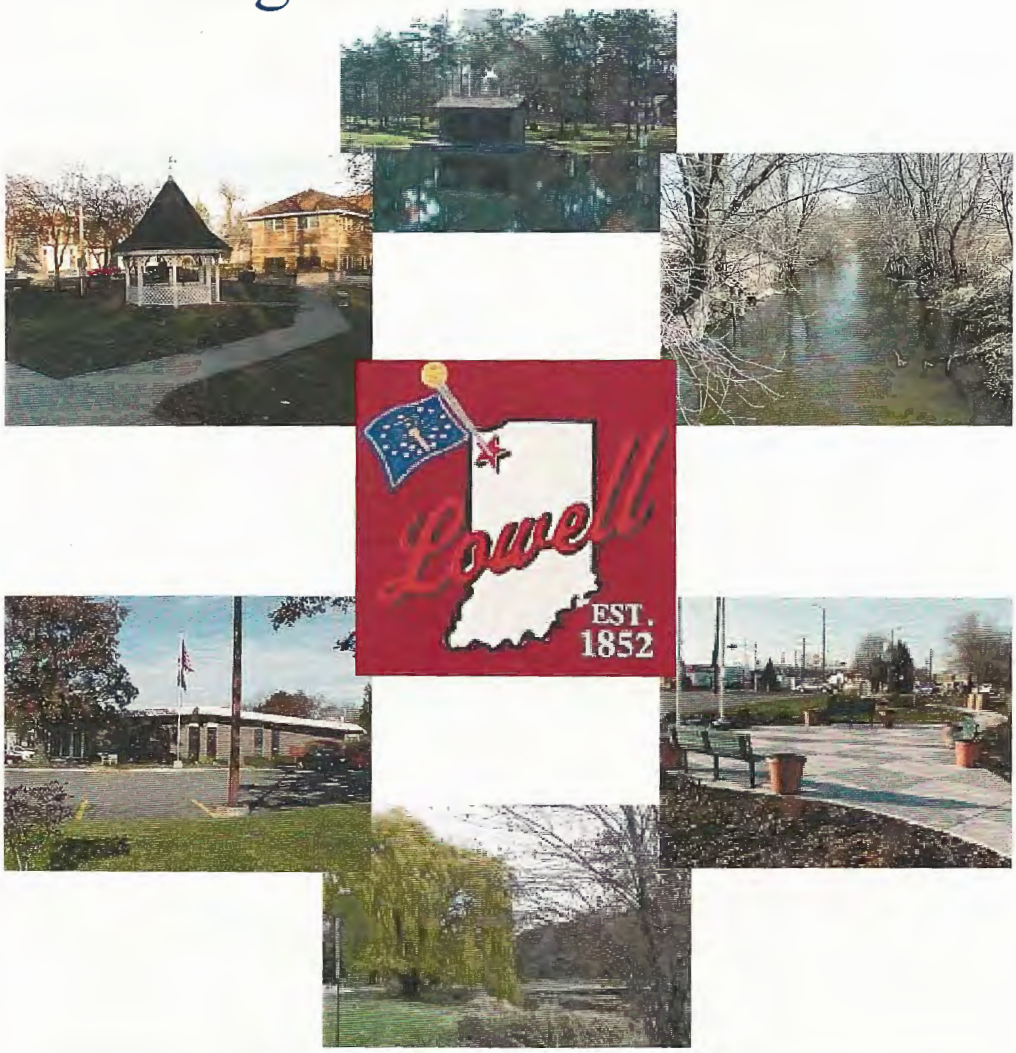
Town of Lowell

Combined Sewer Overflows

Long Term Control Plan



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REVISED - NOVEMBER 2022

TOWN OF LOWELL, INDIANA
COMBINED SEWER LONG TERM CONTROL PLAN (LTCP)

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The following LTCP includes revisions made in November 2022. All revisions are included as red text in the document. Proposed revisions include the addition Item 6 - Equalization Basin Drain Back Pipe Modifications project, removal of Item 4 - Interceptor Rehabilitation , removal of Items 2.B and 5 - CSA sewer evaluation and rehabilitation, as well as an updated Compliance Plan Schedule and miscellaneous items.

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EXECUTIVE SUMMARY

The Town of Lowell, Indiana, located in Lake County, Indiana, is required by its NPDES permit (IN0023621) to complete this combined sewer Long Term Control Plan (LTCP) for the purpose of controlling discharges from its Combined Sewer System (CSS). This report describes the Town of Lowell's plans for implementation and the process used to determine appropriate long-term Combined Sewer Overflow (CSO) controls.

Through the Town's combined sewer operational and control plans, Lowell will strive to meet Federal and State CSO policy, which has the purpose of reducing or eliminating the impacts of combined sewers on waterways. The first phase of this effort focuses on what is known as the "nine minimum controls" and will be achieved through complete implementation of the Town's Combined Sewer Overflow Operational Plan (CSOOP). Controls and operations recommended in the CSOOP maximize the use of the Town's existing wastewater infrastructure. In addition to implementation of the CSOOP, CSO impacts on local waterways were identified through the Stream Reach Characterization and Evaluation Report (SRCER), submitted to the Indiana Department of Environmental Management (IDEM) in June, 2002.

This document represents the second phase of the Federal and State CSO policy, taking a CSO control approach based on Water Quality Standards. This report will address the following elements detailed in the Phase II policy:

1. Existing uses and sensitive areas of the receiving waters;
2. Public participation in the selection and identification of priority areas and CSO controls;
3. Characterization, monitoring and engineering evaluation in the selection of CSO control alternatives;
4. Evaluation of control alternatives;
5. Evaluation of maximizing treatment of wet weather flows at the existing Wastewater Treatment Plant (WWTP);
6. Implementation schedule for the proposed CSO controls;
7. Affordability analysis (ability of a municipality to pay for CSO controls over indicated periods of time);
8. Post-construction compliance monitoring program; and
9. CSO Operational Plan revisions to reflect changes resulting from construction of the proposed CSO controls.

According to the U.S. Census Bureau 2000 Census Data, the Town of Lowell has a population of 7,505. This population is considerably smaller than 75,000, which is the maximum population required to qualify for a "Small Community Consideration" under Indiana's CSO program. Further, IDEM granted a "Small Community Consideration" to the Town of Lowell in a letter dated December 10, 2001. A copy of the letter is included in Appendix A of this report. In the referenced

letter, IDEM states that this grants relief from completing each of the formal steps outlined in Section ll.C of EPA's National CSO Control Policy. Specifically, this Small Community Consideration minimizes the required content of this Long-Term Control Plan (LTCP) report. The Small Community Consideration sets forth the following requirements for inclusion in the LTCP:

- Documentation of full implementation of the nine minimum controls via the operational plan;
- Complete revisions to the Operational Plan throughout the implementation of the LTCP;
- Public participation;
- Sensitive areas consideration;
- Maximization of treatment at the WWTP;
- Monitoring, as necessary, to support decisions regarding proposed CSO controls;
- Scope, schedule & budget of proposed CSO controls, and
- Post-construction monitoring after the implementation of each phase of the proposed schedule.

While the Town of Lowell has exceeded small community requirements with many components of this written plan to demonstrate good faith efforts in fully understanding their Combined Sewer System (CSS) and potential remedial alternatives, other components of this plan follow the minimal submission requirements. The remainder of this Executive Summary will highlight key elements from the remainder of the text as well as provide a summary of recommendations and implementation schedules.

A. COMBINED SEWER OVERFLOWS

The Town of Lowell has one (1) permitted CSO point, identified as CSO 004. The structure is located in the equalization basin at the Wastewater Treatment Plant at approximately 41 ^{0}16' latitude and 87^{0}25" longitude. Excess flow passes over a 6 foot diameter manhole set at high water elevation in the equalization basin. The 30 inch overflow pipe then carries the flow to Cedar Creek. The outfall of the pipe has a flapgate on the discharge at the bank of the creek, as a backflow preventor.

B. WATER QUALITY GOALS

All waters in the State of Indiana are designated for full-body recreational contact. It is the intent of the Town of Lowell to do their part in helping local surface waters meet water quality standards by complying with the mandates of the Federal and State Combined Sewer Overflow (CSO) policies. In essence, if Lowell eliminates combined sewer overflows, then there is no end-of-pipe for which to measure water quality. If Lowell continues to have combined sewer overflows, then Lowell will continue to strive to meet water quality standards at the end-of-pipe.

C. EXISTING AND DESIGNATED USES

The Town of Lowell's single overflow point (CSO 004) is located outside the town's corporate limits. Since the discharge point into Cedar Creek is into a rural, agricultural area, there are no existing uses. Details supporting this conclusion are provided in Section 1 of this report.

Since all streams in the State of Indiana have a designated use of full-body recreational contact, the associated water quality standards must be met at all times. Federal law allows for a temporary suspension of designated uses, and associated water quality standards, only if there is no existing use. Since there are no existing uses in Cedar Creek down gradient from CSO 004, the Town of Lowell has an option available to pursue a temporary suspension of designated uses and consequently, associated water quality standards. The Town recognizes that if a temporary suspension of designated uses is pursued, the Town will be required to successfully complete a Use Attainability Analysis

As of the effective date of this report, September 1, 2003, it is the opinion of the Town of Lowell, that there is little to no advantage gained by initiating a UAA. Consequently, the Town of Lowell has chosen to not move forward with the UAA process at this time. However, the Town may choose to proceed with a IJAA at some future date should federal or state statutes, regulations, rules, guidelines, standards, protocols, or practices be modified in a manner that would make the IJAA process worth pursuing.

D. SENSITIVE AREAS

According to IDEM's guidance document, sensitive areas along waterways are to receive priority in regards to CSO control. The areas that are considered sensitive include primary recreational areas, surface water drinking water sources, areas with threatened or endangered species, or outstanding state or national resources waters. There are no sensitive areas along Cedar Creek. Details supporting this conclusion are provided in Section 1 of this report.

E. PRESUMPTIVE VERSUS DEMONSTRATIVE APPROACH

The national CSO Control Policy and Indiana CSO Strategy identify two general approaches for the attainment of water quality standards: the presumptive approach and the demonstrative approach.

The presumptive approach is based on the assumption that an LTCP meets certain minimum defined performance criteria that:

> *"*…would be presumed to provide an adequate level of control to meet the water quality-based requirements of the CWA, provided the permitting authority determines that such presumption is

> reasonable in light of the data and analysis conducted in the characterization, monitoring, and modeling of the system and the consideration of sensitive areas. "

The State admits in its own guidance document that the presumptive approach may be limited due to the expression of the E. coli. standard as a daily maximum. As one of the criteria, this approach allows for up to an average of four (4) overflows per year. The problem with the entire philosophy associated with the presumptive approach, however, is that the State's guidance document states:

> "Use of the presumptive approach does not relieve municipalities from the overall requirement that water quality standards be attained. "

This means simply, that when overflows occur, control technologies are to be implemented at "end-of-pipe" to allow the effluent to meet water quality standards.

The Town of Lowell has chosen to follow a demonstrative approach. Under the demonstrative approach, the Town of Lowell must meet each of four (4) criteria.

1. The planned control program is adequate to meet water quality standards and protect designated use.

2. The CSO discharges remaining after implementation of the planned control program will not preclude the attainment of water quality standards or the receiving waters' designated uses or contribute to their impairment during the design storm

3. The planned control program will provide the maximum pollution reduction benefits reasonably attainable, and this reiterates the emphases on developing cost effective levels of control.

4. The planned control program is designed to allow cost-effective expansion or cost effective retrofitting if additional controls are subsequently determined to be necessary to meet water quality standards or designated uses.

The projects outlined in this LTCP meet the above four (4) required criteria of a demonstrative approach.

F. RECOMMENDED PLAN

The proposed action plan consists of five (5) separate phases:

Phase I:

This phase consists of construction of an approximate 14-million gallon equalization basin to collect, store, "dampen" the Town of Cedar Lake's effluent contribution to the Town of Lowell's combined sewers, and subsequently, the Town of Cedar Lake flow spikes to the plant. Based off statistical analysis, a substantial decrease in overflows will result once said basin is constructed and spikes which result from wet weather flows can be equalized.

Phase I is already completed. The basin has been in operation since January 2003.

Data analysis consisting of a comparison of historical overflow with-respect-to the correspondingly documented rainfall events as well as current and future overflows with-respect-to both the documented rainfall events and means / methods of basin operation (i.e. basin optimization) will be ongoing to allow for a stream-lining of future phased corrective work. Phase I project costs were approximately $4-million.

Phase II:

This phase consists of construction of the planned Town of Lowell Compliance Plan Phase II WWTP Improvements. This improvements project includes modifications and improvements to both the WWTP's headworks (i.e. pretreatment) as well as the WWTP's Existing 14-Million Gallon Equalization Basin.

A New Headworks Structure complete with new mechanical bar screen, new grit handling system, and new pretreated wastewater conveyance pumps will be constructed. Modifications to the existing Equalization Basin consisting of new asphalt liner, new mixers / aerators, and miscellaneous piping modifications will also be constructed.

From a CSO standpoint, the new headworks structure and associated equipment introduces a drastic improvement to the existing plants floatable controls — since the existing headworks structure consists of a dilapidated and sporadically functioning "dated" mechanical screen and NO grit removal. The modifications to the existing plant's equalization basin provide a substantive increase in the quality of "potential" CSO effluent. The modified basin provides:

a. Mixing and aeration — increasing the level of pretreatment.

b. The hydraulic means to effectively store excess flow and "bleed back" same expeditiously — which allows for optimization of the basins storage / equalization capabilities.

c. The physical means to more readily clean the basin's surface -which allows operational staff the ability to readily remove and appropriately dispose of settled particulate (sludge); increasing the effective quality of potential overflow effluent.

Phase II has already been designed and is awaiting IDEM construction permit issuance (July 2003). It is anticipated that Phase II will be constructed and in operation by early 2005.

As is the case in Phase l, Phase II will also consist of data analysis comparing historical overflow with-respect-to the correspondingly documented rainfall events as well as current and future overflows with-respect-to both the documented rainfall events and means / methods of basin operation (i.e. basin optimization).

Phase II project costs are estimated to be $8-million.

Phase II construction was completed in 2006, with the Post Construction Observation completed in 2008.

Items 2.A, 2.B, and 4 (Identified as Phase III in the Original LTCP):

These Items consists of the evaluation and rehabilitation of the existing interceptor as well as an evaluation of the integrity of the existing combined sewer area's (CSA's) subsystems. Based on previously performed investigatory work / flow metering by and for the town, it is known that the existing interceptor has infiltration and inflow (I&I) issues. Items 2.A and 4 were originally intended to consist of cleaning, televising, and repair of the existing interceptor and its defects. Additionally, Item 2.B was to consist of the completion of the evaluation underway for CSA subsystems.

Additionally, these Items were to consist of data analysis comparing the flows received during known rainfall events and known equalization basin discharges prior to the completion of Items 2.A and 4 completion with those occurring after any rehabilitation work on the interceptor was done.

The original estimated cost for Items 2.A and 4 were somewhat tentative, but estimated at the time of the Original LTCP to be $1.6-million.

The evaluation of the Interceptor Sewer, Item 2.A, was started, with approximately half of the system televised. Based on review of that information, and further review of flow monitoring data, it was concluded that the Interceptor is in good condition, and subsequently does not require rehabilitation at this time. Therefore, it is recommended

that Item 4, the interceptor rehabilitation be eliminated from the LTCP Implementation Schedule.

Prior to implementing the interceptor and CSA evaluations, a wet Wet Weather Treatment Facility was constructed at the Lowell WWTP (identified as Phase III under the current Implementation Schedule). Because this process is in place, with the intent of treating excess flows during wet weather (see information below under Phase III), the Item 2.B and Item 5, the evaluation and rehabilitation of the CSA subsystems has been eliminated from the LTCP Implementation Schedule. As routine maintenance of its system, Lowell will have ongoing inspections of all sanitary and combined sewers, with the intent of making repairs to areas that show signs of significant infiltration as time and budget allows.

Item 5 (Identified as Phase IV in the Original LTCP):

Item 5 was to consist of rehabilitation of the CSA's subsystems, as deemed necessary and required — based on the outcome of the Item 2.B subsystem investigation.

As in Item 2.A, data analysis and comparison was to occur to quantify the effectiveness of the rehabilitation and repair work performed under Item 5.

The original estimated cost for Items 2.B and 5 were somewhat tentative, but estimated at the time of the Original LTCP to be $3.0-million.

As described under Item 2.B above, with the construction of the Wet Weather Treatment Facility, Item 5 has been eliminated from the LTCP Implementation Schedule.

Phase III (Identified as Phase V (if required) in the Original LTCP):

A Wet Weather Treatment Facility was constructed at the Lowell WWTP in 2013. It included a 10.0 MGD high rate clarifier (Actiflo) with UV disinfection. The intent of the facility is to treat any excess flows that are the result of a storm greater than a 1-year 1-hour storm. The Town of Lowell operates the facility whenever the EQ Basin is getting full, in order to prevent an untreated CSO.

Recent operations of the Wet Weather Treatment Facility have shown a great deal of success. From the period of June 30, 2020 through February 23, 2022, the wet weather treatment facility was not required. Any excess flows due to wet weather were stored in the EQ Basins and sent through the conventional WWTP after the events were over. The wet weather treatment facility has been utilized on a couple of occasions since that 15-month period when it wasn't used, but no untreated CSO's have occurred

Because of the success that the Town has recently had with the use of the wet weather treatment facility and no untreated CSO's, Items 2.B and 5, the evaluation and rehabilitation of the CSA sewer systems have been eliminated from the LTCP Implementation Schedule as described above.

Item 6 – EQ Basin Drain Back Pipe Modifications:

Item 6 is added to the LTCP as part of the October 2022 Amendment. A 12-inch sewer was installed as part of the Phase II WWTP Improvements with the purpose of draining the contents of the Equalization Basin back to the headworks so it could be treated through the conventional WWTP as flows allowed after a wet weather event. When the sewer was installed, there were no access points included, or other ways of maintaining the pipe. With the valve controlling the flow located at the downstream end, whenever it is closed with any water in the basin, the pipe is full and stagnant. It appears that, over time, solids and debris in the water have settled out in the pipe, significantly restricting flows.

Item 6 includes the cleaning and inspection of the 12-inch drain back sewer, as well as the construction of three access points which the plant personnel will be able to use to clean and inspect the pipe in the future to prevent the buildup of solids and debris over time. The project also includes the installation of a new control valve and flow meter near the upstream end of the sewer, adjacent to the EQ Basin.

The estimated cost for Item 6 is $950,000, and it is anticipated that the work will be started in 2022 and completed in 2023.

G. IMPLEMENTATION SCHEDULE

Based on the financial impacts of the Long-Term Control Plan project's and based on the current guidance rule, the following schedule is projected (The schedule below is as it was presented in the Origingal LTCP. An updated Schedule, as it has been revised periodically since the original LTCP submission is included on the following page):

Task	Target Date
Submit LTCP to IDEM	September, 2003
Complete and Operational Phase I Project	January, 2003
Post-Construction Phase I Observation Start	July, 2003
Post-Construction Phase I Observation Finish	On-going
Anticipated IDEM Phase II Project Approval (Construction permit)	September, 2003
Receive Contractor Bids	October, 2003
Close on SRF Loan	December, 2003
Begin Construction Phase II	December, 2003
Complete Construction of Phase II	December, 2004
Post-Construction Phase II Observations Start	January, 2005
Post-Construction Phase II Observations Finish	On-going
Commence Phase III — CSA Evaluation	January, 2003
Complete Phase III — CSA Evaluation	January,2008
Commence Phase III — Interceptor Rehabilitation Work	January,2007
Complete Phase III — Interceptor Rehabilitation Work	January, 2008
Post-Construction Phase III Observations Start	January,2008
Post-Construction Phase III Observations Finish	January,2010
Commence Phase IV — CSA's Subsystem Work	January,2011
Complete Phase IV — CSA's Subsystem Work	January, 2018
Post-Construction Phase IV Observations Start	January,2018
Post-Construction Phase IV Observations Finish	January, 2019
Update LTCP to Address Resulting Phase I thru IV Issues	February, 2019

Town of Lowell, Indiana
Long-Term Control Plan Implementation Schedule (Summary)
Updated November 2022

Item No.	Task Description	Target Date	Current Project Status
N/A	***Submit LTCP to IDEM***	September, 2003	Complete
N/A	***Phase I - Cedar Lake EQ Basin***		
	Complete and Operational Phase I Project	January, 2003	Complete
	Post-Construction Phase I Observation Start	July, 2003	
	Post-Construction Phase I Observation Finish	On-Going	
N/A	***Phase II - Lowell WWTP Headworks and EQ Basin Improvements***		
	IDEM Phase II Project Approval (Construction Permit)	September, 2003	Complete
	Receive Contractor Bids	February, 2005	
	Close On SRF Loan	April, 2005	
	Begin Construction Phase II	May, 2005	
	Complete Construction of Phase II	March, 2006	
	Post-Constrction Phase II Observation Start	April, 2006	
	Post-Constrction Phase II Observation Finish	July, 2008	
N/A	***Phase III - CSO Wet Weather Treatment Facility*** ***(Identified as Phase V in Original LTCP)***		
	Construction Begins	June 2012	Complete
	Construction Complete	June 2013	
	Initial Post Construction Evaluation Begins	July 2013	
	Initial Post Construction Evaluation Ends	July 2014	
1	***Evaluation of Existing Rain Gauges and Installation of Additional Rain Gauges*** ***(Item Added after Original LTCP)***	6/30/2016	Complete
2.A	***Sanitary Sewer System Evaluation Survey (SSES) Interceptor*** ***(Identified as Part of Phase III in Original LTCP)***		
	Evaluation Begins	7/1/2016	Complete
	Evaluation Ends	5/1/2020	
	Summarize findings, send to IDEM for review	6/1/2020	
2.B	***Sanitary Sewer System Evaluation Survey (SSES) Sanitary Sub-System*** ***(Combined Sewer Area) (Identified as Part of Phase III in Original LTCP)***		
	Evaluation Begins	12/1/2017	Elimination of Item from LTCP Requested
	Evaluation Ends	9/1/2020	
	Summarize findings, send to IDEM for review	10/1/2020	
3	***Operational Review of Wet Weather Treatment Facility and Influent Flow Monitoring / Reporting***		
	Evaluation Begins	5/1/2016	Complete
	Completion of Evaluation and Implementation	10/31/2016	
	Post Construction Monitoring Begins	11/1/2016	
	Post Construction Monitoring Ends	11/1/2017	
	Summarize findings, send to IDEM for review	12/1/2017	
4	***Phase IV - Interceptor Rehabilitation*** ***(Identified as Part of Phase III in Original LTCP)***		
	Design & Bidding Services Begins	2/1/2019	Elimination of Item from LTCP Requested
	Design & Bidding Services Ends	7/1/2020	
	Construction Begins	9/1/2020	
	Construction Ends	5/1/2021	
	Post Construction Monitoring Begins	5/1/2021	
	Post Construction Monitoring Ends	4/30/2022	
5	***Phase V - Sanitary Sub-System (Combined Sewer Area) Rehabilitation*** ***(Identified as Phase IV in Original LTCP)***		
	Design & Bidding Services Begins	6/1/2020	Elimination of Item from LTCP Requested
	Design & Bidding Services Ends	10/1/2020	
	Construction Begins	10/1/2020	
	Construction Ends	10/1/2021	
	Post Construction Monitoring Begins	10/1/2021	
	Post Construction Monitoring Ends	10/1/2022	
6	***EQ Basin Drain Line Modifications*** ***(Requested for Inclusion in LTCP with November 2022 Addendum)***		
	Design and Bidding Services Ends	7/1/2022	Complete - April 2022
	Construction Begins	7/31/2022	
	Construction Ends	8/1/2023	
	Post Construction Monitoring Begins	8/1/2023	
	Post Construction Monitoring Ends	8/1/2024	

1. CONSIDERATION OF EXISTING USES AND SENSITIVE AREAS

Communities are required to evaluate each stream reach area that receives CSO discharges for existing uses and sensitive areas. The distinction between existing uses and sensitive areas is essential for purposes of this LTCP document.

Since all streams in the State of Indiana have a Designated Use of full-body recreational contact, as well as fishable, the associated water quality standards for these designated uses must be met, even during wet weather events. The bacteriological water quality standard associated with full-body recreational contact in Indiana is based on E. coli. The E. coli counts shall not be any higher than 125 colonies per 100 ml as a geometric mean based on not less than five (5) samples equally spaced over a thirty (30) day period nor is it allowed to exceed 235 colonies per 100 ml in any one sample in a thirty (30) day period (327 IAC 2-1-6(d)). The law does allow for a temporary suspension of the designated use, and associated water quality standards, if there is no existing use. Under federal law, if existing uses are documented, there can be no suspension of water quality standards for the stream reaches impacted by the CSOs (40 CFR 131.10(g) and 40 CFR131.10(h

Therefore, existing uses preclude a suspension of the designated use, and the associated water quality standards must be adhered to, even during wet weather.

Sensitive areas have a different role in long range planning under the State's CSO Policy. Sensitive areas are defined as waters impacted by CSO discharges that must be given first priority for elimination, relocation or control of combined sewer discharges.

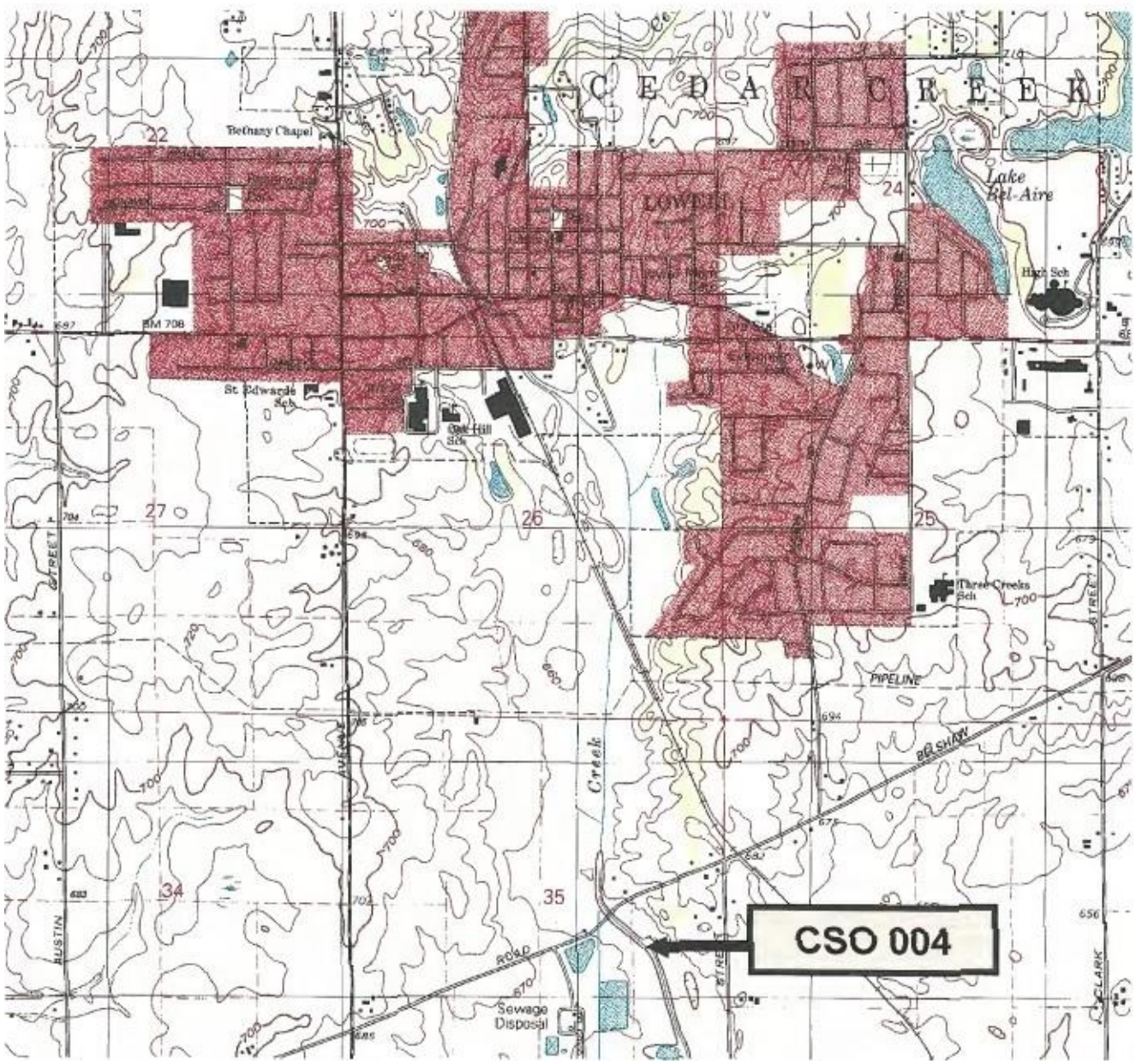
Both existing uses and sensitive area issues in the Town of Lowell are discussed in the following narratives.

A. COMBINED SEWER DISCHARGE LOCATIONS

The Town of Lowell has one (1) permitted CSO point, identified as CSO 004. The structure is located in the equalization basin at the Wastewater Treatment Plant at approximately 41 ^{0} 16' latitude and 87^{0}25" longitude. Excess flow passes over a 6 foot diameter manhole set at high water elevation in the equalization basin. The 30 inch overflow pipe then carries the flow to Cedar Creek. The outfall of the pipe has a flap gate on the discharge at the bank of the creek, as a backflow preventor.

The discharge location is shown in **Figure 1**.

Figure 1 — Location of CSO Point in Lowell, Indiana



The following Table 1 provides summary information related to the Town's current CSOs.

TABLE 1 - COMBINED SEWER OVERFLOWS

CSO	Location	Pipe Size	Backflow Prevention
004	Lowell WWTP	30" Gravity	Yes, Flap Gate

B. RECEIVING STREAM EXISTING USE DESIGNATION

The U.S. EPA developed the definition for an existing use as:

> "Those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards (40 CFR 131.30)."

IDEM adopted this definition in its guidance document dated December 14, 2001. Photographs are presented directly after the following existing use narratives.

CSO 004 - Lowell WWTP Equalization Basin

CSO 004, located at the Lowell WWTP, is located a couple of miles south of the Town of Lowell. This CSO discharges into Cedar Creek via a 30-inch gravity line (Photos 13-16). A flap gate is located at the headwall.

CSO 004 discharges into Cedar Creek a couple of miles south of the Town of Lowell's corporate limits. Cedar Creek flows to the south, which is away from the Town of Lowell. The land uses surrounding the CSO discharge area are agricultural. Photos 18 through 22 illustrate the rural setting of Cedar Creek. Cedar Creek does not have existing uses down gradient from CSO 004.

When evaluating the potential for existing uses, it is also important to evaluate if boating or canoeing activities are conducted upgradient from the CSO, because these boats could potentially be paddled through the CSO area. Local interviews and information provided by the CAC members indicated that there are never any boating or canoeing activities on Cedar Creek. The physical characteristics of the creek support these statements.

Photo 1 – Cedar Creek, approximately 2 miles upstream of the only CSO on the Lowell Combined Sewer System. S.R. 2 bridge in the background. Photo taken facing north.

Photo 2 – Cedar Creek, approximately 2 miles upstream of the only CSO on the Lowell Combined Sewer System. Just south of S.R. 2 bridge. Photo taken facing south.

Photo 3 – Cedar Creek a few blocks south of S.R. 2. Photo taken from Oakley Street bridge, facing north.

Photo 4 – Cedar Creek a few blocks south of S.R. 2. Photo taken from Oakley Street bridge, facing south.

Photo 5 – Cedar Creek approximately 1.5 miles upstream of the only CSO on the Lowell Combined Sewer System. Photo taken near the old WWTP site, now the Lowell Street Dept. Photo taken facing south.

Photo 6 – Cedar Creek approximately 1.5 miles upstream of the only CSO on the Lowell Combined Sewer System. Photo taken near the old WWTP site, now the Lowell Street Dept. Photo taken facing southeast.

TOWN OF LOWELL, INDIANA – LONG TERM CONTROL PLAN

PHOTOGRAPHS TAKEN APRIL 10, 2003

Photo 7 – Cedar Creek about 3,500 feet upstream of the only CSO on the Lowell Combined Sewer System. Photo taken facing north.

Photo 8 – Cedar Creek about 3,500 feet upstream of the only CSO on the Lowell Combined Sewer System. Photo taken facing south. Pipes in the background carry natural gas.

Photo 9 – Cedar Creek about 3,500 feet upstream of the only CSO on the Lowell Combined Sewer System. Photo illustrates the predominance of agricultural land use around Cedar Creek. Photo taken facing west.

Photo 10 – Overview of Lowell Wastewater Treatment Plant, located a couple of miles south of the Town of Lowell.

Photo 11 – Overview of Lowell Wastewater Treatment Plant.

Photo 12 – CSO 007 – Stormwater equalization basin located at the Lowell Wastewater Treatment Plant. Arrow indicates the location of the CSO 004 overflow pipe.

TOWN OF LOWELL, INDIANA – LONG TERM CONTROL PLAN

PHOTOGRAPHS TAKEN APRIL 10, 2003

Photo 13 – CSO 004 overflow pipe from equalization basin. Basin provides floatable and solids control.

Photo 14 – Close-up view of CSO 004 overflow pipe from equalization basin. Scum baffle provides for floatable control.

Photo 15 – CSO 004 outfall into Cedar Creek. Located just east of the equalization basin at the Lowell Treatment Plant. Note: No evidence of solids build up or floatable materials.

Photo 16 – CSO 004 headwall and flapgate.

Photo 17 – CSO 004 warning sign. Located above the headwall.

Photo 18 – Location of CSO 004 outfall along Cedar Creek. Photo taken from Belshaw Road Bridge, just upstream (north) of the Lowell treatment plan. Photo taken facing south.

TOWN OF LOWELL, INDIANA – LONG TERM CONTROL PLAN

PHOTOGRAPHS TAKEN APRIL 10, 2003

Photo 19 – Cedar Creek a couple of miles downstream from CSO 004 outfall. Photo taken facing north from the 205th Avenue bridge.

Photo 20 – Illustrating typical agricultural land uses that are predominant south of the Town of Lowell. Photo taken adjacent to Cedar Creek next to 205th Avenue.

Photo 21 – Cedar Creek a couple of miles downstream from CSO 004 outfall. Photo taken facing south from the 205th Avenue bridge.

Photo 22 – Cedar Creek a couple of miles downstream from CSO 004 outfall. Photo taken facing southwest from the 205th Avenue bridge.

C. RECEIVING STREAM SENSITIVE AREAS DOCUMENTATION

The elimination, relocation or control of combined sewer discharges to sensitive areas is given a high priority in the Federal and State CSO policies. IDEM defines sensitive areas as "waters impacted by CSO discharges, which must be given the highest priority for CSO discharge elimination, relocation or control. Examples of sensitive areas include:

- *Habitat for threatened or endangered species;*
- *Primary Contact Recreational Areas such as beaches and other swimming areas;*
- *Drinking Water Source Waters;*
- *Outstanding State Resource Waters/Outstanding National Resource Waters."*

1. Habitat for Threatened or Endangered Species

   The Indiana Department of Natural Resources (IDNR), Division of Nature Preserves conducted an Indiana Natural Heritage Data Center database search for the Lowell, Indiana, CSO project area. This database references endangered, threatened and rare species, high quality natural communities, and significant natural areas. The database search reports no findings. A copy of the letter is included in Appendix B.

2. Primary Contact Recreational Areas

   There are no primary recreational areas south of Lowell, Indiana along Cedar Creek.

3. Drinking Water Source Waters

   Surface drinking water intakes are considered a sensitive area for human health factors. According to IDEM's Safe Drinking Water Information System (SDWIS), the Town of Lowell uses groundwater as its drinking water source. Therefore, the Town of Lowell does not have drinking water intakes from Cedar Creek. According to Lowell's Wellhead Protection Plan, dated March of 2001, Cedar Creek is not within the 5 year time of travel for the zone of influence of the groundwater drinking water well intakes. In addition, the SDWIS indicates that there are no other Cedar Creek down gradient entities that use surface water for drinking water. A copy of the database is included in the Appendix.

4. Outstanding State or National Resource Waters

   Cedar Creek is not considered an outstanding state or national resource waters, according to 327 IAC 2-1-2(3) and 327 IAC 2-1.5-19(b).

D. CSO CONTROL PRIORITIES

The IDEM requires that communities evaluate the CSOs and assign a priority for addressing each one, based upon existing uses and particularly, sensitive areas. Cedar Creek does not have existing uses or sensitive areas. In addition, there is no prioritization required in Lowell since there is only one permitted CSO to address.

E. CSO CONTROL LEVELS

Since all streams in the State of Indiana have a designated use of full-body recreational contact, the associated water quality standards must be met at all times. Federal law allows for a temporary suspension of designated uses, and associated water quality standards, only if there is no existing use. Since there are no existing uses in Cedar Creek down gradient from CSO 004, the Town of Lowell has an option available to pursue a temporary suspension of designated uses and consequently, associated water quality standards. The Town recognizes that if a temporary suspension of designated uses is pursued, the Town will be required to successfully complete a Use Attainability Analysis (UAA).

As of the effective date of this report, September 1, 2003, it is the opinion of the Town of Lowell, that there is little to no advantage gained by initiating a UAA. Consequently, the Town of Lowell has chosen to not move forward with the IJAA process at this time. However, the Town may choose to proceed with a IJAA at some future date should federal or state statutes, regulations, rules, guidelines, standards, protocols, or practices be modified in a manner that would make the UAA process worth pursuing.

Two basic methods are acceptable for control of the Town's CSO discharge. The first alternative is elimination of the CSO. A second alternative is to provide treatment of the CSO discharge to meet water quality standards. Various combinations of the two basic approaches are also possible.

The following evaluation of possible control of CSOs does not take into account costs; it only considers feasible control alternatives based on physical parameters. A detailed evaluation of the various alternatives is given in Section 4, Evaluation of Control Alternatives.

1. Physical Constraints Present

   No significant physical constraints, such as adverse topography, exist to prevent elimination of the one (1) discharge. All combined sewer flows directly to the WWTP's headworks. The combined sewage is either (1) solely pumped from the headworks to the WWTP for treatment (4 MGD or less daily), or (2) pumped from the headworks to both the WWTP and the Equalization Basin for treatment and storage. When basin storage capacity is exceeded, the one (1) overflow discharges - from the basin to Cedar Creek.

2. Feasible Elimination or Relocation Alternatives

It is physically feasible to eliminate the existing CSO discharge using one or more alternatives, namely:

a. Retaining all Existing Combined Sewer Flows at the WWTP

Currently, all wet weather combined sewer flows are transported via the town's main interceptor to the headworks - then pumped through the treatment processes and/or to the equalization basin. It is possible to retain the existing combined sewer flow at the plant. This would likely involve additional pumps to expand the headworks pumping capacity to that of the existing interceptors hydraulic capacity as well as an increase in either or both the equalization basin storage volume and the existing plants treatment processes (aeration, clarification, and disinfection).

b. Sewer Separation through Installation of New Sanitary Sewers

Separation of the combined sewer system could be accomplished by installing a new sanitary sewer system and using the existing combined sewer for stom drainage. The new sanitary sewer pipes would likely be smaller in diameter and therefore may need to be installed at a steeper grade than the existing pipe locations. Steeper installation may require the sewers to be much deeper at their downstream end than the combined sewers.

Any separation project in the public right-of-way must include separation of all private inflow sources to be successful (e.g. perimeter drains, roof drains, sump pumps). Otherwise, a significant allowance in pipe size, pumping capatown and treatment must be considered for substantial amounts of excessive infiltration and inflow from the private areas.

An advantage to this approach is the replacement of older sewers nearing their useful life with new ones to transport wastewater. The disadvantage is the difficulty in separating clear water from sanitary sources, as noted above. With the new sanitary sewer needing to be larger than what would be necessary for normal sanitary flow, additional cleaning would be required by Town staff.

c. Sewer Separation through New Storm Sewers

This alternative would use the existing combined sewers to transport sewage and existing infiltration only. A new storm sewer system would be installed to collect direct surface water runoff, including that located on private property through roof drains where possible. The existing combined sewers currently benefit from the flushing action of surface water runoff. If most of the surface water sources are removed and relocated to a separate stom sewer, the peak flows will be reduced in the existing sewer. This will require additional sewer cleaning by the Town to keep the sewers flowing.

This alternative would require transportation and treatment of remaining infiltration and residential inflow, but the peak flow rates currently experienced from direct surface water runoff would be reduced. This approach would also "benefit" from not disturbing private property and facilities. A disadvantage is that sewers nearing their useful life would be relied on to transport wastewater from a significantly large area.

d. Sewer Separation through New Storm and Sanitary Sewers

In this option, the existing combined sewer would be abandoned and new separate sanitary and storm facilities would be constructed. Complete separation of the public facilities would need to be accompanied by a complete separation of the private wastewater and storm facilities for the project to be successful.

3. Feasible End of Pipe Treatment Alternatives

Any end-of-pipe treatment facility would continue to discharge to the existing use area. It would therefore need to meet or exceed water quality standards at all times. Such a facility would need to be able to handle high peak wet weather flow rates, but would only operate during periods of high flow. This creates a wide variance of flows. Consequently, this process would need to be a chemical/physical process (as opposed to a biological process).

The logical location for end-of-pipe treatment would be in the vicinity of the Existing Equalization Basin where the CSO overflow manhole is located.

4. Treatment of Excess Wet Weather Flows

A treatment facility could be constructed to treat all flows in excess of what can be transported to the WWTP. Process design would be based upon the CSA's sewer conveyance capacity and/or a selected design storm event.

This option would require transport of all flows from the sewers to the facility. The existing interceptor may not be large enough to transport all combined sewer flows from a selected storm event. Therefore, a new higher capacity interceptor would be required as a replacement or in parallel to / with the existing interceptor.

5. Storage and Treatment of Excess Wet Weather Flows

This option could combine treatment and storage to minimize the hydraulic requirements of the end-of-pipe treatment facility.

Either an increase in storage capacity of the existing Equalization Basin and/or new Equalization Basin(s) would need to be constructed. Further, an increase in pumping capacity at the existing headworks and/or a new high rate wet weather pumping station would be required to pump the excess wet weather flow from the headworks to and through the equalization basin(s). Sizing is dependent upon the selected design storm event and distribution.

2. PUBLIC PARTICIPATION

In an effort to encourage frequent and on-going public participation, education and input concerning the Town's combined sewer system and development of this document, the Town of Lowell implemented the programs described below. Public participation is a key element in the Federal and State CSO policies.

A. CITIZEN ADVISORY COMMITTEE

The State of Indiana requires that CSO communities form Citizen Advisory Committees (CAC) as part of the long-term planning process. The function of the committee is threefold:

- Forming the CAC is the recommended way to begin the public participation process.
- The CAC is formed to serve as liaisons among municipal officials, NPDES permitting agencies, and the general public.
- The overall goal of the CAC is to help the decision-makers of the community select long-term controls that best achieve the environmental goals of the community in an economically responsible manner.

Those individuals serving on the Lowell CAC are:

Name	Representing	Title	Address	Telephone
G7eg Shook	Tom of Lowell	Public Works Director	501 E. Main Street Lowell, IN 46356	219-6967794
Terry Wright	Lowell WWTP	Superintendent	7500 Belshaw Road Lowell, IN 46356	219-696-0343
Don Huseman	Citizen		362 Gwens Cove Ct. Lowell, IN 46356	219-696-8493
Mike Hall	Citizen		101 W. Oakley Lowell, IN 46356	2W69&5100
Ray Talavek	Citizen Member	Councilman	472 Apache Lane Lowell, IN 46356	219-696-7534
Jim Peterson	Citizen Member		214 Cherokee Lowell, IN 46356	219-696-7917
Ed Bradbury	Citizen Member		5704 w. 171 Street Lowell, IN 46356	219-696-8198
Don Cripe	Citizen Member		1005 E. Cottage Grove Lowell, IN 46356	219-696-9663
Phii Kuiper	Citizen Member	Councilman	432 Meadow Lane Lowell, IN 46356	219-6964425
Dan Harper	Citizen Member		20012 Colfax Street Lowell, IN 46356	219-6964560
Randy Santy	Citizen Member	Lowell Sewer Board Member	Lowell, IN 46356	

The CAC had its first organizational meeting on April 30, 2003. At this meeting, representatives from Commonwealth Engineers, Inc. met with the committee and explained the fundamentals of the CSO program.

B. PUBLIC MEETINGS AND HEARINGS

The Town of Lowell held a public meeting on April 30, 2003, at the Lowell Town Hall. At this meeting, representatives of Commonwealth Engineers, Inc. presented a PowerPoint presentation. The presentation described the LTCP process, detailing that it incorporates many factors such as mapping of the combined sewer system, identifying existing uses of rivers and streams, addressing sensitive areas, developing and evaluating control alternatives, and developing implementation priorities and schedules. After the presentation, Commonwealth Engineers, Inc. answered questions for the general public and CAC members. Issues of existing uses and sensitive areas were openly discussed with the general public. There were no comments from the meeting attendees regarding significant growth issues. At the conclusion of the meeting, there was a consensus that Cedar Creek does not have existing uses. A copy of the PowerPoint presentation is included in the Appendix C of this report.

The CAC then met on May 15, 2003 and June 17, 2003 to further discuss specific CSO issues in the community. The Town of Lowell held a second public meeting on July 22, 2003 at the Lowell Town Hall. At this meeting, representatives of Commonwealth Engineers, Inc. presented a draft of this LTCP report, and discussed alternatives and costs for proposed projects.

C. PUBLIC EDUCATION

The Town of Lowell has been proactive with CSO public education and outreach programs. The City first published a newspaper article in the Lowell Tribune on March 26, 2003, introducing the CSO program and LTCP objectives to the general public. The City then published a second newspaper article on April 22, 2003, providing additional detail about the CSO program, and inviting the general public to attend a public meeting scheduled for April 30, 2003. Copies of the newspaper articles are included in Appendix C of this report.

The Town also distributed tri-fold pamphlets that describe the CSO program, at their April 30, 2003, public meeting. Pamphlets continue to be available from the Town. A copy of this pamphlet is included as Appendix C of this report.

The Town also distributed a process flow diagram that describes the CSO LTCP program logistics, at their April 30, 2003, public meeting. Copies of this diagram continue to be available from the Town. A copy of this diagram is included as Appendix C of this report.

In fulfillment of one of the recommendations contained in the Town's Combined Sewer Overflow Operational Plan, identification signs have been installed at all CSOs warning about the potential health risks. This is also a public education and outreach program.

D. PUBLIC INVOLVEMENT

The Town is continuing to develop public involvement processes as part of the long-term control strategy. Some of the public involvement programs that are being considered are:

- Control alternative workshops;
- Funding task force;
- Telephone surveys, and/or
- Focus groups.

E. COMMUNITY NOTIFICATION

The Town of Lowell intends to comply with the community notification rule published as 327 IAC 5-2.1.

F. LTCP NOVEMBER 2022 AMENDMENT – PUBLIC HEARING

A public meeting was held on November 14, 2023 to provide information on the LTCP Amendment dated November 2023. A summary of the current status of the LTCP and the changes made through the amendment were presented. A copy of the announcement and the minutes from the Public Hearing are included in Appendix C.

3. CSA CHARACTERIZATION, MONITORING AND SYSTEM ANALYSIS

Formulation of an adequate combined sewer Long Term Control Plan (LTCP) requires a complete understanding of the physical aspects of the Combined Sewer Area (CSA), as well as system response to a wide range of wet weather events and the various variables that affect the system's response. Additionally, the impact on the receiving stream of the combined sewer overflow(s) (CSOs) resulting from these wet weather events must also be considered.

As part of meeting the requirements of the Phase I Indiana CSO Policy, the Town of Lowell has already and will continue to invest significant effort into characterizing, monitoring and analyzing the CSA and the corresponding affects remediation and improvement activities have on the CSA. Through the Town's Combined Sewer Overflow Operational Plan (CSOOP), the first eight of the "nine minimum controls" were addressed, including maximizing use of the collection system for storage and providing limited floatable control. Field investigation of the CSA, flow monitoring, and analysis of existing data for the system has already provided a rather thorough understanding of the Town's combined sewer system, and by continuing said analysis throughout the remediation and improvements process, additional information and understanding of the CSA, including wet weather responses, will be ascertained — allowing for a more and more streamlined and dynamic approach to the ultimate solution(s).

Additionally, a Stream Reach Characterization and Evaluation Report (SRCER) was completed to characterize the impact of the Town's CSO and evaluate the effectiveness of the CSOOP implementation. This evaluation met the ninth minimum control of the CSO strategy.

The following paragraphs summarize the City's CSA and presents a general assessment of the system during wet weather. The information below highlights and supplements portions of the CSOOP and SRCER.

A. COMBINED SEWER SYSTEM CHARACTERIZATION

An understanding of the Town of Lowell's combined sewer system is needed to be able to evaluate CSO control altematives.

1. <u>System Location and Area Description</u>

   The Town of Lowell is located in the southwestern portion of Lake County, Indiana on State Road 2 approximately 10 miles east of U.S. 41, and approximately 20 miles southwest of the City of Crown Point, Indiana. The topography of the Town can be generally described as gently sloping, with elevation ranging from the mid 600’s to low 700's above sea level.

Cedar Creek flows south through the center of Lowell, providing storm water drainage for the Town. Cedar Creek flows south to the Singleton Ditch. It eventually meets up with the Kankakee River in Newton County. The Kankakee then travels west across Indiana to Illinois. The nearest municipality upstream on Cedar Creek is the small town of Cedar Lake, just north of Lowell. The nearest major metropolitan center downstream is Kankakee, Illinois.

2. Collection System Condition

In 1998 an Infiltration/lnflow Report was complete for the Town of Lowell. Portable flow meters were placed in eleven subsystems of the Town's Sewer System in the manholes where sewer branches entered into the Interceptor. A flow meter was also installed at the Wastewater Treatment Plant and at the flume north of the Town to record flows from Cedar Lake. The results indicated that there is excessive infiltration/inflow in most of the branches as well as the Interceptor and the Cedar Lake subsystem.

3. Collection System Inventory

The Town's wastewater facilities include storm, combined, and separate sanitary gravity sewers, lift stations, and a Class Ill activated sludge-type treatment facility. The Town's Wastewater Treatment Plant also treats wastewater from the Town of Cedar Lake and Lake Dalecarlia via Lowell - Cedar Lake Interceptor Sewer. The collection system is illustrated in Appendix D. An overview of said system is as follows:

a. Gravity Sewers

The total length of sewers in the Town of Lowell's sewer collection system is approximately 186,203 lineal feet (approximately 35 miles). The bulk of the original sewer system was constructed in the 1950's. It was designed and constructed as a combined sewer system. In the early 1970's, a sanitary sewer system was constructed in much of the remaining portions of the Town that did not have sewers. The collection system has been recently re-designated to a partial separate sanitary and partial combined collection system. The sewers in the Town of Cedar Lake and Lake Dalecalia were constructed in the 1980's. All of the sewers in these communities are separate sanitary sewer systems.

An interceptor sewer picks up flow from the partially combined subsystems and transports dry weather flow and wet weather flow to the plant's headworks. A maximum of 4 MGD is pumped from the headworks to the plant's treatment processes. Flows in excess of 4 MGD, up to an additional 15 MGD, are pumped to the plant's equalization basin — where they are stored, mixed, and aerated as they await for system flow to subside (to less than 4 MGD) at which time the stored flow can be "bled"

back to the headworks and pumped from the headworks through the plants treatment processes. Should the excess amounts of wet weather flow exceed the equalization basin's storage capabilities, the equalization basin overflows and a CSO discharge to Cedar Creek occurs.

In January of 2003 the Lowell / Cedar Lake Equalization basin was completed and put on-line. This basin is located at the end of the Cedar Lake SSA and is capable of accepting, storing, equalizing flow contributions from Cedar Lake — with a total storage capacity of 14 million gallons.

The collection system is divided into eleven subsystems, as indicated by the map included in Appendix D. The Town's collection system is primarily composed of vitrified clay pipe and reinforced concrete pipe in diameters ranging from 6-inch laterals to the 48-inch Lowell - Cedar Lake Interceptor Sewer. The following Table provides a breakdown of the total length of pipe within each subsystem and the interceptor in the Town's collection system.

Collection System Inventory

Subsystem	Total Length (Ft)	Total Inch-Miles
1	14,670	22.48
2	18,250	34.50
3	39,450	75.82
4	6,300	13.75
5	24,350	56.44
6	17,350	30.68
6A	800	1.21
6B	600	0.91
7	5,800	10.50
8	7,100	13.60
9	18,430	31.90
Interceptor	33,103	272.82
TOTAL	186,203	564.61

The interceptor is jointly used by flows from Lowell and from Cedar Lake. The capacity of the interceptor is allocated based upon contractual agreement percentages. The table below shows a calculation of the breakdown of the allowable flows through the various segments of the interceptor, and correspondingly, the distribution method of shared cost for its rehabilitation:

Lowell / Cedar Lake Interceptors

Flow Analysis

Interceptor	Slope	Full Flow Capacity	% Capacity Cedar Lake	
		(MGD)	(%)	MGD
30"	A. 0.043% Min. [1]	5.50	100	5.50
	B. 0.28% Overall[l]	14.03	100	14.03
	C. O. 1 00/02	8.38	100	8.38
	D. 0.063	6.49	100	6.49
42"	A. 0.005% Min.[1]	4.60	43	1.98
	B. 0.098% Overall[l]	20.36	43	8.75
	c. 0.080/02	18.39	43	7.91
	D. 0.043	13.00	43	5.59
Upper 48"	A. 0.011% Min. [1]	9.74	31	3.02
	B. 0.097% Overall[l]	28.91	31	8.96
	c. 0.080/02	26.26	31	8.14
	D. 0.0313	16.35	31	5.07
Lower 48"	A. 0.036% Min. [1]	17.61	31	5.46
	c. 0.051% Overall[l]	20.96	31	6.50
	D. 0.080/02	26.26	31	8.14
	0.0313	16.35	31	5.07

June 4, 1997

Sources of Data for Slope:

1. Data from AS-BLT. Information documented in Lowell's files.
2. Data from Sheet 3 of 79, 1971 plans prepared by Huntington Wade & Assoc.
3. Minimum slopes based on velocity of 2 fps per Ten States Standards.

1) Subsystem 1

Subsystem No. 1 is located in the southeast side of the Town. The sewers in this area drain to the 48-inch Lowell - Cedar Lake Interceptor immediately north of the wastewater treatment plant. No direct overflow exists for this subsystem.

2) Subsystem 2

Subsystem No. 2 is located in the southeast most comer of the Town. The sewers in this area drain to the 48-inch interceptor immediately north of the wastewater treatment plant. No direct overflow exists for this subsystem.

3) Subsystem 3

Subsystem No. 3 is located in the east side of the Town. The sewers in this area drain to the 48-inch interceptor north of the wastewater treatment plant. No direct overflow exists for this subsystem.

4) Subsystem 4

Subsystem No. 4 is located in the west side of the Town. The sewers in this area drain to the 48-inch interceptor immediately north of the wastewater treatment plant. No direct overflow exists for this subsystem.

5) Subsystem 5

Subsystem No. 5 is located in the southwest corner of the Town. The sewers in this area drain to the 48-inch interceptor immediately north of the wastewater treatment plant. No direct overflow exists for this subsystem.

6) Subsystem 6

Subsystem No. 6 is located in the west side of the Town. The sewers in this area drain to the 48-inch interceptor north of the wastewater treatment plant. No direct overflow exists for this subsystem.

7) Subsystem 6A

Subsystem No. 6A is located in the center of the Town. The sewers in this area drain to the 42-inch interceptor north of the wastewater treatment plant. No direct overflow exists for this subsystem.

8) Subsystem 6B

Subsystem No. 6B is located in the center of the Town. The sewers in this area drain to the 42-inch interceptor north of the wastewater treatment plant. No direct overflow exists for this subsystem.

9) Subsystem 7

Subsystem No. 7 is located in the east side of the Town. The sewers in this area drain to the 42-inch interceptor north of the wastewater treatment plant. No direct overflow exists for this subsystem.

10) Subsystem 8

Subsystem No. 8 is located in the northwest comer of the Town. The sewers in this area drain to the 42-inch interceptor north of the wastewater treatment plant. No direct overflow exists for this subsystem.

11) Subsystem 9

Subsystem No. 9 is located in the northeast corner of the Town. The sewers in this area drain to the 42-inch interceptor north of the wastewater treatment plant. No direct overflow exists for this subsystem.

b. Combined Sewer Outfalls and Regulators

The Town has one (1) permitted outfall. The structure is located in the equalization basin at the Wastewater Treatment Plant. Excess flow passes over a 6 foot diameter manhole set at high water elevation in the equalization basin. The 30" overflow pipe then carries the flow to Cedar Creek. The outfall of the pipe has a flap gate on the discharge at the bank of the creek.

4. EVALUATION OF CONTROL ALTERNATIVES

The Town of Lowell has been aware of and working toward solving issues and their corresponding potential detrimental effects — namely, uncontrolled discharges.

As a result of years of extensive flow "cause/effect' analysis, flow metering, and investigatory work — including smoke testing of the existing CSA's integrity, coupled with an analysis of flows received from the Town of Cedar Lake, which require transport to the WWTP through the interceptor running through the Town of Lowell. The Town of Lowell has formulated and commenced work which is required to address the current problem of uncontrolled discharge of pretreated wastewater through its one (1) remaining overflow point. The below outlined approach reflects the thoughtful and phased manor in which the Town has been and still anticipates addressing this issue.

A. CONTROL ALTERNATIVES PHASE I - LIMIT FLOW CONTRIBUTION FROM CEDAR LAKE

Under Phase I the Town of Lowell has agreed with and proceeded in a joint venture with the Town of Cedar Lake to construct a 14-million gallon Equalization Basin Facility — to minimize the effects of wet weather flow fluctuations from the Town of Cedar Lake.

A 14-million gallon equalization basin has been constructed and has been in operation since January 2003. This basin is capable of accepting, storing, and subsequently dampening the currently observed excess flows that occur during rainfall events — from the Town of Cedar Lake.

Prior to embarking on the design and construction of this basin, a means for controlling / limiting overflow events was desired. Upon subsequent analysis of 1999 Monthly Report of Operations (MROs) and Daily Monitoring Reports (DMRs) it was determined that if such a basin were constructed and placed into operation, of the overflow events that occurred over the course of that year, the majority could have been avoided if such a basin were in place.

Consequently, this project was deemed instrumental and of the highest priority to implement in the Town's progression toward controlling and ultimately eliminating uncontrolled discharges of sewage to Cedar Creek (i.e. overflows).

The construction cost of said project was approximately 4-million dollars.

Monitoring of the beneficial effects of said basin are occurring and on-going — providing the Town with the information required to optimize the basin's use and subsequently minimize the number, duration, and volume of uncontrolled discharges to Cedar Creek.

B. CONTROL ALTERNATIVES PHASE II - OPTIMIZE THE EXISTING EQUALIZATION BASIN AT THE EXISTING WWTP

Once the wet weather flow issues resulting from Cedar Lake were addressed (via Phase I) the Town then turned its attention to issues within its own CSA that require improvements to further optimize its ability to control and eventually eliminate uncontrolled discharge of pretreated sewage to Cedar Creek.

As part of an agreed order with IDEM, the Town of Lowell has a Wastewater Treatment Plant improvements project currently under design. Currently, the Town is awaiting its IDEM Construction Permit, with anticipated approval slated for September 2003.

This improvements project includes modifications and improvements to Lowell's existing 14-million gallon equalization basin as well as a new headworks facility (pretreatment). Headworks improvements include (1) a new headworks building, (2) a new mechanical screen — replacing the existing, dilapidated, and sporadically operating mechanical screen, and (3) grit removal — where none is currently present. Basin improvements include (1) modifications to the current influent and effluent piping — effectively converting the basin to a solely equalization purpose; (2) incorporating a means of aeration, mixing of basin contents — increasing the level of pretreatment for the floatable controlled, pretreated sewage that is pumped to said basin; and (3) modification of the existing synthetic liner to a more durable asphalt liner — providing for a better means of cleaning said basin, which in turn can further limit the floatables contained within any potential overflow.

The above outlined improvements to both the headworks and the basin will have a synergistic effect on the communities CSO strategy. The improvements will provide the operational staff with more flexibility in selectively storing and subsequently draining excess flows, the ability to more readily regulate operational levels in the basin, the means to optimize storage capabilities of excess flows, as well as more readily and effectively pre-treat the raw sewage — to optimize the quality of any potential uncontrolled discharge to Cedar Creek.

The total costs associated with the Lowell Compliance Plan Phase II project is approximately 8-million dollars.

Phase II as described in the original LTCP was completed in 2006. Item 6 (see description below in Part F of this chapter) has been added as part of this November 2022 revision to the LTCP due to the inadequacy of the sewer drain from the Equalization Basin to the Headworks.

C. CONTROL ALTERNATIVES Items 2.A, 2.B, and 4 - REHABILITATING THE EXISTING INTERCEPTOR AND CONTINUED EVALUATION OF THE INTEGRITY OF THE EXISTING CSA SUBSYSTEMS

Phase III of the original LTCP has subsequently been renumbered as Item 2.A (Sanitary Sewer System Evaluation Survey (SSES) Interceptor); Item 2.B (Sanitary Sewer System Evaluation Survey (SSES) Sanitary Sub-System (Combined Sewer Area)); and Item 4 (Interceptor Rehabilitation).

It is known through flow metering investigatory work performed in 1998 that the existing interceptor has issues. It is proposed that the existing interceptor (1) receive a "heavy" cleaning, (2) be televised to determine extent and location of required rehabilitation work, and (3) perform require rehabilitation work.

There is currently approximately 33,100 lineal feet of interceptor line ranging from 30" diameter to 48" diameter concrete pipe. Although an accurate cost estimate for the referenced cleaning and televising can be assembled base upon past work and costs of same performed, there is no way to quantify the exact extent of rehabilitation work required prior to the quantifiable cleaning and televising.

Costs, however, for the cleaning and televising of said interceptor can be quantified with a reasonable degree of accuracy, since like work has been performed in the past and the length and diameter of pipes are known. Anticipated costs associated with the cleaning and televising of the interceptor are approximately $238,000. .

For estimation purposes, the following assumptions were made to estimate the cost for interceptor repair / replacement / rehabilitation:

1. Twenty-Five Percent of the Interceptor will require replacement.
2. A cost of $150 per lineal foot will be utilized.

(33,100 lf. of interceptor) x (25%) x ($150 per l.f.) = $1 ,241 ,250

Additionally, a 2003 manhole inspection report for same located along the interceptor indicates 35 manholes requiring substantive rehabilitation / replacement. A cost of $1 ,800 was utilized for estimation purposes to quantify said activity (35 manholes x $1800 per manhole = $63,000).

Interceptor Sewer Update - The Town of Lowell, along with the Joint Management Oversight Board (JMOB), undertook the inspection of approximately 49% of the existing interceptor sewer via closed-circuit television (CCTV) as part of Item 2.A. The original plan was to televise the entire interceptor. However, approximately halfway through the project, there were issues with accessing some sewer sections due to weather and remote locations. At that time, the portions that had been inspected were reviewed. Overall, the interceptor is in good condition. There were a few areas where infiltration was noted, but it appeared to be minimal, and the pipe looks to be in sound structural condition. It is therefore recommended that the cost of televising the remainder of the interceptor would

be better spent elsewhere. That said, it is also recommended that CCTV inspections be done in the future on an as-needed basis when blockages or I/I are suspected, but not necessarily as part of the LTCP.

Therefore, the Sanitary Sewer System Evaluation Survey (SSES) Interceptor (described as Item 2.A is considered complete, and the Item 4, Interceptor Rehabilitation is considered as not required at this time and has been eliminated from the Implementation Schedule.

Currently, subsystems 1, 2, and 3 have had smoke testing and visual inspection evaluations performed (July 2003) — quantifying the extent of anticipated rehabilitation required. The costs incurred for said evaluations have been analyzed with respect to investigated pipe length, and an estimated unit cost assigned based on costs incurred: $0.75 per lineal foot.

The remaining lineal footage of subsystem pipe is known to be approximately 81 ,000. Therefore, an investigatory cost of $61,000 can be associated with the remaining subsystems.

Total estimated cost for the Phase Ill project is:

1.	Cleaning and Televising of Interceptor:	$ 238,000
2.	Repair / replacement of Interceptor Line:	$1,241,250
3.	Repair / replacement of Interceptor Manholes:	$ 63,000
4.	Evaluate the integrity of the CSA subsystems:	$ 61,000
	Total:	$1,603,250

Or, approximately, 1.6-million dollars.

Further, the clear water contributions to the CSA via sump pump effluent, structure perimeter drains, etc. represent a significant issue that requires quantification. As part of the proposed investigatory work on the CSA subsystems, the Town will engage in a program to identify and quantify the number and locations of these clear water contributors to allow for a more succinct and global approach toward their eventual removal.

With moving the construction of the Wet Weather Facility (Phase III) up in the schedule, and the success the Town has had with eliminating untreated CSO's during wet weather events by utilizing the extra process, the further evaluation of the CSA sewer subsystems (described as Item 2.B) has been eliminated from LTCP Implementation Schedule. As previously noted, the Town will continue to inspect all of its sanitary sewers as part of its ongoing maintenance, and address areas where I/I is discovered.

D. CONTROL ALTERNATIVES ITEM 5 ~~PHASE IV~~ - SUBSYSTEM REHABILITATION

The final phase of the proposed LTCP project is to rehabilitate the Item 2.B identified CSA subsystems.

As was the case in the Phase III (Now Items 2.A, 2.B, and 4) project, it is impossible to accurately quantify the costs associated with existing sewer rehabilitation without knowing first the extent of the deficiencies.

Therefore, the best estimation of cost that can be offered at this time is a projection based on engineering judgment.

The following table reflects the costing procedures applied for gross estimation purposes, in which Commonwealth attempted to quantify potential costs associated with Lowell's CSA sewer subsystem for the purposes of this report. Again, it is of note worth that the assumptions applied are gross in nature — simply providing a "starting point'. After the activities outlined in Phase Ill are completed, namely the characterization of the Town's subsystems existing conditions, the costs can be updated and an amendment to this report will be submitted to IDEM outlining a more refined and information based estimate.

Subsystem	Total Length (ft)	Estimated Rehabilitation Length (ft)	Cost	No. of MH's requiring rehabilitation	Cost	Perimeter Drain / Sump Pump Removal	Cost	Total Cost
1	14 670	4,890	$ 244,500.00	12	$ 18,000.00	12	$ 24,000.00	$ 286,500.00
2	28,250	6,083	$ 304,150.00	15	$ 22,500.00	15	$ 30,000.00	$ 356,650.00
3	39,450	13,150	$ 657,500.00	33	$ 49,500.00	32	$ 64,000.00	$ 771,000.00
4	6,300	2,100	$ 105,000.00	5	$ 7,500.00	5	$ 10,000.00	$ 122,500.00
5	24,350	8,117	$ 405,850.00	20	$ 30,000.00	19	$ 38,000.00	$ 473,850.00
6	17,350	5,783	$ 289,150.00	14	$ 21,000.00	14	$ 28,000.00	$ 338,150.00
6A	800	267	$ 13,350.00	1	$ 1,500.00	1	$ 2,000.00	$ 16,850.00
6B	600	200	$ 10,000.00	1	$ 1 500.00		$ 0.00	$ 11 ,500.00
7	5,800	1 ,933	$ 96,650.00	5	$ 7,500.00	5	$ 10,000.00	$ 114,150.00
8	7,100	2,367	$ 118,350.00	6	$ 9,000.00	6	$ 12,000.00	$ 139,350.00
9	18,430	6,143	$ 307,150.00	15	$ 22,500.00	15	$ 30,000.00	$ 359,650.00
Total	163,100	51,033	$2,551,650.00	127	$190,550.00	124	$248,000.00	$2,990,150.00

Note:

Heading	Description
Estimated Rehabilitation Length:	Assumed that one third of the overall total length will require rehabilitation.
Subsystem Cost:	Utilized a cost of $50/lineal foot.
MH Rehabilitation Required:	Assumed that for the estimated rehabilitation length, every 400 lineal feet a MH will require rehabilitation.
MH Cost:	Utilized a cost of $1,500/manhole.
Perimeter Drain / Sump Removal:	Utilized information obtained from inspection of subsystems 1, 2, and 3 and reduced this number to a "per lineal foot' average — than applied this to the remaining systems.
Drain / Sump Removal Cost:	Utilized a cost of $2000/per sump and/or drain.

As described previously in this amended report, due to the construction of the wet weather treatment facility and its success at eliminating untreated CSO's, Item 5 has been eliminated from the LTCP Implementation Schedule.

E. CONTROL ALTERNATIVES PHASE III - END OF PIPE TREATMENT OF REMAINING OVERFLOWS (IF REQUIRED)

The final phase of the proposed LTCP project was to assess the necessity for end-of-pipe treatment (should any remaining overflow issues remain) or seal the one permitted overflow.

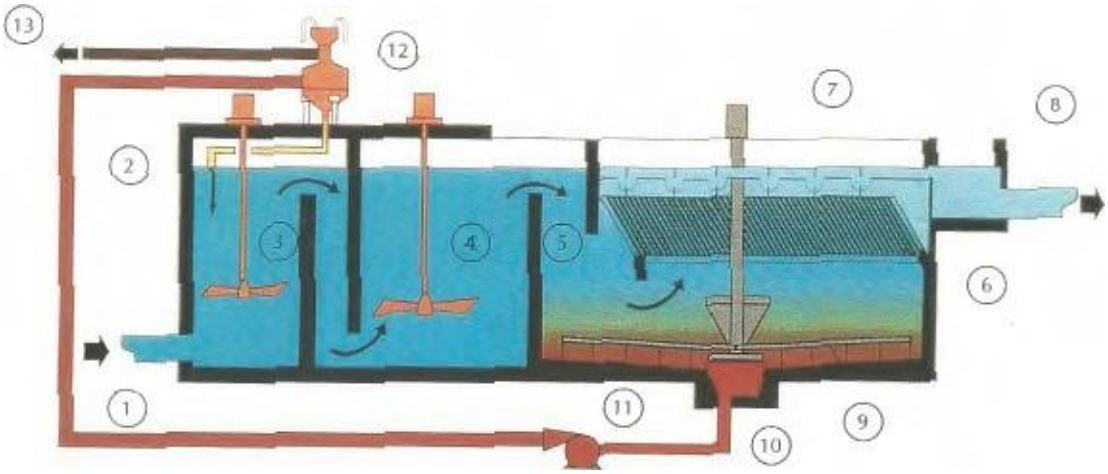
Upon completion of Phases I thru IV and the subsequent monitoring of the effects each phase has had on the systems response, it can be readily determined if (1) the existing overflow should remain, and (2) if said overflow remains, a design volume to treat.

All flows received from CSA will be stored and pre-treated by the WWTP's Headworks structure and the WWTP's Equalization Basin. Current headwork's pumping capabilities to the Equalization Basin are set at 15 million gallons per day.

It is impossible to quantify at this time the extent of end-of-pipe treatment that will be necessary upon completion of Phases I thru IV. However, the Town finds it prudent at this time to outline the treatment process anticipated should such a mechanism be required to be set in place.

- Due to the location of the overflow and corresponding limited space, it is most prudent to anticipate a high rate, limited footprint treatment process with disinfection. Such a process has been identified and is being proposed should end-of-pipe treatment ultimately be required. This process provides a ballasted flocculation system that allows very high settling rates thereby minimizing the footprint of the tanks. A major benefit to the process is that it is not a biological process; therefore, it can be stopped and started as necessary to handle wet weather rain events. This process is shown in the below figure:

LONGITUDINAL SECTION



1 - Raw water inlet
2 - Injection of microsand
3 - Flash mixing zone (coagulation)
4 - Gentle mixing zone (flocculation)
5 - Inlet to settling zone
6 - Lamella modules
7 - Collecting troughs or pipes
8 - Treated water outlet
9 - Sludge scraper and trough
10 - Sludge and sand outlet sump
11 - Recycling pump
12 - Hydrocyclones for microsand recovery
13 - Sludge outlet

Phase III was moved up in the Schedule, and the construction of the new Wet Weather Treatment Facility (Actiflo) was completed in 2013. The project included a 10.0 MGD high-rate clarifier and UV disinfection. Effluent from the Wet Weather Treatment Facility is sampled separately before being re-combined with flow from the conventional WWTP prior to discharge.

F. CONTROL ALTERNATIVES ITEM 6 – EQUALIZATION BASIN DRAIN BACK PIPE

The work included under Phase II was completed in 2006. A part of the improvements project at the WWTP included a 12-inch drain line from the downstream end of the EQ Basin back to the headworks. The purpose of this line, which included a flow control valve, was to bleed stored excess influent from the basin back through the WWTP for treatment once the wet weather flows have subsided. While the new pipe has allowed the facility to accomplish the goal of emptying the basin after wet weather events, there have been some operational issues that need to be addressed. The pipe allows only up to 1.5 MGD of flow at this time. The pipe's capacity should be approximately 3.0 MGD when the EQ Basin is full. It is suspected that due to the sporadic use of the drain, solids settle in the pipe, reducing its capacity to move water. The pipe was not installed with any effective way of flushing or otherwise cleaning any debris from it.

The importance of being able to drain the EQ Basin at a faster rate is critical during seasons when wet weather events occur at a regular interval. For example, during the spring, it is not unusual to have several rain events during the course of a week or two span. While none of these events may reach the level of a one-year one-hour storm that would allow for the use of the Wet Weather Treatment Facility (Actiflo constructed under the completed Phase III), having them in succession, especially with saturated ground conditions, can result in a great deal of excess flow to the plant. If the EQ Basin could be emptied, or at least drawn down as low as possible between these rain events, there would be more volume to utilize when the next rain begins, reducing the chances of needing to operate the Wet Weather Treatment Facility, or cause a CSO.

Various alternatives were evaluated for emptying the EQ Basin. One included the construction of a Lift Station that would pump the contents back to the headworks of the plant. However, there are several issues with this. One of them being the elevation difference between the basin and the headworks. The system would essentially be pumping downhill, which creates operational and maintenance issues. The cost of a pump station and new force main are much higher than the selected alternative described below.

Increasing the size of the drain pipe was also investigated. While this would allow for greater flows back to the headworks, the cost of a new sewer, which would be up to 25' deep in areas where there is high water table, is prohibitive, and would only provide a faster drain back time if the influent flows to the plant decreased significantly right after the rain event.

At the time of this revision, a new Item 6 is proposed. As part of a larger improvements project, the EQ Basin Drain Back would be cleaned and televised, and modified to include three cleanouts that would allow for the pipe to be flushed on a routine basis after it has been used to empty the EQ Basin, as well as provide access points where a camera could be inserted into the pipe for inspection. The remainder of the proposed improvements project does not affect the focus of the CSO-LTCP. They include automation of valves, replacement of the non-potable water system, a new standby generator, and upgrades to the aerobic digesters.

The proposed modifications to the EQ Basin Drain Sewer would bring its maximum carrying capacity back to the original design of 3.0 MGD, when the basin is full. The flowrate would be controlled by a pinch valve near the EQ Basin. The operator will set the flow from the EQ Basin based on the influent to the plant, maximizing the treatment capacity to empty the basin as quickly as possible while still maintaining the required level of treatment at the plant.

There are many variables that will affect the amount of time that it takes to drain the basin after a wet weather event. At a minimum, it would take approximately 2 weeks based on the capacity of the drain sewer. The maximum flow of 3.0 MGD would be achievable when the basin is full, but as it empties, the flow will begin to slow down. The most critical factor in the amount of time it will take is the incoming flow to the plant. For instance, if the influent flows average 3.5 MGD, only 0.5 MGD can be drained back to the headworks (due to the 4.0 capacity of the conventional WWTP), which would result in the basin being drained over the course of four weeks.

It is the intent to leave CSO #4 open upon completion of Item 6 and the LTCP. Although the Town's NPDES Permit will be modified at that time, including the reclassification of the CSO from "permitted" to "prohibited", CSO #4 will remain open for storms greater than a 10-year 1-hour event, based on IDEM's Nonrule Policy Number Water-016 for CSO Treatment Facilities.

The estimated construction cost of the new EQ Basin Drain Back pipe is $800,000, with non-construction costs estimated at $150,000, for a total Project Estimated cost of $950,000. The project that includes the pipe modifications is planned to be start construction in 2022 and finish in 2023.

5. MAXIMIZING TREATMENT AT THE WWTP

A. CURRENT FACILITIES

The original facilities were constructed in 1973. In 1987 the plant was upgraded. In 1999 a modifications / improvements project was performed as part of an agreement with IDEM for a two (2) phased approach to addressing plant deficiencies. The second phase of said project was completed in 2006.

The existing WWTP consists of a 4 MGD average design activated sludge plant.

Table 2 summarizes the unit processes and the capacities.

TABLE 2
PLANT UNIT CAPACITIES

Process	Size	Qty.	Max. Rated Capacity
PreTreatment Headworks[1] -- Screening, Degritting , Pumping			
Bar Screen[1]	4 ft.	1	15 MGD
Raw Sewage Pumps[1]	4 MGD — treatment 1 1 MGD - storm	2	2 pumps = 4 MGD, total — to plant 2 pumps = 11 MGD, total - to E.Q Basin 1 pump = 5.5 MGD (back-up)
Grit Tank	12 ft. dia.	1	15 MGD
Equalization[2] Mixers/Aerators			
Earthen Basin w/Asphalt Liner[2]		1	14-Million Gallon Storage Capacity
Mixers / Aerators	25 HP each	5	
Aeration Fine Bubble Aeration			
Fine Bubble Aeration Circular Tanks		4	4 MGD
Secondary Clarification			
Final Clarifiers	Clarifiers 1&2: 40' diam.	6	4 MGD
	Clarifiers 3&4: 50' diam.		
	Clarifiers 5&6: 50' diam.		

RAS/WAS Pumping	Final Clarifiers 1 & 2		
	Pump	Operating Condition	
	1	465 GPM 17' TDH	
	2	465 GPM 17' TDH	
	3	370 GPM 17' TDN	
	4	280 GPM 15' TDN	
	Final Clarifiers 3 & 4		
	Pump	Operation Condition	
	1	830 GPM 35' TDN	
	2	830 GPM 35' TDN	
	3	600 GPM 35' TDH	
	4	260 GPM 35' TDH	
	Final Clarifiers 5 & 6		
	Pump	Operation Condition	
		1000 GPM 37' TDH all three operation in series	
	Scum Pump	200 GPM 29' TDH	
Disinfection			
Ultra Violet Light[1]	1'Wx28'Lx8" D	1 -channel	4 MGD

Note: [1]Planned Component for the Phase II WWTP Compliance Plan Project
[2]Modifications to existing under Phase II WWTP Compliance Plan Project

B. MAXIMIZATION OF FLOW TO THE WWTP

According to the operational reports and input from the operating staff, the existing plant at times can be overwhelmed during wet weather periods — resulting in uncontrolled overflows. With the recent and planned improvements, namely, the New Cedar Creek / Lowell Equalization Basin and the planned Compliance Plan Phase II project at the Existing Wastewater Treatment Facility, a dramatic increase in the plant's capability of managing and ultimately treating and discharging resulting flows from these wet weather events has been seen and is further expected.

With the incorporation of the New Cedar Creek / Lowell Equalization Basin an additional 14 million gallons (approximate) of storage is available for use. This storage can be utilized to intercept and regulate flows from the Town of Cedar Lake — in essence, reducing the "spiked" wet weather flows to the plant.

With the near future incorporation of the Lowell Wastewater Treatment Plant Compliance Plan Phase II improvements, additional storage will be provided by means of hydraulic, piping, pumping, and associated control upgrades — allowing the operational staff to fully

utilize the existing 14 million gallon (approximate) equalization basin currently in place to it's full and intended potential.

C. PROPOSED WET WEATHER FLOW OPERATIONS

An additional 28-million gallons of storage (flow equalization) has been and will be incorporated as part of Lowell's LTCP for combined sewer overflow elimination.

Total project costs are about $12-million; $4-million for the new Cedar Lake / Lowell E.Q. Basin and $8-million for the WWTP Improvements Project. The project(s) have and are anticipated to dramatically increase the plant's capability for intercepting and storing excessive flows.

6. AFFORDABILITY ANALYSIS

The affordability analyses presented in this section are calculated to determine general implementation schedules per a Waste Water Cost Per Household Indicator (WWcpHl) and Socio-Economic Indicator Matrix (SEIM) table developed by IDEM. In general, this section follows the recommended financial calculations outlined in the U.S. EPA's "Combined Sewer Overflows - Guidance For Financial Capability Assessment And Schedule Development", EPA 832-B-97-004.

Supporting documentation for the socio-economic analyses presented in the section is included as **Appendix I** to this report.

A. WASTEWATER COST PER HOUSEHOLD INDICATOR (WW_{CPHI})

Total Number of Total Customers in Service Area = (Residential, Commercial & Industrial)	2,907	**(A)**
Total Number of Households in Service Area =	2,684	**(B)**
Total Number of Residents in Service Area =	7,505	**(C)**
FRACTION OF RESIDENTIAL FLOW (Based on Water Usage) Total Annual Water Used	236,677,111 Gallons	**(D)**
Total Annual Water Used By Residential Sources	185,906,311 Gallons	**(E)**

E/D = Fraction of Residential Flow (F)

F = **0.79**

CURRENT ANNUAL WWT COSTS	DOLLARS	LINE
- Annual Operations and Maintenance Expenses (Excluding Depreciation)	$1,525,091	G
- Annual Debt Service (Principal & Interest)	$1,087,950	H
Subtotal of Current Annual WWT COSTS (G+H)	**$2,613,041**	I

PROJECTED ANNUAL WWT AND CSO COSTS		
- Estimated Annual Operations and Maintenance Expenses	$25,000	J
- Phases III & IV Annual Debt Service Principal & Interest	$319,056	K
Subtotal of Projected Annual WWT AND COSTS (J+K)	**$344,056**	L
Total Current and Projected WWT and CSO COSTS (I + L)	**$2,957,097**	M
Residential Share of Total Costs (M * F)	$2,336,106	N
Cost Per Household (N/B)	**$870.38**	O

K = Annual Debt Service Cost = Adjusted Debt Cost X Annualization Factor
K = Annual Debt Service Cost =$ 4,600,000 X 0.06936 - Phases III & IV (based on 3.3% APR for 20 yrs.) K = Annual Debt Service Cost = $319,056

MEDIAN HOUSEHOLD INCOME:

P = $36,546

WASTEWATER COST PER HOUSEHOLD INDICATOR AS A PERCENT OF MHI:

Current and Phase III & IV Project Costs

WW_{CPHI} = Q = O/P x 100

CC = WW_{CPHI} = 2.38 %

B. SOCIO-ECONOMIC INDICATOR MATRIX (SEIM)

B.1 Median Household Income (MHI) as a percentage of National Average

Median Household Income for the CSO municipality = $36,546 * (A)

National Median Household Income $41 ,994 * (B)

* = 2000 Census Data

Calculation Formula:

-[1-(A/B)X100] = C

C = -12.97

if C is less than -25, then the MHI is classified as WEAK — Assign 3 Points

if C is between -25 +25, then the MHI is classified as MID-RANGE – Assign 2 Points

if C is greater than +25, then the MHI is classified as STRONG — Assign 1 Point

B.2 Average Unemployment Percentage Rate (avg. from 1/00 to 12/00)

Average Unemployment Rate of the CSO Municipality = 6.9% * (A)

National Average Unemployment Rate = 5.8% ** (B)

* Bureau of Labor Statistics, Year 2002 Average For Lake County

** Bureau of Labor Statistics, Year 2002 National Average

Calculation Formula:

A – B = C

C = 1.1%

if C is greater than +1/ then it is classified as WEAK — Assign 3 Points

if C is between -0.99 and +0.99, then it is classified as MID-RANGE — Assign 2 Points

if C is less than —1 , then it is classified as STRONG — Assign 1 Point

B.3 Overall Net Debt Per Capita

Public debt related to schools in the municipality	$21,014,297	(A)
Public debt related to municipal building projects (e.g. libraries, fire stations, town or city hall)	$0	(B)
Public debt related to bridges and roads	$0	(C)
Public debt related to EDIT bonds	$0	(D)
Public debt related to TIF bonds	$863,655	(E)
Other misc. public debt burden incurred by residents of the CSO municipality's sewer service area ➢ WWTP Phase II SRF Loan - $8,049,000 ➢ Water Department - $5,434,000 ➢ Park Department - $700,000	$14,183,000	(F)
Total Population served by the sewer utility	7,505	(G)

Calculation Formula:

(A + B + C + D + E + F) / G = H

H = $4,805

if H is greater than $3,000 then it is classified as WEAK —Assign 3 points

if H is between $1 ,000 and $3,000, then it is classified as MID-RANGE - Assign 2 Points

if H is less than $1 ,000, then it is classified as STRONG — Assign 1 Point

B.4 Bond Rating

THE TOWN OF LOWELL DOES NOT HAVE A BOND RATING

This should be identified for the CSO municipality's utility, which may be based on ratepayers, property taxpayers or a combination of these bases. If this is not possible, then it is reasonable to use the CSO municipality's bond rating, only.

if rated as BB-D (S&P) or Ba-C (Moody's), then the bond rating is classified as WEAK — Assign 3 Points

if rated as BBB (S&P) or Baa (Moody's), then the bond rating is classified as MID-RANGE — Assign 2 Points

if rated as AAA-A (S&P) or Aaa-A (Moody's), then the bond rating is classified as STRONG — Assign 1 Point

B.5 ~~Property Tax Revenue as a Percent of Full Market Property Value~~

~~This should be available from the Township Assessors' offices or through the Indiana State Tax Commission's office.~~

~~If above 4%, then classified as WEAK – Assign 3 Points~~

~~If between 2% and 4%, then classified as MID-RANGE – Assign 2 Points~~

~~If below 2%, then classified as STRONG – Assign 1 Point~~

NOT APPLICABLE IN INDIANA

B.6 Property Tax Revenue Collection Rate

This should be available from the Township Assessors' offices or through the Indiana State Tax Commission's office.

Total Property Taxes Billed by the Municipality In 2000 $2,231 ,507 (A)

Total Property Taxes Collected by the Municipality In 2000 $2,204 ,051 (B)

Calculation Formula:

(B/A) X 100 = C

C = 98.8%

if C is below 94%, then classified as WEAK — Assign 3 Points

if C is between 94% and 98%, then classified as MID-RANGE — Assign 2 Points

if C is above 98%, then classified as STRONG – Assign 1 Point

Calculation of Overall SEIM

Assigned Points from Section B. 1 =	2
Assigned Points from Section B.2 =	3
Assigned Points from Section B.3 =	3
Assigned Points from Section B.4 =	N/A
~~Assigned Points from Section B.5 =~~	N/A
Assigned Points from Section B.6 =	1
Summation of Total Points =	9 (Total Points)

Calculation Formula:

$$\frac{\text{Total Points}}{4} = \text{SEIM}$$

SEIM = 2.25

7. IMPLEMENTATION SCHEDULE

Schedule Matrix

WW_{CPHI} = 2.38% SEIM = 2.25

Please reference the below listed matrix to determine if the overall financial capability is classified as low, medium, or high.

S-E INDICATOR SCORE	WW_{CPHI} BELOW 1%	WW_{CPHI} 1% TO 2%	WW_{CPHI} ABOVE 2%
ABOVE 2.5	MEDIUM	HIGH	HIGH
1.5 TO 2.5	LOW	MEDIUM	HIGH
BELOW 1.5	LOW	LOW	MEDIUM

THIS MUNICIPALITY'S CLASSIFICATION = High

LENGTH OF TIME FOR CSO LONG TERM CONTROL PLAN (LTCP) IMPLEMENTATION:

- IF CLASSIFIED AS **HIGH**, THEN IMPLEMENTATION CAN BE OVER A **10 TO 20 YEAR** PERIOD
- IF CLASSIFIED AS **MEDIUM**, THEN IMPLEMENTATION CAN BE OVER A **5 TO 10 YEAR** PERIOD
- IF CLASSIFIED AS **LOW**, THEN IMPLEMENTATION CAN BE OVER A **5 YEAR** PERIOD

SCHEDULED TIME PERIOD FOR THIS MUNICIPALITY = Between 10 and 20 Years

Town of Lowell, Indiana
Long-Term Control Plan Implementation Schedule (Summary)
Updated November 2022

Item No.	Task Description	Target Date	Current Project Status
N/A	***Submit LTCP to IDEM***	September, 2003	Complete
N/A	***Phase I - Cedar Lake EQ Basin***		
	Complete and Operational Phase I Project	January, 2003	Complete
	Post-Construction Phase I Observation Start	July, 2003	
	Post-Construction Phase I Observation Finish	On-Going	
N/A	***Phase II - Lowell WWTP Headworks and EQ Basin Improvements***		
	IDEM Phase II Project Approval (Construction Permit)	September, 2003	Complete
	Receive Contractor Bids	February, 2005	
	Close On SRF Loan	April, 2005	
	Begin Construction Phase II	May, 2005	
	Complete Construction of Phase II	March, 2006	
	Post-Constrction Phase II Observation Start	April, 2006	
	Post-Constrction Phase II Observation Finish	July, 2008	
N/A	***Phase III - CSO Wet Weather Treatment Facility*** ***(Identified as Phase V in Original LTCP)***		
	Construction Begins	June 2012	Complete
	Construction Complete	June 2013	
	Initial Post Construction Evaluation Begins	July 2013	
	Initial Post Construction Evaluation Ends	July 2014	
1	***Evaluation of Existing Rain Gauges and Installation of Additional Rain Gauges*** ***(Item Added after Original LTCP)***	6/30/2016	Complete
2.A	***Sanitary Sewer System Evaluation Survey (SSES) Interceptor*** ***(Identified as Part of Phase III in Original LTCP)***		
	Evaluation Begins	7/1/2016	Complete
	Evaluation Ends	5/1/2020	
	Summarize findings, send to IDEM for review	6/1/2020	
2.B	***Sanitary Sewer System Evaluation Survey (SSES) Sanitary Sub-System*** ***(Combined Sewer Area) (Identified as Part of Phase III in Original LTCP)***		
	Evaluation Begins	12/1/2017	Elimination of Item from LTCP Requested
	Evaluation Ends	9/1/2020	
	Summarize findings, send to IDEM for review	10/1/2020	
3	***Operational Review of Wet Weather Treatment Facility and Influent Flow Monitoring / Reporting***		
	Evaluation Begins	5/1/2016	Complete
	Completion of Evaluation and Implementation	10/31/2016	
	Post Construction Monitoring Begins	11/1/2016	
	Post Construction Monitoring Ends	11/1/2017	
	Summarize findings, send to IDEM for review	12/1/2017	
4	***Phase IV - Interceptor Rehabilitation*** ***(Identified as Part of Phase III in Original LTCP)***		
	Design & Bidding Services Begins	2/1/2019	Elimination of Item from LTCP Requested
	Design & Bidding Services Ends	7/1/2020	
	Construction Begins	9/1/2020	
	Construction Ends	5/1/2021	
	Post Construction Monitoring Begins	5/1/2021	
	Post Construction Monitoring Ends	4/30/2022	
5	***Phase V - Sanitary Sub-System (Combined Sewer Area) Rehabilitation*** ***(Identified as Phase IV in Original LTCP)***		
	Design & Bidding Services Begins	6/1/2020	Elimination of Item from LTCP Requested
	Design & Bidding Services Ends	10/1/2020	
	Construction Begins	10/1/2020	
	Construction Ends	10/1/2021	
	Post Construction Monitoring Begins	10/1/2021	
	Post Construction Monitoring Ends	10/1/2022	
6	***EQ Basin Drain Line Modifications*** ***(Requested for Inclusion in LTCP with November 2022 Addendum)***		
	Design and Bidding Services Ends	7/1/2022	Complete - April 2022
	Construction Begins	7/31/2022	
	Construction Ends	8/1/2023	
	Post Construction Monitoring Begins	8/1/2023	
	Post Construction Monitoring Ends	8/1/2024	

Town of Lowell, Indiana
Long-Term Control Plan Implementation Schedule (Detailed)
Updated November 2022

Item No.	Task Description	Target Date	Current Project Status	Notes
N/A	***Submit LTCP to IDEM***	September, 2003	Complete	
N/A	***Phase I - Cedar Lake EQ Basin***			
	Complete and Operational Phase I Project	January, 2003	Complete	Phase I included the New 14 MG EQ Basin in **Cedar Lake**.
	Post-Construction Phase I Observation Start	July, 2003		
	Post-Construction Phase I Observation Finish	On-Going		
N/A	***Phase II - Lowell WWTP Headworks and EQ Basin Improvements***			
	IDEM Phase II Project Approval (Construction Permit)	September, 2003	Complete	Phase II included a new Headworks and improvmnents to the Existing 14 MG EQ Basin located at the **Lowell WWTP**.
	Receive Contractor Bids	February, 2005		
	Close On SRF Loan	April, 2005		
	Begin Construction Phase II	May, 2005		
	Complete Construction of Phase II	March, 2006		
	Post-Constrction Phase II Observation Start	April, 2006		
	Post-Constrction Phase II Observation Finish	July, 2008		
N/A	***Phase III - CSO Wet Weather Treatment Facility*** ***(Identified as Phase V in Original LTCP)***			
	Construction Begins	June 2012	Complete	Phase III included the new Wet Weather Treatment Facility at the **Lowell WWTP**.
	Construction Complete	June 2013		
	Initial Post Construction Evaluation Begins	July 2013		
	Initial Post Construction Evaluation Ends	July 2014		
1	***Evaluation of Existing Rain Gauges and Installation of Additional Rain Gauges*** ***(Item Added after Original LTCP)***	6/30/2016	Complete	Additional Item added to LTCP Schedule - see letter from IDEM dated June 20, 2016
2.A	***Sanitary Sewer System Evaluation Survey (SSES) Interceptor*** ***(Identified as Part of Phase III in Original LTCP)***			
	Evaluation Begins	7/1/2016	Complete	Approximately 49% of the Interceptor Sewer was inspected via CCTV. The pipe appeared to be in good condition, and evaluation of flow monitoring data from 2018 indicated that the majority of I/I is not entering the system through the interceptor. In a letter dated July 7, 2020, Lowell requested remaining evaluation and subsequent rehabilitation (Item 4) be eliminated from the LTCP requirements. This request is included in the November 2022 proposed LTCP Amendment.
	Evaluation Ends	5/1/2020		
	Summarize findings, send to IDEM for review	6/1/2020		
2.B	***Sanitary Sewer System Evaluation Survey (SSES) Sanitary Sub-System*** ***(Combined Sewer Area) (Identified as Part of Phase III in Original LTCP)***			
	Evaluation Begins	12/1/2017	Elimination of Item from LTCP Requested	With use of the EQ Basins and Wet Weather Treatment Facility, Lowell has not had an untreated CSO in over 2 years. The Town (via LTCP proposed November 2022 Amendment) requests further evaluation and subsequent rehabilitation (Item 5) be eliminated from the LTCP requirements. Refer to the proposed Amendment for additional discussion.
	Evaluation Ends	9/1/2020		
	Summarize findings, send to IDEM for review	10/1/2020		
3	***Operational Review of Wet Weather Treatment Facility and Influent Flow Monitoring / Reporting***			
	Evaluation Begins	5/1/2016	Complete	
	Completion of Evaluation and Implementation	10/31/2016		
	Post Construction Monitoring Begins	11/1/2016		
	Post Construction Monitoring Ends	11/1/2017		
	Summarize findings, send to IDEM for review	12/1/2017		
4	***Phase IV - Interceptor Rehabilitation*** ***(Identified as Part of Phase III in Original LTCP)***			
	Design & Bidding Services Begins	2/1/2019	Elimination of Item from LTCP Requested	See Note under Item 2.A above.
	Design & Bidding Services Ends	7/1/2020		
	Construction Begins	9/1/2020		
	Construction Ends	5/1/2021		
	Post Construction Monitoring Begins	5/1/2021		
	Post Construction Monitoring Ends	4/30/2022		
5	***Phase V - Sanitary Sub-System (Combined Sewer Area) Rehabilitation*** ***(Identified as Phase IV in Original LTCP)***			
	Design & Bidding Services Begins	6/1/2020	Elimination of Item from LTCP Requested	See Note under Item 2.B above.
	Design & Bidding Services Ends	10/1/2020		
	Construction Begins	10/1/2020		
	Construction Ends	10/1/2021		
	Post Construction Monitoring Begins	10/1/2021		
	Post Construction Monitoring Ends	10/1/2022		
6	***EQ Basin Drain Line Modifications*** ***(Requested for Inclusion in LTCP with November 2022 Addendum)***			
	Design and Bidding Services Ends	7/1/2022	Complete - April 2022	Item 6 is added via proposed Addendum to the LTCP dated November *2022.* The Item includes modifications to the **Lowell WWTP** EQ Basin Drain Sewer. The original 12" Sewer is not operating properly, significantly reducing the flow from the basin to the headworks. Cleanouts and access points will be added, and the sewer will be jetted and televised to return it to its original capacity. Construction of Item 6 is weather dependent, and may also be affected by material supply issues. The completion date may be in 2022 if dry weather continues through the fall, and necessary materials are able to be procured.
	Construction Begins	7/31/2022		
	Construction Ends	8/1/2023		
	Post Construction Monitoring Begins	8/1/2023		
	Post Construction Monitoring Ends	8/1/2024		

8. POST CONSTRUCTION MONITORING

There are several specific variables that can change between the effective date of this LTCP and the finalization of all separation programs (e.g. by the year 2020 or later). As an example, sometime within the next 10 to 20 years, new technologies may be developed that can have significant impacts on end-of-pipe treatment options. Therefore, the Town of Lowell will continue to observe the evolution of these variables, and at an appropriate time in the future, work with IDEM to get approval on a written Post Construction Monitoring document.

The Town of Lowell will add or continue the following practices as part of its Post Construction Monitoring after the completion of the LTCP Projects:

- Maximize the treatment capacity of the Conventional WWTP.
- Monitoring of influent flow, rain data (intensity and totals), and flow to and from the EQ Basin.
- Develop a Standard Operating Procedure for the Wet Weather Treatment Facility, including recognition of early indicators when the facility will be required, and standard procedures once it is placed into operation.
- As currently required by the Town's NPDES Permit - Monitoring and Reporting of flows, raw sewage characteristics, effluent characteristics and loadings, and biosolids handling data.
- Continue to implement the nine minimum control measures detailed in the IDEM approved CSOOP, and evaluate the CSOOP when changes are made to the WWTP equipment or processes, and/or when changes occur with regards to the characteristics of the influent flow to the WWTP.

9. CSOOP AND LTCP REVISIONS

The Combined Sewer Overflow Operational Plan and this Long-Term Control Plan are intended to be dynamic documents, which will need to be updated periodically to reflect current situations and projects.

The Town of Lowell certifies that they shall continue to implement the nine minimum control measures detailed in the IDEM approved CSOOP. Furthermore, the Town of Lowell commits to completing revisions to the CSOOP throughout the implementation of this LTCP. The updates to the CSOOP will address additional equipment, procedures, and/or processes addressing any of the nine minimal controls, including but not limited to, floatable controls and/or end of pipe treatments that may be required throughout the implementation period.

The Town of Lowell will review the contents of this Long Term Control Plan report at a minimum of every two years to determine the appropriateness of incorporating new programs, and reflecting construction projects and other changes in the combined sewer area.

Indiana Department of Environmental Management
LTCP REVIEW CHECKLIST

		INCLUDED		ADEQUATE		PAGE
I.	General					
A.	Was a certification statement (pursuant to 327 IAC 5-2-22 (b-d) and 327 5-2-8 (14)) submitted with the LTCP?	Y X N ___		Y ___ N ___		___
B.	Are all related documents and past correspondence gathered to supplement the LTCP review? (CSO operational plan, stream reach characterization and evaluation report (SRCER), inflow/infiltration studies, sewer system evaluation survey (SSES), etc.)	Y X N ___		Y ___ N ___		___
C.	Are there a general description of the CSS that includes the area (acres) and an estimate of the population served?	Y X N ___		Y ___ N ___		29
D.	Are all CSOs listed within the NPDES permit as well as those not included in the permits listed in the LTCP and identified on a collection system map?	Y X N ___		Y ___ N ___		1
	Are the CSOs identified by latitude/longitude or street address?	Y X N ___		Y ___ N ___		1
F.	Is POTW capacity (primary and secondary; average and peak hydraulic) been specified?	Y X N ___		Y ___ N ___		27
G.	Are dry weather sanitary flow (base flow) estimates or patterns presented?	Y X N ___		Y ___ N ___		App G
H.	Are wastewater flows to the combined sewer system (CSS) from neighboring or satellite communities identified and quantified?	Y ___ N ___		Y ___ N ___		App G
I.	Are the principal hydraulic control structures identified (interceptors, regulators, pump stations, storage and control facilities, POTW) and their capacities identified?	Y X N ___		Y ___ N ___		16
J.	Are chronic problems within the CSS identified (dry weather overflows (DWOs), sewer surcharging, or basement backups)?	Y ___ N ___		Y ___ N ___		N/A
K.	Did the permitted identify significant industrial users within the CSS service area?	Y ___ N ___		Y ___ N ___		N/A

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		INCLUDED		ADEQUATE		PAGE
L.	Are any existing flow metering or SCADA records described?	Y X	N ___	Y ___	N ___	App G
M.	Are all tributaries and downstream water bodies identified?	Y X	N ___	Y ___	N ___	1
N.	Is information regarding stream flow presented?	Y X	N ___	Y ___	N ___	App E
O.	Is information about water quality, sediment, and biological data presented? Dry and Wet weather?	Y X	N ___	Y ___	N ___	App E
P.	Are the current water quality standards and existing and designated uses of each receiving water identified?	Y X	N ___	Y ___	N ___	3
Q.	Are the pollutants of concern identified for each receiving water?	Y X	N ___	Y ___	N ___	App E
R.	Are long-term rainfall records and annual average conditions identified and evaluated?	Y X	N ___	Y ___	N ___	App G
S.	Does the permittee demonstrate an adequate understanding of the rainfall conditions that cause CSO events at each outfall?	Y X	N ___	Y ___	N ___	App G
T.	Does the permittee demonstrate a good understanding of the hydraulic response of the CSS and/or POTW to wet weather conditions.	Y X	N ___	Y ___	N ___	App G
U.	Does the characterization provide information on the known effects of the CSO's on water quality during wet weather events (such as beach closings, evidence of floatables washup, fish kills, sediment accumulation, and frequency, duration and magnitude of instream WQS violations)?	Y X	N ___	Y ___	N ___	App E
II.	Sensitive Area					
A.	Have all sensitive areas been identified? (Habitat for threatened or endangered species, primary contact recreational areas such as beaches and other swimming areas, drinking water source waters, and outstanding state resource waters).	Y X	N ___	Y ___	N ___	8
B.	Is a detailed description of the process used to determine existence of sensitive areas given?	Y X	N ___	Y ___	N ___	8

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		INCLUDED		ADEQUATE		PAGE
C.	Has verification been given that all parties including Department of Natural Resources (DNR), EPA, US Fish and Wildlife, Health Dept., have been utilized in the determination of sensitive areas?	Y X	N ___	Y ___	N ___	8
D.	Are maps submitted outlining all sensitive areas, CSO Outfalls, and the receiving waters?	Y X	N ___	Y ___	N ___	Fig. 1
E.	Has public input on all potential Sensitive Areas where full-body contact recreation occurs been included in the Plan?	Y X	N ___	Y ___	N ___	12
F.	Have all Sensitive areas been given the first priority in selection of alternatives for removal, relocation, or treatment?	Y ___	N ___	Y ___	N ___	N/A

III. Public Participation

A.	Has public participation been utilized in the identification of existing uses?	Y X	N ___	Y ___	N ___	12
B.	Has verification been given by OWQ inspector, and DNR personnel, regarding any other potential known areas with uses, which should have been included?	Y ___	N ___	Y ___	N ___	___
		TO BE ANSWERED BY AGENCIES				
C.	Has a public meeting or hearing notice been published by IDEM (SRF follow Rule 327 IAC 13-8.1-8) and submitted showing the public has had an opportunity to add any other information or dispute that given by the community?	Y ___	N ___	Y ___	N ___	___
		TO BE ANSWERED BY AGENCIES				
D.	Were meeting dates, sign in sheets, handouts, and meeting minutes (SRF projects require verbatim transcript as well as a proof of publication) submitted?	Y X	N ___	Y ___	N ___	20
E.	Does the LTCP document the process used to inform the public about control alternatives and engage them in the decision process?	Y X	N ___	Y ___	N ___	13
F.	Was a Citizen Advisory Committee formed, or a similar group?	Y X	N ___	Y ___	N ___	12
G.	Did the public participation process involve rate payers (including satellite customer communities), industrial users of the CSS, persons near impacted waters, and persons who use the impacted waters?	Y X	N ___	Y ___	N ___	12

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H.	Does the LTCP document decisions or changes made in response to public comments?	Y X N ___		Y ___ N ___		13
I.	What is the frequency of meetings, and was education conducted?	Y X N ___		Y ___ N ___		12
J.	Input on growth issues?	Y X N ___		Y ___ N ___		13
K.	Have potential environmental justice (EJ) issues been considered by ensuring all impacted groups have had the understanding and opportunity to contribute?	Y X N ___		Y ___ N ___		13
IV.	Monitoring and Modeling					
A.	Was small community consideration granted?	Y X N ___		Y ___ N ___		App A
B.	If yes, has the permittee demonstrated a good understanding of the hydraulic response of the CSS and/or POTW to wet weather conditions?	Y X N ___		Y ___ N ___		App G
C.	If no, are models (hydraulic and/or water quality) presented?	Y ___ N ___		Y ___ N ___		SCC
	Is recent data available for an adequate range of storms to characterize the hydraulic response of the collection system and CSOs? Data should be within the last five years.	Y ___ N ___		Y ___ N ___		SCC
E.	Was rainfall data (depth and intensity) collected within the CSS during the flow monitoring periods? Are rain gauge locations listed on a map? What type of gauges were used?	Y X N ___		Y ___ N ___		App G
F.	Does the flow monitoring data adequately portray the hydraulic response of the CSS to rainfall?	Y X N ___		Y ___ N ___		App G
G.	Does the LTCP present estimated concentrations of the pollutants discharged and reasonable justification?	Y X N ___		Y ___ N ___		App E
H.	Is the monitoring and concentration information adequate to estimate pollutant loads associated with CSO discharges?	Y X N ___		Y ___ N ___		App E

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		INCLUDED		ADEQUATE		PAGE
..	Is there information about the impact of CSO pollutant loadings on the receiving waters for the water quality parameters of concerns? (Typically bacteria, BOD and TSS)	Y X	N ___	Y ___	N ___	App E
J.	Is the monitoring sufficient to document pre-control baseline conditions to allow the permittee to demonstrate the long-term benefits of CSO controls?	Y X	N ___	Y ___	N ___	App E
K.	Does the monitoring program include adequate spatial and temporal coverage during wet weather conditions to support an evaluation of the impacts associated with CSOs?	Y X	N ___	Y ___	N ___	App E
L.	Does the monitoring consider the appropriate range of possible CSO impacts on the receiving stream? (Typically bacteria and floatables; sometimes dissolved oxygen, metals, or nutrients)	Y X	N ___	Y ___	N ___	App E
M.	Has some type of model (e.g. spreadsheet, SWMM, HydroWorks, etc.) been developed to assess the response of the CSS to different rainfall conditions with respect to CSO volume, frequency, and peak overflow rate?	Y ___	N ___	Y ___	N ___	SCC
N.	Does the selected CSS model framework adequately address the engineering and regulatory needs of the LTCP?	Y ___	N ___	Y ___	N ___	SCC
O.	Is the level of detail of the CSS model consistent with and representative of the complexity of the CSS?	Y ___	N ___	Y ___	N ___	SCC
P.	Is sufficient flow and effluent concentration data available to calibrate the water quality model? (8 - 10 storms)	Y ___	N ___	Y ___	N ___	SCC
Q.	Is the model credible? That is, has the model been documented, calibrated, and verified to demonstrate that it generally represents observed behaviors (response to rainfall) over a variety of rainfall events?	Y ___	N ___	Y ___	N ___	SCC
R.	Is the model able to forecast the operation of the CSS under various CSO control scenarios, including the complete elimination of the CSOs?	Y ___	N ___	Y ___	N ___	SCC

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		INCLUDED		ADEQUATE		PAGE
S.	Has dry weather calibration of the model been conducted?	Y ___ N ___		Y ___ N ___		SCC
T.	Have other community's inputs been turned off?	Y ___ N ___		Y ___ N ___		N/A
U.	Has adequate seasonal representation been done for monitoring; and if only one season was sampled was it compared to normal conditions?	Y ___ N ___		Y ___ N ___		SCC
V.	Are wastewater flows to the CSS from neighboring or satellite communities identified in the model?	Y ___ N ___		Y ___ N ___		N/A
W.	Has some type of model been developed to assess the response of receiving waters to external CSO loads?	Y ___ N ___		Y ___ N ___		SCC
X.	Is the level of detail of the water quality model(s) relatively consistent with and representative of the complexity of the receiving waters?	Y ___ N ___		Y ___ N ___		SCC
Y.	Is the model credible? That is, has the model been documented, calibrated, and verified to demonstrate that it generally represents the major processes affecting water quality for the pollutants of concern?	Y ___ N ___		Y ___ N ___		SCC
Z.	Was information on pollutant loadings from other point and nonpoint sources in the watershed identified?	Y ___ N ___		Y ___ N ___		SCC
AA.	Are impacts from other point and nonpoint sources quantified?	Y ___ N ___		Y ___ N ___		SCC
BB.	Is the model able to forecast the benefits caused by various CSO scenarios on the receiving water(s)?	Y ___ N ___		Y ___ N ___		SCC
CC.	Did model results show compliance of water quality standards or demonstrate that water quality standards cannot be met regardless of the level of CSO control implemented?	Y ___ N ___		Y ___ N ___		SCC
DD.	Is the monitoring/modeling proposed sufficient to document the frequency and magnitude of CSO event-associated impacts, and to guide in the evaluation and selection of CSO controls?	Y ___ N ___		Y ___ N ___		SCC
EE.	How were the models calibrated; number and location of inputs, monitoring points, rainfall records, etc.?	Y ___ N ___		Y ___ N ___		SCC

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		INCLUDED		ADEQUATE		PAGE
FF.	Are any existing flow metering or SCADA records described?	Y ___	N ___	Y ___	N ___	App G
GG.	Is information about water quality, sediment, and biological data presented? Dry and Wet weather?	Y ___	N ___	Y ___	N ___	SCC
V.	Alternative Analysis					
A.	Has an analysis been conducted on a system-wide basis to compare alternatives? (discussing different controls such as source controls, collection system controls, storage technologies, etc.)	Y X	N ___	Y ___	N ___	9
B.	Does the LTCP describe the process by which the CSO control and alternatives combinations were developed?	Y X	N ___	Y ___	N ___	9
C.	Does the LTCP describe the approach used to screen and narrow the list of CSO control technologies, and list the screening criteria?	Y X	N ___	Y ___	N ___	9
D.	Does the LTCP explain the reasons for selecting certain CSO controls? Reasonable?	Y X	N ___	Y ___	N ___	9
	Were reasons for rejecting other CSO controls resented and reasonable?	Y X	N ___	Y ___	N ___	9
F.	Has an analysis been done on each CSO?	Y X	N ___	Y ___	N ___	App G
G.	Have the NMC been integrated into the permittee's description of the selected CSO controls?	Y X	N ___	Y ___	N ___	15
H.	Have sensitive areas & priority areas driven the analysis?	Y ___	N ___	Y ___	N ___	N/A
I.	Will the selected CSO controls eliminate all CSO impacts on sensitive areas?	Y ___	N ___	Y ___	N ___	N/A
J.	If not, do the data support the permittee's conclusion that elimination is not physically possible or economically achievable?	Y ___	N ___	Y ___	N ___	N/A
K.	Has the LTCP looked at whether or not the overflow can be relocated?	Y ___	N ___	Y ___	N ___	N/A
L.	If CSO discharges to sensitive areas remain, will these CSO's receive treatment?	Y X	N ___	Y ___	N ___	25

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		INCLUDED		ADEQUATE		PAGE
...	If CSO discharges and impacts on sensitive areas remain, is a strategy presented for prohibiting any new or significantly increased overflows to these areas?	Y X	N ___	Y ___	N ___	25
N.	Have previous compliance issues and the industrial contributions been considered?	Y ___	N ___	Y ___	N ___	N/A
O.	Is a POTW expansion considered?	Y ___	N X	Y ___	N ___	___
P.	Is the approach - presumptive and/or demonstrative stated?	Y X	N ___	Y ___	N ___	EX-3
Q.	Has the permitted organized the evaluation of controls in a technical framework and in an approach that is understandable and consistent with the National Policy?	Y X	N ___	Y ___	N ___	___
R.	Has the plan attempted to address the capture of the first flush?	Y ___	N ___	Y ___	N ___	N/A
S.	Has the permittee evaluated a sufficient range of CSO control alternatives to select a cost-effective CSO control plan to meet water quality standards and protect designated uses? Zero overflows, average of 1-3, 4-7, and 8-12 events per year, no action.)	Y ___	N ___	Y ___	N ___	SCC
T.	Has the permittee evaluated a range of controls sufficient for a cost/performance comparison in the LTCP, and has a cost/performance (knee of the curve) analysis been developed for the control alternatives considered?	Y ___	N ___	Y ___	N ___	SCC
U.	Will the selected CSO controls provide the treatment of floatables and settleable solids equivalent to that achieved by primary clarification?	Y X	N ___	Y ___	N ___	25
V.	Is disinfection of CSOs addressed?	Y X	N ___	Y ___	N ___	25
W.	If chlorine is proposed, is dechlorination discussed?	Y ___	N ___	Y ___	N ___	N/A
X.	Do the selected control alternatives allow for cost-effective expansion or retrofitting if additional controls are eventually necessary to attain water quality standards?	Y ___	N ___	Y ___	N ___	N/A

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		INCLUDED		ADEQUATE		PAGE
. .	Does the LTCP adequately document the controls selected for implementation, including detailed descriptions, preliminary engineering analysis, and cost estimates?	Y X	N ___	Y ___	N ___	___
VI.	Maximization of treatment at the WWTP					
A.	Does the flow data from the MROs and DMRs match the actual data given?	Y ___	N ___	Y ___	N ___	SCC
B.	Have recombination and alternate wet weather treatment been researched and if chosen are they thoroughly documented?	Y ___	N X	Y ___	N ___	___
C.	If recombination is proposed, is the process described in detail? The CSOOP should also describe the process.	Y ___	N ___	Y ___	N ___	N/A
D.	Have issues such as I/I been resolved or proposed to increase treatment capacity or other temporary solutions?	Y X	N ___	Y ___	N ___	___
E.	Is an influent flow meter installed to know what flow is coming into the plant?	Y X	N ___	Y ___	N ___	___
F.	Are current conditions such as bottlenecks, identified in the Operational Plan resolved?	Y ___	N ___	Y ___	N ___	N/A
G.	Has future growth been projected and a determination made on how this will effect the max. of flow?	Y ___	N ___	Y ___	N ___	N/A
H.	Is the WWTPs design, instantaneous peak and sustained peak capabilities identified? Are the capabilities ID'd in an NPDES permit/construction permit?	Y X	N ___	Y ___	N ___	27
I.	Are such capabilities identified for each unit process (primary, secondary, tertiary units)?	Y X	N ___	Y ___	N ___	27
VII.	Cost Performance					
A.	Has a cost vs. projected performance analysis been conducted for each alternative?	Y ___	N ___	Y ___	N ___	SCC
B.	Has the source of actual cost data been given; are additional costs; consulting, etc., included in these costs?	Y ___	N ___	Y ___	N ___	App G

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		INCLUDED		ADEQUATE		PAGE
C.	Has community growth and potential increased tax revenues and expenses been considered?	Y ___	N ___	Y ___	N ___	SCC
D.	How has the community evaluated the performance of the alternatives; is this a realistic evaluation; is it feasible for this community?	Y X	N ___	Y ___	N ___	13
E.	What is the population of the overall rate base?	Y X	N ___	Y ___	N ___	29
VIII.	Implementation of the Selected Plan, Schedule/Affordability					
A.	Does the LTCP adequately document the controls selected for implementation, including detailed descriptions, preliminary engineering analysis, and cost estimates?	Y X	N ___	Y ___	N ___	___
B.	Is sufficient information provided to show that CSO discharges remaining after implementation of the planned control program will not preclude the attainment of water quality standards or existing uses of the receiving water, or contribute to the impairment?	Y X	N ___	Y ___	N ___	___
C.	Can the selected alternative reasonably be considered sufficient to provide for the attainment of applicable water quality standards and the protection of existing and designated uses?	Y X	N ___	Y ___	N ___	___
D.	Does the LTCP discuss how the LTCP implementation will be financed?	Y ___	N X	Y ___	N ___	___
E.	Has an adequate assessment of the financial resources available for the implementation of CSO controls been completed? (Financial indicators may include total annual wastewater and CSO control cost per household; unemployment rate; median household income; property tax revenue collection rate.)	Y X	N ___	Y ___	N ___	29
F.	Have financial factors been reviewed; verify proper conclusions have been made?	Y X	N ___	Y ___	N ___	30
G.	Are potential EJ issues considered; and is future growth considered?	Y X	N ___	Y ___	N ___	___
H.	Has more than 15 years been proposed (SRF loans may be for 20 years)?	Y X	N ___	Y ___	N ___	EX-8

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I.	Is the proposed implementation schedule less than 5 years, if so, the schedule shall be incorporated into the permit.	Y ___	N ___	Y ___	N ___	N/A
J.	Have the items on the schedule been evenly spread out?	Y X	N ___	Y ___	N ___	EX-8
K.	Are the implementation phases consistent with the permittees available resources and the priorities for eliminating the CSO induced impacts?	Y X	N ___	Y ___	N ___	EX-8
L.	Did the permittee evaluate the community's financial capability analysis, including the following:	Y X	N ___	Y ___	N ___	___
M.	Debt management conditions (how much they owe).	Y X	N ___	Y ___	N ___	30
N.	Financial performance.	Y X	N ___	Y ___	N ___	33
O.	Estimated capitol & operating, maintenance & recovery cost for water and wastewater utilities.	Y X	N ___	Y ___	N ___	30
P.	Financing and annualized facility cost.	Y X	N ___	Y ___	N ___	30
	Impact of compliance cost on typical residential user (MHI)	Y X	N ___	Y ___	N ___	31
R.	Unemployment Rate	Y X	N ___	Y ___	N ___	32
S.	Property tax revenue collection rate	Y X	N ___	Y ___	N ___	35
T.	Property tax revenue as a percentage of full market property value.	Y X	N ___	Y ___	N ___	35
U.	Comparison of your household cost with household cost from comparable communities.	Y X	N ___	Y ___	N ___	31
V.	Moody's community rating.	Y X	N ___	Y ___	N ___	34
W.	Standard and Poor's corporate and municipal bond rating.	Y X	N ___	Y ___	N ___	34
X.	Trend analysis of indicators of financial condition.	Y X	N ___	Y ___	N ___	34
Y.	General social economic condition.	Y X	N ___	Y ___	N ___	37

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		INCLUDED		ADEQUATE		PAGE
IX.	UAA/Variance/Temp Suspension					
A.	If the LTCP forecasts that, even after implementation of the selected alternative, water quality standards will not be attained, has a UAA/Variance/temp suspension request been submitted? Which?	Y ___	N ___	Y ___	N ___	N/A
B.	Which factor(s) was utilized (from 40 CFR 131.10(j))?	Y ___	N ___	Y ___	N ___	N/A
C.	Is enough background information and data given for an evaluation of the application to be conducted?	Y ___	N ___	Y ___	N ___	N/A
D.	Has the UAA/Variance application been public noticed and is EPA aware of the application?	Y ___	N ___	Y ___	N ___	N/A
E.	Is the existing use for each receiving stream identified?	Y X	N ___	Y ___	N ___	3
F.	Are known impairments for the CSO impacted waters identified (303(d) list, fish kills, beach closures, etc)?	Y ___	N ___	Y ___	N ___	N/A
	If a TMDL has been or will be developed, does the permittee consider the TMDL in the LTCP?	Y ___	N ___	Y ___	N ___	N/A
H.	If water quality standards cannot be met because of sources other that CSOs, are the other limiting sources and background conditions sufficiently documented?	Y ___	N ___	Y ___	N ___	App E
X.	Post-Construction Monitoring					
A.	Is monitoring being conducted periodically from the beginning of the LTCP, throughout the plan to verify projects are working as proposed, and at the completion?	Y X	N ___	Y ___	N ___	EX-8
B.	When will results be submitted?	Y ___	N ___	Y ___	N ___	EX-8
C.	Is monitoring proposed at different sites, in multiple seasons, correct parameters proposed, different types of storm events?	Y ___	N ___	Y ___	N ___	EX-8
D.	Has a baseline condition been established? If a reference is simply given to the SRCER; was the sampling conducted in the SRCER adequate?	Y ___	N ___	Y ___	N ___	App E

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		INCLUDED		ADEQUATE		PAGE
	Is there a focus on monitoring after any projects conducted in sensitive areas?	Y ___	N ___	Y ___	N ___	N/A

XI. CSOOP Revisions

A.	Has the CSOOP been submitted, approved?	Y X	N ___	Y ___	N ___	___
B.	Has the CSOOP been updated since approval, if necessary?	Y ___	N X	Y ___	N ___	___
C.	If the community had CSOOP requirements rolled into their LTCP (e.g.: mapping) did they fulfill these requirements?	Y X	N ___	Y ___	N ___	___
D.	When are CSOOP revisions proposed?	Y ___	N ___	Y ___	N ___	___
E.	Is information included regarding the O & M for the new alternatives proposed in the LTCP?	Y ___	N ___	Y ___	N ___	N/A
F.	Does the LTCP document benefits derived from implementation of the NMCs?	Y ___	N ___	Y ___	N ___	N/A

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Appendix A

Small Community Consideration Letter

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live

...ink O'Bannon
Governor

Lori F. Kaplan
Commissioner

100 North Senate Avenue
P.O. Box 6015
Indianapolis, Indiana 46206-6015
(317) 232-8603
(800) 451-6027
www.state.in.us/idem

December 10, 2001

Mr. Robert D. Hatch, President
Town of Lowell
501 East Main Street
P.O. Box 157
Lowell, Indiana 46356

Re: Town of Lowell's Small CSO Community
Consideration Request

Dear Mr. Hatch:

The OWQ has reviewed your request that the Town of Lowell be considered a small CSO community. Such a classification affects the development of the Long-Term CSO Control Plan (LTCP) in that a small community is granted relief from completing each of the formal steps outlined in Section II.C. of EPA's National CSO Control Policy.

Upon reviewing your request, utilizing the definition of small community within EPA's National CSO Control Policy and analyzing site specific collection system conditions within your community, such as system complexity, the OWQ shall classify the Town of Lowell as a small CSO community. At a minimum, the permittee must comply with the following elements within their LTCP: 1) CSO Operational Plan; (i) documentation of the full implementation of the nine minimum controls via the Operational Plan, (ii) complete revisions to the Operational Plan throughout the implementation of the LTCP; 2) public participation; 3) sensitive areas consideration; 4) maximization of treatment at the POTW treatment plant; 5) monitoring, as necessary, to support decisions regarding proposed CSO controls; 6) scope, schedule & budget of proposed CSO controls; and 7) post-construction monitoring after the implementation of each phase of the proposed schedule.

If you have any questions regarding this matter, please contact Mike Perriguey at 317/234-2122.

Sincerely,

Timothy J. Method
Deputy Commissioner
Environmental Results

cc: Ron Pearson, OWQ Inspections
✓Donald B. Larson, Commonwealth Engineers, Inc.

Appendix B

Threatened and Endangered Species Database Letter from IDNR

DNR Indiana Department of Natural Resources

Frank O'Bannon, Governor
Larry D. Macklin, Director

Division of Nature Preserves
402 W. Washington St., Rm W267
Indianapolis IN 46204

April 28, 2003

Mr. Eric Welling, M.S.
Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis, IN 46237

Dear Mr. Welling:

I am responding to your request for information on the endangered, threatened, or rare (ETR) species, high quality natural communities, and natural areas documented from a combined sewer overflow project area, Cedar Creek, Lowell, Indiana. The Indiana Natural Heritage Data Center has been checked and there are no ETR species and significant areas documented from the project area.

The information I am providing does not preclude the requirement for further consultation with the U.S. Fish and Wildlife Service as required under Section 7 of the Endangered Species Act of 1973. You should contact the Service at their Bloomington, Indiana office.

U.S. Fish and Wildlife Service
620 South Walker St.
Bloomington, Indiana 47403-2121
(812)334-4261

At some point, you may need to contact the Department of Natural Resources' Environmental Review Coordinator so that other divisions within the department have the opportunity to review your proposal. For more information, please contact:

John Goss, Director
Department of Natural Resources
attn: Christie Kiefer
Environmental Coordinator
Division of Fish and Wildlife
402 W. Washington Street, Room W273
Indianapolis, IN 46204
(317)232-4080

Please note that the Indiana Natural Heritage Data Center relies on the observations of many individuals for our data. In most cases, the information is not the result of comprehensive field surveys conducted at particular sites. Therefore, our statement that there are no documented significant natural features at a site should not be interpreted to mean that the site does not support special plants or animals.

Due to the dynamic nature and sensitivity of the data, this information should not be used for any project other than that for which it was originally intended. It may be necessary for you to request updated material from us in order to base your planning decisions on the most current information.

Thank you for contacting the Indiana Natural Heritage Data Center. You may reach me at (317)232-8059 you have any questions or need additional information.

Sincerely,

Ronald P. Hellmich

Ronald P. Hellmich
Indiana Natural Heritage Data Center

enclosure: invoice

***** *Effective March 1, 2003, the Indiana Natural Heritage Data Center, Indiana Department of Natural Resources will be assessing a fee for information requests based on the time needed to complete the request. This charge will be $30 per one half hour, one half hour minimum. Most requests take one half hour or less to complete. An invoice for the amount due will be included with the completed request response.*

Appendix C

Public Participation

Forma' of Citizens Advisory Committee

Please ... the possible individuals to serve on the Citizens Advis... Committee or CAC. While there are no set requireme... on exactly who should serve on the CAC, the IDEM recommends the inclusion of municipal utility employees, municipal elected officials, private industry representatives, environmental groups, neighborhood associations, and/or citizen activists.

Name	Representing	Title	Address	Telephone #	E-Mail
GREG SHOOK	Town of Lowell	Public Works Dir.	501 E. Main-P.O.Box 157	219-696-7794	publicworks@townhall lowell.net
TERRY WRIGHT	Lowell W.W.T.P.	W.W.T.P. Supt.	Plant - 7500 Belshaw Road - Mail Address P.O. Box 157-Lowell	219-696-0343	
DON HUSEMAN	Huseman Excavating	Owner of Company	work-112 Mill St. home-362 Gwens Cove (both Lowell)	219-696-8493 219-696-4008	
MIKE HALL	Reiter Automotive	Supervisor	101 W. Oakley	219-696-5100 Ext.317	
RAY TALAREK	Town of Lowell	Town Councilman	Home Address: 472 Apache Lane	219-696-7534	
JIM PETERSON	Lifelong Resident of Lowell	Citizen	214 Cherokee Drive	219-696-7917	
ED BRADBURY	Resident & former Lowell businessman	Citizen	5704 W. 171st Lowell	219-696-8198	
DON CRIPE	Cripe Constr.	Owner of Cripe Constr.	1005 E. Cottage Grove	219-696-9663	
PHILLIP KUIPER	Town of Lowell	Town Councilman	432 Meadow Lane	219-696-4425	
DAN HARPER	Local Farmer	Downstream Farmer	20012 Colfax Street	219-696-4560	
RANDY SANTY	Local Plumber	Member of Lowell/C.L. Sewer Board	1304 Harrison St.	219-696-9865	

TOWN OF LOWELL
501 East Main Street • P.O. Box 157 • Lowell, IN 46356
Phone: 219-696-7794 • Fax: 219-696-7796
E-Mail: Lowell2@xvi.net

March 26, 2003

PRESS RELEASE FROM THE TOWN OF LOWELL

FOR MORE INFORMATION: ACTING DIRECTOR OF ADMINISTRATION: SUSAN PETERSON, 696-7794

RE: LONG RANGE PLANS BEING DEVELOPED FOR LOWELL'S COMBINED SEWER OVERFLOWS

LOWELL - The Town of Lowell is currently in the process of developing long-term control plans for our combined sewer systems. The plans will develop strategies for minimizing occasional sewage overflow impacts to local streams and rivers.

What are combined sewers? Combined sewer systems are sewers that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. Under dry conditions, the entire sewer contents are transported to the local Wastewater Treatment Plant (WWTP). The sewage is treated in accordance with State regulations, and discharged to the river. However, during some rain events, the capatown of the sewer pipes or the WWTP is exceeded. The system is designed to overflow and discharge excess wastewater directly to nearby streams and rivers. The resulting overflows contain levels of bacteria, and possibly, other contaminants that exceed the State's water quality standards.

According to the U.S. EPA, our community is not alone. They estimate that approximately 1,100 municipalities nationwide have combined sewers serving over 43 million Americans. Indiana has 107 other municipalities that join our community in having combined sewer overflow discharges. According to the Indiana Department of Environmental Management (IDEM), these 108 combined sewer overflow systems have a total of 900 different discharge points on various streams and rivers throughout the State of Indiana.

The EPA, in both its 1992 national Water Quality Inventory and its Report to Congress noted that pollution from these wet weather discharges is cited by many states as the leading cause of water quality impairment. The EPA concluded its report with the statement that wet weather discharges are "*one of the largest threats remaining to water quality, aquatic life, and human health that exist today.*"

There is good news, however, for local citizens that value protecting our water quality. The U.S. EPA and the IDEM are both involved in working alongside municipalities to address long-term strategies on minimizing, or possibly eliminating, combined sewer overflow impacts to waterways.

Addressing overflows from combined sewer systems started several years ago under the U.S. EPA's Combined Sewer Overflow (CSO) Control Policy, a national framework for control of discharges through the State's wastewater permitting program. This control policy allows communities the flexibility of phased implementation of CSO controls to accommodate a community's financial capability.

The first phase of this program addressed the development of a CSO Operational Plan, which outlines nine minimum "technology-based" control strategies. The initial nine control strategies are measures that can reduce the prevalence and impacts of CSO discharges through minimal capital expenditures. Lowell has been proactive, and already written this first phase operational plan, and implemented the nine minimal controls.

The Town of Lowell is currently in the process of addressing the second phase of the CSO program. This second phase requires that our town develop a written Long Term Control Plan (LTCP). The LTCP addresses long-term alternatives and solutions for protecting water resources.

Developing the LTCP is a comprehensive process, incorporating many factors of the town's combined sewer system. The LTCP will include specific mapping of the combined sewer system, identifying existing uses of rivers and streams, addressing sensitive areas, developing computer models, developing and evaluating control alternatives from a technical and economical standpoint, and developing implementation priorities and schedules.

Throughout this planning and development process, the general public will be invited to participate in public meetings and discussions. If you would like additional information

on the CSO LTCP program, you are invited to contact the town offices, or you may log-on to IDEM's CSO information website at http://www.in.gov/idem/water/compbr/wetwthr/cso/index.html.

By Gone Years. . .

Taken From Past Issues Of The Lowell Tribune

By Gone Years
20 Yrs. Ago
(April, 1983)

Oak Hill Elementary chool in Lowell was the lace to be Apr. 19 as the taff and students hosted ieir Annual Open House or families and friends. ne of the most popular oots was the dinosaur chibit presented by Nan arente's kindergarten clas-s. Visiting with the friend- giants were Tony Bar-ard, a third grader, with er sister Nicole Barnard, a ndergartener, and Shelley elm, a second grader, and ndergarten student Anne aw and Jenny Kelm.

* * *

The 1983 golf team at anover Central High Sch-ol are: Todd Wilkening, ewell Anderson, Tim Din-, John Foreman, Coach hn Brindley, Ron Imbo-n, Bob Kubiak, Steve Van-, Tim Bevins and Todd llis.

* * *

On Apr. 17 children in st thru 5th grade from e First United Methodist urch in Lowell present-the musical, "The Run-ay." Leads for the story Jonah were Danny Hur- Kevin Weaver and Sarah ba. Directors were San- Hurst and Patrice Mar-

* * *

Brian Burnham of Port erni, British Columbia, ited his grandparents, lett and Ernest r last week. He was a ..turn trip from the ribbean, where he spent spring vacation. Mr. and Burnham recently rned from their winter ne in Lakeland, Fla. y stopped at Kentucky pus. Students from all divisions of the University who earned listing on the Dean's Honor Rolls, or who were elected to membership in scholastic societies during the past two semester will be honored.

* * *

Mr. and Mrs. Herb Boyens had as dinner guests Easter Sunday their children, Mr. and Mrs. Jack Genge and son Scotty, Mr. and Mrs. Frank Fehring and daughters, Sheri and Lori, of Hammond, and Mrs. Boyens' father, Harold Cornell of Lowell.

* * *

Mr. and Mrs. Gerald Charles and children Chade, Beth Ann and Faith visited this past week end at the home of Mr. and Mrs. Ronald Sinclair and family in Indianapolis.

* * *

Saturday guests at the home of Mr. and Mrs. Thomas Bear were Mr. and Mrs. Roger Bowen of Lansing, Ill., and Glenn Cook of East Chicago.

* * *

Well wishes are extended to Mrs. Robert Henke who had the misfortune to fall and dislocate her shoulder last week when she chaperoned the group from Dalecarlia Community Church at a roller skating party.

* * *

60 Yrs. Ago
(March, 1943)

Charles Roberts, son of Attorney and Mrs. V. K. Roberts, Lowell, was one of approximately 400 students who were candidates for degrees at Purdue University's 70th commencement exercises held at Lafayette last Sunday

Public Asked For Comments On Cedar Creek Uses

The Town of Lowell will be holding the first of a series of public meetings on Wednesday, April 30, at 6:00 p.m. at the Town Hall.

Lowell has been moving forward with the development of a long-term control plan for the town's combined sewer system. The reason for the meeting is to get public input on the existing uses of Cedar Creek, which now receives the overflows from the town's CSO (combined sewer overflow).

During dry weather, combined sewers carry wastewater and stormwater to the Lowell wastewater treatment plant on Belshaw Road. However, during a heavy rain event, a combined sewer pipe can get too full.

These combined pipes are designed with "safety valves" that allow the combined wastewater and stormwater to overflow into a stream or river. If combined pipes did not have overflows, untreated wastewater could back-up into homes and businesses and cause flooding in the streets.

When the untreated wastewater and stormwater do overflow into a stream, this is called a Combined Sewer Overflow or CSO. The point where the overflow enters a stream is a 'CSO outfall.'

For additional information on the town's combined Sewer Overflow Long-Term Control Plan, contact Greg Shook, director of Public Works, at 696-7794 or log on to IDEM's CSO information website at http:/www.in.gov/idem/cimpbr/wetwthr/cso/index.html.

Dinner And Registration Set

Hope Preschool, located in Cedar Lake, will be having its annual fundraiser and open registration on Friday, April 25, from 5:00 to 8:00 p.m.

Hope Lutheran Church is located at 9010 141st Avenue between Lauerman and Parish Avenues.

The buffet dinner includes spaghetti, salad, rolls, drink and dessert, with tickets discounted for children and a family rate also available.

Church Leaders Gather At VU

Religious leaders from throughout the nation will be at Valparaiso University, April 28 through May 1, for the 55th annual Institute of Liturgical Studies.

The institute, built around the them of "Generation of Liturgical Renewal: 1963/1978-2003," will celebrate the 40th anniversary of the

ing of pastors, church musicians, liturgical artists, lay worship leaders and scholars of worship who meet to reflect and study the renewal of church worship.

In addition to master classes and breakout sessions there are worship opportunities, meals and concerts.

Lowell Tribune - Tuesday, April 1, 2003

Lowell Develops Long-Range Plan For Sewer Overflows

The town of Lowell is currently in the process of developing long-term control plans for its combined sewer systems. The plan will develop strategies for minimizing the impact of occasional sewage overflows on local streams and rivers.

Combined sewer systems are sewers that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. Under dry conditions, the entire sewer contents transported to the Lowell Wastewater Treatment Plant (WWTP). The sewage is treated in accordance with state regulations, and discharged to the river.

However, during some heavy rain events, the capacity of the sewer pipes or the WWTP is exceeded. The system is designed to overflow and discharge excess wastewater directly to nearby streams and rivers. The resulting overflows contain excess wastewater directly to nearby streams and rivers. The resulting overflows contain levels of bacteria, and possibly other contaminants that exceed the states water quality standards.

"According to the U.S. Environmental Protection Agency (EPA), our community is not alone. They estimate that approximately 1,100 municipalities nationwide have combined sewers serving over 43 million Americans." said Mark Downey, engineer, at the March 24 Town Council meeting.

Indiana has 107 other municipalities that join Lowell in having combined sewer overflow discharges. According to the Indiana Department of Environmental Management (IDEM) these 1087 combined sewer overflow systems have a total of 900 different discharge points on various streams and rivers throughout the State of Indiana.

The EPA, in both its 1992 national Water Quality Inventory and its Report to Congress, noted that pollution from these wet weather discharges is cited by many states as the leading cause of water quality impairment. The EPA concluded its report with the statement that wet weather discharges are "one of the largest threats remaining to water quality, aquatic life, and human health that exist today."

"There is good news, however, for local citizens that value protecting our water quality. The U.S. EPA and the IDEM are both involved in working alongside municipalities to address long-term strategies on minimizing, or possibly eliminating, combined sewer overflow impacts to waterways," Downey noted.

Addressing overflows from combined sewer systems started several years ago under the U.S EPA's Combined Sewer Overflow (CSO) Control Policy, a national frame work for control of discharges through the State's wastewater permitting program. This control policy allows communities the flexibility of phased implementation of CSO controls to accommodate a community's financial capability.

The first phase of this program addressed the development of a CSO Operational Plan, which outlines nine minimum "technology-based" control strategies. The initial nine control strategies are measures that can reduce the prevalence and impacts of CSO discharges through minimal capital expenditures. Lowell has been proactive, and has already written this first phase operational plan, and implemented the nine minimal controls.

The Town of Lowell is currently in the process of addressing the second phase of the CSO program. This second phase requires the town to develop a written Long Term Control Plan (LTCP) that addresses long-term alternatives and solutions for protecting water resources.

Last week, the Town Council Approved spending up to $42,500 for the LTCP by Downey and Commonwealth Engineering of Indianapolis.

Developing the LTCP is a comprehensive process, incorporating many factors of the town's combined sewer system. The LTCP will include specific mapping of the combined sewer system, identifying existing uses of rivers and streams, addressing sensitive areas, developing computer models, developing and evaluating control alternatives from a technical and economical standpoint, and developing implementation priorities and schedules.

Throughout this planning and developing process, the general public will be invited to participate in public meetings and discussions. For additional information on the CSO LTCP program, contact the Town Hall, or log on to IDEM's CSO information website at http://www.in.gove/idem/water/compbr/wetwthr/cso/index/html.

CITIZENS ADVISORY COMMITTEE MEETING
APRIL 30, 2003
6:00 PM

The meeting started at 6:00 PM. Philip Kuiper introduced the committee members who were Greg Shook, Terry Wright, Don Huseman, Mike Hall, Ray Talarek, Jim Peterson, Ed Bradbury, Don Cripe, Philip Kuiper, Dan Harper, Randy Santy, Judy Walters and Sue Peterson. Mr. Kuiper explained that he would be Chairman, Mr. Talarek would be Co-Chairman and Sue Peterson will be Secretary.

The meeting was then turned over to Eric Welling and Mark Downey of Commonwealth Engineers. Eric Welling explained that this meeting was about learning more about combined sewer overflow issues and regulations surrounding those. He further stated that the regulations for the combined sewer overflows are based out of the Clean Water Act. A presentation followed. Materials from this presentation are attached and made part of these minutes. Mr. Welling went through each slide and explained what they meant.

Questions and General Discussion:

Mark Downey stated that Commonwealth Engineers recommended going with the Blue Road to eliminate occurrences of overflows. Nell Fabish wanted to know if the residents that are not community residents should be notified by mail and ask for their input. Mark Downey stated that IDEM has put in the permit for Lowell to do this process. This is Lowell's responsibility to go out publicly and identify that they are doing this long term control plan. Mr. Carlson wanted to know if the long-term control plan look into increasing the capacity of Cedar Creek and maintaining the capacity. Mr. Welling stated that under this particular program the rules aren't there to address water quantity, this is more of a drainage issue. Mr. Shook stated that the Lowell Town Council has sent a letter to the Lake County Drainage Board requested them to do some work on Cedar Creek from Belshaw Rd. back into town. Mr. Marshall wanted to know what the quality of water was in Cedar Creek. Mr. Welling stated that a company that they are working with did a stream reach characterization survey, which was done in 2002, showed 50 some species of fish in the creek.

The next meeting would be 45-60 days, sometime in June.

Mr. Kuiper adjourned the meeting at 7:40 PM.

Flow Chart – CSO/LTCP Process

CSOOP "Phase I" 9 Minimum Controls

START LTCP/UAA Process

- Photo Documentation of CSO Areas
- Formation of CAC
- Public Meeting & Input

Optional IDEM LTCP Planning Meeting To Discuss Existing Uses/UAA

Existing Uses?

Yes

No

Are There Sensitive Areas?

Yes

No

Are There Sensitive Areas That Need Prioritization?

No

Yes

Physically & Economically Achievable?

No

Reevaluate in 3 Years

Yes

Relocate CSOs Outside "Sensitive Areas" OR End of Pipe Treatment in "Sensitive Areas"

Implementation Schedule Dependent Upon Socio-Economic Impacts

- Up To 5 Yrs.
- 5 to 10 Yrs.
- 10 to 20 Yrs.

Project(s) Selection & Implementation

Meet Time Frame and WQS?

No

Agreed Order Terms

Yes

Successful In Meeting Water Quality Standards Through:
1. Full Sewer Separation and/or
2. End of Pipe Treatment and/or
3. Transport & Treat and/or
4. A combination of 1, 2, or 3.

Determine Non-Sensitive Areas Alternatives

No

Are There Other CSO Reduction Projects to Try?

Yes

No

Monitoring of CSOs – Successful in Meeting Temporary Suspension Requirements?

Yes

No Further CSO Projects

CSO Reduction Projects

Temporary Suspension of Designated Uses and Associated Water Quality Standards

WPCB Rule Making Process

Yes

IDEM & EPA Review – Meet All Necessary Requirements?

No

- Use Attainability Analysis or a (UAA)
- Affordability Analysis or "Knee of the Curve"

NPDES "Phase II" LTCP Requirements

- All communities will go through the green boxes
- Based upon existing uses, you will either take the "red road", or the "blue road"
- If you take the "blue road", you will always stay on the "blue road"
- If you take the "red road", there are issues that may change your course to the "blue road"

TOWN OF LOWELL

501 East Main Street • P.O. Box 157 • Lowell, IN 46356

Phone: 219-696-7794 • Fax: 219-696-7796

E-Mail: townhall@townhall.lowell.net

CITIZENS ADVISORY COMMITTEE MEETING NOTICE

WEDNESDAY, MAY 15, 2003

6:00 P.M.

LOWELL TOWN HALL
501 E. MAIN STREET
LOWELL, INDIANA

CITIZENS ADVISORY COMMITTEE MEETING
WEDNESDAY, MAY 15, 2003

This is a synopsis of an informal meeting of the Citizens Advisory Committee that was held on Wednesday, May 15, 2003 at the Lowell Town Hall. Present at the meeting were Philip Kuiper, Jim Peterson, Randall Santy, Greg Shook. Ed Bradbury, Dan Harper, Don Huseman, Terry Wright, Don Cripe and Susan Peterson.
The meeting was called to order at 6:00 P.M by Chairman, Phillip Kuiper.

Phil Kuiper opened the meeting by saying that he is confused by the $8 million dollar figure for the cost of Phase II for the wastewater treatment plant. Greg Shook explained that Phase II has nothing to do with the LTCP. Greg explained that Phase I was completed so that we would be in compliance. We agreed that we would do Phase I and Phase II. Greg said that the $7 million dollar figure that was presented was based on the rehabilitation of every manhole and interceptor in Lowell. Several committee members said that they thought the interceptor should be looked at. The general consensus was that a lot of water is getting into the interceptor. How to do repairs in-house was also discussed.

Greg said that he planned to approach the town council about hiring a couple of part-time employees to help in the Street Department, so that repairs to manholes could be repaired in house. The summer part-time help could free up the regular employees to do the manhole work. Greg will also check with Judy to see if sewer funds are available.

It was decided that going with the Blue Road plan to eliminate occurrences of overflows was the sensible choice, since it will give us 10 to 20 years time to complete. Greg passed out Commonwealth's Combined Sewer Overflow – Long Term Control Plan to everyone.

The next meeting was tentatively set for Wednesday, June 11 at 6:00 P.M. Susan will confirm with everyone for that date.

The meeting adjourned at 6:55 P.m.

TOWN OF LOWELL

501 East Main Street • P.O. Box 157 • Lowell, IN 46356

Phone: 219-696-7794 • Fax: 219-696-7796

E-Mail: townhall@townhall.lowell.net

CITIZENS ADVISORY COMMITTEE MEETING NOTICE

TUESDAY, JUNE 17, 2003

6:30 P.M.

LOWELL TOWN HALL
501 E. MAIN STREET
LOWELL, INDIANA

Town of Lowell
Citizens Advisory Committee
for
Long Term Control Plan

AGENDA
June 17, 2003
Lowell Town Hall

The Lowell Citizens Advisory Committee will meet on Tuesday, June 17, 2003, at 6:30 P.M. in the Conference Room at the Lowell Town Hall, located at 501 East Main Street, Lowell, Indiana, 46356.

1. Call Meeting to Order

*2. Approval of Minutes – April 30, 2003 and May 15, 2003

3. Update of Hiring Personnel for Manhole Repairs – Shook

*4. Combined Sewer Overflow Operational Plan was approved June 12, 2003. - Shook

*5. Revised Schedule of Events for LTCP provided by Commonwealth.

6. Schedule next CAC Meeting with Commonwealth. Week of July 21st per schedule.

7. New Business

8. Public Comments

9. Adjournment

* Indicates Attachments.

CITIZENS ADVISORY COMMITTEE MEETING
JUNE 17, 2003
6:30 P.M.

The citizens advisory committee meeting was called to order at 6:30 P.M. by chairman, Philip Kuiper. Present at the meeting were Don Huseman, Ed Bradbury, Terry Wright, Greg Shook, Jim Peterson, Ray Talarek, Don Cripe and Susan Peterson.

Chairman, Phil Kuiper asked for an approval of the minutes from the April 30 and the May 15 meetings. Don Cripe made a motion to approve the minutes and Don Huseman seconded the motion.

Greg Shook announced that 2 part-time employees have been hired for the street department. One of the employees is working on the sewer truck and one is working on the chipper truck. Each is working with one of the regular employees. This will free up the regular employees to work on drainage projects.

Greg Shook also told everyone that the CSOOP (combined sewer overflow operational plan) has been approved.

Greg provided everyone with a revised schedule of events for the long-term control plan that was provided by Commonwealth. The next CAC meeting with Commonwealth will be the week of July 21. The group decided that Tuesday, July 22 at 6:00 P.M. would be a good date for the meeting.

A general discussion followed among the group regarding smoke testing and how to enforce when someone is illegally hooked up. Greg will check with other towns to see how they enforce this type of ordinance. It was suggested that people be made aware of the ordinance. Susan could put articles in the "Talk of the Town" regarding this issue. Commonwealth has records of smoke testing that has been done in town.

There was also a short discussion on the manholes in town. Don Huseman commented that most are 500 feet apart. There was some discussion on which ones most often overflow and which ones need to be looked at with the sewer camera.

Being no public comment, Ed Bradbury made a motion to adjourn with Ray Talarek seconding the motion.

The meeting adjourned at 7:17 P.M.

The next meeting will be scheduled for July 22 at 6:00 P.M.

TOWN OF LOWELL
501 East Main Street • P.O. Box 157 • Lowell, IN 46356
Phone: 219-696-7794 • Fax: 219-696-7796
E-Mail: townhall@townhall.lowell.net

CITIZENS ADVISORY COMMITTEE MEETING NOTICE

TUESDAY, JULY 22, 2003
6:00 P.M.

LOWELL TOWN HALL
501 E. MAIN STREET

CITIZENS ADVISORY COMMITTEE MEETING
JULY 22, 2003
6:00 P.M.

A meeting of the Citizens Advisory Committee was held at 6:00 P.M. on Tuesday, July 22, 2003 at the Lowell Town Hall. Present at the meeting were Greg Shook, Terry Wright, Phillip Kuiper, Don Huseman, Jim Peterson, Ed Bradbury, Randy Santy, Ray Talarek, Sue Peterson, Mark Downey, Eric Welling and David Mohler.

Eric Welling of Commonwealth Engineering began the meeting with a slide presentation. Eric said that the CSO Program is basically designed in two distinct phases – Phase I and Phase II. The existing uses of Cedar Creek were discussed. Eric also said that there were two options for the town to take – the blue road or the red road. The simplest, cheapest and most beneficial would be the blue road.

The slide presentation showed how calculations were made to determine the length of time that the town has to become compliant. Mr. Mohler of Commonwealth Engineering went through each slide and explained the meaning of each one. Materials from the presentation are attached and are being made a part of these minutes.

A Question and Answer Period Followed:

Phil Kuiper asked Greg Shook, the Director of Public Works about the progress on the work being done on the town's manholes. Greg answered that the work was going kind of slow due to the amount of rain that has occurred this month. Mark Downey then explained how the interceptor line works and answered some questions regarding it.

Mr. Welling told everyone that a packet containing the LTCP would be mailed to him or her to sign. The LTCP must be submitted to IDEM no later than 09/01/03.

The meeting adjourned at 7:10 P.M. with Mr. Welling saying that no other meetings are necessary at this time. Mr. Welling passed out his business cards to everyone and invited them to call with any questions that they may have.

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live.

100 North Senate Avenue
P. O. Box 6015
Indianapolis, Indiana 46206-6015
(317) 232-8603
(800) 451-6027
www.state.in.us/idem

Frank O'Bannon
Governor

Lori F. Kaplan
Commissioner

June 12, 2003

Mr. David Gard, President
Town Council of Lowell
501 East Main Street
P.O. Box 157
Lowell, Indiana 46356

Dear Mr. Gard:

RE: CSOOP Approval
Lowell, Indiana
Lake County

The Office of Water Quality (OWQ) has completed a review of the Combined Sewer Overflow Operational Plan (CSOOP) responses submitted on May 9, 2003 by the Town of Lowell, and by this letter, grants approval.

The Town of Lowell shall maintain a current Plan, updated to reflect any new or revised State and/or Federal CSO regulations, policy and guidance material, as well as system modifications on file at the POTW and also inform the OWQ of any significant changes. The Plan is a requirement of Attachment A of the National Pollutant Discharge Elimination System (NPDES) Permit No. IN0023621. The goal of the Plan is to eliminate all dry-weather overflows and minimize wet-weather overflows and impacts to Cedar Creek.

If you have questions regarding this Combined Sewer Overflow Operational Plan Approval, please contact Mike Perriguey, of my staff at 317-234-2122.

Sincerely,

Reggie Baker Jr., Chief
Urban Wet Weather Section
Office Of Water Quality

cc: Rick Roudebush, OWQ Inspections
Mike Lush, Utility Director
Northwest Regional Office, IDEM
File Room

Town of Lowell
Targeted CSO Long Term Control Plan Schedule of Events
Revised June 16, 2003

Activity	Target Date
Mail Socio-Economic (S/E) Data Sheet	March 5, 2003
Mail Citizens Advisory Committee (CAC) Development Sheet	March 5, 2003
Mail First Newspaper Article	March 5, 2003
Receive Confirmation of CAC Formation	Week of March 24, 2003
Receive Preliminary S/E Data	Week of March 24, 2003
Run First Newspaper Article in Local Paper	Week of March 31, 2003
Complete System Mapping Field Work	Week of March 31, 2003
Initiate Additional System Modeling (SWMM)	Week of April 7, 2003
Preliminary S/E Calculations Completed	Week of April 7, 2003
Complete Existing Uses/Sensitive Areas Field Surveys	Week of April 7, 2003
First CAC Meeting	Week of April 14, 2003
Preliminary System Modeling Results	Week of June 30, 2003
Evaluate Engineering Alternatives	Week of July 7, 2003
Second CAC Meeting	Week of July 21, 2003
Develop Preliminary Draft of LTCP Report	Week of August 4, 2003
Receive Town of Lowell's Review Comments	Week of August 11, 2003
Submit Finalized LTCP to the Town of Lowell	Week of August 18, 2003
Submit Finalized LTCP to IDEM	Week of August 25, 2003

Appendix D

Collection System Map

Appendix F

Supporting Documentation for SOCIO-Economic Analyses

Town Name: Lowell

Primary Person Reporting Information: Judith Walters

Primary Person Telephone Number: (219) 696-7794

Wastewater Billing and Customer Profiles Information
(Over the last 12 months or the last completed year report)

Total annual revenues from wastewater billings:

= 1,201,020.81 (a) (e+f)
Residential + Commercial

= 172,917.92 (b)
Industrial

= 444,210.00 (c) ← (Cedar Lake)
~~Commercial~~

Please attach a copy of your latest rate ordinance

Total number of residential households (accounts) in your wastewater service area

= 2,684 (d)

Total number of residents in your wastewater service area

= 7,505 (e)

Total number of commercial customers in your wastewater service area

= 217 (f)

Total number of industrial customers in your wastewater service area

= 6 (g)

Wastewater Volumes Information
(Over the last 12 months or the last completed year report)

Please complete the following table related to monthly billed volume totals. This will be reported in volume units (such as Millions of Gallons Billed).
(Over the last 12 months or the last completed year report)

Note: Utility customers are billed on water gallons that are registered on a meter

Month, Year	Units	Residential	Commercial	Industrial
Jan, 2002	19,122,480.	15,692,980.		3,429,500.
Feb. 2002	16,421,450.	13,930,550.		2,490,900.
Mar. 2002	16,494,433.	13,374,333.		3,120,100.
Apr. 2002	18,010,340.	14,401,340.		3,609,000.
May 2002	19,008,950.	14,718,750.		4,290,200.
June 2002	20,013,620.	15,991,720.		4,021,900.
July 2002	22,854,300.	18,056,200.		4,798,100.
Aug. 2002	23,426,250.	19,097,150.		4,329,100.
Sept. 2002	23,121,680.	17,052,080.		6,069,600.
Oct. 2002	19,631,420.	14,573,520.		5,057,900.
Nov. 2002	19,775,200.	14,941,400.		4,833,800.
Dec. 2002	18,796,988.	14,076,288.		4,720,700.

Please complete the following table related to total monthly volumes received and treated by the wastewater treatment plant. Please note that these total treated volumes will be greater than the totals from the residential, commercial and industrial volumes reported above due to infiltration and inflow. This will be reported in volume units (such as Millions of Gallons treated). **Please include the units of your reporting.**
(Over the last 12 months or the last completed year report)

Month, Year	Units	Total Monthly Treated Volume
Jan. 2002	Million gallons	68,258
Feb. 2002	" "	112,048
Mar. 2002	" "	113,692
Apr. 2002	" "	122,829
May 2002	" "	130,147
June 2002	" "	76,968
July 2002	" "	73,545
Aug. 2002	" "	70,055
Sept. 2002	" "	68,020
Oct. 2002	" "	64,978
Nov. 2002	" "	69,236
Dec. 2002	" "	70,602

Wastewater Finances Information
(Over the last 12 months or the last completed year report)

Annual wastewater department operations and maintenance expenses (excluding depreciation).

= 1,452,161. (h) + $72,930 Phase II ($1,182,930 - $1,110,000) → from PER Financing Section

Annual wastewater department debt service (principal and interest).

= 487,265.68 (i) + $600,685 - Phase II

Remaining term of issue for this debt: 1993 Bonds - (j) 2010
SRF - 2021

Overall Net Debt Information (For your Town, Not Your Whole County)

Public debt related to schools in the municipality.

= 21,014,296.85 (k)

Public debt related to municipal building projects (e.g. libraries, fire stations, town hall).

= _____ (l)

Public debt related to bridges and roads.

= _____ (m)

Public debt related to EDIT bonds.

= _____ (n)

Public debt related to TIF bonds.

= 863,655. (o)

Other misc. public debt burden incurred by residents of the CSO municipality's sewer service area. If listed, please describe in detail.

= _____ (p)

Description: Water - 5,434,000
PARK - 700,000
+ Debt for Phase II Project = $8,049,000

Property Tax Collection Rate

The property tax revenue collection rate is an indicator of the efficiency of the tax collection system and the acceptability of tax levels to residents.

Property tax revenue collected in 2002. (This is commonly available from a community's annual financial statement.)

= 2,204,051. (q)

Property taxes levied in 2002. (Property taxes levied can be computed by multiplying the assessed value of real property by the property tax rate, both of which are commonly available from a community's financial statements.)

= 2,231,507. (r)

Bond Rating – NONE

This should be identified for the CSO municipality's utility, which may be based on ratepayers, property taxpayers or a combination of these bases. If this is not possible, then it is reasonable to use the CSO municipality's bond rating, only.

Please Circle Either 1, 2, Or 3:

1. **Rated as BB-D (S&P) or Ba-C (Moody's)**

OR

2. **Rated as BBB (S&P) or Baa (Moody's)**

OR

3. **Rated as AAA-A (S&P) or Aaa-A (Moody's)**

Local Demographics Information *

Local Median Household Income (MHI) for your community.

= 26,424. (s)
Please provide the year of the provided Median Household Income (e.g. 1998) = _____

Please provide the source for the data =

_____

Local average unemployment rate for your community over a 12 month period.

= _____ (t) (expressed as a percentage)
Please provide the specific 12 month period averaged (e.g. 9/00 – 8/01) = _____

Please provide the source for the data =

_____

* If available. If local information is not available from comprehensive, town-wide surveys from qualified economic experts, then Commonwealth Engineers, Inc. will use 2000 Census Data available for your community.

SRF PROJECT FINANCING INFORMATION
(wastewater)

1. Project Cost Summary
   a. Collection/transport system cost $ N/A
   b. Treatment System cost $6,320,000.00
   Subtotal Construction Cost $ 6,320,000.00

   c. Contingencies $ 632,000.00
   (should not exceed 10% of construction cost)
   d. Non-construction Cost $ 1,097,000.00
   (e.g., engineering/design services, field exploration studies, project management & construction inspection, legal & administrative services, land costs (including capitalized costs of leased lands, ROWs & easements), start-up costs (e.g., O&M manual, operator training).
   e. **Total Project Cost** (lines a+b+c+d) $ 8,049,000.00
   f. Total ineligible costs* (see next page) $ N/A
   * Total ineligible costs should be covered by funds from other sources.
   g. Other funding sources (list other grant/loan sources & amounts)

   (1) hook-on fees -0-
   (2) cash on hand -0-
   (3)
   (4)
   (5)

   Total Other Funding Sources $ 0.00

2. **SRF Loan Amount** (line e minus line g) $8,049,000.00

3. SRF interest rates: 4.3%

WW SRF Interest Rates	User Rates (Over $50)	User Rates ($30 to $50)	User Rates (Under $30)
Tier III (MHI*:under $24,994)	2.9%	3.1%	3.3%
Tier II (MHI:$24,994 to $31,241)	3.6%	3.8%	4.0%
Tier I (MHI:over $31,241)	4.1%	4.3%	4.5%

*Current MHI (which will be automatically changed after 2000 census is available).

Note: Based on 4,000-gallons usage, monthly sewer rate is between $30.00 to $50.00. Since MHI is over $31,241 the interest rate is 4.3%.

4. Annual OM&R costs:
   current $1,110,000 post-project $1,182,930
5. Avg. monthly residential sewer fee (Lowell Residents Only)[1]
   current $33.30 post-project $41.50

[1] Sewer fee based on a 4,000 gallon user (see **Appendix Q-"Financial Report Summary"**)

The following costs are not eligible for SRF reimbursement:

1. Land cost *(unless it's for sludge application)* $ 0
   Only the actual cost of the land is not eligible; associated costs (such as attorney's fees, site title opinion and the like) are eligible.

2. Materials & work done on private property $ 0
   (installation/repair of laterals, including disconnection of inflow into laterals; abandonment of on-site systems [septic tank or mound systems]). Grinder pumps, vacuum stations and other appurtenances/installations on private property to treat/transport ARE fundable IF owned and maintained by the political subdivision. $ 0

3. Grant applications and income surveys done for other agencies (i.e. DOC, RDA, RECD, etc.). $ 0

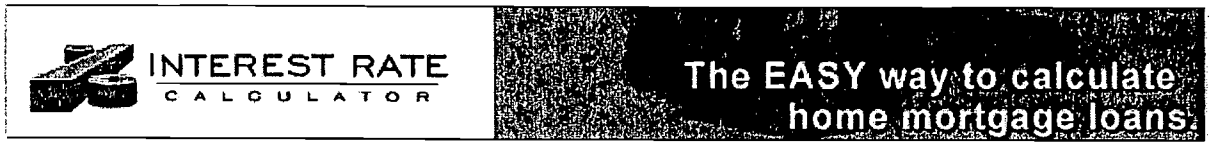
4. Any project designed to promote economic development and growth is ineligible.

5. Expenses incurred as part of formings RWD's, RSD, CD's, etc., or changing their boundaries, or other non-SRF District activities. $ 0

6. Costs incurred for preparing NPDES permit applications and other tasks unrelated to the SRF project. $ 0

7. Cleaning of equipment, such as digesters, sand filters, grit tanks and settling tanks. These items should have been maintained through routine operation, maintenance and replacement by the political subdivision. Sewer cleaning is ineligible for SRF unless the cleaning is required for sewer rehabilitation such as sliplining and cured in place piping (CIPP).
   $ 0

8. One time connection fee $ 0



Initial Loan Data

Principal:	$8,049,000	Start date:	April 2003
Interest %:	4.3	End date:	March 2023
Years:	20	Monthly payment:	$50,057.10
Annual insurance:	$0	Total interest:	$3,964,705.65
Annual tax:	$0	Total real interest:	$3,534,949.26

Prepayment Data

Monthly prepayment:	$0	Total interest paid:	$3,964,705.652
Starting after month #:	0	Savings:	$0.00
One-time prepayment:	$0	Real savings:	$0.00
After month #:	0	New end date:	<< no change >>
Annual inflation %:	1.5	Term shortened by:	<< no change >>

Annual Payment: $50,057.10 x 12 months = $600,685.2

Year	Interest	Principal	Balance
2003	$256,820.54	$193,693.36	$7,855,306.64
2004	$332,534.34	$268,150.86	$7,587,155.78
2005	$320,773.87	$279,911.33	$7,307,244.45
2006	$308,497.61	$292,187.59	$7,015,056.86
2007	$295,682.96	$305,002.23	$6,710,054.63
2008	$282,306.24	$318,378.96	$6,391,675.67
2009	$268,342.90	$332,342.28	$6,059,333.38
2010	$253,767.14	$346,918.06	$5,712,415.32
2011	$238,552.14	$362,133.06	$5,350,282.26
2012	$222,669.80	$378,015.40	$4,972,266.86
2013	$206,090.95	$394,594.25	$4,577,672.61
2014	$188,784.98	$411,900.22	$4,165,772.39
2015	$170,719.99	$429,965.21	$3,735,807.18
2016	$151,862.72	$448,822.48	$3,286,984.70
2017	$132,178.42	$468,506.78	$2,818,477.92
2018	$111,630.81	$489,054.39	$2,329,423.52
2019	$90,182.01	$510,503.19	$1,818,920.34

2020	$67,792.53	$532,892.66	$1,286,027.68
2021	$44,421.13	$556,264.06	$729,763.61
2022	$20,024.68	$580,660.52	$149,103.09
2023	$1,069.84	$149,101.44	$1.65

Town of Lowell

Summary of Reported Wastewater Volumes

Month, Year	Units	Residential	Commercial	Industrial	Monthly Total
January, 2002	Gallons	15,692,980	None Reported	3,429,500	19,122,480
February, 2002	Gallons	13,930,550	None Reported	2,490,900	16,421,450
March, 2002	Gallons	13,374,333	None Reported	3,120,100	16,494,433
April, 2002	Gallons	14,401,340	None Reported	3,609,000	18,010,340
May, 2002	Gallons	14,718,750	None Reported	4,290,200	19,008,950
June, 2002	Gallons	15,991,720	None Reported	4,021,900	20,013,620
July, 2002	Gallons	18,056,200	None Reported	4,798,100	22,854,300
August, 2002	Gallons	19,097,150	None Reported	4,329,100	23,426,250
September, 2002	Gallons	17,052,080	None Reported	6,069,600	23,121,680
October, 2002	Gallons	14,573,520	None Reported	5,057,900	19,631,420
November, 2002	Gallons	14,941,400	None Reported	4,833,800	19,775,200
December, 2002	Gallons	14,076,288	None Reported	4,720,700	18,796,988
TOTALS	**Gallons**	**185,906,311**	**0**	**50,770,800**	**236,677,111**
Monthly Averages	**Gallons**	**15,492,193**	**0**	**4,230,900**	**19,723,093**

Fraction of Residential Flow:

Fraction of Residential Flow = (Residential Flow)/(Residential Flow + Commerical Flow + Industrial Flow)

Fraction of Residential Flow = 0.78548496

Appendix G

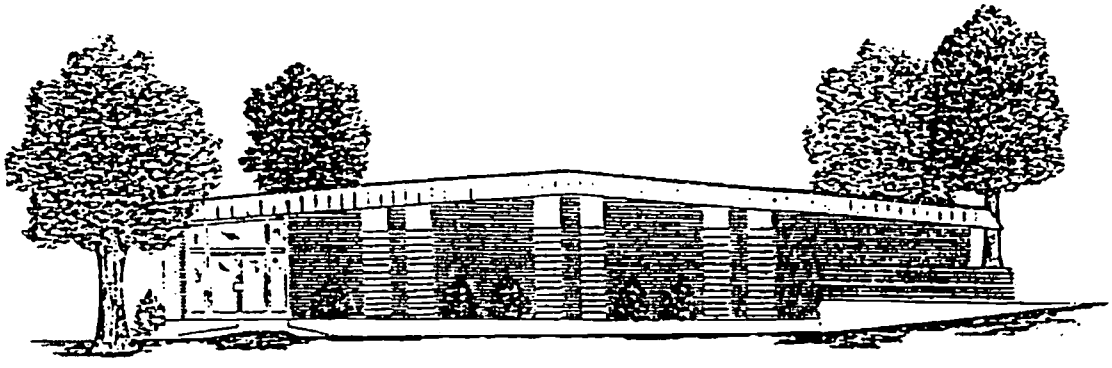
Flow Monitoring Report for Sewer Collection System September 1998

FLOW MONITORING REPORT

on the

LOWELL, INDIANA

SEWER COLLECTION SYSTEM



TOWN OF LOWELL

501 East Main Street • P.O. Box 157 • Lowell, Indiana 46356

219/696-7794 • Fax: 219/696-7796

SEPTEMBER 1998

Prepared by:

COMMONWEALTH ENGINEERS, INC.

Environmental Engineers and Consultants

Indianapolis, Indiana

I SCOPE OF WORK

Commonwealth Engineers was retained by the Town of Lowell to locate and install eleven sewer flow meters at various locations within the Lowell Sewer System. The locations of these meters were chosen by us to determine the amount of excessive clear water generated by the Town's Interceptor. Secondarily, these meter locations were also chosen to provide information on flows from other general areas of the Sewer System. After the metering phase, we reviewed the flow information and conducted some basic flow analyses. The flows meter readings from permanent meters at Cedar Lake and the flow that Lowell's Wastewater Treatment Plant were also included in the analyses.

II PROCEDURE

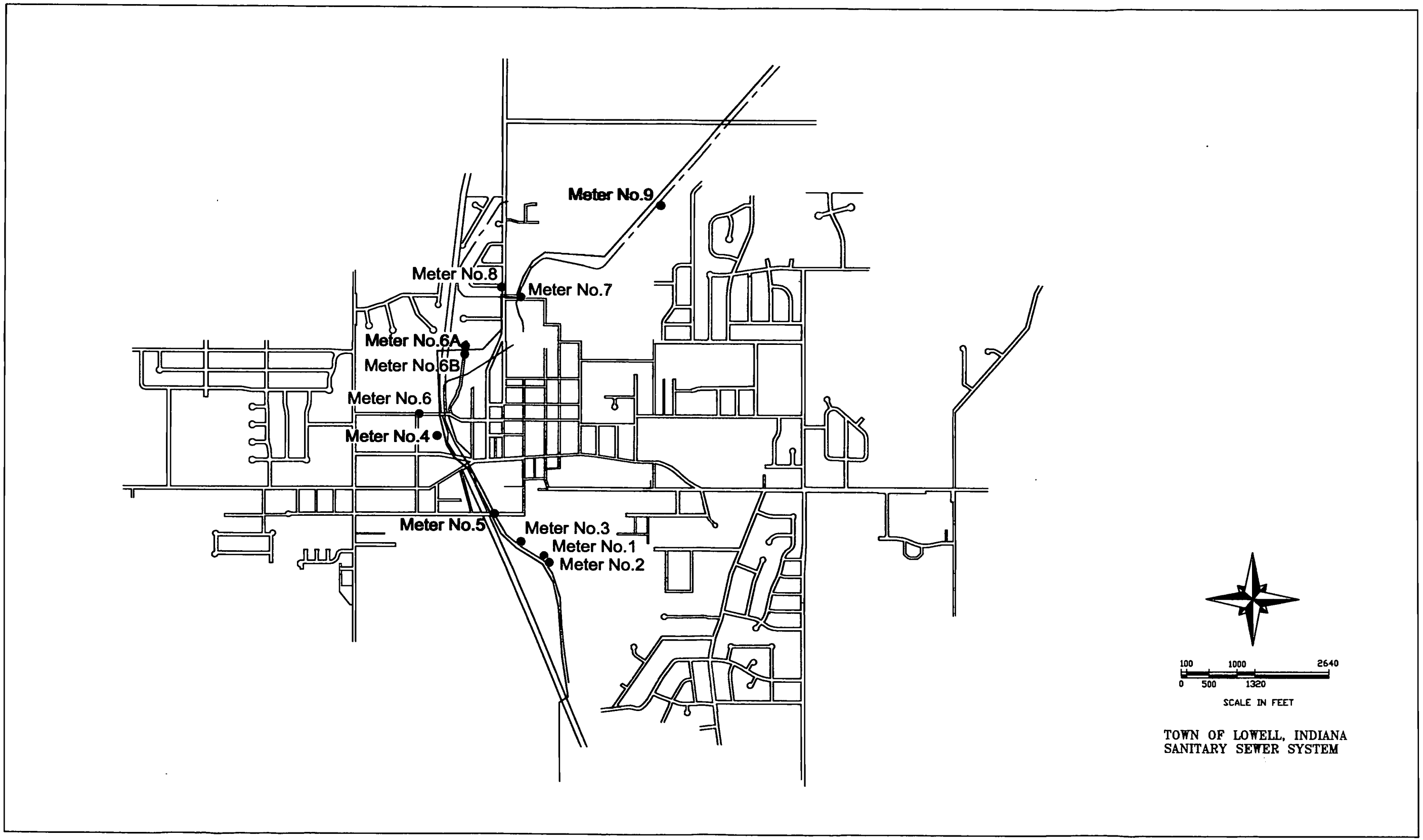
A. Flow Metering Period

We installed the flow meters at all locations for the period from March 27, 1998 through July 17, 1998. In this report, we have called this time frame the Metering Period.

B. Meter Locations and Areas Metered

Portable flow meters were placed in all branches of the Town's Sewer System in the manholes where sewer branches entered into the Interceptor. In **Figure 1**, we show the locations of the eleven meters installed in Sewer System. Following this in **Figure 2**, we indicate the upstream sewer subsystems that generated the flows included at each metering site. A continuous-reading rainfall gauge was installed at the Lowell Wastewater Treatment Plant during the flow metering period. The rainfall information from this gauge was used for all meter analyses. The permanent flow meters at the Cedar Lake flume and the Lowell Wastewater Treatment Plant were also included as meter locations.

Figure 1
Flow Meter Locations



C. Metering Procedure

We temporarily installed American-Sigma® Model 950 area-velocity flow meters in the Lowell Sewer System used to measure the flows. Once installed, we calibrated the flow meters to the pipe slope and site conditions according to the manufacturer's recommendations. To measure rainfall during the Metering Period, we set up an American-Sigma Datalogger Rain Gauge at the Lowell Wastewater Treatment Plant.

The permanent meters at the Cedar Lake flume and the Lowell Wastewater Treatment Plant influent were also used in the metering procedure. No modifications were done on these meters during the Metering Period.

During the Metering Period, the Town's staff inspected and maintained the meters. The Town's staff was responsible for checking the batteries and changing them as needed. If needed, the Town's staff also cleaned the flow meters.

On a periodic basis, the Town's staff downloaded the flow information from each meter into a portable computer. The Cedar Lake flume meter and the Lowell Wastewater Treatment Plant meter were also read daily by Town staff during the Metering Period. This information was sent by the Town to our office for analysis.

D. Analysis Procedure

When the metering information from the flow meters was received, we conducted some general analyses of the data. For these analyses, we used the Vision® flow analysis software provided by American-Sigma for use with its portable flow meters. Meter readings from the Cedar Lake flume and the Lowell Wastewater Treatment Plant were manually entered into the software.

The Lowell Wastewater Treatment Plant flowmeter was the only meter located downstream of other flow meters. Because of its location, the treatment plant flow meter measured the flow through the upstream flow meters as well as the flows generated in the Interceptor. To analyze the clear water flows from the Interceptor, the flow readings of the upstream meters were time-shifted so that extremes of flow coincided. This time-shifting allowed the direct comparison of clear water flows between meters some distance apart by accounting for the time of travel between meters. Once time-shifted, we subtracted the upstream meter's

flow measurements from the treatment plant meter's flow measurements to obtain an estimate of the flows generated in the Interceptor.

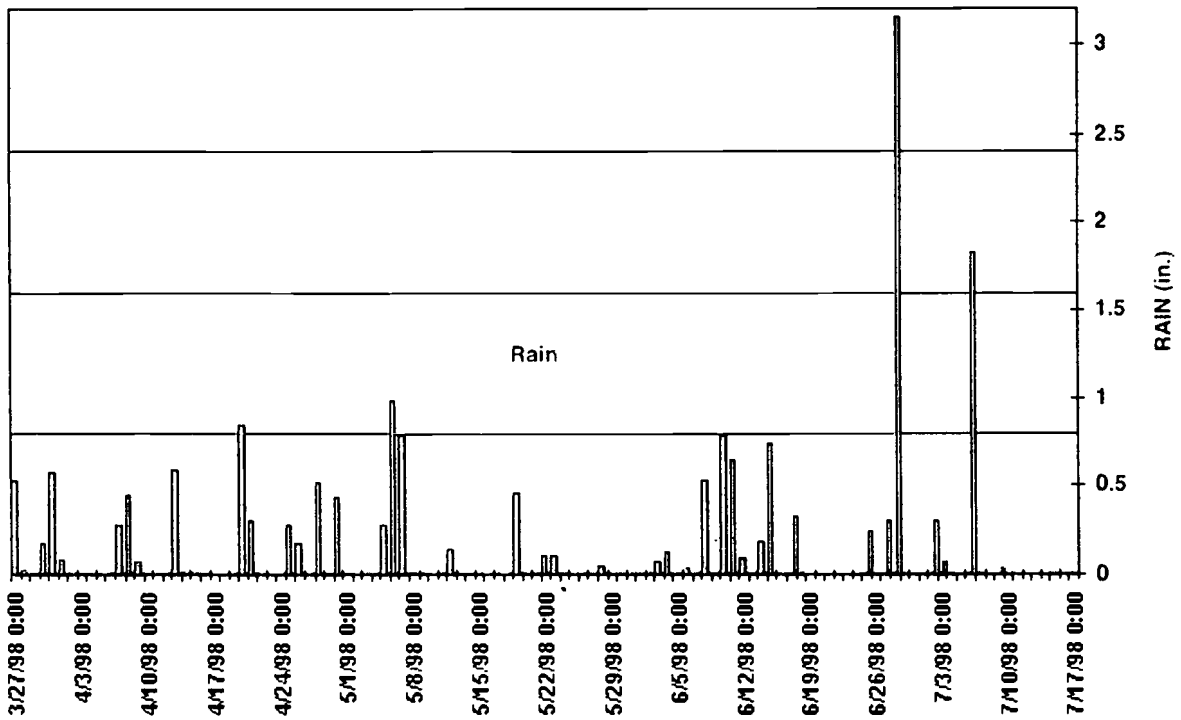
Where flow information was lost or obviously erroneous, we disregarded these time periods and for the meter in question and for the Interceptor sewer clear water flow analyses.

III FINDINGS

A. Rainfall

In the following **Figure 3**, we show the dates and magnitude of each precipitation event recorded by the Rainfall Datalogger located at the Lowell Wastewater Treatment Plant. The maximum rainfall during the Metering Period of 3.15 inches occurred on June 29th. In **Appendix A**, we include a table detailing information about the observed rainfall.

Figure 3
Observed Rainfall

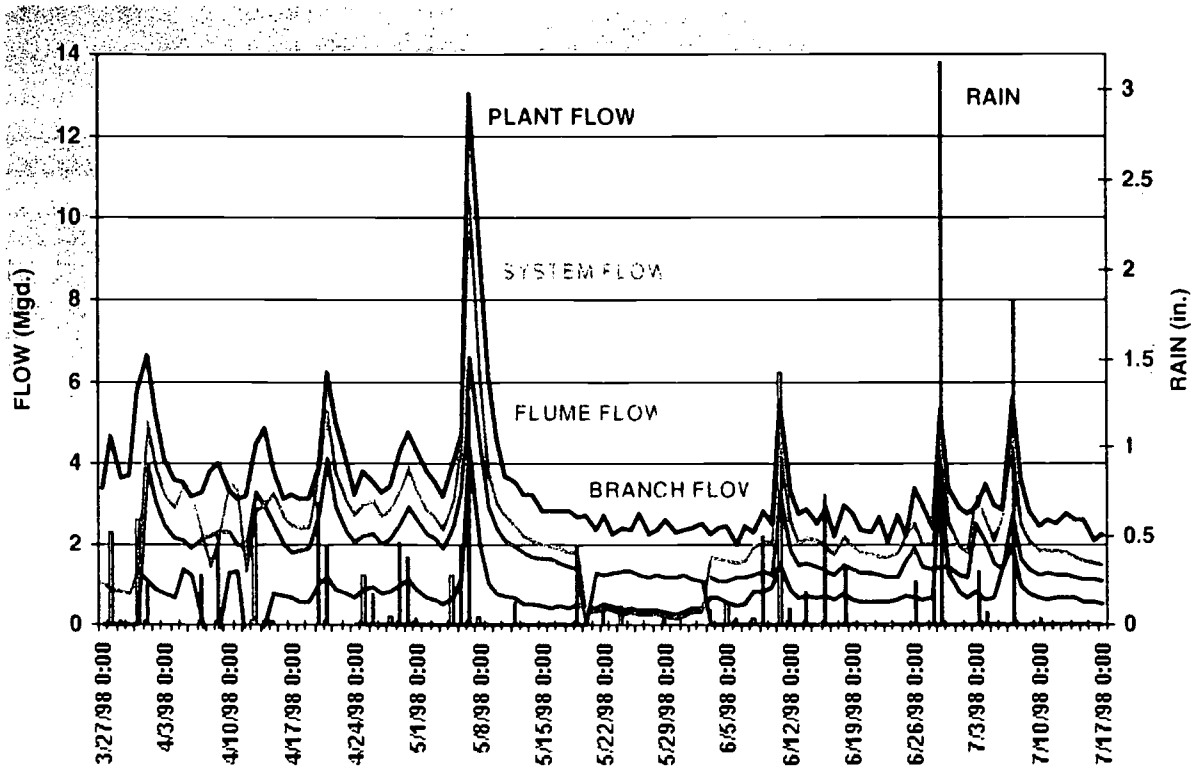


B. Flows

1. Overall Flows

In the following **Figure 4**, we show the flow metered at the plant compared with the flows in the Interceptor, the Cedar Lake flume and the branches flowing into the Interceptor.

Figure 4
Total Flows for All Sites



2. Subsystem Flows

Two flow meters exhibited problems during the Metering Period. Meter 6A was located in a sewer branch that entered the Interceptor sewer near the Interceptor sewer's crown. During wet weather, this meter indicated negative flow through the metering site. This negative flow is a sign of surcharge at the site. Meter readings at this site were incorporated into the Interceptor analyses without modification, since the volume of flow that surcharged into this branch was from the Interceptor and other branch sewers that were metered. However, no flow information was available for this branch sewer during the surcharge events.

Meter 6B entered the Interceptor sewer in the same manhole at Meter 6A, but at a much higher elevation. This meter did not indicate surcharge, but with the small number of homes connected to this branch sewer, low flows and sludge buildup caused metered velocities to be too low for reliable measurement.

In the following figures, we show the flows measured by each of the meters and by the Lowell Wastewater Treatment Plant for the Metering Period. The rainfall information from the Rain Gauge is included in each graph to compare the flows to precipitation events. The flows shown for downstream meters exclude the flows from upstream sewer subsystems.

Figure 5
Cedar Lake Flume

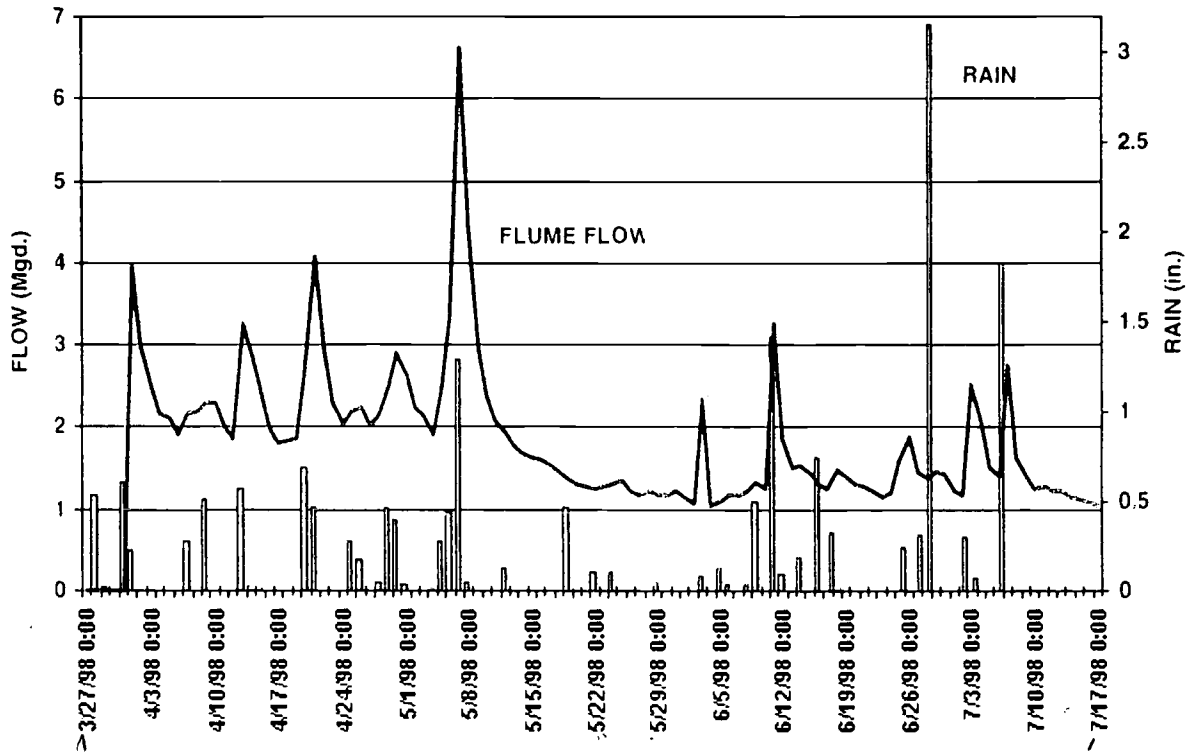


Figure 6
Site 1: Old WWTP NE Line Subsystem

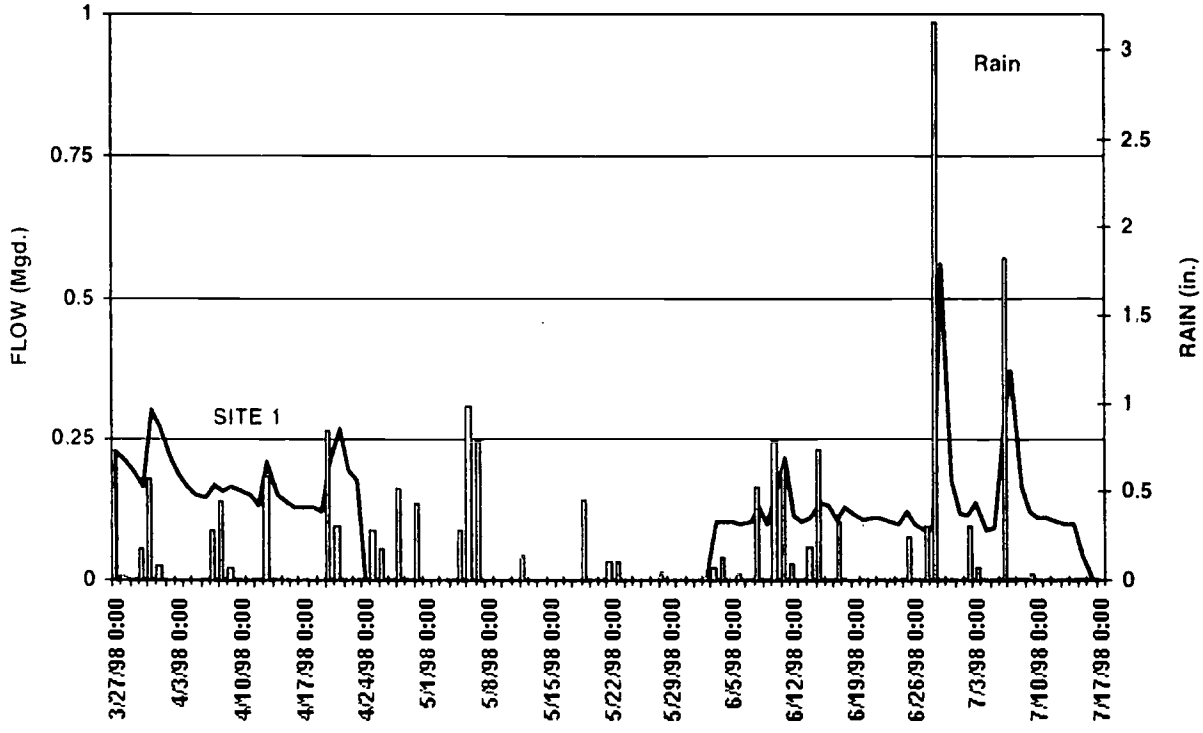


Figure 7
Site 2: Old WWTP SE Line Subsystem

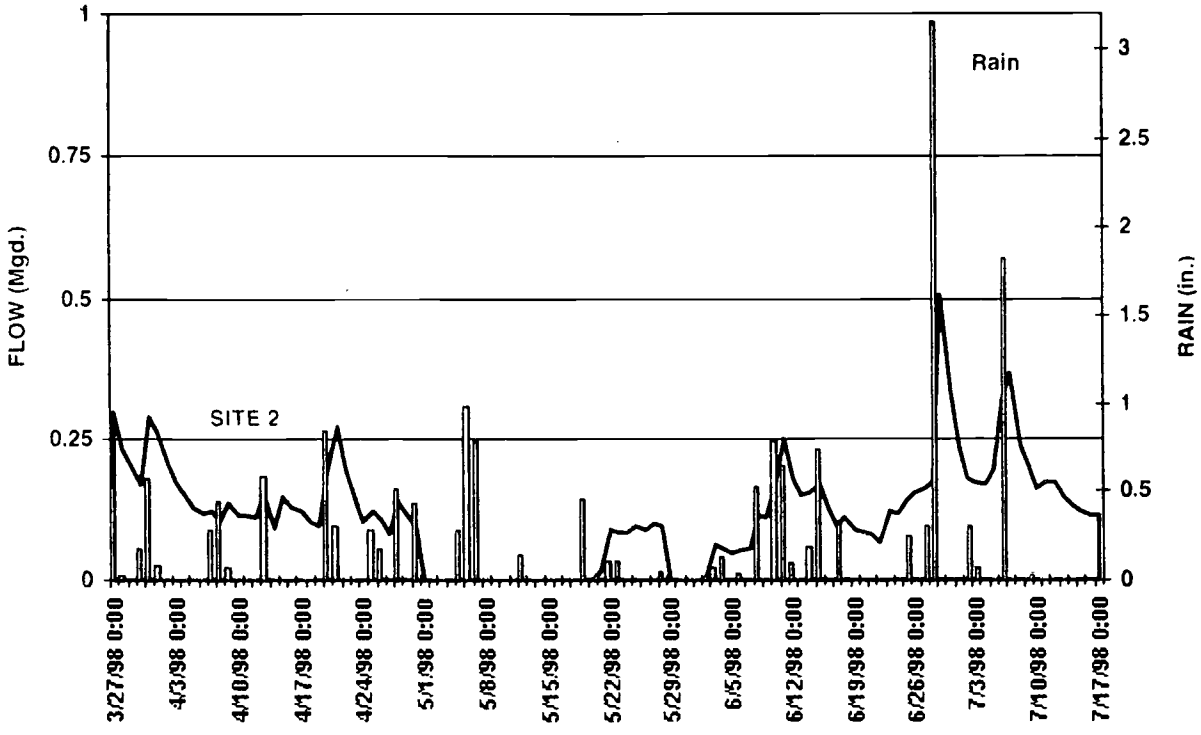


Figure 8
Site 3: Oakley & Freemont Subsystem

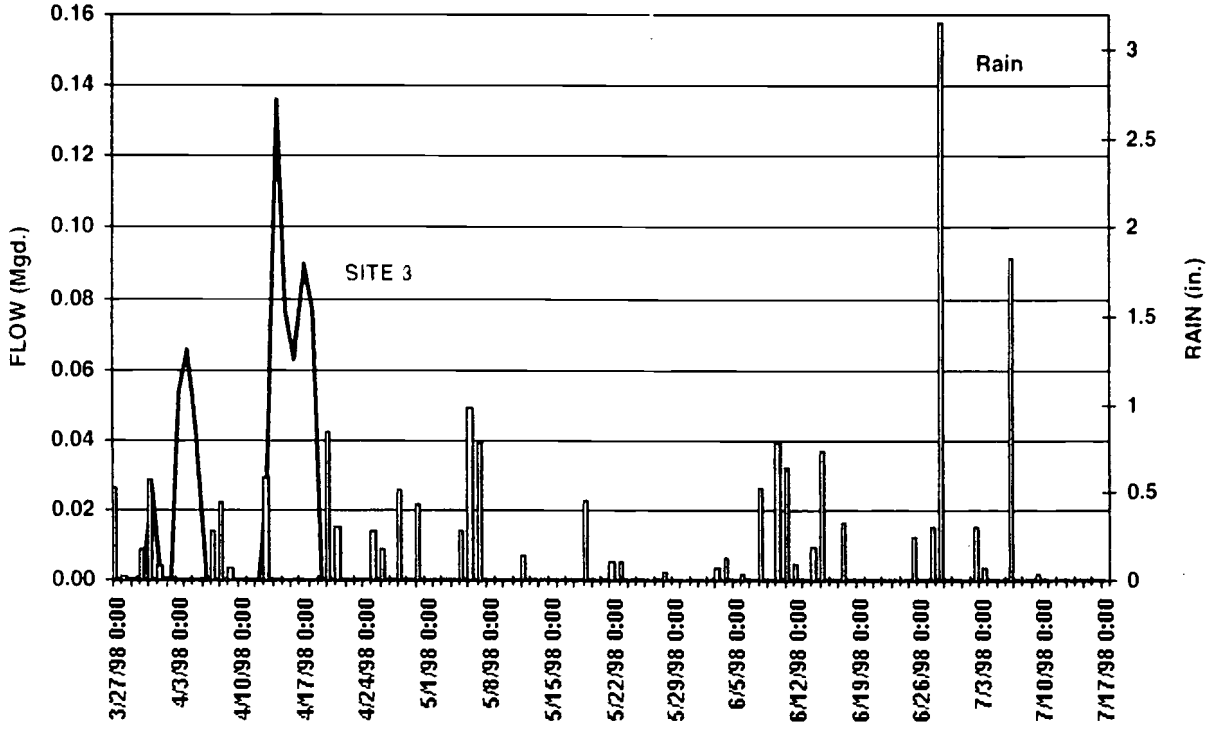


Figure 9
Site 4: Liberty Park Subsystem

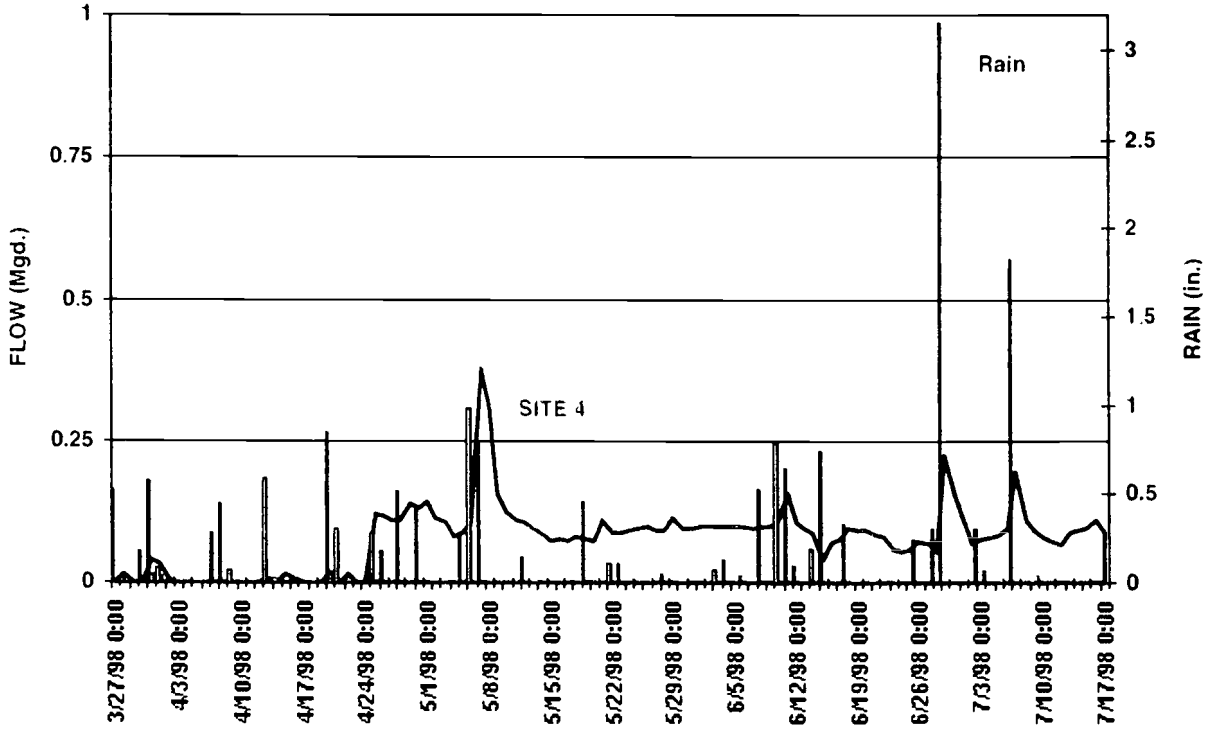


Figure 10
Site 5: Oakley at Cedar Creek Subsystem

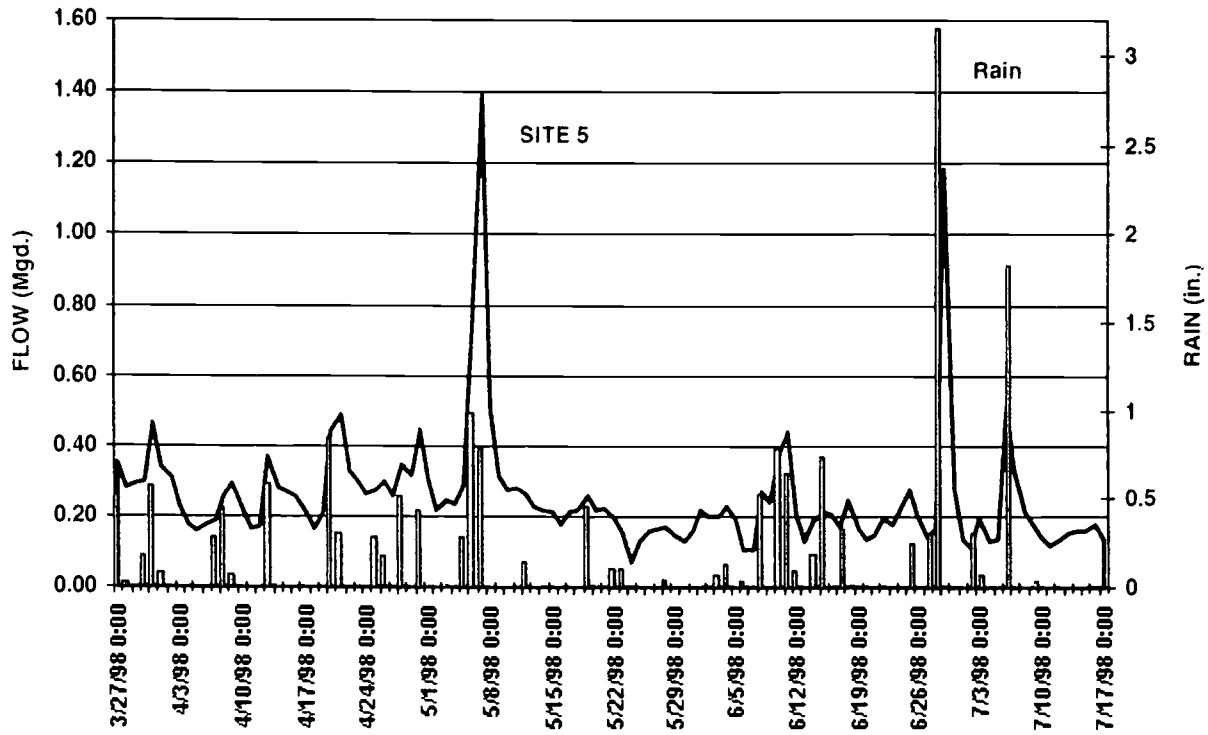


Figure 11
Site 6: Liberty & Main Subsystem

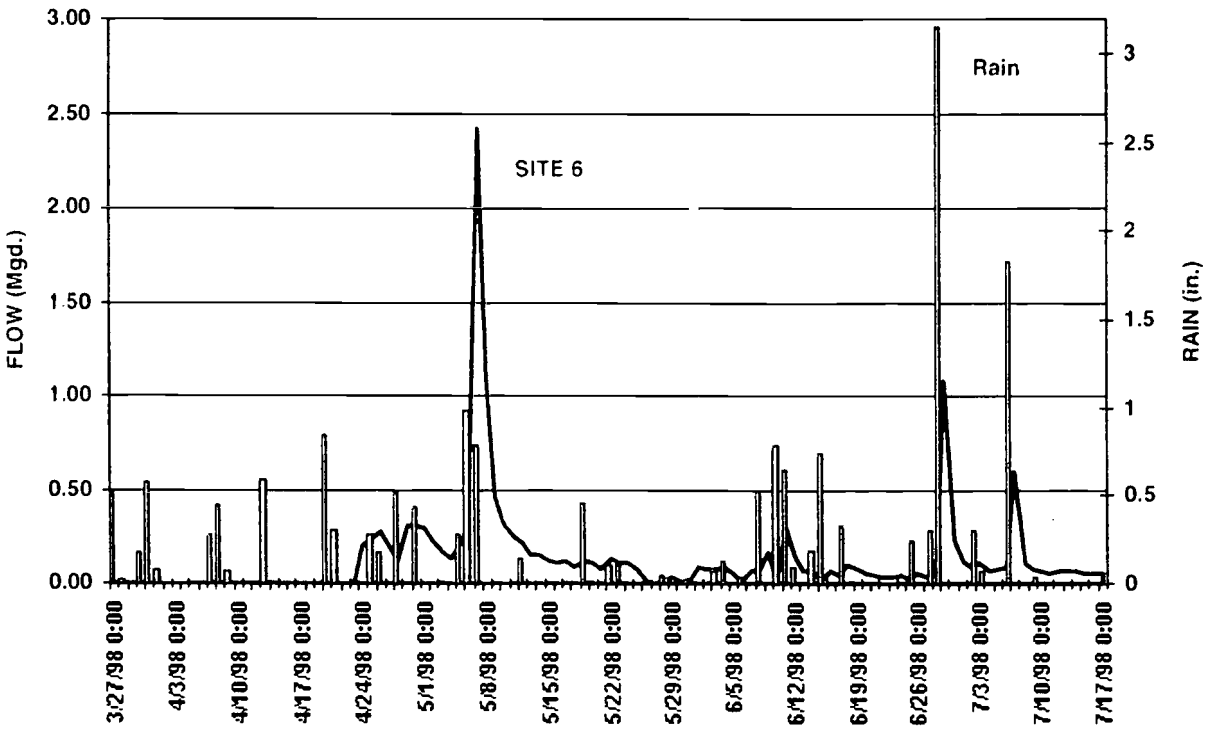


Figure 12
Site 7: 176th Street Subsystem

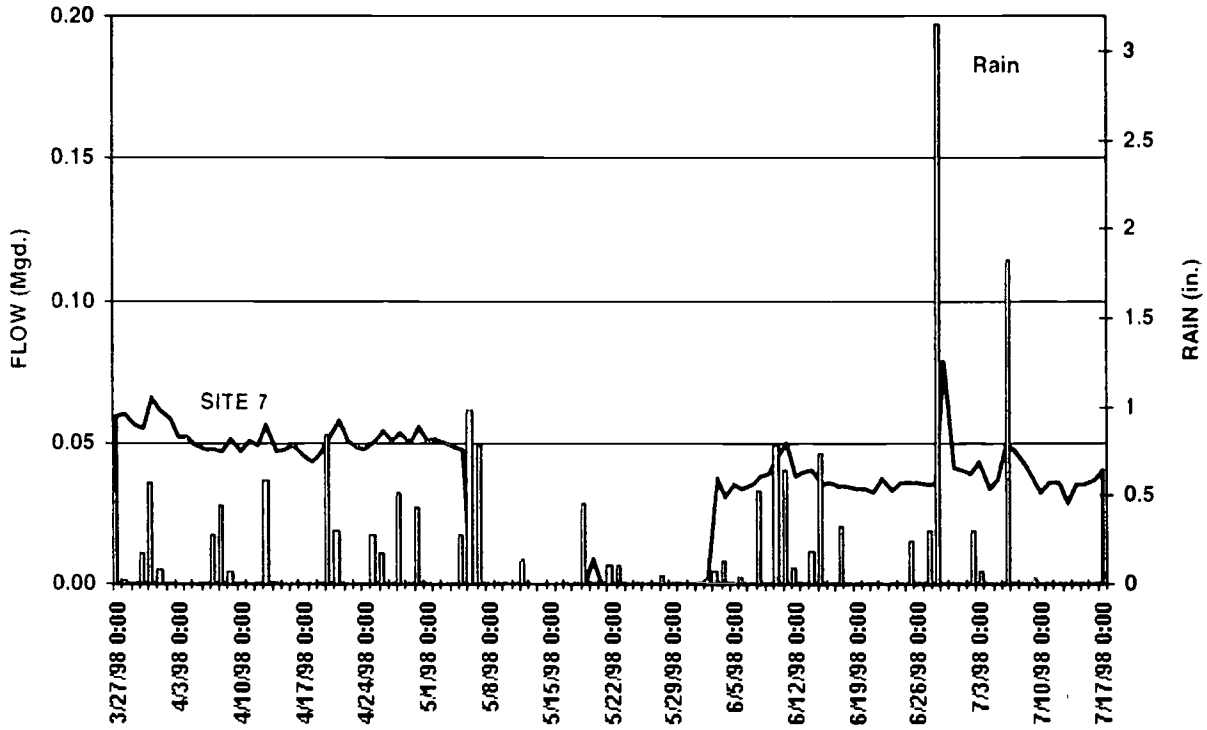


Figure 13
Site 8: Morse & Willowbrook Subsystem

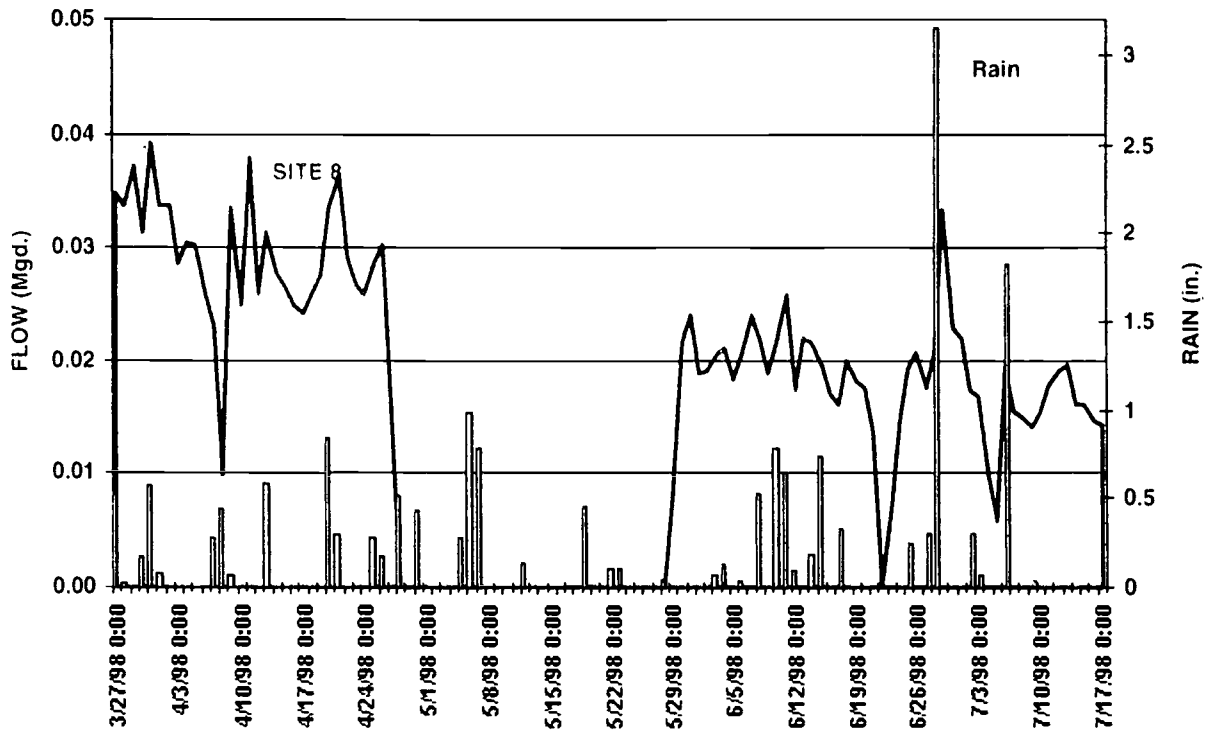
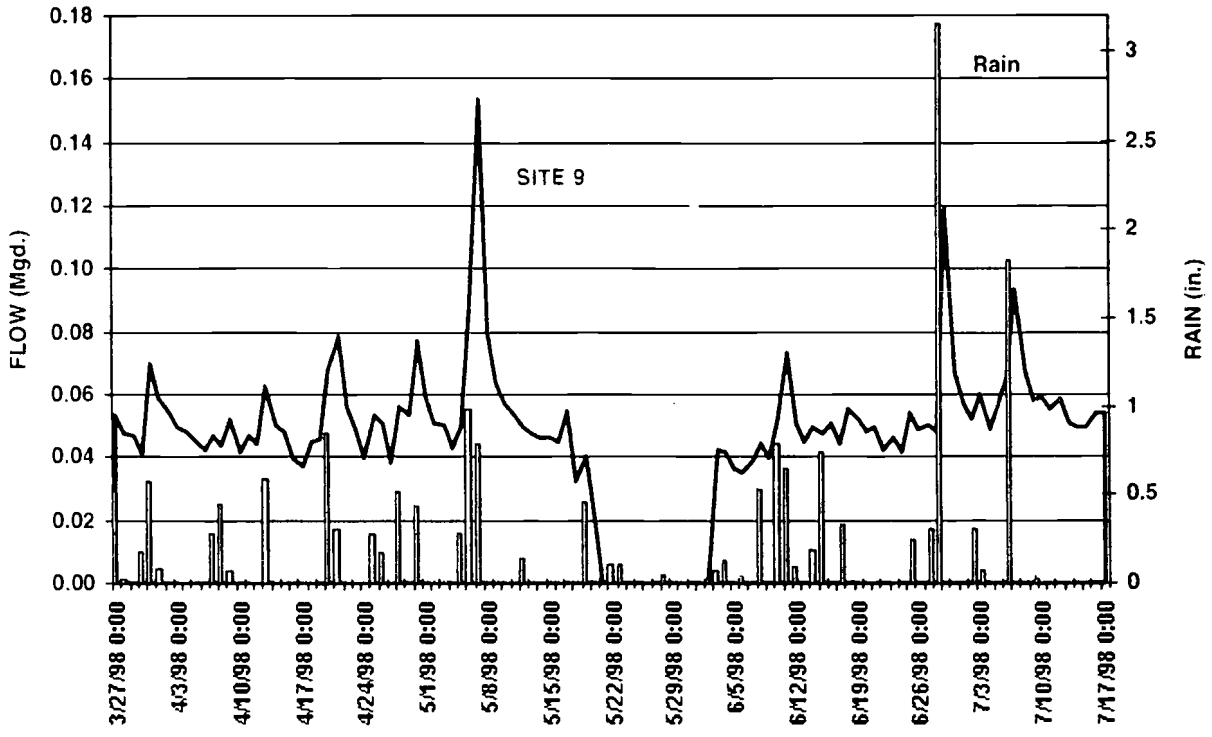


Figure 14
Site 9: In Woods Subsystem



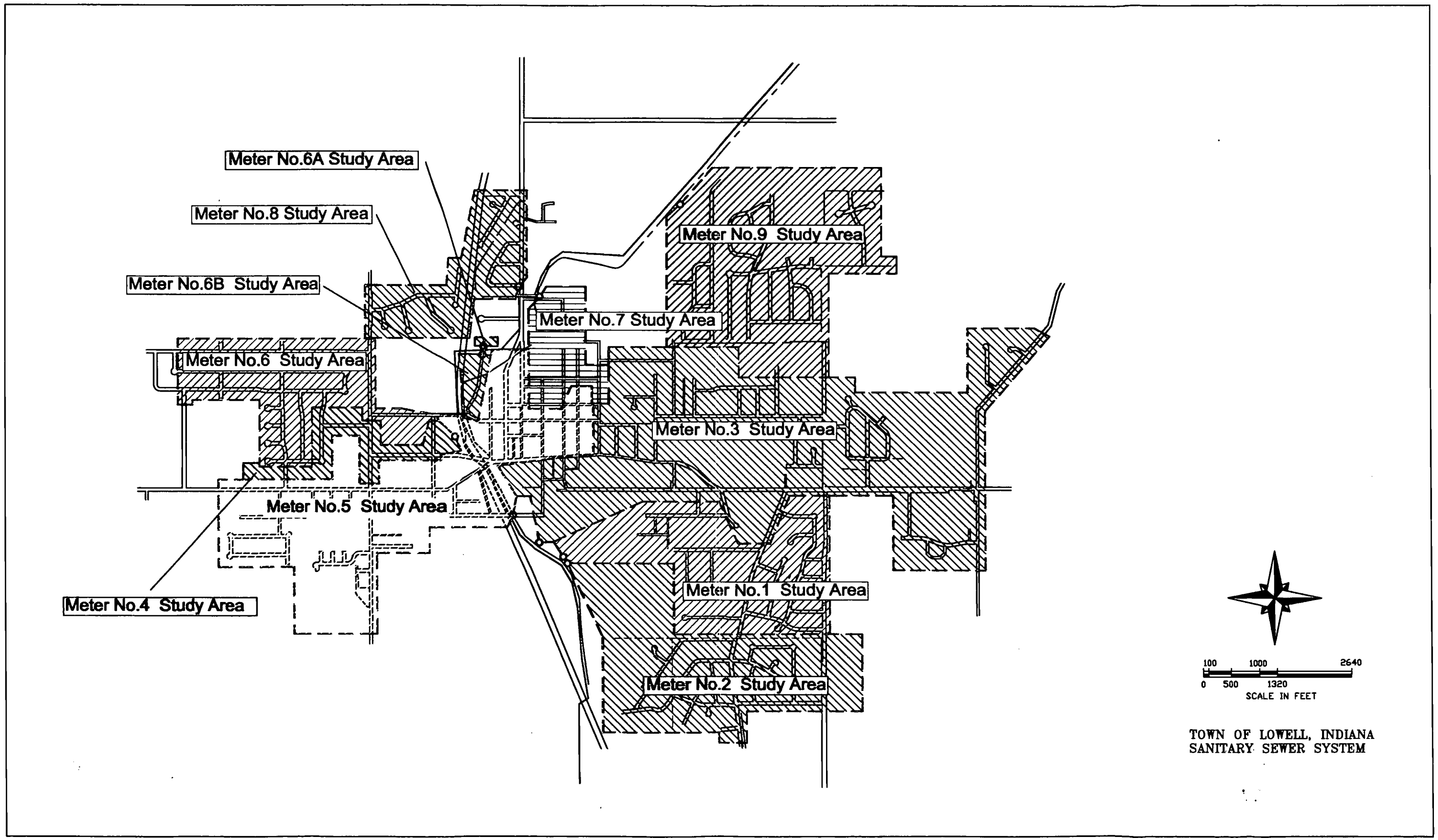
C. Flow Analysis Results

We analyzed in detail the flow readings from all of the meters during the day before through the day after the highest precipitation event (June 29th) during the Metering Period. The flows for June 29th and June 30th were subtracted from the June 28th flow to estimate the inflow (June 29th) and the infiltration (June 30th) rates for each branch sewer system and the Interceptor.

There are a number of techniques for determining whether excessive inflow and infiltration exist in a sewer system. The technique we used compares the amount of pipe in the metered sewer system, measured in inch-miles, with the higher flows during and after a precipitation event. (An inch-mile of sewer is the diameter of the pipe in inches multiplied by the length in miles). This technique is essentially the same as the one required by EPA for the federally funded grants program. The guideline for determining excessive flows was the same as that required under EPA programs-3,000 gallons per day per inch mile (gpd/in-mi) for infiltration and 2.0 gallons per lineal foot (gplf) for inflow.

In **Table 1** on the next page, we show the flows for each of the days analyzed in detail, along with the results of our analyses for excessive/non-excessive flows.

Figure 2
Flow Meter Study Areas



LOWELL, INDIANA FLOW METER DATA

March 27, 1998 Thru July 17, 1998

METER NO.	FOOTAGE (FEET)	IN.-MILE	6/28 AVE. DRY FLOW (GPD)	6/29 WET FLOW (GPD)	INFLOW				6/30 NEXT DAY FLOW (GPD)	INFILTRATION		
					FLOW (GPD)	GAL/ IN-MILE/DAY	(GPLF)	EXCESSIVE/ NON-EXCESSIVE		FLOW (GPD)	GAL/ IN-MILE/DAY	EXCESSIVE/ NON-EXCESSIVE
1	14,670	22.48	91,630	560,401	468,771	20,853	31.95	[illegible]	177,034	85,404	3,799	FAIR
2	18,250	34.50	170,462	504,850	334,388	9,692	18.32	[illegible]	337,047	166,585	4,829	POOR
3	39,450	75.82	123,000	360,000	237,000	3,126	6.01	[illegible]	210,000	87,000	1,147	[illegible]
4	6,300	13.75	56,212	224,173	167,961	12,215	26.66	[illegible]	153,937	97,725	7,107	[illegible]
5	24,350	56.44	164,504	1,186,661	1,022,157	18,111	41.98	[illegible]	273,296	108,792	1,928	[illegible]
6	17,350	30.68	58,907	1,073,980	1,015,073	33,086	58.51	[illegible]	227,444	168,537	5,493	[illegible]
6A	800	1.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6B	600	0.91	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7	5,800	10.50	35,299	78,331	43,032	4,098	7.42	[illegible]	40,929	5,630	536	[illegible]
8	7,100	13.60	20,713	33,388	12,675	932	1.79	[illegible]	22,836	2,123	156	[illegible]
9	18,430	31.90	48,404	118,580	70,176	2,200	3.81	[illegible]	67,144	18,740	587	[illegible]
Interceptor	33,103	272.82	410,000	310,000	NA	NA	NA	NA	780,000	370,000	1,356	[illegible]
Flume	NA	NA	1,380,000	1,440,000	60,000	NA	NA	NA	1,420,000	40,000	NA	NA
TOTAL	186,203	564.61	2,559,131	5,890,364	3,431,233	104,313	18.43		3,709,667	1,150,536	26,939	

APPENDIX A
DETAILED RAINFALL INFORMATION

Lowell Rain Summary Report (Daily)

Date	Rain Total (in)	Rain Total (in)
03/27/98	.00	
03/28/98	.53	
03/29/98	.02	
03/30/98	.00	
03/31/98	.60	
04/01/98	.23	
04/02/98	.00	
04/03/98	.00	
04/04/98	.00	
04/05/98	.00	
04/06/98	.00	
04/07/98	.28	
04/08/98	.00	
04/09/98	.51	
04/10/98	.00	
04/11/98	.00	
04/12/98	.00	
04/13/98	.57	
04/14/98	.02	
04/15/98	.02	
04/16/98	.00	
04/17/98	.00	
04/18/98	.00	
04/19/98	.00	
04/20/98	.69	
04/21/98	.46	
04/22/98	.00	
04/23/98	.00	
04/24/98	.00	
04/25/98	.28	
04/26/98	.18	
04/27/98	.00	
04/28/98	.05	
04/29/98	.47	
04/30/98	.39	
05/01/98	.04	
05/02/98	.00	
05/03/98	.00	
05/04/98	.01	
05/05/98	.28	

Date	Rain Total (in)	Rain Total (in)
05/06/98	.44	
05/07/98	1.29	
05/08/98	.05	
05/09/98	.00	
05/10/98	.00	
05/11/98	.00	
05/12/98	.13	
05/13/98	.01	
05/14/98	.00	
05/15/98	.00	
05/16/98	.00	
05/17/98	.00	
05/18/98	.00	
05/19/98	.46	
05/20/98	.01	
05/21/98	.00	
05/22/98	.10	
05/23/98	00	
05/24/98	.11	
05/25/98	.00	
05/26/98	.00	
05/27/98	.00	
05/28/98	.00	
05/29/98	.05	
05/30/98	.00	
05/31/98	.00	
06/01/98	.00	
06/02/98	.00	
06/03/98	.08	
06/04/98	.00	
06/05/98	.13	
06/06/98	.03	
06/07/98	.00	
06/08/98	.03	
06/09/98	.50	
06/10/98	.00	
06/11/98	1.42	
06/12/98	.09	
06/13/98	.00	
06/14/98	.19	
06/15/98	.00	
06/16/98	.74	
06/17/98	.00	
06/18/98	.00	.33
06/19/98		.01
06/20/98		.00
06/21/98		.00
06/22/98		.00

Date	Rain Total (in)	Rain Total (in)
06/23/98		.00
06/24/98		.00
06/25/98		.00
06/26/98		.25
06/27/98		.00
06/28/98		.31
06/29/98		3.15
06/30/98		.00
07/01/98		.00
07/02/98		.00
07/03/98		.30
07/04/98		.07
07/05/98		.00
07/06/98		.00
07/07/98		1.83
07/08/98		.00
07/09/98		.00
07/10/98		.03
07/11/98		.00
07/12/98		.00
07/13/98		.00
07/14/98		.00
07/15/98		.00
07/16/98		.00

REPORT STATISTICS

Min.	**.00**	**.00**
Avg.	**.14**	**.22**
Max.	**1.42**	**3.15**

Lowell Rain Summary Report (Hourly)

Date/Time	Rain Total (in)
06/11 12:00 am	.0000
06/11 12:05 am	.0000
06/11 12:10 am	.0000
06/11 12:15 am	.0000
06/11 12:20 am	.0000
06/11 12:25 am	.0000
06/11 12:30 am	.0000
06/11 12:35 am	.0000
06/11 12:40 am	.0000
06/11 12:45 am	.0000
06/11 12:50 am	.0000
06/11 12:55 am	.0000
06/11 01:00 am	.0000
06/11 01:05 am	.0000
06/11 01:10 am	.0000
06/11 01:15 am	.0000
06/11 01:20 am	.0000
06/11 01:25 am	.0000
06/11 01:30 am	.0000
06/11 01:35 am	.0000
06/11 01:40 am	.0000
06/11 01:45 am	.0000
06/11 01:50 am	.0000
06/11 01:55 am	.0000
06/11 02:00 am	.0000
06/11 02:05 am	.0000
06/11 02:10 am	.0000
06/11 02:15 am	.0000
06/11 02:20 am	.0000
06/11 02:25 am	.0000
06/11 02:30 am	.0000
06/11 02:35 am	.0000
06/11 02:40 am	.0000
06/11 02:45 am	.0000
06/11 02:50 am	.0000
06/11 02:55 am	.0000
06/11 03:00 am	.0000
06/11 03:05 am	.0100
06/11 03:10 am	.0000
06/11 03:15 am	.0100

Date/Time	Rain Total (in)
06/11 03:20 am	.0000
06/11 03:25 am	.0100
06/11 03:30 am	.0000
06/11 03:35 am	.0100
06/11 03:40 am	.0000
06/11 03:45 am	.0200
06/11 03:50 am	.0100
06/11 03:55 am	.0000
06/11 04:00 am	.0100
06/11 04:05 am	.0000
06/11 04:10 am	.0000
06/11 04:15 am	.0000
06/11 04:20 am	.0000
06/11 04:25 am	.0000
06/11 04:30 am	.0100
06/11 04:35 am	.0100
06/11 04:40 am	.0100
06/11 04:45 am	.0100
06/11 04:50 am	.0200
06/11 04:55 am	.0100
06/11 05:00 am	.0100
06/11 05:05 am	.0000
06/11 05:10 am	.0200
06/11 05:15 am	.0000
06/11 05:20 am	.0000
06/11 05:25 am	.0000
06/11 05:30 am	.0000
06/11 05:35 am	.0100
06/11 05:40 am	.0000
06/11 05:45 am	.0100
06/11 05:50 am	.0200
06/11 05:55 am	.0000
06/11 06:00 am	.0000
06/11 06:05 am	.0100
06/11 06:10 am	.0100
06/11 06:15 am	.0000
06/11 06:20 am	.0000
06/11 06:25 am	.0000
06/11 06:30 am	.0200
06/11 06:35 am	.0100
06/11 06:40 am	.0100
06/11 06:45 am	.0700
06/11 06:50 am	.0600
06/11 06:55 am	.0100
06/11 07:00 am	.0000
06/11 07:05 am	.0100
06/11 07:10 am	.0100
06/11 07:15 am	.0200

Date/Time	Rain Total (in)
`/11 07:20 am	.0200
/11 07:25 am	.0000
06/11 07:30 am	.0100
06/11 07:35 am	.0000
06/11 07:40 am	.0100
06/11 07:45 am	.0000
06/11 07:50 am	.0000
06/11 07:55 am	.0000
06/11 08:00 am	.0000
06/11 08:05 am	.0000
06/11 08:10 am	.0000
06/11 08:15 am	.0000
06/11 08:20 am	.0000
06/11 08:25 am	.0000
06/11 08:30 am	.0000
06/11 08:35 am	.0000
06/11 08:40 am	.0000
06/11 08:45 am	.0000
06/11 08:50 am	.0000
06/11 08:55 am	.0000
06/11 09:00 am	.0000
06/11 09:05 am	.0000
/11 09:10 am	.0000
06/11 09:15 am	.0000
06/11 09:20 am	.0000
06/11 09:25 am	.0000
06/11 09:30 am	.0000
06/11 09:35 am	.0000
06/11 09:40 am	.0000
06/11 09:45 am	.0000
06/11 09:50 am	.0000
06/11 09:55 am	.0000
06/11 10:00 am	.0000
06/11 10:05 am	.0000
06/11 10:10 am	.0000
06/11 10:15 am	.0000
06/11 10:20 am	.0000
06/11 10:25 am	.0000
06/11 10:30 am	.0000
06/11 10:35 am	.0000
06/11 10:40 am	.0000
06/11 10:45 am	.0000
06/11 10:50 am	.0000
06/11 10:55 am	.0000
6/11 11:00 am	.0000
06/11 11:05 am	.0000
06/11 11:10 am	.0000
06/11 11:15 am	.0000

Date/Time	Rain Total (in)
6/11 11:20 am	.0000
06/11 11:25 am	.0100
06/11 11:30 am	.0500
06/11 11:35 am	.0800
06/11 11:40 am	.0700
06/11 11:45 am	.0500
06/11 11:50 am	.0200
06/11 11:55 am	.0000
06/11 12:00 pm	.0000
06/11 12:05 pm	.0000
06/11 12:10 pm	.0400
06/11 12:15 pm	.0000
06/11 12:20 pm	.0000
06/11 12:25 pm	.0000
06/11 12:30 pm	.0000
06/11 12:35 pm	.0000
06/11 12:40 pm	.0000
06/11 12:45 pm	.0000
06/11 12:50 pm	.0000
06/11 12:55 pm	.0000
06/11 01:00 pm	.0000
06/11 01:05 pm	.0000
6/11 01:10 pm	.0000
06/11 01:15 pm	.0000
06/11 01:20 pm	.0000
06/11 01:25 pm	.0000
06/11 01:30 pm	.0000
06/11 01:35 pm	.0000
06/11 01:40 pm	.0000
06/11 01:45 pm	.0000
06/11 01:50 pm	.0000
06/11 01:55 pm	.0000
06/11 02:00 pm	.0000
06/11 02:05 pm	.0000
06/11 02:10 pm	.0000
06/11 02:15 pm	.0000
06/11 02:20 pm	.0000
06/11 02:25 pm	.0000
06/11 02:30 pm	.0000
06/11 02:35 pm	.0100
06/11 02:40 pm	.1200
06/11 02:45 pm	.0600
06/11 02:50 pm	.0300
06/11 02:55 pm	.0000
06/11 03:00 pm	.0000
06/11 03:05 pm	.0000
06/11 03:10 pm	.0000
06/11 03:15 pm	.0000

Date/Time	Rain Total (in)
6/11 03:20 pm	.0000
06/11 03:25 pm	.0000
06/11 03:30 pm	.0000
06/11 03:35 pm	.0000
06/11 03:40 pm	.0000
06/11 03:45 pm	.0000
06/11 03:50 pm	.0000
06/11 03:55 pm	.0000
06/11 04:00 pm	.0000
06/11 04:05 pm	.0000
06/11 04:10 pm	.0000
06/11 04:15 pm	.0000
06/11 04:20 pm	.0000
06/11 04:25 pm	.0000
06/11 04:30 pm	.0000
06/11 04:35 pm	.0000
06/11 04:40 pm	.0000
06/11 04:45 pm	.0000
06/11 04:50 pm	.0000
06/11 04:55 pm	.0000
06/11 05:00 pm	.0200
06/11 05:05 pm	.0300
06/11 05:10 pm	.0100
06/11 05:15 pm	.0200
06/11 05:20 pm	.0200
06/11 05:25 pm	.0000
06/11 05:30 pm	.0000
06/11 05:35 pm	.0000
06/11 05:40 pm	.0000
06/11 05:45 pm	.0000
06/11 05:50 pm	.0000
06/11 05:55 pm	.0000
06/11 06:00 pm	.0000
06/11 06:05 pm	.0000
06/11 06:10 pm	.0000
06/11 06:15 pm	.0000
06/11 06:20 pm	.0000
06/11 06:25 pm	.0000
06/11 06:30 pm	.0000
06/11 06:35 pm	.0000
06/11 06:40 pm	.0000
06/11 06:45 pm	.0000
06/11 06:50 pm	.0000
06/11 06:55 pm	.0000
06/11 07:00 pm	.0000
06/11 07:05 pm	.0000
06/11 07:10 pm	.0000
06/11 07:15 pm	.0000

Date/Time	Rain Total (in)
'11 07:20 pm	.0000
06/11 07:25 pm	.0000
06/11 07:30 pm	.0000
06/11 07:35 pm	.0100
06/11 07:40 pm	.0000
06/11 07:45 pm	.0000
06/11 07:50 pm	.0000
06/11 07:55 pm	.0000
06/11 08:00 pm	.0000
06/11 08:05 pm	.0000
06/11 08:10 pm	.0000
06/11 08:15 pm	.0000
06/11 08:20 pm	.0000
06/11 08:25 pm	.0000
06/11 08:30 pm	.0000
06/11 08:35 pm	.0000
06/11 08:40 pm	.0000
06/11 08:45 pm	.0000
06/11 08:50 pm	.0000
06/11 08:55 pm	.0000
06/11 09:00 pm	.0000
06/11 09:05 pm	.0000
06/11 09:10 pm	.0000
06/11 09:15 pm	.0000
06/11 09:20 pm	.0000
06/11 09:25 pm	.0000
06/11 09:30 pm	.0000
06/11 09:35 pm	.0000
06/11 09:40 pm	.0000
06/11 09:45 pm	.0000
06/11 09:50 pm	.0000
06/11 09:55 pm	.0000
06/11 10:00 pm	.0000
06/11 10:05 pm	.0000
06/11 10:10 pm	.0000
06/11 10:15 pm	.0000
06/11 10:20 pm	.0000
06/11 10:25 pm	.0000
06/11 10:30 pm	.0000
06/11 10:35 pm	.0000
06/11 10:40 pm	.1700
06/11 10:45 pm	.1000
06/11 10:50 pm	.0000
06/11 10:55 pm	.0000
06/11 11:00 pm	.0000
06/11 11:05 pm	.0000
06/11 11:10 pm	.0000
06/11 11:15 pm	.0000

Date/Time	Rain Total (in)
'1 11:20 pm	.0000
06/11 11:25 pm	.0000
06/11 11:30 pm	.0000
06/11 11:35 pm	.0000
06/11 11:40 pm	.0000
06/11 11:45 pm	.0000
06/11 11:50 pm	.0000
06/11 11:55 pm	.0000

REPORT STATISTICS

Min.	**.0000**
Avg.	**.0049**
Max.	**.1700**

APPENDIX B
DETAILED FLOW METERING INFORMATION

TOWN OF LOWELL

FLOW METERING PROGRAM

The flow metering program for Lowell began on Friday, March 27, 1998. A total of eleven (11) meters were installed in the branch lines to the main interceptor sewer. In addition, a continuous reading rain gauge was installed at the existing wastewater treatment plant.

The purpose of installing the meters in the branch lines to the main interceptor sewer was twofold: ❶ to quantify the Town's wastewater flow and compare that flow with the flows from Cedar Lake and the treatment plant flows. By comparing these flows, they indicated that the main interceptor is contributing a major portion of infiltration/inflow (I/I) into the system; and ❷ to identify areas of the Town that have substantial I/I.

The following is a brief description of the meter locations and the associated flow data achieved. The hydrographs show the flow (red line) and the rain (blue columns) data. Flow is the hourly average in gallons.

Flow Meter No. 1

Located at the old wastewater treatment plant in an 18-inch VC pipe. The area metered is residential. There are two (2) hydrographs of Site 1. The first, is from March 27th through April 24th 1998. The flows respond relatively quickly in relation to the rain which is an indication of inflow. The flows after the rain recovered quickly which is also an indication of inflow. The second graph is flow for the day of March 31st 1998. The flow is about ½ hour behind the rain which is the time it takes for the flow to reach the meter. The flow peaks out at around 5:45 AM and steadily rescinds until 17:00 and then begins to rise again. This rise is probably due to residential flow.

Lowell 1998 Flowmeter Study

Site:1 OLD WWTP NE LINE

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
03/27 12:00 am	227853	125200	461700	.00	
03/28 12:00 am	211871	145600	307200	.53	
03/29 12:00 am	188926	122500	250000	.02	
03/30 12:00 am	164391	107600	250000	.00	
03/31 12:00 am	302180	156700	633200	.60	
04/01 12:00 am	272476	222700	343700	.23	
04/02 12:00 am	217043	169200	267700	.00	
04/03 12:00 am	186454	135700	235600	.00	
04/04 12:00 am	165279	109100	231800	.00	
04/05 12:00 am	151751	97340	199400	.00	
04/06 12:00 am	148254	97340	195000	00	
04/07 12:00 am	168445	132400	323000	.28	
04/08 12:00 am	158885	110600	202200	.00	
04/09 12:00 am	164128	108400	220300	.51	
04/10 12:00 am	155773	95250	217900	.00	
04/11 12:00 am	151659	90390	203300	.00	
04/12 12:00 am	133425	81330	191700	.00	
04/13 12:00 am	208658	117700	440300	.57	
04/14 12:00 am	152002	98540	207900	.02	
04/15 12:00 am	140758	95250	213100	.02	
04/16 12:00 am	129666	81330	176400	.00	
04/17 12:00 am	127801	70900	206800	.00	
04/18 12:00 am	128979	69080	217900	.00	
04/19 12:00 am	120771	66660	177100	.00	
04/20 12:00 am	206674	99450	452300	.69	
04/21 12:00 am	266040	201800	352500	.46	
04/22 12:00 am	193353	141700	260400	.00	
04/23 12:00 am	176340	168500	180400	.00	
04/24 12:00 am				.00	
04/25 12:00 am				.28	
04/26 12:00 am				.18	
04/27 12:00 am				.00	
04/28 12:00 am				.05	
04/29 12:00 am				.47	
04/30 12:00 am				.39	
05/01 12:00 am				.04	
05/02 12:00 am				.00	
05/03 12:00 am				.00	
05/04 12:00 am				.01	
05/05 12:00 am				.28	

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
05/06 12:00 am				.44	
05/07 12:00 am				1.29	
05/08 12:00 am				.05	
05/09 12:00 am				.00	
05/10 12:00 am				.00	
05/11 12:00 am				.00	
05/12 12:00 am				.13	
05/13 12:00 am				.01	
05/14 12:00 am				.00	
05/15 12:00 am				.00	
05/16 12:00 am				.00	
05/17 12:00 am				.00	
05/18 12:00 am				.00	
05/19 12:00 am				.46	
05/20 12:00 am				.01	
05/21 12:00 am				.00	
05/22 12:00 am				.10	
05/23 12:00 am				.00	
05/24 12:00 am				.11	
05/25 12:00 am				.00	
05/26 12:00 am				.00	
05/27 12:00 am				.00	
05/28 12:00 am				.00	
05/29 12:00 am				.05	
05/30 12:00 am				.00	
05/31 12:00 am				.00	
06/01 12:00 am				.00	
06/02 12:00 am				.00	
06/03 12:00 am	101743	91080	112200	.08	
06/04 12:00 am	102045	47940	165700	.00	
06/05 12:00 am	103577	52630	233000	.13	
06/06 12:00 am	98809	43680	180200	.03	
06/07 12:00 am	103749	42240	166200	.00	
06/08 12:00 am	126781	59040	478800	.03	
06/09 12:00 am	97463	47420	148400	.50	
06/10 12:00 am	151396	54540	575900	.00	
06/11 12:00 am	217417	101400	604700	1.42	
06/12 12:00 am	112533	60860	158900	.09	
06/13 12:00 am	102324	52050	159700	.00	
06/14 12:00 am	109050	61880	199700	.19	
06/15 12:00 am	134633	50600	550000	.00	
06/16 12:00 am	132898	74170	201300	.74	
06/17 12:00 am	106489	54540	148400	.00	
06/18 12:00 am	129383	77430	248600	.00	.33
06/19 12:00 am	113416	55100	166700		.01
06/20 12:00 am	107173	50600	155300		.00
06/21 12:00 am	110463	58170	153400		.00
06/22 12:00 am	108103	61200	240800		.00

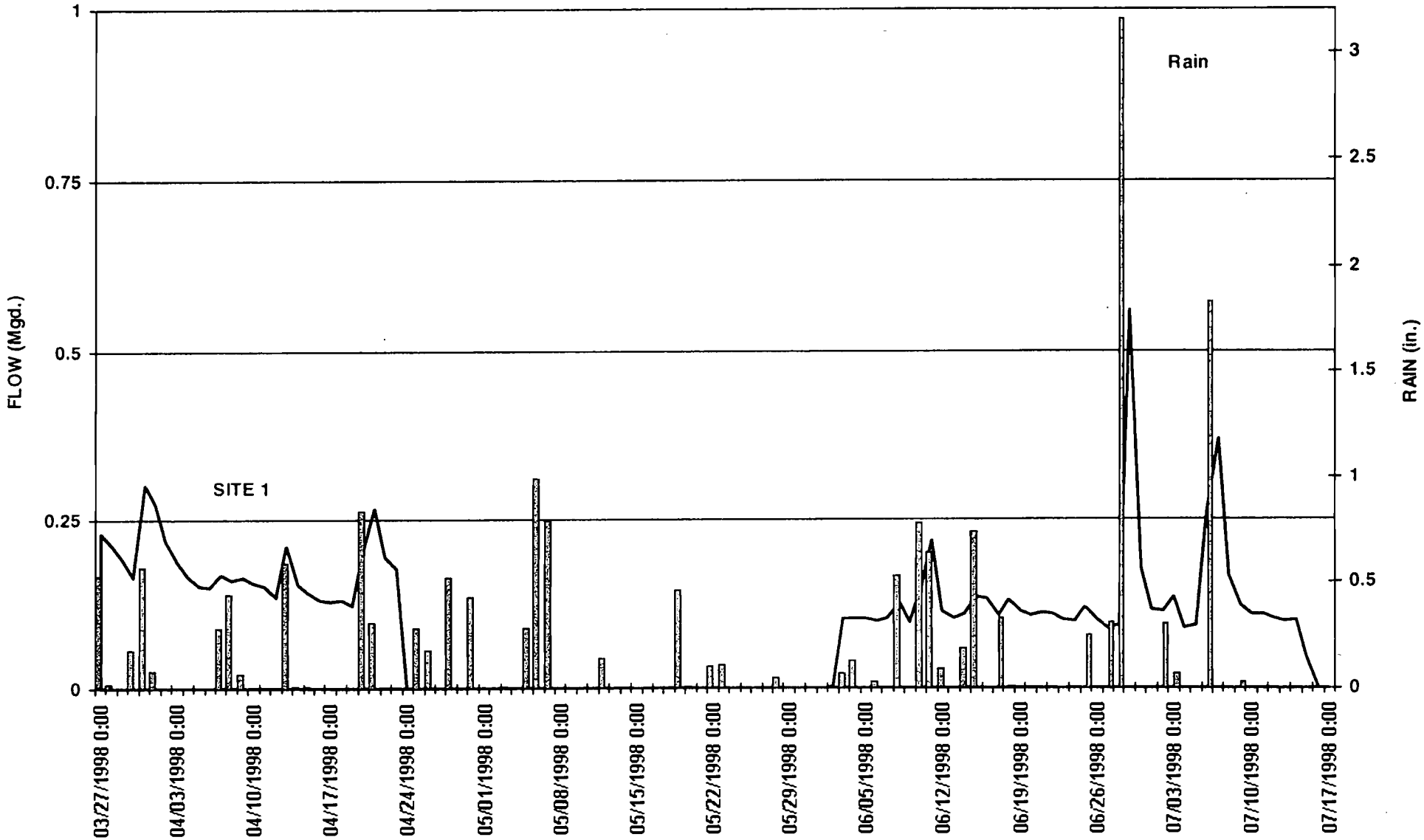
Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
'23 12:00 am	101454	48350	147400		.00
../24 12:00 am	98433	47790	146900		.00
06/25 12:00 am	119060	45540	387300		.00
06/26 12:00 am	100143	53350	164300		.25
06/27 12:00 am	88144	43800	144500		.00
06/28 12:00 am	91630	47280	129800		.31
06/29 12:00 am	560401	31300	2320999		3.15
06/30 12:00 am	177034	102600	274300		.00
07/01 12:00 am	115693	65300	168300		.00
07/02 12:00 am	112203	64780	178900		.00
07/03 12:00 am	135093	59410	316800		.30
07/04 12:00 am	89011	48670	144700		.07
07/05 12:00 am	91351	45820	140800		.00
07/06 12:00 am	257727	39420	2018999		.00
07/07 12:00 am	368256	199700	1288999		1.83
07/08 12:00 am	165192	109400	234800		.00
07/09 12:00 am	121691	73740	167100		.00
07/10 12:00 am	109327	61600	167300		.03
07/11 12:00 am	108535	57150	164300		.00
07/12 12:00 am	103524	55660	153900		.00
07/13 12:00 am	98373	59860	136500		.00
07/14 12:00 am	100374	53930	157400		.00
'/15 12:00 am	44480		134600		.00
07/16 12:00 am					.00

REPORT STATISTICS

Min.	**44480**	**31300**	**112200**	**.00**	**.00**
Avg.	**151358**	**84704**	**309234**	**.14**	**.22**
Max.	**560401**	**222700**	**2320999**	**1.42**	**3.15**

Lowell 1998 Flowmeter Study

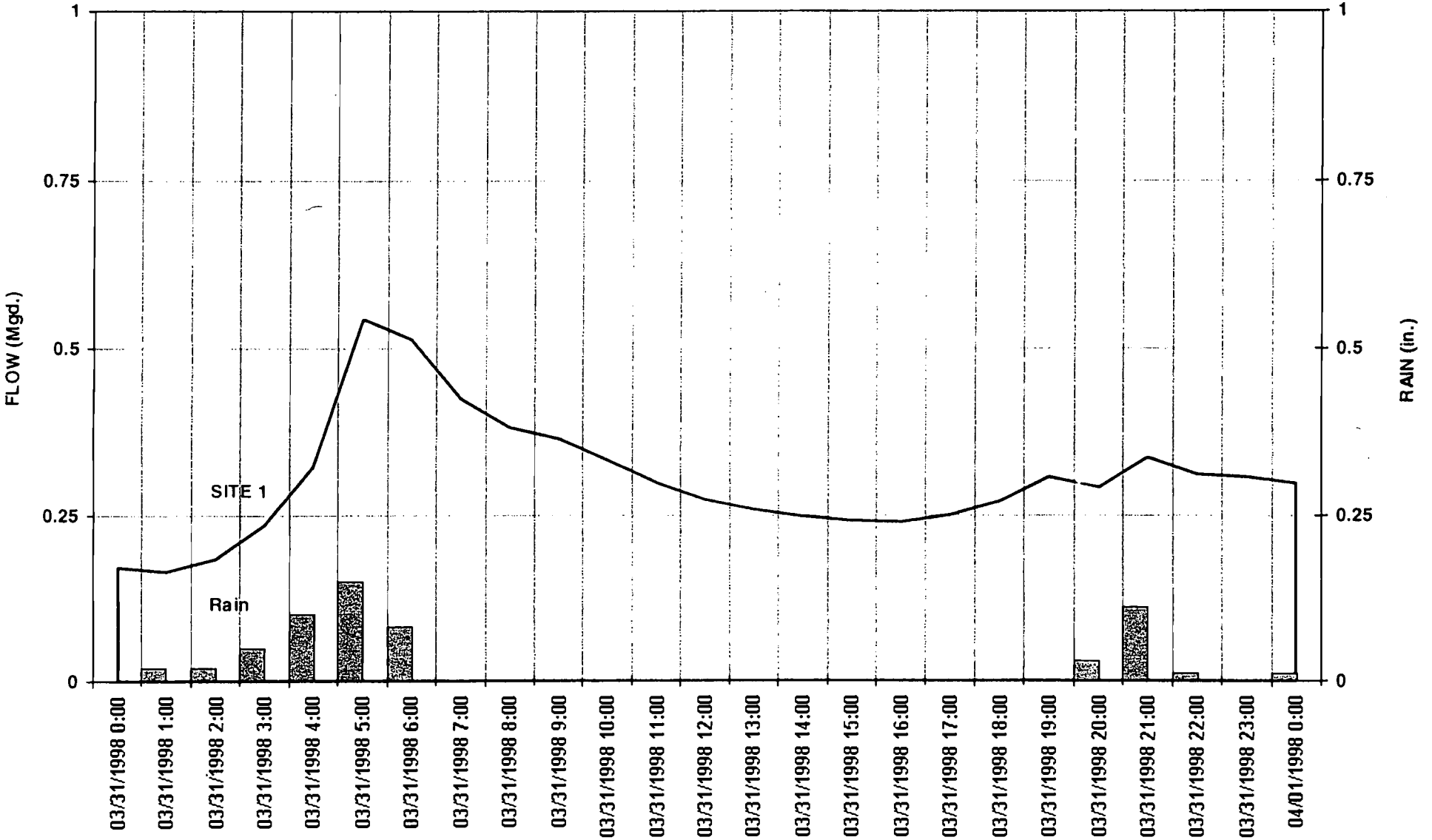
Site:1 OLD WWTP NE LINE



LOWELL SITE 1 FLOW

Lowell 1998 Flowmeter Study

Site:1 OLD WWTP NE LINE



LOWELL SITE 1 FLOW

Flow Meter No. 2

Located at the old wastewater treatment plant in an 18-inch VC pipe. The area metered is residential. There are two (2) hydrographs of Site No. 2.

The first is from March 27th through April 24th 1998. The flows respond quickly to the rain and recede quickly after the rain quits. Each spike represents a 24-hour period of flow.

The second graph is flow for the day of March 31st 1998. The flow is about ½ hour behind the rain and peaks out at about 6:00 PM and quickly recedes after the rain quits. This spike indicates inflow. The flow continues to fall until around 17:00 when residential flow generally will begin to increase.

Lowell 1998 Flowmeter Study

Site:2 Old WWTP SE Line

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
03/27 12:00 am	295063	187800	641900	.00	
03/28 12:00 am	231659	155200	344100	.53	
03/29 12:00 am	197655	120200	261100	.02	
03/30 12:00 am	167050	84570	332100	.00	
03/31 12:00 am	290756	149800	698200	.60	
04/01 12:00 am	258526	183800	327800	.23	
04/02 12:00 am	206807	142400	257400	.00	
04/03 12:00 am	172073	116700	221800	.00	
04/04 12:00 am	151814	96270	211100	.00	
04/05 12:00 am	128912	71740	198700	.00	
04/06 12:00 am	117735	68580	167000	.00	
04/07 12:00 am	120793	69630	390000	.28	
04/08 12:00 am	100955	48980	185900	.00	
04/09 12:00 am	133824	83270	193800	.51	
4/10 12:00 am	112503	54020	200700	.00	
4/11 12:00 am	115054	45630	197600	.00	
04/12 12:00 am	110233	44380	176200	.00	
04/13 12:00 am	150836	78600	394400	.57	
04/14 12:00 am	93099	43810	148100	.02	
04/15 12:00 am	147227	84770	223900	.02	
04/16 12:00 am	128927	65270	184100	.00	
04/17 12:00 am	120556	66740	179600	.00	
04/18 12:00 am	100942	47310	174200	.00	
04/19 12:00 am	96573	38050	162100	.00	
04/20 12:00 am	189129	71740	430000	.69	
04/21 12:00 am	271130	207700	390000	.46	
04/22 12:00 am	193075	128800	259900	.00	
04/23 12:00 am	148022	79300	224600	.00	
04/24 12:00 am	102966	49030	181900	.00	
04/25 12:00 am	121079	48120	315400	.28	
04/26 12:00 am	105719	34980	283000	.18	
04/27 12:00 am	81975		129500	.00	
04/28 12:00 am	139163	45400	485900	.05	
04/29 12:00 am	112197	62770	166100	.47	
04/30 12:00 am	92114		385600	.39	
05/01 12:00 am				.04	
05/02 12:00 am				.00	
05/03 12:00 am				.00	
05/04 12:00 am				.01	
05/05 12:00 am				.28	

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
06 12:00 am				.44	
05/07 12:00 am				1.29	
05/08 12:00 am				.05	
05/09 12:00 am				.00	
05/10 12:00 am				.00	
05/11 12:00 am				.00	
05/12 12:00 am				.13	
05/13 12:00 am				.01	
05/14 12:00 am				.00	
05/15 12:00 am				.00	
05/16 12:00 am				.00	
05/17 12:00 am				.00	
05/18 12:00 am				.00	
05/19 12:00 am				.46	
05/20 12:00 am				.01	
05/21 12:00 am	13292		116500	.00	
05/22 12:00 am	88023	39350	185700	.10	
05/23 12:00 am	85891	36130	131000	.00	
05/24 12:00 am	82825	40610	183800	.11	
05/25 12:00 am	94729	34590	154400	.00	
05/26 12:00 am	87750	40610	159600	.00	
05/27 12:00 am	98751	53000	133400	.00	
5/28 12:00 am	93809		135700	.00	
05/29 12:00 am				.05	
05/30 12:00 am				.00	
05/31 12:00 am				.00	
06/01 12:00 am				.00	
06/02 12:00 am				.00	
06/03 12:00 am	60892	50660	75440	.08	
06/04 12:00 am	55020	8085	141100	.00	
06/05 12:00 am	49313	8964	99420	.13	
06/06 12:00 am	51365	6314	128100	.03	
06/07 12:00 am	56227	6314	110600	.00	
06/08 12:00 am	114384	16260	584000	.03	
06/09 12:00 am	111599	60360	163800	.50	
06/10 12:00 am	164300	66470	583600	.00	
06/11 12:00 am	250669	146500	669200	1.42	
06/12 12:00 am	180456	117900	234800	.09	
06/13 12:00 am	150952	98130	206900	.00	
06/14 12:00 am	153651	99420	245100	.19	
06/15 12:00 am	166998	72510	610500	.00	
06/16 12:00 am	126818	64780	219400	.74	
06/17 12:00 am	94068	50840	120100	.00	
06/18 12:00 am	109711	63310	262600	.00	.33
06/19 12:00 am	86543	46470	128000		.01
06/20 12:00 am	82422	48570	128100		.00
06/21 12:00 am	78946	41900	115000		.00
06/22 12:00 am	65100	19070	154400		.00

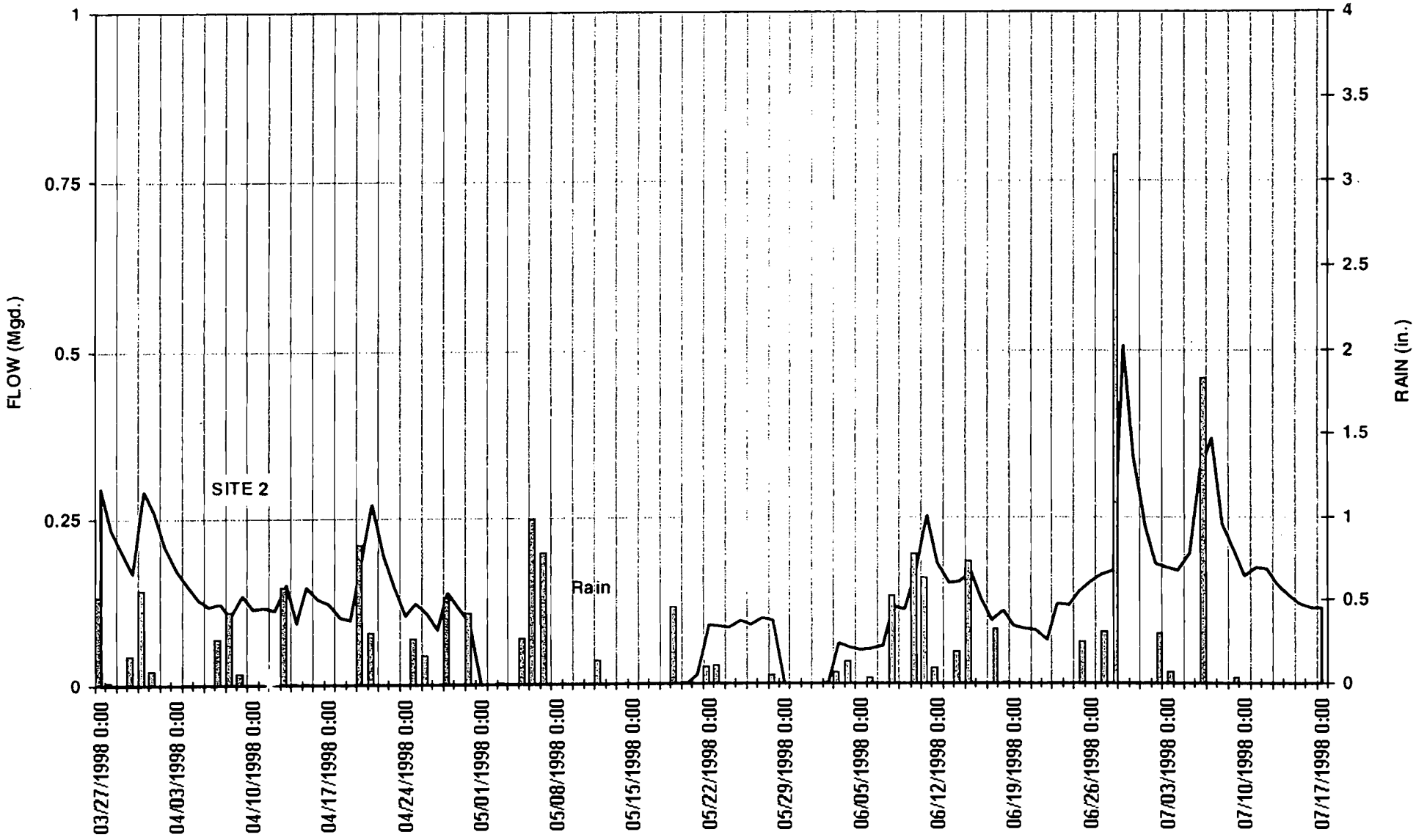
Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
6/23 12:00 am	119282	76470	167000		.00
6/24 12:00 am	118103	75340	154400		.00
06/25 12:00 am	139271	76470	331300		.00
06/26 12:00 am	153507	71540	196700		.25
06/27 12:00 am	162937	96380	241700		.00
06/28 12:00 am	170462	124100	221800		.31
06/29 12:00 am	504850	152000	1650999		3.15
06/30 12:00 am	337047	248400	489500		.00
07/01 12:00 am	235322	167700	299400		.00
07/02 12:00 am	180834	118000	228100		.00
07/03 12:00 am	173576	112800	377700		.30
07/04 12:00 am	169473	120200	257400		.07
07/05 12:00 am	195580	138100	244800		.00
07/06 12:00 am	317722	163900	1344999		.00
07/07 12:00 am	367570	259900	783000		1.83
07/08 12:00 am	239045	174900	302400		.00
07/09 12:00 am	200058	147800	246400		.00
07/10 12:00 am	162121	109800	221700		.03
07/11 12:00 am	173602	125200	222400		.00
07/12 12:00 am	170977	27820	215600		.00
07/13 12:00 am	148238	95450	191300		.00
07/14 12:00 am	132503	83920	190800		.00
7/15 12:00 am	119154	69670	167000		.00
07/16 12:00 am	114003	29290	157900		.00

REPORT STATISTICS

Min.	**13292**	**6314**	**75440**	**.00**	**.00**
Avg.	**149033**	**85273**	**285152**	**.14**	**.22**
Max.	**504850**	**259900**	**1650999**	**1.42**	**3.15**

Lowell 1998 Flowmeter Study

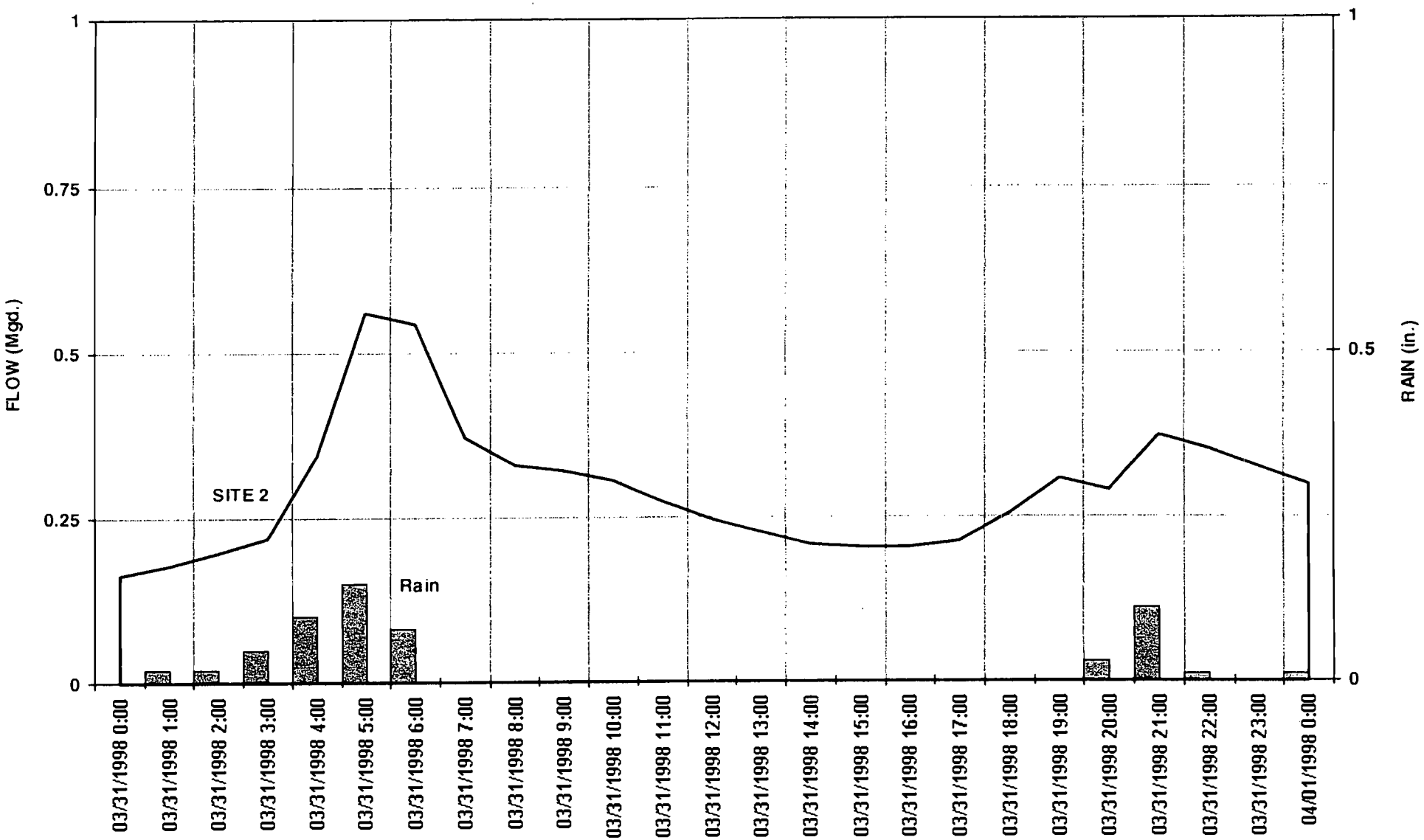
Site:2 Old WWTP SE Line



LOWELL SITE 2 FLOW

Lowell 1998 Flowmeter Study

Site:2 Old WWTP SE Line



LOWELL SITE 2 FLOW

Flow Meter No. 3

Located south of Oakley Street on the east side of Cedar Creek in a 24-inch pipe. The flow is from residential and some commercial customers.

The initial flow data indicated some negative flows. This was thought to be because we were too close to the interceptor line and that flow was backing up into our site. The probe was sitting up very badly and giving us "0" velocity which resulted in "0" flow.

The meter has since been moved to a new site; however, data from that new site is not yet available.

Lowell 1998 Flowmeter Study

Site:3 Oakly & Freemont in woods

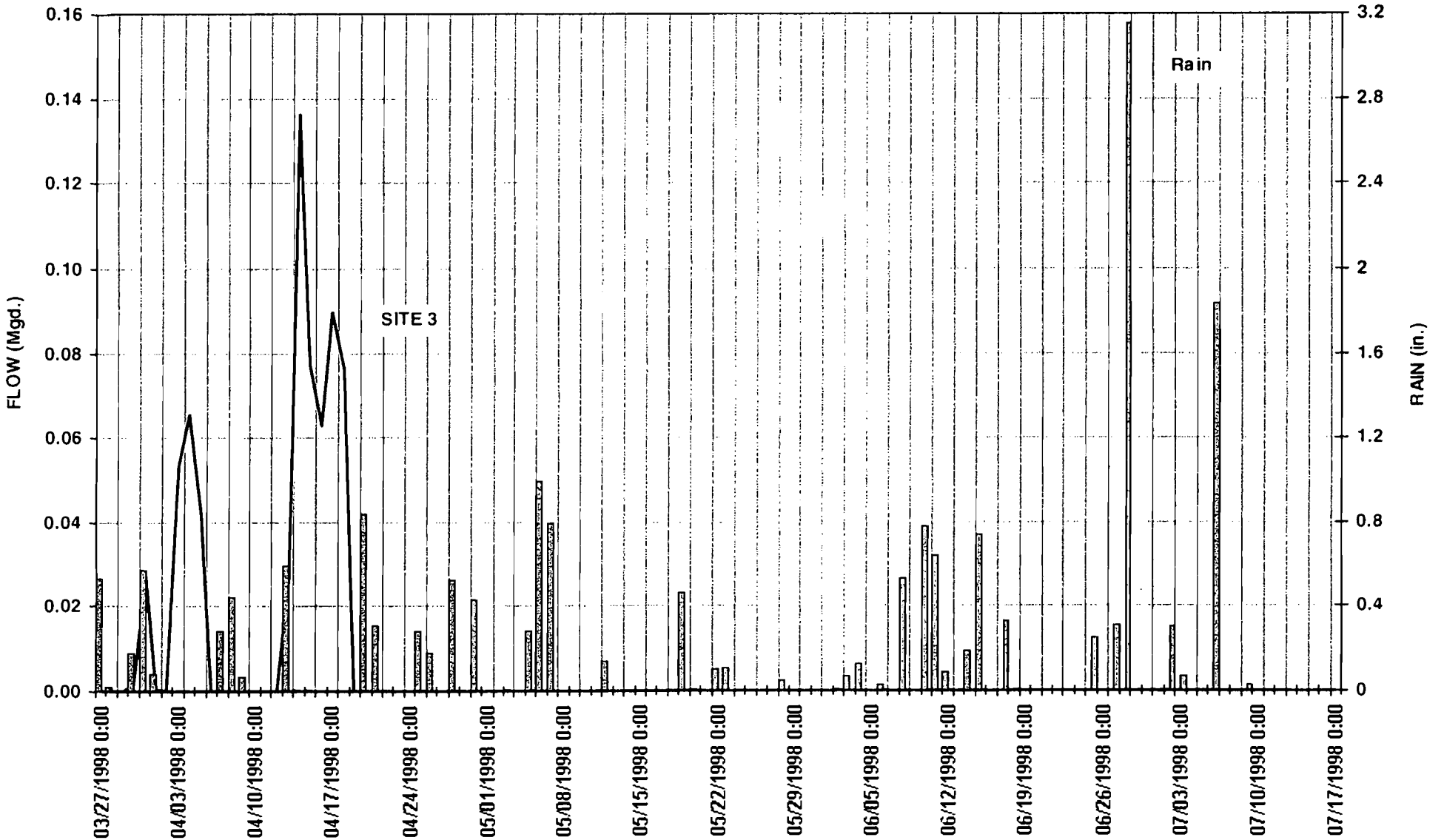
Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
03/27 12:00 am	-11116	-82230		.00	
03/28 12:00 am	-19742	-314400		.53	
03/29 12:00 am				.02	
03/30 12:00 am	1623		98410	.00	
03/31 12:00 am	26890		393100	.60	
04/01 12:00 am	364		104700	.23	
04/02 12:00 am				.00	
04/03 12:00 am	53439		156600	.00	
04/04 12:00 am	65420		137700	.00	
04/05 12:00 am	42402		132400	.00	
04/06 12:00 am				.00	
04/07 12:00 am				.28	
04/08 12:00 am				.00	
04/09 12:00 am				.51	
04/10 12:00 am				.00	
04/11 12:00 am				.00	
04/12 12:00 am				.00	
04/13 12:00 am	26049		403200	.57	
04/14 12:00 am	136193	61880	274700	.02	
04/15 12:00 am	76986		113000	.02	
04/16 12:00 am	62690		108300	.00	
04/17 12:00 am	89480	58230	121800	.00	
04/18 12:00 am	76073		148800	.00	
04/19 12:00 am				.00	
04/20 12:00 am				.69	
04/21 12:00 am				.46	
04/22 12:00 am				.00	
04/23 12:00 am				.00	
04/24 12:00 am				.00	
04/25 12:00 am				.28	
04/26 12:00 am				.18	
04/27 12:00 am				.00	
04/28 12:00 am				.05	
04/29 12:00 am				.47	
04/30 12:00 am				.39	
05/01 12:00 am				.04	
05/02 12:00 am				.00	
05/03 12:00 am				.00	
05/04 12:00 am				.01	
05/05 12:00 am				.28	

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
/06 12:00 am				.44	
5/07 12:00 am				1.29	
05/08 12:00 am				.05	
05/09 12:00 am				.00	
05/10 12:00 am				.00	
05/11 12:00 am				.00	
05/12 12:00 am				.13	
05/13 12:00 am				.01	
05/14 12:00 am				.00	
05/15 12:00 am				.00	
05/16 12:00 am				.00	
05/17 12:00 am				.00	
05/18 12:00 am				.00	
05/19 12:00 am				.46	
05/20 12:00 am				.01	
05/21 12:00 am				.00	
05/22 12:00 am				.10	
05/23 12:00 am				.00	
05/24 12:00 am				.11	
05/25 12:00 am				.00	
05/26 12:00 am				.00	
05/27 12:00 am				.00	
5/28 12:00 am				.00	
05/29 12:00 am				.05	
05/30 12:00 am				.00	
05/31 12:00 am				.00	
06/01 12:00 am				.00	
06/02 12:00 am				.00	
06/03 12:00 am				.08	
06/04 12:00 am				.00	
06/05 12:00 am				.13	
06/06 12:00 am				.03	
06/07 12:00 am				.00	
06/08 12:00 am				.03	
06/09 12:00 am				.50	
06/10 12:00 am				.00	
06/11 12:00 am				1.42	
06/12 12:00 am				.09	
06/13 12:00 am				.00	
06/14 12:00 am				.19	
06/15 12:00 am				.00	
06/16 12:00 am				.74	
06/17 12:00 am				.00	
06/18 12:00 am				.00	.33
6/19 12:00 am					.01
06/20 12:00 am					.00
06/21 12:00 am					.00
06/22 12:00 am					.00

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
6/23 12:00 am					.00
06/24 12:00 am					.00
06/25 12:00 am					.00
06/26 12:00 am					.25
06/27 12:00 am					.00
06/28 12:00 am					.31
06/29 12:00 am					3.15
06/30 12:00 am					.00
07/01 12:00 am					.00
07/02 12:00 am					.00
07/03 12:00 am					.30
07/04 12:00 am					.07
07/05 12:00 am					.00
07/06 12:00 am					.00
07/07 12:00 am					1.83
07/08 12:00 am					.00
07/09 12:00 am					.00
07/10 12:00 am					.03
07/11 12:00 am					.00
07/12 12:00 am					.00
07/13 12:00 am					.00
07/14 12:00 am					.00
7/15 12:00 am					.00
07/16 12:00 am					.00
REPORT STATISTICS					
Min.	**-19742**	**-314400**	**98410**	**.00**	**.00**
Avg.	**44768**	**-69130**	**182726**	**.14**	**.22**
Max.	**136193**	**61880**	**403200**	**1.42**	**3.15**

Lowell 1998 Flowmeter Study

Site:3 Oakly & Freemont in woods



LOWELL SITE 3 FLOW

Flow Meter No. 4

Located in Lincoln Park in a 12-inch sewer. The flow is from a small section of residential customers on the west side of Town.

Flows at times were very minimal and resulted in "0" flow conditions. However, when rain events occurred, the flows did increase and decrease very rapidly. This indicates an inflow problem.

The rain on April 8th and April 9th did not record any flow. The rain gauge is at the far south end of Town. The recorded rain for that period may have only been at the rain gauge site and may not have rained in the metered area.

Lowell 1998 Flowmeter Study

Site:4 Liberty Park S. of Tennis Courts

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
03/27 12:00 am				.00	
03/28 12:00 am	12891		116300	.53	
03/29 12:00 am				.02	
03/30 12:00 am	1232		45460	.00	
03/31 12:00 am	41113		202300	.60	
04/01 12:00 am	32670		82840	.23	
04/02 12:00 am	5044		75680	.00	
04/03 12:00 am	407		40680	.00	
04/04 12:00 am				.00	
04/05 12:00 am				.00	
04/06 12:00 am				.00	
04/07 12:00 am				.28	
04/08 12:00 am				.00	
04/09 12:00 am				.51	
04/10 12:00 am				.00	
4/11 12:00 am				.00	
04/12 12:00 am				.00	
04/13 12:00 am	7041		102400	.57	
04/14 12:00 am	4340		65540	.02	
04/15 12:00 am	14570		81560	.02	
04/16 12:00 am	5847		73170	.00	
04/17 12:00 am				.00	
04/18 12:00 am				.00	
04/19 12:00 am				.00	
04/20 12:00 am	18151		182900	.69	
04/21 12:00 am	955		79850	.46	
04/22 12:00 am	13659		133600	.00	
04/23 12:00 am				.00	
04/24 12:00 am				.00	
04/25 12:00 am	119479	95880	170400	.28	
04/26 12:00 am	115462	75600	172200	.18	
04/27 12:00 am	110018	84820	131700	.00	
04/28 12:00 am	108703	76340	122400	.05	
04/29 12:00 am	138851	82970	182500	.47	
04/30 12:00 am	132980	99570	173300	.39	
05/01 12:00 am	141153	109500	191800	.04	
05/02 12:00 am	111925	92930	132800	.00	
05/03 12:00 am	106617	74490	124300	.00	
05/04 12:00 am	81551	-30240	124300	.01	
05/05 12:00 am	86124	18440	164100	.28	

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
'06 12:00 am	107716	20280	250100	.44	
05/07 12:00 am	377849	172200	590200	1.29	
05/08 12:00 am	310628	162300	491000	.05	
05/09 12:00 am	156333	129800	173300	.00	
05/10 12:00 am	125325	85560	155600	.00	
05/11 12:00 am	110266	35030	142700	.00	
05/12 12:00 am	107023	22860	157500	.13	
05/13 12:00 am	95147	26550	146400	.01	
05/14 12:00 am	86317	42410	132800	.00	
05/15 12:00 am	74749	33190	129100	.00	
05/16 12:00 am	75929	28400	130900	.00	
05/17 12:00 am	74556	15490	113200	.00	
05/18 12:00 am	80505	10330	120600	.00	
05/19 12:00 am	78707	7744	214500	.46	
05/20 12:00 am	71981	12170	120600	.01	
05/21 12:00 am	110792	12910	182500	.00	
05/22 12:00 am	87065	11060	129800	.10	
05/23 12:00 am	88770	35770	129800	.00	
05/24 12:00 am	90728		138300	.11	
05/25 12:00 am	93757		129100	.00	
05/26 12:00 am	97086	12540	129500	.00	
05/27 12:00 am	92925	22130	121700	.00	
5/28 12:00 am	90758	18440	116900	.00	
05/29 12:00 am	112570	13280	210300	.05	
05/30 12:00 am	95156	18440	119900	.00	
05/31 12:00 am	94865	31350	125400	.00	
06/01 12:00 am	98107	9588	125400	.00	
06/02 12:00 am	98028	52370	123500	.00	
06/03 12:00 am	100732	54210	125400	.08	
06/04 12:00 am	97665	27660	129100	.00	
06/05 12:00 am	97242		122400	.13	
06/06 12:00 am	98318	55320	122400	.03	
06/07 12:00 am	94276	35030	126100	.00	
06/08 12:00 am	99263	19180	125400	.03	
06/09 12:00 am	97175		194800	.50	
06/10 12:00 am	105217		195500	.00	
06/11 12:00 am	157349		355800	1.42	
06/12 12:00 am	106061	44250	156700	.09	
06/13 12:00 am	94836		129100	.00	
06/14 12:00 am	88887	-32080	140900	.19	
06/15 12:00 am	41559	-38720	116200	.00	
06/16 12:00 am	69432	-63430	129100	.74	
06/17 12:00 am	76522	-20280	119900	.00	
06/18 12:00 am	96624		162700	.00	.33
06/19 12:00 am	91431	-4420	129100		.01
06/20 12:00 am	92991	22860	116200		.00
06/21 12:00 am	83041	16590	116200		.00
06/22 12:00 am	81709	12170	127100		.00

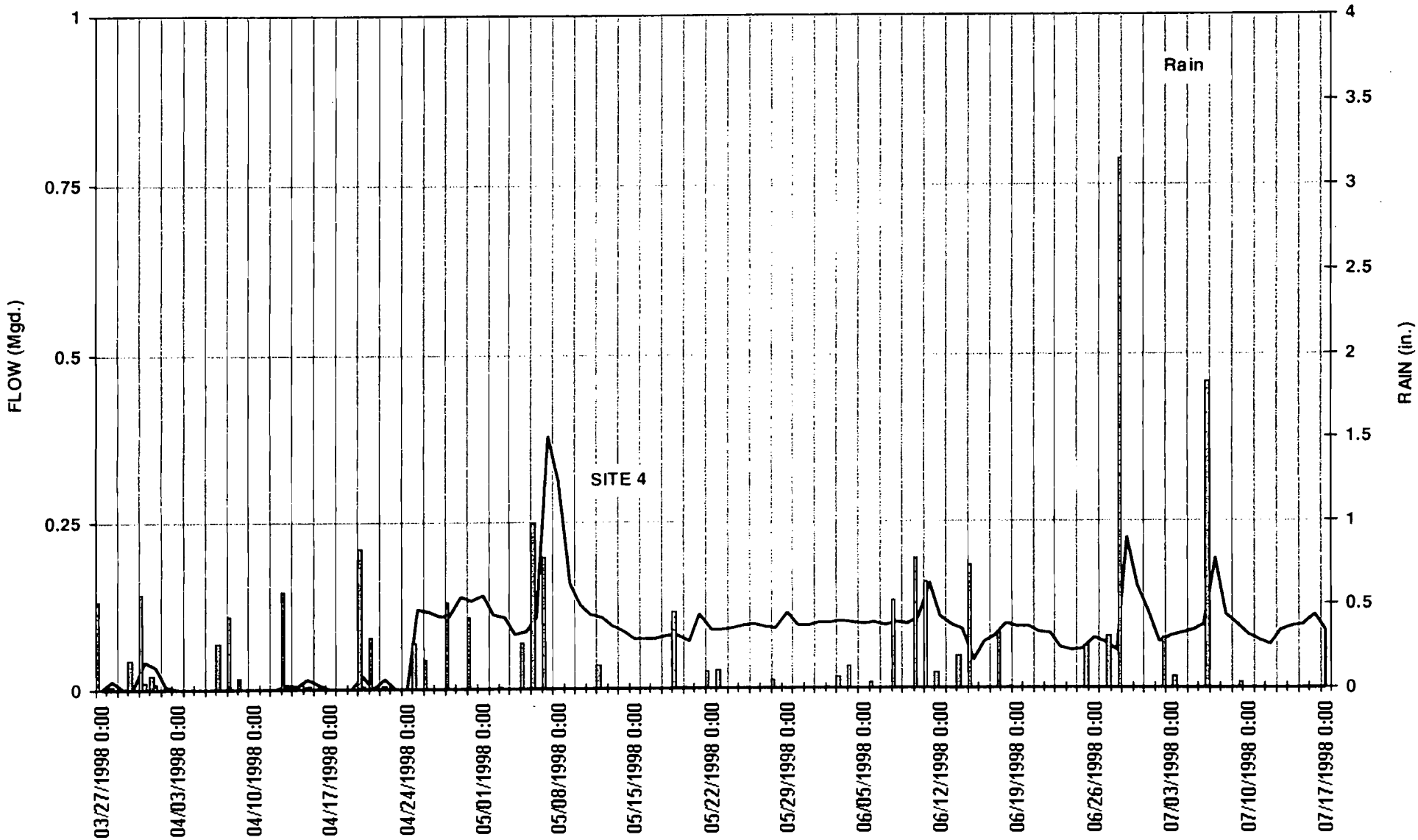
Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
6/23 12:00 am	60338		115300		.00
06/24 12:00 am	55696	12910	116000		.00
06/25 12:00 am	58935	15860	101200		.00
06/26 12:00 am	74940	5163	151400		.25
06/27 12:00 am	70073	19180	105800		.00
06/28 12:00 am	56212		114100		.31
06/29 12:00 am	224173		2496998		3.15
06/30 12:00 am	153937	79290	269800		.00
07/01 12:00 am	110671	-39460	224600		.00
07/02 12:00 am	68214	-46100	127200		.00
07/03 12:00 am	77348	-16960	205900		.30
07/04 12:00 am	82075	-32080	158700		.07
07/05 12:00 am	85670		132800		.00
07/06 12:00 am	94321	40570	137100		.00
07/07 12:00 am	193790	44990	876299		1.83
07/08 12:00 am	108828	82970	144800		.00
07/09 12:00 am	93407	50520	144200		.00
07/10 12:00 am	78758	35030	129900		.03
07/11 12:00 am	71440	31350	121200		.00
07/12 12:00 am	64292	21020	105800		.00
07/13 12:00 am	86742	20280	148400		.00
07/14 12:00 am	93122	32080	118700		.00
07/15 12:00 am	95146	25810	127500		.00
07/16 12:00 am	108948	14380	210300		.00

REPORT STATISTICS

Min.	**407**	**-63430**	**40680**	**.00**	**.00**
Avg.	**90957**	**33065**	**180696**	**.14**	**.22**
Max.	**377849**	**172200**	**2496998**	**1.42**	**3.15**

Lowell 1998 Flowmeter Study

Site:4 Liberty Park S. of Tennis Courts



LOWELL SITE 4 FLOW

Flow Meter No. 5

Located south of Oakley Street along the west side of Cedar Creek in a 24-inch sewer pipe. The area metered is residential, commercial and industrial. There are two (2) hydrographs of Site No. 5.

The first is from March 27th through April 24th 1998. The flow responded quickly to the rain events and returned relatively quick to normal flows.

The second graph is for March 31st 1998. Again, the flow indicates an inflow problem. The flow rises quickly with the rain and returns to normal very quickly after the rain quits (10 hours).

Lowell 1998 Flowmeter Study

Site:5 Oakley St. at Cedar Creek

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
03/27 12:00 am	352928	199100	847800	.00	
03/28 12:00 am	281604	176400	400300	.53	
03/29 12:00 am	290674	186600	389200	.02	
03/30 12:00 am	299295	192700	455400	.00	
03/31 12:00 am	464509	261500	1214999	.60	
04/01 12:00 am	337173	231600	468200	.23	
04/02 12:00 am	310495	210200	419200	.00	
04/03 12:00 am	230784	145900	431900	.00	
04/04 12:00 am	175887	124800	246500	.00	
04/05 12:00 am	156356	111600	237900	.00	
04/06 12:00 am	178209	124800	231100	.00	
04/07 12:00 am	185132	133100	410000	.28	
04/08 12:00 am	259663	152000	583600	.00	
04/09 12:00 am	293924	169600	467400	.51	
04/10 12:00 am	221087	161100	324400	.00	
04/11 12:00 am	166595	96900	281500	.00	
04/12 12:00 am	168761	118200	259500	.00	
04/13 12:00 am	369238	166600	799999	.57	
04/14 12:00 am	281219	175100	411400	.02	
04/15 12:00 am	267760	160900	364800	.02	
04/16 12:00 am	257206	164200	376300	.00	
04/17 12:00 am	213675	125700	326700	.00	
04/18 12:00 am	163703	76400	258100	.00	
04/19 12:00 am	206786	125700	352000	.00	
04/20 12:00 am	441558	224100	1109999	.69	
04/21 12:00 am	487674	317400	864000	.46	
04/22 12:00 am	327951	235200	443400	.00	
04/23 12:00 am	297363	192700	411400	.00	
04/24 12:00 am	262098	176400	388600	.00	
04/25 12:00 am	272847	151000	557100	.28	
04/26 12:00 am	300941	211800	530600	.18	
04/27 12:00 am	256210	175100	365700	.00	
04/28 12:00 am	345538	181000	922899	.05	
04/29 12:00 am	315139	212900	433700	.47	
04/30 12:00 am	444170	336100	814299	.39	
05/01 12:00 am	304111	169600	457700	.04	
05/02 12:00 am	214113	119600	342500	.00	
05/03 12:00 am	246187	175100	375600	.00	
05/04 12:00 am	233348	144500	375600	.01	
05/05 12:00 am	289410	186800	600800	.28	

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
05/06 12:00 am	711660	181000	2204999	.44	
05/07 12:00 am	1390879	751700	2173999	1.29	
05/08 12:00 am	501660	354600	812799	.05	
05/09 12:00 am	315301	219500	409600	.00	
05/10 12:00 am	274909	188200	395100	.00	
05/11 12:00 am	282446	188700	419200	.00	
05/12 12:00 am	263294	181000	478600	.13	
05/13 12:00 am	227230	147100	338000	.01	
05/14 12:00 am	215394	141100	342900	.00	
05/15 12:00 am	208706	121500	329200	.00	
05/16 12:00 am	178299	127000	281100	.00	
05/17 12:00 am	209238	129600	329200	.00	
05/18 12:00 am	214611	125500	329200	.00	
05/19 12:00 am	255969	186800	587100	.46	
05/20 12:00 am	216669	154100	289800	.01	
05/21 12:00 am	220090	134600	311400	.00	
05/22 12:00 am	193272	127000	294100	.10	
05/23 12:00 am	153436	94050	238100	.00	
05/24 12:00 am	71915		181000	.11	
05/25 12:00 am	129463	68040	237700	.00	
05/26 12:00 am	159278	92080	267600	.00	
05/27 12:00 am	167027	119400	244100	.00	
05/28 12:00 am	170277	101800	339800	.00	
05/29 12:00 am	146380	65550	216200	.05	
05/30 12:00 am	127373	73960	188700	.00	
05/31 12:00 am	157052	101600	281500	.00	
06/01 12:00 am	216058	134600	302700	.00	
06/02 12:00 am	201343	101200	302700	.00	
06/03 12:00 am	200113	88750	364800	.08	
06/04 12:00 am	228522	156700	333600	.00	
06/05 12:00 am	191837	122100	352100	.13	
06/06 12:00 am	107519	41190	209100	.03	
06/07 12:00 am	105305	53830	231100	.00	
06/08 12:00 am	266819	94050	1319999	.03	
06/09 12:00 am	237918	152400	333600	.50	
06/10 12:00 am	366375	116800	1532999	.00	
06/11 12:00 am	440103	220500	1385999	1.42	
06/12 12:00 am	206522	105100	370700	.09	
06/13 12:00 am	127992	60670	226200	.00	
06/14 12:00 am	186295	123800	302700	.19	
06/15 12:00 am	213555	114300	395100	.00	
06/16 12:00 am	202682	123800	320000	.74	
06/17 12:00 am	171549	107000	328600	.00	
06/18 12:00 am	248745	132300	701100	.00	.33
06/19 12:00 am	166040	82390	281100		.01
06/20 12:00 am	132477	79390	218200		.00
06/21 12:00 am	147527	82390	320300		.00
06/22 12:00 am	193563	116500	265800		.00

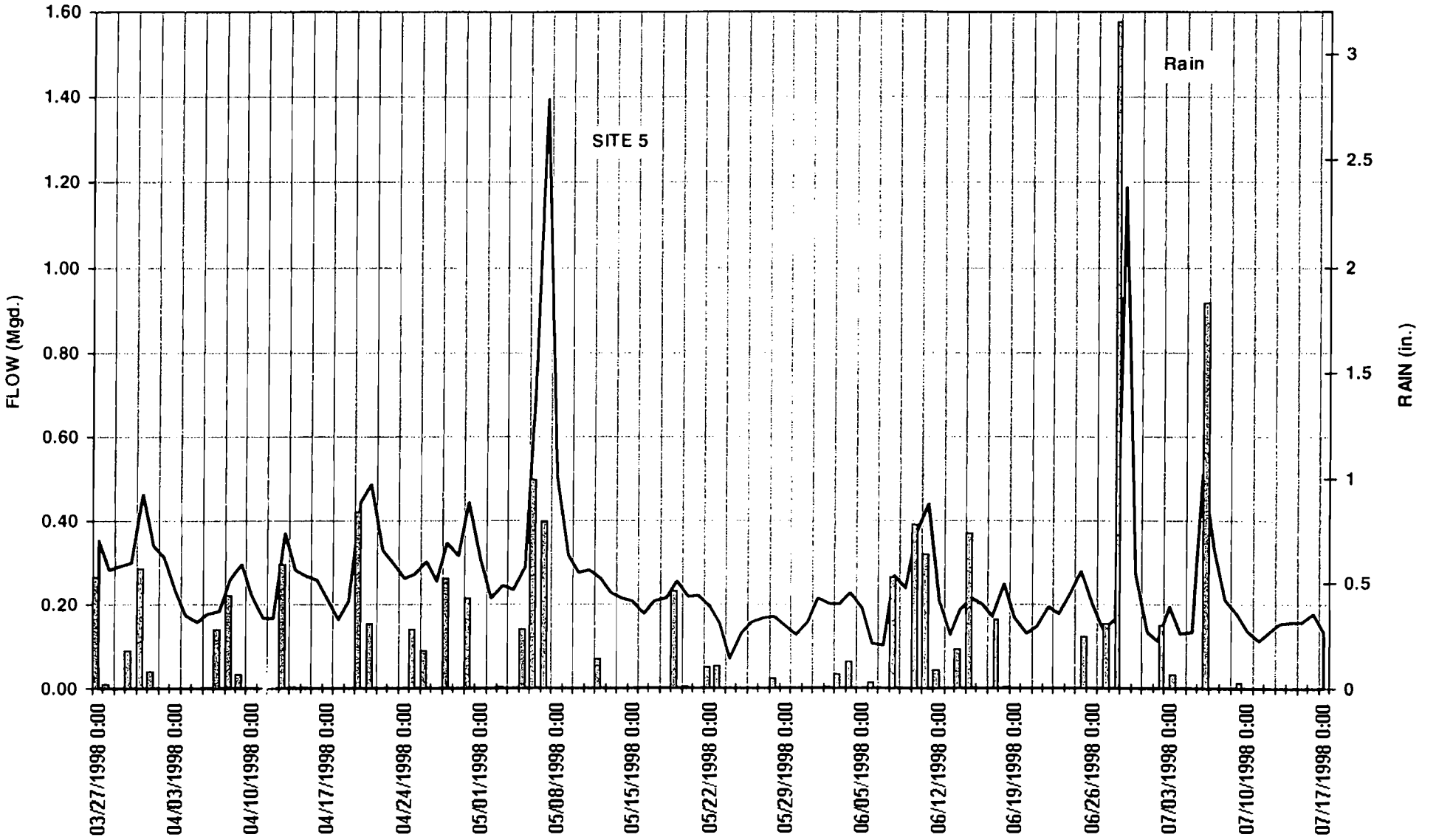
Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
3/23 12:00 am	177170	88350	329200		.00
06/24 12:00 am	228298	144500	342900		.00
06/25 12:00 am	277396	152400	839599		.00
06/26 12:00 am	197443	91200	302500		.25
06/27 12:00 am	139223	56020	260500		.00
06/28 12:00 am	164504	93370	247100		.31
06/29 12:00 am	1186661	166200	11559990		3.15
06/30 12:00 am	273296	168100	408500		.00
07/01 12:00 am	134461	60330	226200		.00
07/02 12:00 am	113216	57670	197500		.00
07/03 12:00 am	193693	103500	1008999		.30
07/04 12:00 am	131282	76900	231100		.07
07/05 12:00 am	134654	79800	245000		.00
07/06 12:00 am	510765	82650	7467995		.00
07/07 12:00 am	326745	160900	920299		1.83
07/08 12:00 am	212276	159400	333600		.00
07/09 12:00 am	176906	111100	273600		.00
07/10 12:00 am	138192	79640	253200		.03
07/11 12:00 am	115305	63170	171600		.00
07/12 12:00 am	133072	76950	224600		.00
07/13 12:00 am	153291	74100	238100		.00
07/14 12:00 am	156493	92000	211800		.00
07/15 12:00 am	158875	82650	238100		.00
07/16 12:00 am	177346	104300	273100		.00

REPORT STATISTICS

Min.	**71915**	**41190**	**171600**	**.00**	**.00**
Avg.	**254487**	**144238**	**618542**	**.14**	**.22**
Max.	**1390879**	**751700**	**11559990**	**1.42**	**3.15**

Lowell 1998 Flowmeter Study

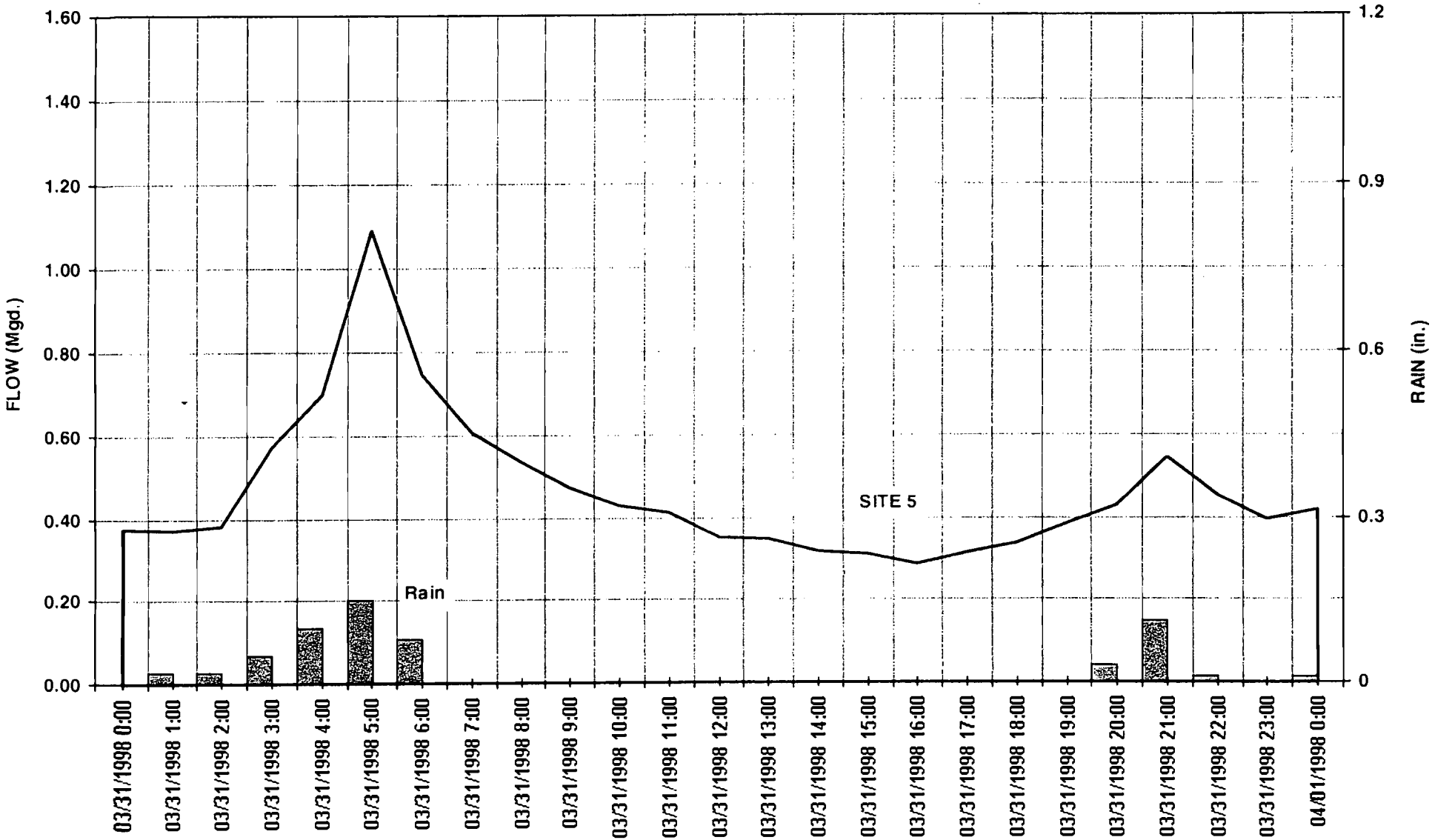
Site:5 Oakley St. at Cedar Creek



LOWELL SITE 5 FLOW

Lowell 1998 Flowmeter Study

Site:5 Oakley St. at Cedar Creek



LOWELL SITE 5 FLOW

Flow Meter No. 6

The meter is located at Liberty Street and Main Street in an 18-inch sewer pipe. The flow is from residential customers.

The hydrograph is from April 28th through May 5th 1998 and indicates that during a rain event, inflow is a problem. The recovery period takes about 3 to 4 days, which indicates an infiltration problem.

The area metered includes the Indian Hills Subdivision. This is the area where foundation drains were directly tied into the sanitary sewers. The hydrograph supports this documentation.

Lowell 1998 Flowmeter Study

Site:6 Liberty St. & Main St.

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
03/27 12:00 am				.00	
03/28 12:00 am				.53	
03/29 12:00 am				.02	
03/30 12:00 am				.00	
03/31 12:00 am				.60	
04/01 12:00 am				.23	
04/02 12:00 am				.00	
04/03 12:00 am				.00	
04/04 12:00 am				.00	
04/05 12:00 am				.00	
04/06 12:00 am				00	
04/07 12:00 am				.28	
04/08 12:00 am				.00	
04/09 12:00 am				.51	
04/10 12:00 am				.00	
04/11 12:00 am				.00	
04/12 12:00 am				.00	
04/13 12:00 am				.57	
04/14 12:00 am				.02	
04/15 12:00 am				.02	
04/16 12:00 am				.00	
04/17 12:00 am				.00	
04/18 12:00 am				.00	
04/19 12:00 am				.00	
04/20 12:00 am				.69	
04/21 12:00 am				.46	
04/22 12:00 am				.00	
04/23 12:00 am				.00	
04/24 12:00 am	200113	147500	371700	.00	
04/25 12:00 am	240809	83010	782600	.28	
04/26 12:00 am	270972	139500	790499	.18	
04/27 12:00 am	202284	88780	398800	.00	
04/28 12:00 am	120311		326300	.05	
04/29 12:00 am	308896		1232999	.47	
04/30 12:00 am	311357	125800	714000	.39	
05/01 12:00 am	301983	89560	528500	.04	
05/02 12:00 am	226592	128200	437000	.00	
05/03 12:00 am	167996		424200	.00	
05/04 12:00 am	126832		262400	.01	
05/05 12:00 am	213294		747799	.28	

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
5/06 12:00 am	274784	126800	1509999	.44	
05/07 12:00 am	2414616	235600	3996998	1.29	
05/08 12:00 am	1080853	422000	2386999	.05	
05/09 12:00 am	463906	249200	842000	.00	
05/10 12:00 am	313580	198800	489500	.00	
05/11 12:00 am	257257	149700	456300	.00	
05/12 12:00 am	224230	109600	483200	.13	
05/13 12:00 am	154415	57050	321700	.01	
05/14 12:00 am	150841		335500	.00	
05/15 12:00 am	124039		275200	.00	
05/16 12:00 am	111657		201200	.00	
05/17 12:00 am	122058		243600	.00	
05/18 12:00 am	87231		240000	.00	
05/19 12:00 am	121205		428500	.46	
05/20 12:00 am	106508		280000	.01	
05/21 12:00 am	72997		216100	.00	
05/22 12:00 am	127794	19100	265700	.10	
05/23 12:00 am	106262		277400	.00	
05/24 12:00 am	110067		281200	.11	
05/25 12:00 am	78323		179900	.00	
05/26 12:00 am	11368		139000	.00	
05/27 12:00 am				.00	
05/28 12:00 am	8118		126700	.00	
05/29 12:00 am	36044		99890	.05	
05/30 12:00 am	6924		89160	.00	
05/31 12:00 am	25670		253800	.00	
06/01 12:00 am	88074	4108	191200	.00	
06/02 12:00 am	75521	1662	145700	.00	
06/03 12:00 am	75145		178500	.08	
06/04 12:00 am	92192		175300	.00	
06/05 12:00 am	54063		250500	.13	
06/06 12:00 am	12215		106500	.03	
06/07 12:00 am	65081		195200	.00	
06/08 12:00 am	82287		233500	.03	
06/09 12:00 am	170178		1420999	.50	
06/10 12:00 am	13429		165200	.00	
06/11 12:00 am	296353	-9910	2220999	1.42	
06/12 12:00 am	145441		303000	.09	
06/13 12:00 am	69464		254100	.00	
06/14 12:00 am	70057		322100	.19	
06/15 12:00 am	22768		130800	.00	
06/16 12:00 am	69876		265400	.74	
06/17 12:00 am	46430	-3860	166900	.00	
06/18 12:00 am	96838		560900	.00	.33
06/19 12:00 am	73289		195500		.01
06/20 12:00 am	57644		178600		.00
06/21 12:00 am	44843		128900		.00
06/22 12:00 am	34864		107600		.00

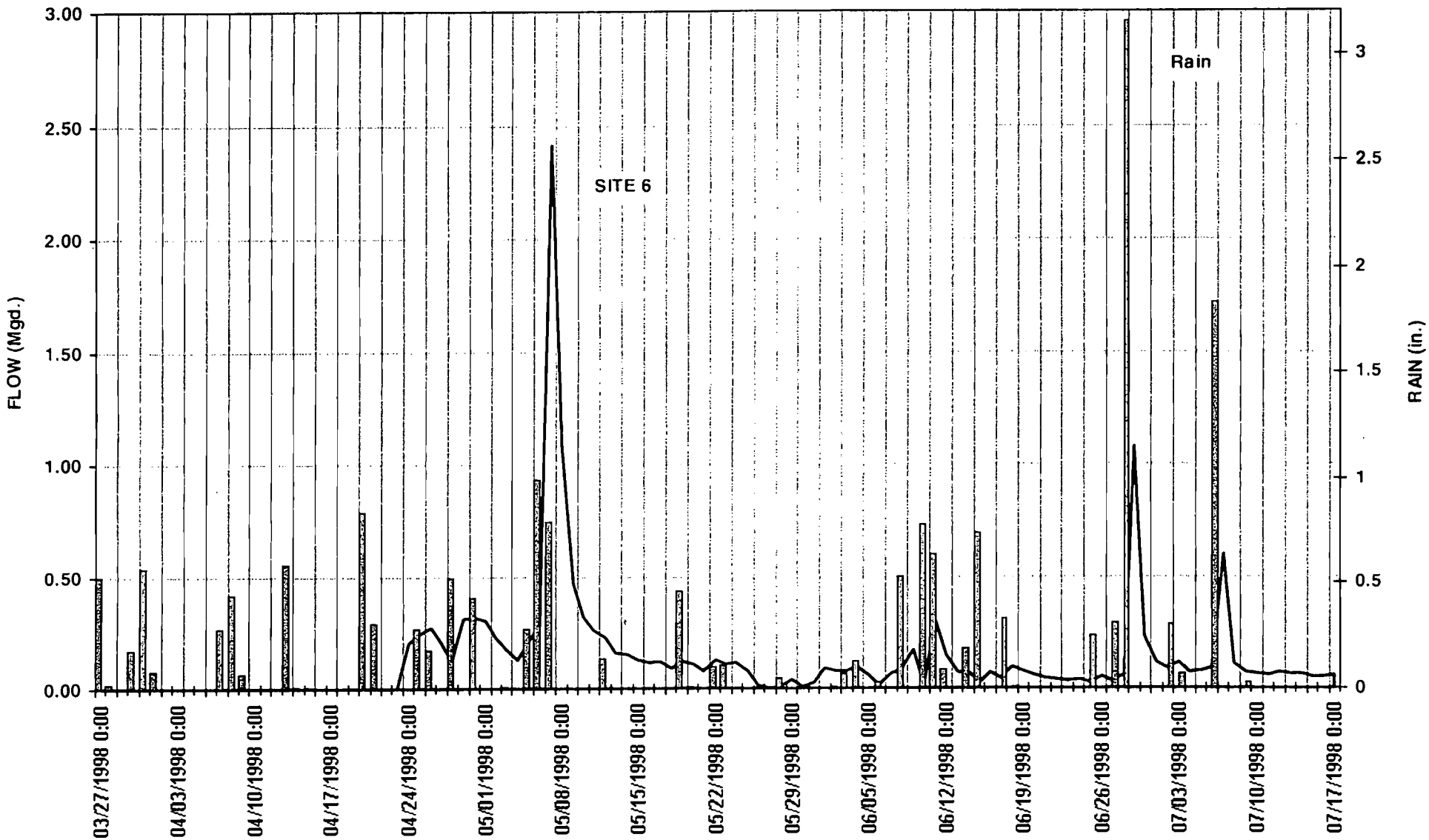
Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
06/23 12:00 am	34281		158100		.00
06/24 12:00 am	40880	-8450	176900		.00
06/25 12:00 am	23020		165000		.25
06/26 12:00 am	50569		550700		.00
06/27 12:00 am	32182	-5440	168300		.31
06/28 12:00 am	58907	-5890	171300		3.15
06/29 12:00 am	1073980		13909990		.00
06/30 12:00 am	227444	95880	376200		.00
07/01 12:00 am	115970		226700		.00
07/02 12:00 am	88178		166100		.30
07/03 12:00 am	111627		780100		.07
07/04 12:00 am	71053		204700		.00
07/05 12:00 am	74625		201600		.00
07/06 12:00 am	87488		255000		1.83
07/07 12:00 am	595361		8632995		.00
07/08 12:00 am	105015		158400		.00
07/09 12:00 am	71612		155800		.03
07/10 12:00 am	61091		141800		.00
07/11 12:00 am	57272		170100		.00
07/12 12:00 am	69115		169700		.00
07/13 12:00 am	64848		173300		.00
07/14 12:00 am	64461		168800		.00
07/15 12:00 am	50536		124000		.00
07/16 12:00 am	49487		137400		

REPORT STATISTICS

Min.	**6924**	**-9910**	**89160**	**.00**	**.00**
Avg.	**172497**	**101596**	**685262**	**.14**	**.22**
Max.	**2414616**	**422000**	**13909990**	**1.42**	**3.15**

Lowell 1998 Flowmeter Study

Site:6 Liberty St. & Main St.



LOWELL SITE 6 FLOW

Flow Meter Nos. 6A and 6B

Located at the interceptor at Grant Street in two (2) 10-inch sewer pipes.

There was not enough flow, even during rain events to register on the meter. No hydrographs submitted.

Flow Meter No. 7

Located at 176th Street and the southeast side of Cedar Creek in a 12-inch sewer pipe. The area metered is residential. There are two (2) hydrographs submitted.

The first graph is from March 27th through April 24th 1998 and shows some increase in flow during the rain event, but not the substantial amount that would indicate an inflow problem.

The second graph also indicates an increase in flow during a rain event, but does not show the sharp drop in flow after the rain quits. The increased flow appears to be caused by inflow and not infiltration.

Lowell 1998 Flowmeter Study

Site:7 176th St. S. side of Creek

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
03/27 12:00 am	59189	41010	89860	.00	
03/28 12:00 am	60172	39690	80340	.53	
03/29 12:00 am	56725	35970	77130	.02	
03/30 12:00 am	54821	38370	78540	.00	
03/31 12:00 am	66016	50020	98660	.60	
04/01 12:00 am	61782	37460	86770	.23	
04/02 12:00 am	58799	34470	81920	.00	
04/03 12:00 am	51932	38040	72840	.00	
04/04 12:00 am	51862	37040	69630	.00	
04/05 12:00 am	49295	31170	74980	.00	
04/06 12:00 am	47331	32070	71770	.00	
04/07 12:00 am	47652	31170	64940	.28	
04/08 12:00 am	46971	32370	66930	.00	
04/09 12:00 am	51533	34470	73910	.51	
04/10 12:00 am	47041	28940	69630	.00	
4/11 12:00 am	50377	35670	72310	.00	
04/12 12:00 am	49336	31380	80830	.00	
04/13 12:00 am	56457	41340	80260	.57	
04/14 12:00 am	46995	34770	66440	.02	
04/15 12:00 am	47296	38040	72310	.02	
04/16 12:00 am	49028	29760	72930	.00	
04/17 12:00 am	45374	29760	64880	.00	
04/18 12:00 am	42983	25100	61170	.00	
04/19 12:00 am	46264	29970	70430	.00	
04/20 12:00 am	51222	34070	77660	.69	
04/21 12:00 am	57949	39690	78200	.46	
04/22 12:00 am	50213	32670	74980	.00	
04/23 12:00 am	48708	33570	75430	.00	
04/24 12:00 am	47326	30870	77130	.00	
04/25 12:00 am	50269	34470	77130	.28	
04/26 12:00 am	54318	35370	81410	.18	
04/27 12:00 am	50183	34770	73380	.00	
04/28 12:00 am	53514	34170	92300	.05	
04/29 12:00 am	49724	31650	70930	.47	
04/30 12:00 am	55644	39030	78730	.39	
05/01 12:00 am	50656	33270	69050	.04	
05/02 12:00 am	51070	32370	69930	.00	
05/03 12:00 am	49751	32070	72930	.00	
05/04 12:00 am	48084	32370	70930	.01	
05/05 12:00 am	47680		84090	.28	

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
'06 12:00 am				.44	
05/07 12:00 am				1.29	
05/08 12:00 am				.05	
05/09 12:00 am				.00	
05/10 12:00 am				.00	
05/11 12:00 am				.00	
05/12 12:00 am				.13	
05/13 12:00 am				.01	
05/14 12:00 am				.00	
05/15 12:00 am				.00	
05/16 12:00 am				.00	
05/17 12:00 am				.00	
05/18 12:00 am				.00	
05/19 12:00 am				.46	
05/20 12:00 am	9018		71770	.01	
05/21 12:00 am				.00	
05/22 12:00 am				.10	
05/23 12:00 am				.00	
05/24 12:00 am				.11	
05/25 12:00 am				.00	
05/26 12:00 am				.00	
05/27 12:00 am				.00	
5/28 12:00 am				.00	
05/29 12:00 am				.05	
05/30 12:00 am				.00	
05/31 12:00 am				.00	
06/01 12:00 am				.00	
06/02 12:00 am				.00	
06/03 12:00 am	37607	24610	54850	.08	
06/04 12:00 am	30424		54530	.00	
06/05 12:00 am	34948	16570	55790	.13	
06/06 12:00 am	33887	16570	58360	.03	
06/07 12:00 am	34879	13270	57510	.00	
06/08 12:00 am	38449	16570	89430	.03	
06/09 12:00 am	39109	20520	72300	.50	
06/10 12:00 am	44766	14740	98030	.00	
06/11 12:00 am	49492	21260	94140	1.42	
06/12 12:00 am	37903	18450	60080	.09	
06/13 12:00 am	39392	20830	69430	.00	
06/14 12:00 am	40631	20830	60080	.19	
06/15 12:00 am	35505	15560	57930	.00	
06/16 12:00 am	36067	13760	57930	.74	
06/17 12:00 am	34367	12910	61170	.00	
06/18 12:00 am	34629	16050	53210	.00	.33
06/19 12:00 am	33887	14250	64940		.01
06/20 12:00 am	33968	12210	57080		.00
06/21 12:00 am	32443	10270	57930		.00
06/22 12:00 am	37171	12210	64420		.00

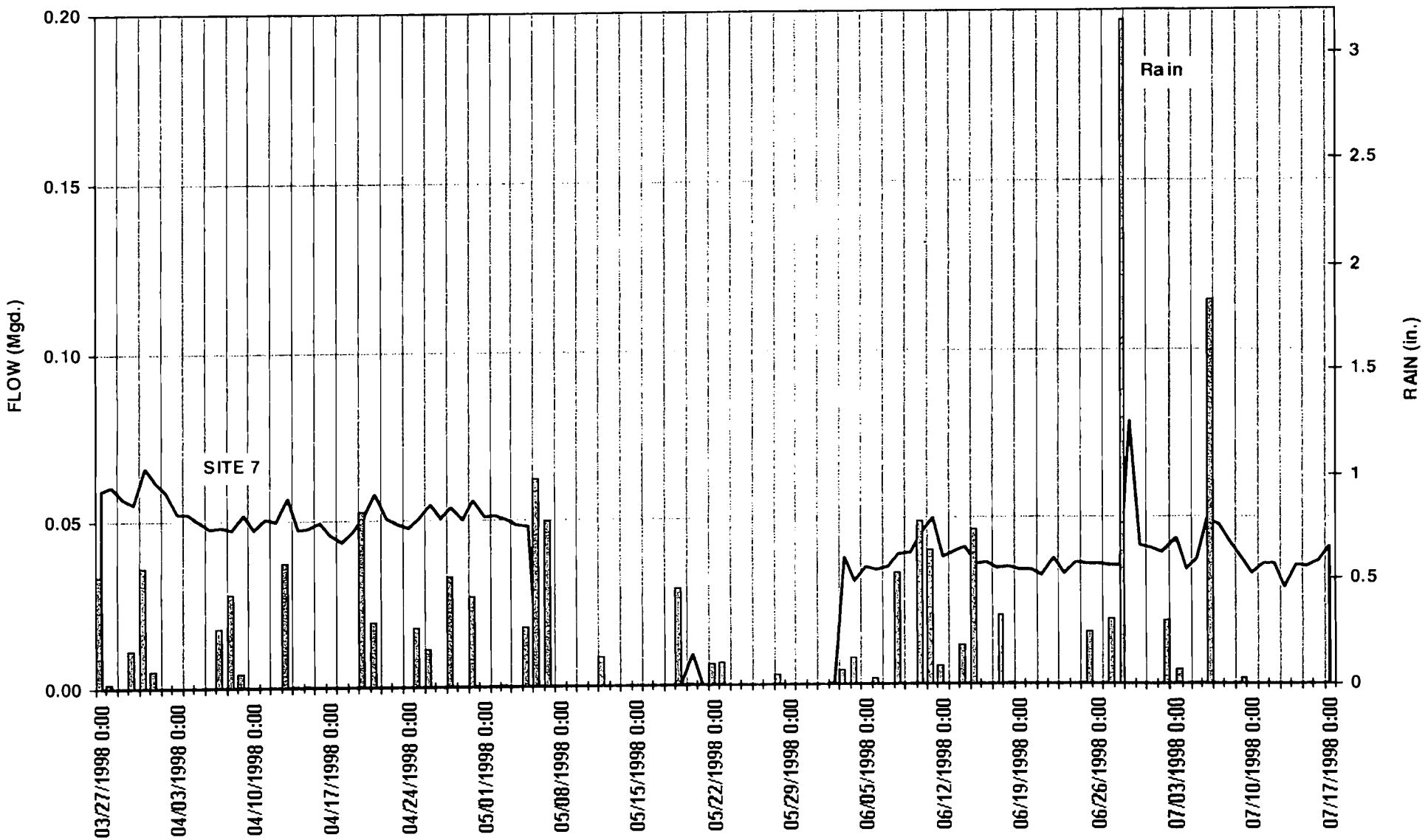
Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
'23 12:00 am	32812	13100	59780		.00
06/24 12:00 am	36137	13600	61940		.00
06/25 12:00 am	35541	13920	60710		.00
06/26 12:00 am	35726	14910	57080		.25
06/27 12:00 am	35238	15630	57510		.00
06/28 12:00 am	35299	15630	62230		.31
06/29 12:00 am	78331	34770	555200		3.15
06/30 12:00 am	40929	20830	66730		.00
07/01 12:00 am	40247	15730	65810		.00
07/02 12:00 am	39063	17700	63490		.00
07/03 12:00 am	43004	24270	73930		.30
07/04 12:00 am	33875	16050	63030		.07
07/05 12:00 am	36994	15230	69930		.00
07/06 12:00 am	49166	16380	220300		.00
07/07 12:00 am	47507	19170	81410		1.83
07/08 12:00 am	42523	22780	65810		.00
07/09 12:00 am	37198	14030	66270		.00
07/10 12:00 am	32524	11930	62230		03
07/11 12:00 am	35816	13920	66270		.00
07/12 12:00 am	35775	13190	66270		.00
07/13 12:00 am	28620		56650		.00
07/14 12:00 am	35297	11930	57930		.00
7/15 12:00 am	34994		58790		.00
07/16 12:00 am	36518	12630	64420		.00

REPORT STATISTICS

Min.	**9018**	**10270**	**53210**	**.00**	**.00**
Avg.	**44108**	**25340**	77391	.14	.22
Max.	**78331**	**50020**	**555200**	**1.42**	**3.15**

Lowell 1998 Flowmeter Study

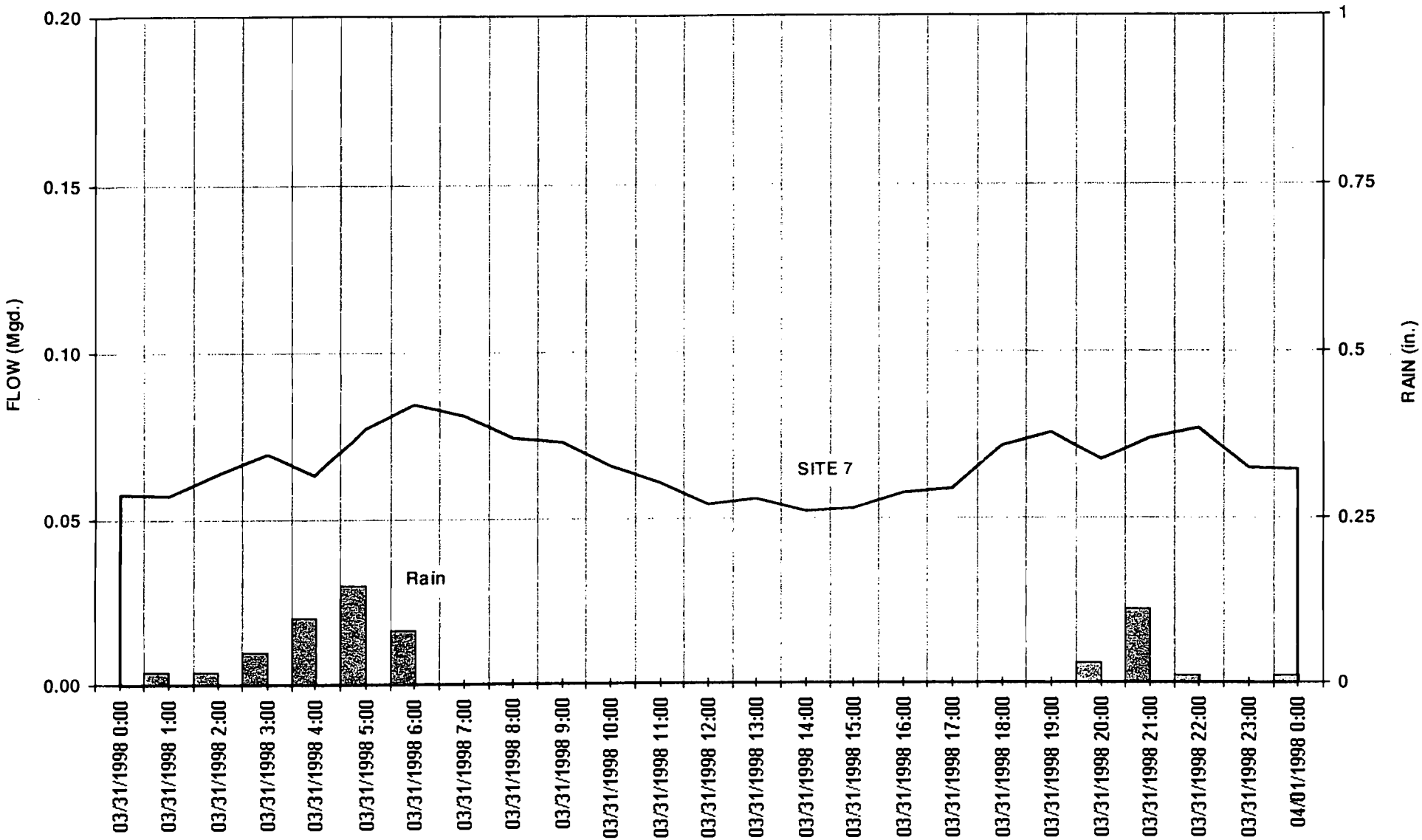
Site:7 176th St. S. side of Creek



LOWELL SITE 7 FLOW

Lowell 1998 Flowmeter Study

Site:7 176th St. S. side of Creek



LOWELL SITE 7 FLOW

Flow Meter No. 8

Located at Morse Street and Willowbrook Street in a 10-inch sewer pipe. The area metered is residential.

There are two (2) hydrographs of this system.

The first graph is from March 27th through April 24th 1998. The rain event does increase the flows somewhat, but not rapidly.

The second graph of March 31st 1998 shows an increase in flows, but the peak flow occurs about one to two hours after the rain event ends. This, along with the inflow problem, indicates the presence of infiltration.

Lowell 1998 Flowmeter Study

Site:8 Corner Morse St. S. Willowbrook Dr.

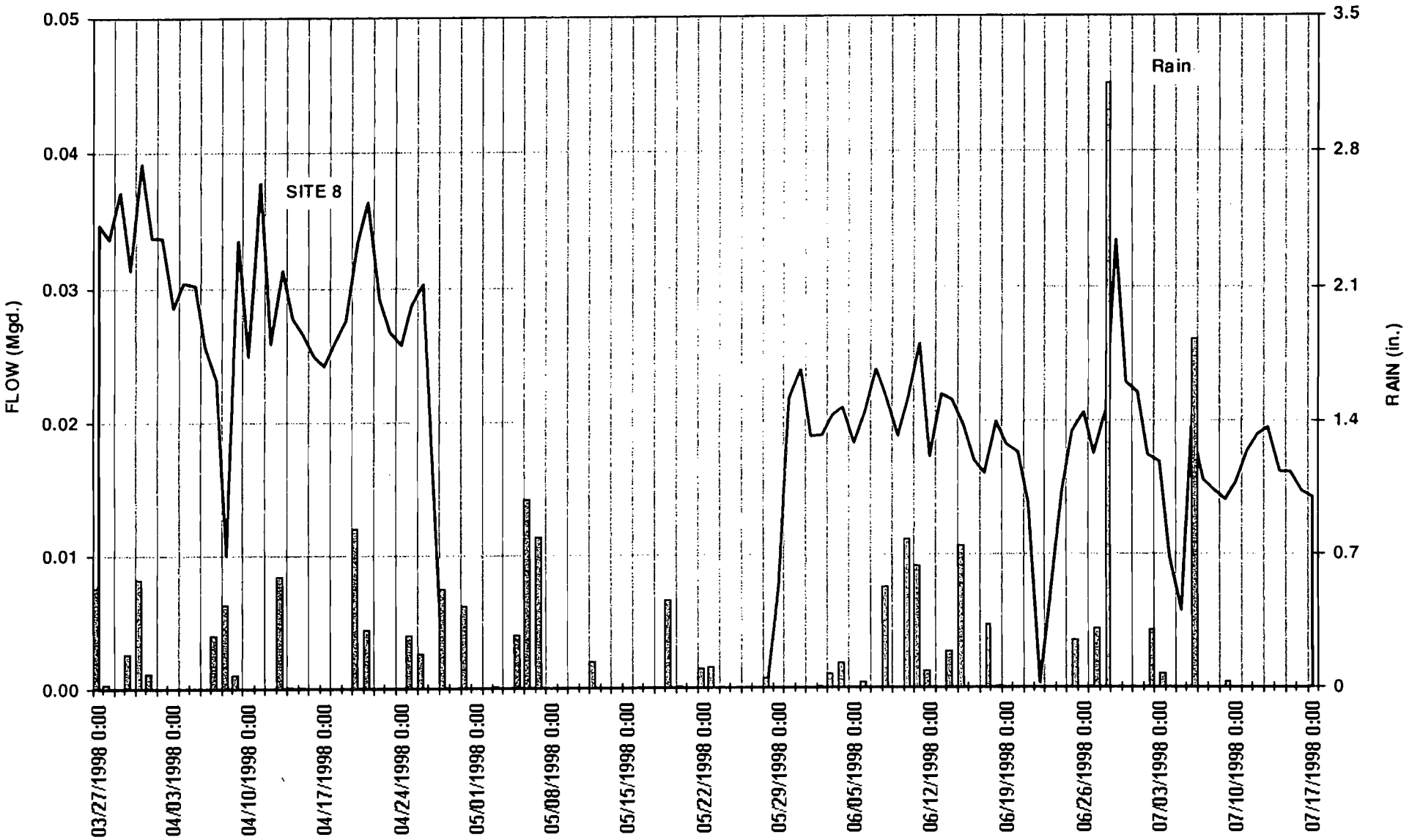
Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
03/27 12:00 am	34724	12520	72040	.00	
03/28 12:00 am	33609		78180	.53	
03/29 12:00 am	37110	7192	73730	.02	
03/30 12:00 am	31334		59480	.00	
03/31 12:00 am	39190	15870	74290	.60	
04/01 12:00 am	33724		72490	.23	
04/02 12:00 am	33707	7058	65530	.00	
04/03 12:00 am	28503		58990	.00	
04/04 12:00 am	30439	3996	66060	.00	
04/05 12:00 am	30222		63960	.00	
04/06 12:00 am	25723		50990	.00	
04/07 12:00 am	23124		58510	.28	
04/08 12:00 am	9972		53640	.00	
04/09 12:00 am	33521	11840	57140	.51	
04/10 12:00 am	24902		56070	.00	
04/11 12:00 am	37853		69790	.00	
04/12 12:00 am	25871	-26800	57530	.00	
04/13 12:00 am	31368		72040	.57	
04/14 12:00 am	27623		54610	.02	
04/15 12:00 am	26637		66580	.02	
04/16 12:00 am	24995	-30830	51440	.00	
04/17 12:00 am	24163		71480	.00	
04/18 12:00 am	26072	-1770	63960	.00	
04/19 12:00 am	27522	-32750	63960	.00	
04/20 12:00 am	33480	13660	70350	.69	
04/21 12:00 am	36362	12520	72040	.46	
04/22 12:00 am	29097	-22040	75420	.00	
04/23 12:00 am	26694		66580	.00	
04/24 12:00 am	25813		72610	.00	
04/25 12:00 am	28715		65530	.28	
04/26 12:00 am	30250		59480	.18	
04/27 12:00 am	15481		50990	.00	
04/28 12:00 am				.05	
04/29 12:00 am				.47	
04/30 12:00 am				.39	
05/01 12:00 am				.04	
05/02 12:00 am				.00	
05/03 12:00 am				.00	
05/04 12:00 am				.01	
05/05 12:00 am				.28	

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
5/06 12:00 am				.44	
05/07 12:00 am				1.29	
05/08 12:00 am				.05	
05/09 12:00 am				.00	
05/10 12:00 am				.00	
05/11 12:00 am				.00	
05/12 12:00 am				.13	
05/13 12:00 am				.01	
05/14 12:00 am				.00	
05/15 12:00 am				.00	
05/16 12:00 am				.00	
05/17 12:00 am				.00	
05/18 12:00 am				.00	
05/19 12:00 am				.46	
05/20 12:00 am				.01	
05/21 12:00 am				.00	
05/22 12:00 am				.10	
05/23 12:00 am				.00	
05/24 12:00 am				.11	
05/25 12:00 am				.00	
05/26 12:00 am				.00	
05/27 12:00 am				.00	
5/28 12:00 am				.00	
05/29 12:00 am	7799	-29470	51680	.05	
05/30 12:00 am	21684	-9890	61860	.00	
05/31 12:00 am	23926		53140	.00	
06/01 12:00 am	18872	-23050	54530	.00	
06/02 12:00 am	18985	-46510	56070	.00	
06/03 12:00 am	20486	-15890	60220	.08	
06/04 12:00 am	21104	-11680	53140	.00	
06/05 12:00 am	18304	-58610	67540	.13	
06/06 12:00 am	20502	-3570	71480	.03	
06/07 12:00 am	23924	-82400	61860	.00	
06/08 12:00 am	21729	-41610	62890	.03	
06/09 12:00 am	18845	-79030	56560	.50	
06/10 12:00 am	21669	-18520	62410	.00	
06/11 12:00 am	25776	-4780	63040	1.42	
06/12 12:00 am	17320	-31040	52660	.09	
06/13 12:00 am	21980	-29430	58990	.00	
06/14 12:00 am	21576	-43640	48280	.19	
06/15 12:00 am	19588	-21050	52660	.00	
06/16 12:00 am	16978	-38620	44500	.74	
06/17 12:00 am	16052	-94130	42000	.00	
06/18 12:00 am	19896	-67880	41590	.00	.33
06/19 12:00 am	18210	-67690	71570		.01
06/20 12:00 am	17625	-31610	48730		.00
06/21 12:00 am	13743	-253700	56620		.00
06/22 12:00 am	271	-253700	44850		.00

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
23 12:00 am	6872	-146200	28200		.00
06/24 12:00 am	14688	-102000	78780		.00
06/25 12:00 am	19188	-38410	46160		.00
06/26 12:00 am	20640		59480		.25
06/27 12:00 am	17523	-43040	75420		.00
06/28 12:00 am	20713	-22200	63960		.31
06/29 12:00 am	33388	-27980	149700		3.15
06/30 12:00 am	22836	-24480	46930		.00
07/01 12:00 am	22067		51440		.00
07/02 12:00 am	17361	-54180	50540		.00
07/03 12:00 am	16911	-155000	53630		.30
07/04 12:00 am	9676	-88920	56620		.07
07/05 12:00 am	5775	-63050	48240		.00
07/06 12:00 am	19453	-46680	81790		.00
07/07 12:00 am	15525		42830		1.83
07/08 12:00 am	14759	-26720	32030		.00
07/09 12:00 am	14098	-25030	36290		.00
07/10 12:00 am	15345	-20220	44310		.03
07/11 12:00 am	17714		45750		.00
07/12 12:00 am	18998	-8370	45750		.00
07/13 12:00 am	19510		44690		.00
07/14 12:00 am	16111	-3890	36200		.00
07/15 12:00 am	16116		38290		.00
07/16 12:00 am	14708		40870		.00

REPORT STATISTICS

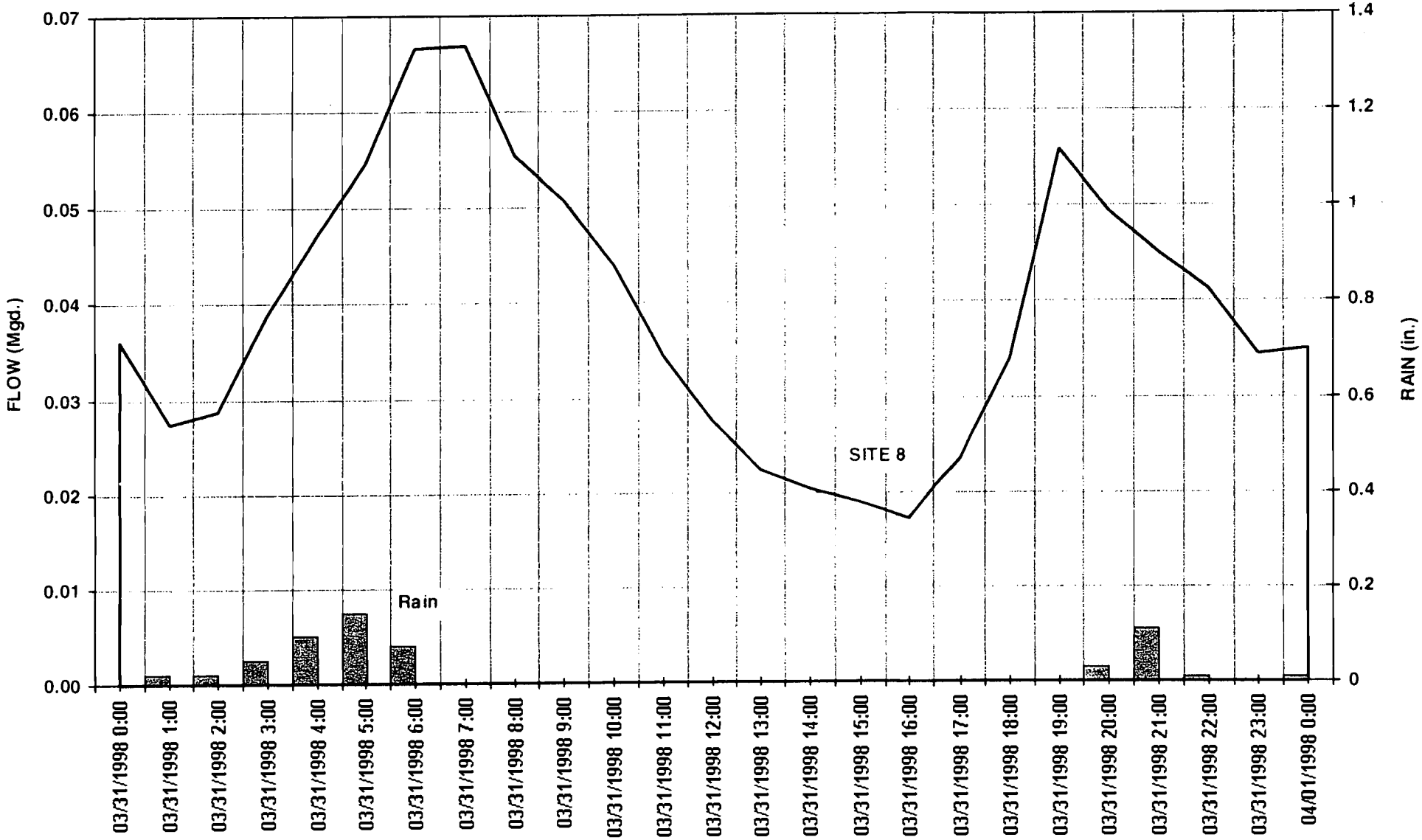
Min.	**271**	**-253700**	**28200**	**.00**	**.00**
Avg.	**22279**	**-42285**	**58793**	**.14**	**.22**
Max.	**39190**	**15870**	**149700**	**1.42**	**3.15**



LOWELL SITE 8 FLOW

Lowell 1998 Flowmeter Study

Site:8 Corner Morse St. S. Willowbrook Dr.



LOWELL SITE 8 FLOW

Flow Meter No. 9

The location is in the woods at the far north portion of the Town in an 18-inch sewer pipe. The area is new residential with a new development underway.

There are two (2) hydrographs for this site.

The first is from April 23rd through May 21st 1998 and indicates a rapid increase in flow during a rain event and a quick recovery after the rain event. This is a good indication of inflow.

The second graph highlights the period from May 6th through May 9th 1998. The flows increase and decrease rapidly during and after a rain, which indicates an inflow problem. The quick decline in flow from May 7th at 9:00 through 16:00 also indicates inflow. The flow increase from May 7th 16:00 through 19:00, and 21:00 through 22:00 is normal residential activity. The increase in flow from May 8th 3:00 through 6:00 is infiltration.

Lowell 1998 Flowmeter Study

Site:9 In Woods

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
03/27 12:00 am	53483	17280	111900	.00	
03/28 12:00 am	47731		94110	.53	
03/29 12:00 am	46655		91410	.02	
03/30 12:00 am	40783		92630	.00	
03/31 12:00 am	69980	30310	166000	.60	
04/01 12:00 am	58619	29420	103600	.23	
04/02 12:00 am	54300	20140	115000	.00	
04/03 12:00 am	49297		101000	.00	
04/04 12:00 am	47814		99360	.00	
04/05 12:00 am	45621		101000	.00	
04/06 12:00 am	42303		86950	.00	
04/07 12:00 am	47002		101000	.28	
04/08 12:00 am	43780		86950	.00	
04/09 12:00 am	51918		92980	.51	
04/10 12:00 am	41462		91410	.00	
/11 12:00 am	46671		84050	.00	
04/12 12:00 am	43993		96960	.00	
04/13 12:00 am	62834	20790	107200	.57	
04/14 12:00 am	50351		105500	.02	
04/15 12:00 am	47899		105500	.02	
04/16 12:00 am	39359		86520	.00	
04/17 12:00 am	36930		89000	.00	
04/18 12:00 am	44912		117000	.00	
04/19 12:00 am	45622		115800	.00	
04/20 12:00 am	67583	22170	131800	.69	
04/21 12:00 am	78783	28530	135600	.46	
04/22 12:00 am	56135	15340	109700	.00	
04/23 12:00 am	48912		101000	.00	
04/24 12:00 am	39670		92980	.00	
04/25 12:00 am	53357		115000	.28	
04/26 12:00 am	51086		115800	.18	
04/27 12:00 am	37975		99810	.00	
04/28 12:00 am	56360		128100	.05	
04/29 12:00 am	53229	14800	106600	.47	
04/30 12:00 am	76971	27640	148300	.39	
05/01 12:00 am	59018	17540	104800	.04	
05/02 12:00 am	51000		95250	.00	
05/03 12:00 am	50086		105200	.00	
05/04 12:00 am	43179		98100	.01	
05/05 12:00 am	49141		114000	.28	

Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
'06 12:00 am	84341	25320	227600	.44	
05/07 12:00 am	153870	85040	243100	1.29	
05/08 12:00 am	80087	30560	135600	.05	
05/09 12:00 am	64237	17800	122300	.00	
05/10 12:00 am	57656	14580	116900	.00	
05/11 12:00 am	53669		118800	.00	
05/12 12:00 am	49383		113700	.13	
05/13 12:00 am	47798		113700	.01	
05/14 12:00 am	45843		113700	.00	
05/15 12:00 am	45969		108500	.00	
05/16 12:00 am	44721		98100	.00	
05/17 12:00 am	54698	9938	117100	.00	
05/18 12:00 am	32335		117400	.00	
05/19 12:00 am	40281		106600	.46	
05/20 12:00 am	21437	15850	23540	.01	
05/21 12:00 am				.00	
05/22 12:00 am				.10	
05/23 12:00 am				.00	
05/24 12:00 am				.11	
05/25 12:00 am				.00	
05/26 12:00 am				.00	
05/27 12:00 am				.00	
05/28 12:00 am				.00	
05/29 12:00 am				.05	
05/30 12:00 am				.00	
05/31 12:00 am				.00	
06/01 12:00 am				.00	
06/02 12:00 am				.00	
06/03 12:00 am	42356	30150	65420	.08	
06/04 12:00 am	41761		110400	.00	
06/05 12:00 am	36399		96960	.13	
06/06 12:00 am	34781		95250	.03	
06/07 12:00 am	38611		100600	.00	
06/08 12:00 am	43948		124300	.03	
06/09 12:00 am	39778		110400	.50	
06/10 12:00 am	51172		184600	.00	
06/11 12:00 am	73407	17830	187800	1.42	
06/12 12:00 am	50745	8858	135000	.09	
06/13 12:00 am	45149	7562	139700	.00	
06/14 12:00 am	49756	7562	103600	.19	
06/15 12:00 am	47278		152300	.00	
06/16 12:00 am	50517	9182	100700	.74	
06/17 12:00 am	44460	8858	83840	.00	
06/18 12:00 am	55239	13760	105200	.00	.33
06/19 12:00 am	52049	11040	111900		.01
06/20 12:00 am	47903		113500		.00
06/21 12:00 am	49368		100700		.00
06/22 12:00 am	42028		85550		.00

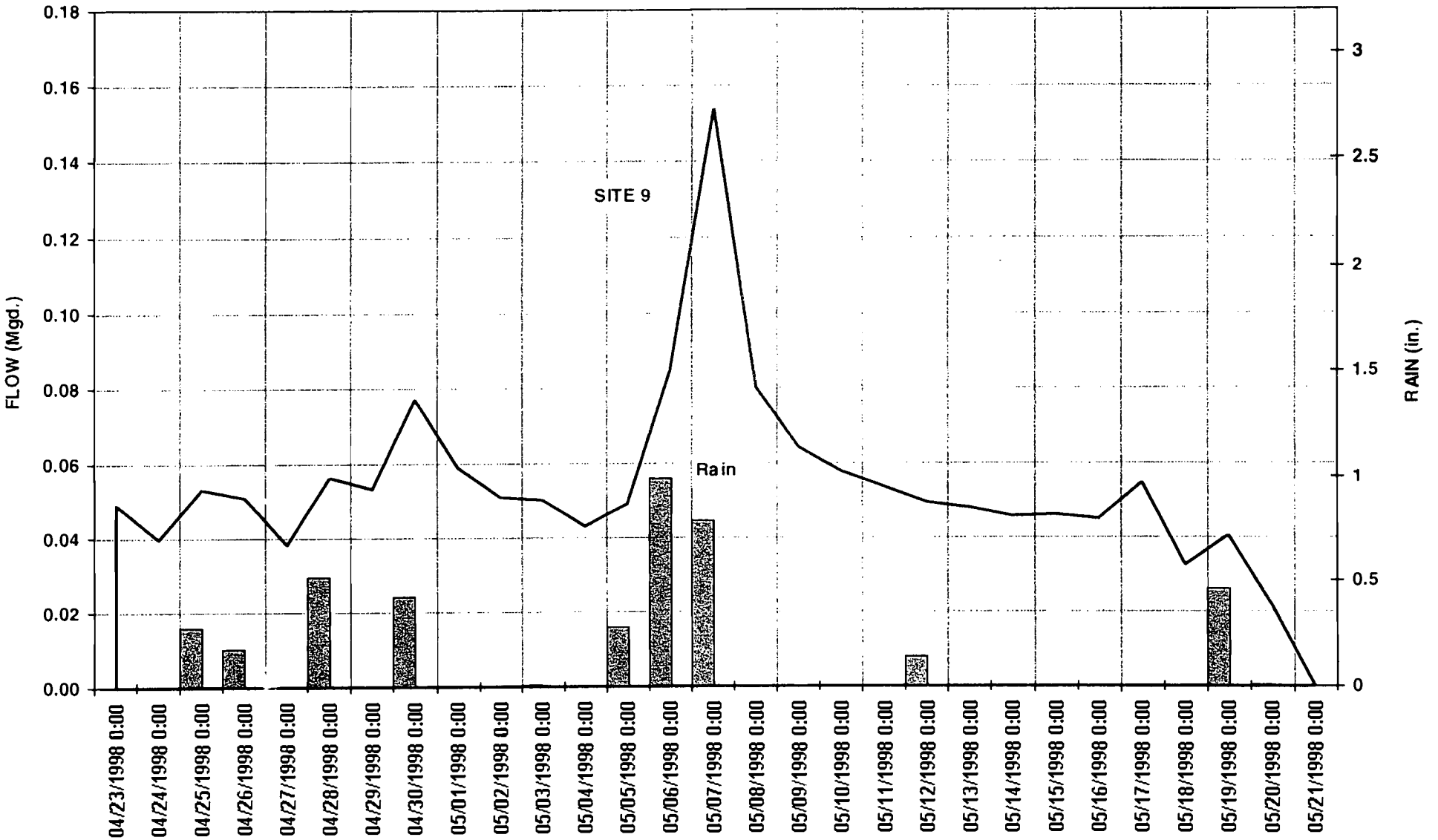
Date/Time	Flow Avg (Gal.)	Flow Min (Gal.)	Flow Max (Gal.)	Total Rain (in)	Total Rain (in)
3 12:00 am	46144		92400		.00
06/24 12:00 am	41463	5941	82360		.00
06/25 12:00 am	53777		174400		.00
06/26 12:00 am	48674		107200		.25
06/27 12:00 am	50009		115000		.00
06/28 12:00 am	48404		108500		.31
06/29 12:00 am	118580	36880	637200		3.15
06/30 12:00 am	67144	17890	122300		.00
07/01 12:00 am	57612	11690	114000		.00
07/02 12:00 am	51897	8318	115000		.00
07/03 12:00 am	59702	13900	124000		.30
07/04 12:00 am	48913	8318	126800		.07
07/05 12:00 am	56597	8642	117100		.00
07/06 12:00 am	65003		396200		.00
07/07 12:00 am	93446	37750	206500		1.83
07/08 12:00 am	67546	19970	117100		.00
07/09 12:00 am	58025	12600	107200		.00
07/10 12:00 am	59487	15160	124000		.03
07/11 12:00 am	55289	8642	124000		.00
07/12 12:00 am	58377	8858	108500		.00
07/13 12:00 am	50713		91410		.00
7/14 12:00 am	49376		98100		.00
/15 12:00 am	49416	7950	97450		.00
07/16 12:00 am	54291	10000	114000		.00

REPORT STATISTICS

Min.	**21437**	**5941**	**23540**	**.00**	**.00**
Avg.	**53078**	**18380**	**121717**	**.14**	**.22**
Max.	**153870**	**85040**	**637200**	**1.42**	**3.15**

Lowell 1998 Flowmeter Study

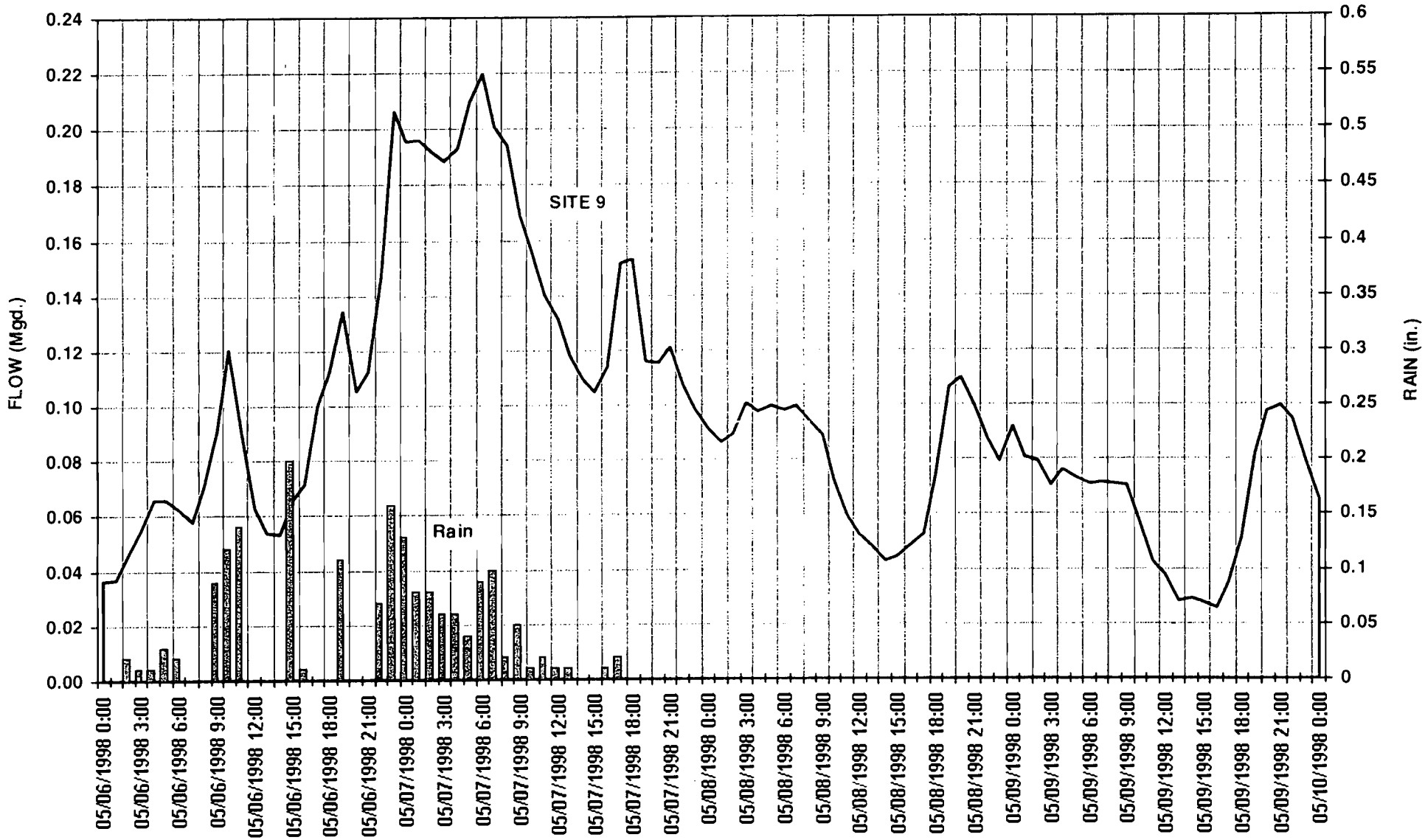
Site:9 In Woods



LOWELL SITE 9 FLOW

Lowell 1998 Flowmeter Study

Site:9 In Woods



LOWELL SITE 9 FLOW

Conclusion

The Town of Lowell has an inflow problem in the sanitary sewer system. Flows increase rapidly during rain events and decrease rapidly after the rain event is complete.

Lowell 1998 Flowmeter Study

Total Average Flow For All Sites

Date/Time	Flume Flow (Mgd)	Branch Flow (Mgd)	System Tot. Flow (Mgd)	Plant Flow (Mgd)	Intercept. Flow (Mgd)	Total Rain (in.)	Total Rain (in.)
03/27 12:00 am	.00	1.01	1.01	3.39	2.38	.00	
03/28 12:00 am	.00	.86	.86	4.66	3.80	.53	
03/29 12:00 am	.00	.82	.82	3.64	2.82	.02	
03/30 12:00 am	.00	.76	.76	3.68	2.92	.00	
03/31 12:00 am	.00	1.30	1.30	5.78	4.48	.60	
04/01 12:00 am	3.94	1.06	5.00	6.66	1.66	.23	
04/02 12:00 am	2.99	.89	3.88	5.23	1.35	.00	
04/03 12:00 am	2.46	.77	3.23	4.07	.84	.00	
04/04 12:00 am	2.16	.69	2.85	3.56	.71	.00	
04/05 12:00 am	2.11	.60	2.71	3.52	.81	.00	
04/06 12:00 am	1.91	.56	2.47	3.16	.69	.00	
04/07 12:00 am	2.17	.59	2.76	3.26	.50	.28	
04/08 12:00 am	2.19	.62	2.81	3.78	.97	.00	
04/09 12:00 am	2.28	.73	3.01	4.01	1.00	.51	
04/10 12:00 am	2.28	.60	2.88	3.34	.46	.00	
4/11 12:00 am	2.00	.57	2.57	3.13	.56	.00	
04/12 12:00 am	1.87	.53	2.40	3.16	.76	.00	
04/13 12:00 am	3.27	.91	4.18	4.47	.29	.57	
04/14 12:00 am	2.91	.79	3.70	4.86	1.16	.02	
04/15 12:00 am	2.51	.77	3.28	3.82	.54	.02	
04/16 12:00 am	1.98	.70	2.68	3.11	.43	.00	
04/17 12:00 am	1.81	.66	2.47	3.21	.74	.00	
04/18 12:00 am	1.84	.58	2.42	3.10	.68	.00	
04/19 12:00 am	1.87	.54	2.41	3.12	.71	.00	
04/20 12:00 am	2.72	1.01	3.73	3.87	.14	.69	
04/21 12:00 am	4.08	1.20	5.28	6.25	.97	.46	
04/22 12:00 am	2.92	.86	3.78	5.02	1.24	.00	
04/23 12:00 am	2.30	.75	3.05	4.05	1.00	.00	
04/24 12:00 am	2.03	.68	2.71	3.21	.50	.00	
04/25 12:00 am	2.20	.77	2.97	3.76	.79	.28	
04/26 12:00 am	2.24	.81	3.05	3.52	.47	.18	
04/27 12:00 am	2.00	.64	2.64	3.29	.65	.00	
04/28 12:00 am	2.15	.71	2.86	3.42	.56	.00	
04/29 12:00 am	2.49	.84	3.33	4.31	.98	.47	
04/30 12:00 am	2.91	.98	3.89	4.76	.87	.39	
05/01 12:00 am	2.63	.72	3.35	4.28	.93	.04	
05/02 12:00 am	2.25	.54	2.79	3.77	.98	.00	
05/03 12:00 am	2.14	.51	2.65	3.55	.90	.00	
05/04 12:00 am	1.90	.45	2.35	3.18	.83	.01	
05/05 12:00 am	2.46	.60	3.06	4.02	.96	.28	

Date/Time	Flume Flow (Mgd)	Branch Flow (Mgd)	System Tot. Flow (Mgd)	Plant Flow (Mgd)	Intercept. Flow (Mgd)	Total Rain (in.)	Total Rain (in.)
5/06 12:00 am	3.30	1.07	4.37	4.71	.34	.44	
05/07 12:00 am	6.61	3.96	10.57	13.05	2.48	1.29	
05/08 12:00 am	4.45	1.66	6.11	9.27	3.16	.05	
05/09 12:00 am	2.93	.84	3.77	6.13	2.36	.00	
05/10 12:00 am	2.38	.65	3.03	4.62	1.59	.00	
05/11 12:00 am	2.10	.59	2.69	3.68	.99	.00	
05/12 12:00 am	1.93	.54	2.47	3.51	1.04	.13	
05/13 12:00 am	1.78	.43	2.21	3.24	1.03	.01	
05/14 12:00 am	1.67	.41	2.08	3.21	1.13	.00	
05/15 12:00 am	1.63	.38	2.01	2.80	.79	.00	
05/16 12:00 am	1.61	.33	1.94	2.83	.89	.00	
05/17 12:00 am	1.53	.39	1.92	2.80	.88	.00	
05/18 12:00 am	1.44	.33	1.77	2.80	1.03	.00	
05/19 12:00 am	1.38	.42	1.80	2.64	.84	.46	
05/20 12:00 am	.00	.35	.35	2.73	2.38	.01	
05/21 12:00 am		.31	.31	2.36	2.05	.00	
05/22 12:00 am		.41	.41	2.73	2.32	.10	
05/23 12:00 am		.35	.35	2.26	1.91	.00	
05/24 12:00 am		.26	.26	2.39	2.13	.11	
05/25 12:00 am		.30	.30	2.37	2.07	.00	
05/26 12:00 am		.26	.26	2.75	2.49	.00	
05/27 12:00 am		.27	.27	2.26	1.99	.00	
05/28 12:00 am		.27	.27	2.35	2.08	.00	
05/29 12:00 am		.19	.19	2.59	2.40	.05	
05/30 12:00 am		.16	.16	2.28	2.12	.00	
05/31 12:00 am		.21	.21	2.34	2.13	.00	
06/01 12:00 am		.32	.32	2.40	2.08	.00	
06/02 12:00 am		.30	.30	2.49	2.19	.00	
06/03 12:00 am	1.17	.54	1.71	2.26	.55	.08	
06/04 12:00 am	1.05	.57	1.62	2.41	.79	.00	
06/05 12:00 am	1.09	.49	1.58	2.45	.87	.13	
06/06 12:00 am	1.16	.36	1.52	1.97	.45	.03	
06/07 12:00 am	1.16	.43	1.59	2.45	.86	.00	
06/08 12:00 am	1.23	.69	1.92	2.28	.36	.03	
06/09 12:00 am	1.33	.71	2.04	2.80	.76	.50	
06/10 12:00 am	1.24	.81	2.05	2.51	.46	.00	
06/11 12:00 am	3.26	1.35	4.61	5.53	.92	1.42	
06/12 12:00 am	1.86	.75	2.61	3.33	.72	.09	
06/13 12:00 am	1.49	.56	2.05	2.77	.72	.00	
06/14 12:00 am	1.53	.63	2.16	2.87	.71	.19	
06/15 12:00 am	1.43	.64	2.07	2.50	.43	.00	
06/16 12:00 am	1.31	.64	1.95	2.91	.96	.74	
06/17 12:00 am	1.24	.51	1.75	2.22	.47	.00	
06/18 12:00 am	1.48	.69	2.17	2.94	.77	.00	.33
06/19 12:00 am	1.39	.54	1.93	2.74	.81		.01
06/20 12:00 am	1.29	.48	1.77	2.33	.56		.00
06/21 12:00 am	1.28	.48	1.76	2.28	.52		.00
06/22 12:00 am	1.22	.48	1.70	2.68	.98		.00

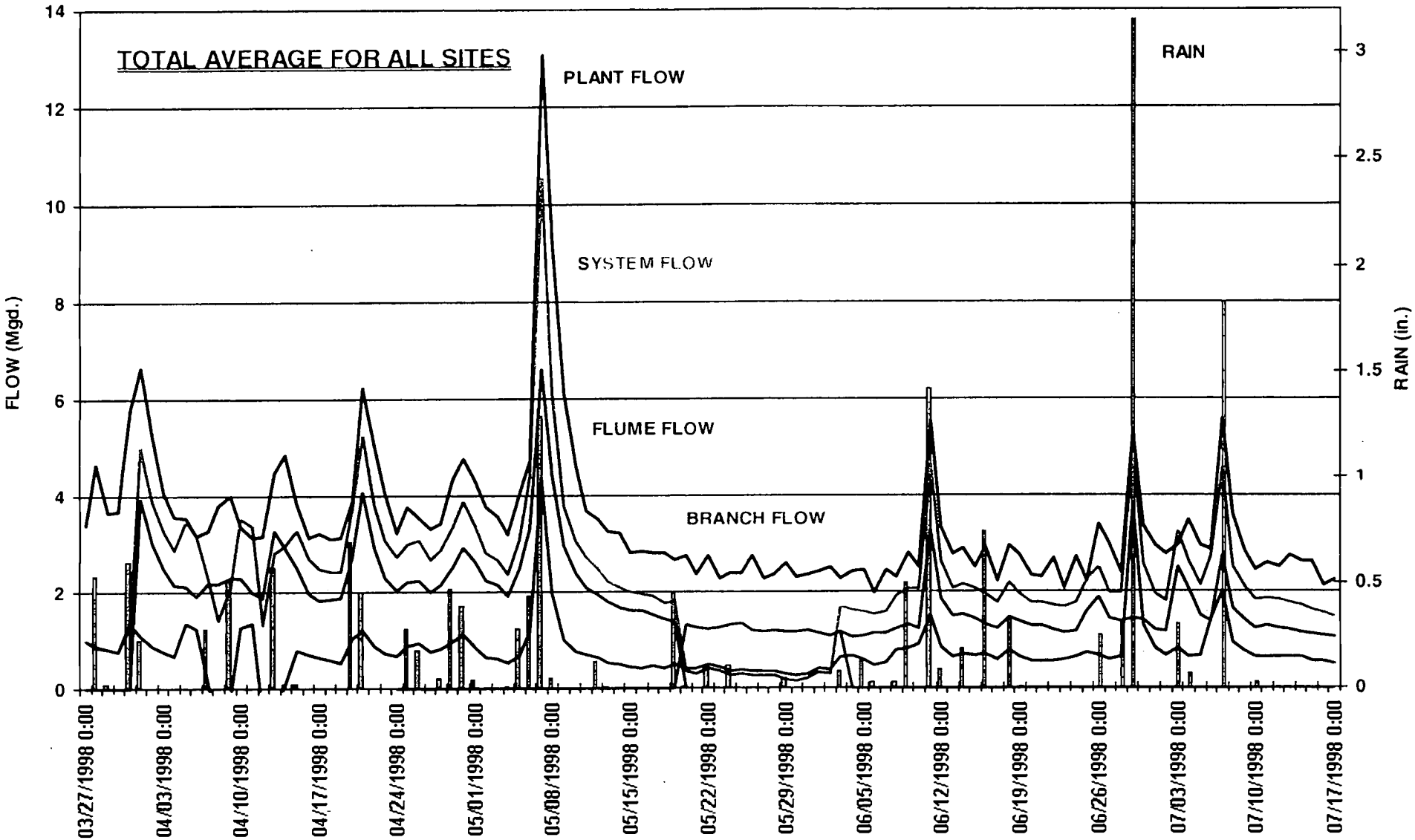
Date/Time	Flume Flow (Mgd)	Branch Flow (Mgd)	System Tot. Flow (Mgd)	Plant Flow (Mgd)	Intercept. Flow (Mgd)	Total Rain (in.)	Total Rain (in.)
'/23 12:00 am	1.15	.52	1.67	2.06	.39		.00
06/24 12:00 am	1.19	.58	1.77	2.71	.94		.00
06/25 12:00 am	1.58	.67	2.25	2.20	-.05		.00
06/26 12:00 am	1.89	.61	2.50	3.38	.88		.25
06/27 12:00 am	1.45	.53	1.98	2.97	.99		.00
06/28 12:00 am	1.38	.59	1.97	2.38	.41		.31
06/29 12:00 am	1.44	3.56	5.00	5.31	.31		3.15
06/30 12:00 am	1.42	1.15	2.57	3.35	.78		.00
07/01 12:00 am	1.21	.72	1.93	2.93	1.00		.00
07/02 12:00 am	1.18	.60	1.78	2.76	.98		.00
07/03 12:00 am	2.51	.73	3.24	2.93	-.31		.30
07/04 12:00 am	2.05	.55	2.60	3.46	.86		.07
07/05 12:00 am	1.51	.60	2.11	2.94	.83		.00
07/06 12:00 am	1.39	1.31	2.70	2.86	.16		.00
07/07 12:00 am	2.74	1.81	4.55	5.60	1.05		1.83
07/08 12:00 am	1.64	.85	2.49	3.58	1.09		.00
07/09 12:00 am	1.40	.68	2.08	2.82	.74		.00
07/10 12:00 am	1.25	.58	1.83	2.43	.60		.03
07/11 12:00 am	1.28	56	1.84	2.60	.76		.00
07/12 12:00 am	1.23	.59	1.82	2.49	.67		.00
07/13 12:00 am	1.21	.56	1.77	2.74	.97		.00
07/14 12:00 am	1.15	.55	1.70	2.61	.91		.00
7/15 12:00 am	1.13	.47	1.60	2.61	1.01		.00
07/16 12:00 am	1.10	.45	1.55	2.11	.56		.00

REPORT STATISTICS

Min.	.00	.16	.16	1.97	-.31	.00	.00
Avg.	1.84	.70	2.33	3.43	1.10	.14	.22
Max.	6.61	3.96	10.57	13.05	4.48	1.42	3.15
Total	182.40 mg	78.11 mg	260.51 mg	383.63 mg	123.12 mg		

Lowell 1998 Flowmeter Study

Total Average Flows For All Sites



Lowell All Sites