD New Plant Conventional Activated Sludge Process W/ Expansion to 14 MGD	$ 33,039,300	$ 26,421,000	$ 1,627,910	$ 1,888,480	**$ 60,842,593**
4B	7 MGD New Plant SBR Process W/ Expansion to 14 MGD	$ 31,930,500	$ 24,026,400	$ 1,577,340	$ 1,612,830	**$ 57,106,473**