City of Springfield, Illinois
Office of Public Works
Sewer Division

Capacity, **M**anagement, **O**perations and **M**aintenance

11/3/2014

CMOM

Definitions and Abbeviations

AMS refers to the Asset Management System

AO refers to the Administrative Order issued by the USEPA to the City of Springfield, February, 2013.

CIPP refers to Cured In Place Pipe

CWLP refers to City Water Light and Power. This is the municipally owned water and electric utility.

IDNR refers to the Illinois Department of Natural Resources.

LACP refers to the Lateral Assessment Certification Program by NASSCO.

MACP refers to the Manhole Assessment Certification Program by NASSCO.

NASSCO refers to the National Association of Sewer Service Companies.

OERP refers to the City of Springfield's *Overflow Emergency Response Plan.*

OPW refers to the Office of Public Works.

PACP refers to the Pipeline Assessment Certification Program by NASSCO.

Privately Owned Building Sewer or ***Building Lateral*** refers to the sewer line which connects a residence to the public sewer. All private sewers or laterals are maintained by the property owner.

Public Sewer refers to the main sewer lines owned, operated and maintained by the City to which the private sewers connect.

Sanitary Sewer Overflow or ***SSO*** means an overflow, spill, release, or diversion of wastewater from a sanitary sewer system. A SSO includes overflows that result in a discharge to waters of the United States and overflows of wastewater, including a wastewater backup into a building (other than a backup caused solely by a blockage or other malfunction in a privately owned sewer or building lateral), even if that overflow does not reach waters of the United States.

Sanitary Sewer System refers to the system of pipes, manholes, pump stations, sewer lines, or other conveyances, upstream of a wastewater treatment plant used to collect and convey wastewater to the wastewater treatment plant.

SCDPH refers to the Sangamon County Department of Public Health.

SMSD refers to the Springfield Metro Sanitary District.

SUO refers to the City of Springfield Sewer Use Ordinance.

Waters of the United States refer to surface waters as defined in 40 CFR 122.2 such as navigable water, rivers, streams (including ephemeral streams), lakes, natural ponds, lagoons, estuaries, man-made canals, ditches, wet meadows, wetlands, marshes, sloughs and water courses.

I. General Information – Collection System Description

The City of Springfield, Illinois through its Office of Public Works operates and maintains the sanitary sewer collection system for the residents of the City. The service area is approximately 54 square miles. There are approximately 43,000 active service connections which service approximately 117,126 residents.

The collection system maintained by the City of Springfield is widely varied and consists of approximately 140 miles of combined sewers and approximately 355 miles of separate sanitary sewers. Infrastructure the City is responsible for dates from the mid 1800's to present day. Accurate estimates of overall system age are not currently available. Materials encountered include older brick, clay, and concrete sewers, along with modern day PVC materials. Many older sewers have been rehabilitated using various lining methods such as gunite or CIPP. The City does not operate any treatment facilities. The Springfield Metro Sanitary District operates two treatment facilities which receive all flow from the City's collection system.

II. Continuing Sewer Assessment Plan

There are several areas in the collection system which experience capacity related issues during wet weather events which most often result in basement backups. Although basement backups have occurred throughout the collection system, these reoccurring problem areas are in parts of the city constructed generally between the 1950's and 1970's. These areas are served by separate sanitary sewers and most homes constructed in this era have gravity floor drains in basements which are connected to the sewer mains. To decrease the potential for basement backups, current ordinances by the SMSD require building service sewers to exit the building between two and three feet below finished grade. Plumbing fixtures below this point are required to be discharged by approved mechanical means. Permits for new connections must be obtained from the SMSD (Springfield Metro Sanitary District, SUO).

The City has developed an Emergency Overflow Response Plan which details the method employed to reduce the number, frequency and duration of basement backups. The plan involves the deployment of portable pumping equipment at key locations in areas which experience reoccurring capacity issues. The pumps transfer flows from the surcharged sanitary sewer system into the storm sewer system. The USEPA considers this an unpermitted discharge and a violation of the Clean Water Act and has issued an Administrative Order to the City to correct these reoccurring capacity issues.

Most all reoccurring problem areas have been studied and had improvement projects performed in the past. Projects and studies in the affected areas are currently underway. A pipe bursting project was completed in Westchester in 2013. This project increased the size of the trunk sewer serving the area from 12 inch diameter pipe to 18 inch diameter pipe. Post construction monitoring was installed to help analyze the effectiveness of the project in eliminating basement backups and the need for by-pass pumping. This is one area to be addressed as part of the Administrative Order. The Hazel Dell area has also been subject to chronic basement backups and by pass pumping operations and included in the Administrative Order. This area is tributary to a SMSD pump station. The SMSD completed stream improvements to an adjacent surface stream that was affecting the pump station and also made improvements to the pump station to increase its capacity. The SMSD is monitoring these improvements to determine this projects effectiveness in eliminating basement backups and the need for by pass pumping. The third main area of chronic basement backups and by pass pumping is located and referred to as the Northeast Area. This large area encompasses the majority of the by pass pumping locations identified in the Administrative Order. The city has contracted with the consulting firm of Crawford, Murphy & Tilly, Inc. to perform a sewer investigation study and to produce the Alternative Analysis as required in the Administrative Order for this area. In connection with this study the city also contracted Crawford, Murphy &Tilly, Inc. to manage a flow monitoring program in the Northeast Area sewer shed. This program was implemented in early 2013 and is expected to continue through the completion of any recommended alternatives in order to analyze post construction results in eliminating basement backups and the need for by pass pumping. A variety of methods have and are being utilized to correct these overflow issues. Relief sewers, lining projects, manhole rehabilitation, and pipe bursting are some of the methods which have and are being employed to correct overflow issues.

All of the overflow areas are in some way connected to the Springfield Metro Sanitary District's trunk lines. These lines transport flows from the City's collection system to the treatment plants. Consultation between the City and the District is required to address some overflow issues in the City's collection system which can be influenced by the District's trunk lines.

Currently sewer assessment occurs largely on an as needed basis. The Sewer Division owns two CCTV trucks but currently only have qualified staff to operate one CCTV truck for inspection of sewers. This truck is kept busy with day to day activities. Additional staffing was hired in May of 2014 to allow the operation of two CCTV trucks. This second crew is still considered to be in training and expected to be independently operational in early 2015. This will allow one truck to handle day to day activities while the second truck in devoted to routine system wide inspections and assessment of the system.

III. Collection System Management

A. Organizational Structure

The Office of Public Works maintains an organizational chart for the Sewer Division which identifies personnel structure and all operations and maintenance staff by name and position/title. This chart shows all budgeted positions and those which are filled.

Organizational positions above the Sewer Engineer include the City Engineer, Office of Public Works Director and the Mayor of the City of Springfield. The City of Springfield is governed by an Aldermanic form of government with ten elected Alderman.

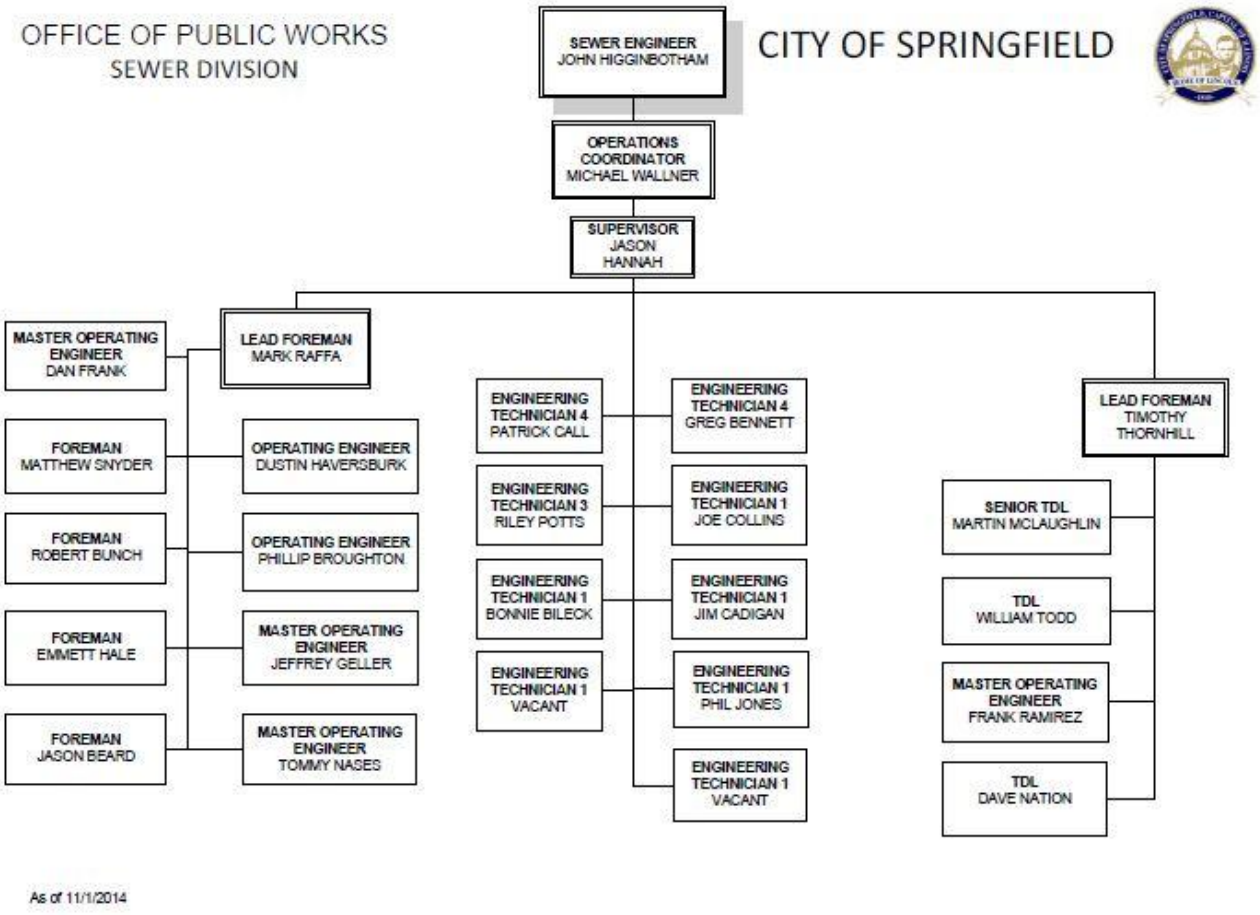
Past practice defines staff responsibilities related to the prioritization of CMOM activities. No formal documentation describes this process other than what is presented below.

Prioritization of day to day maintenance activities is the responsibility of the Operations Coordinator. Prioritization of routine repairs is the responsibility of the Supervisor. Both positions engage the Sewer Engineer for periodic review of priorities.

Capital projects are prioritized by the Sewer Engineer and prioritizations are typically reviewed by both the City Engineer and the OPW Director. Depending on the scope of the capital projects the Mayor's and/or the Alderman's direction may be sought.

Additional prioritization decisions are also made for the city by regulating authorities through their statutory authority.

Figure 1


OFFICE OF PUBLIC WORKS
SEWER DIVISION
CITY OF SPRINGFIELD
SEWER ENGINEER
JOHN HIGGINBOTHAM
OPERATIONS COORDINATOR
MICHAEL WALLNER
SUPERVISOR
JASON HANNAH
MASTER OPERATING ENGINEER
DAN FRANK
LEAD FOREMAN
MARK RAFFA
FOREMAN
MATTHEW SNYDER
OPERATING ENGINEER
DUSTIN HAVERSBURK
FOREMAN
ROBERT BUNCH
OPERATING ENGINEER
PHILLIP BROUGHTON
FOREMAN
EMMETT HALE
MASTER OPERATING ENGINEER
JEFFREY GELLER
FOREMAN
JASON BEARD
MASTER OPERATING ENGINEER
TOMMY NASES
ENGINEERING TECHNICIAN 4
PATRICK CALL
ENGINEERING TECHNICIAN 4
GREG BENNETT
ENGINEERING TECHNICIAN 3
RILEY POTTS
ENGINEERING TECHNICIAN 1
JOE COLLINS
ENGINEERING TECHNICIAN 1
BONNIE BILECK
ENGINEERING TECHNICIAN 1
JIM CADIGAN
ENGINEERING TECHNICIAN 1
VACANT
ENGINEERING TECHNICIAN 1
PHIL JONES
ENGINEERING TECHNICIAN 1
VACANT
LEAD FOREMAN
TIMOTHY THORNHILL
SENIOR TDL
MARTIN MCLAUGHLIN
TDL
WILLIAM TODD
MASTER OPERATING ENGINEER
FRANK RAMIREZ
TDL
DAVE NATION
As of 11/1/2014

Job descriptions for each functional class of employees are reviewed and maintained by the Human Resources Department. Periodic reviews of job descriptions are performed and updates are made as promotions or new hires occur (City of Springfield, OPW-SD-JD, 2014).

Items discussed in the job descriptions include: the nature of the work to be performed, minimum requirements for the position, necessary special qualifications or certifications, examples of the types of work and lists of licenses required for the position. Employee performance evaluations have been conducted in the past.

Generally positions are filled immediately when a vacancy occurs due to a retirement or transfer. Higher level positions are typically filled through promotion which decreases the time a position is left vacant. Entry level positions require interviews and background checks which increase the time required to fill a position.

One challenge the Sewer Division is currently facing is an older workforce with several key personnel nearing retirement. Plans are in place to provide training to current and new employees to fill the upcoming vacancies. Injuries to workers have also affected staffing levels. The Sewer Division budgets for temporary employees to fill vacant positions left open by long term absences.

The Sewer Division is part of the Office of Public Works. Main duties are related to operation and maintenance of the collection system. Employees are required to participate in snow removal operations during the winter months. Most storm water issues are contracted out for repairs or improvements. Management staff often investigates storm water issues and makes recommendations for repair or improvements.

B. Training

The Office of Public Works employees a safety officer to oversee all related safety and training activities for the entire Office.

The Sewer Division relies on on-the-job training for many aspects of the development of employees. Experienced personnel are assigned to provide specific task training to new or inexperienced personnel. This provides the opportunity for institutional knowledge transfer between employees specific to the City's Collection system.

Each fiscal year a training budget is developed with the following goals:

Training Goals:

- ESRI User Conference attended annually by a minimum of one employee.
- Illinois Public Service Institute attended annually by at least one employee.
- PACP training attended every three years by all CCTV operators.
- Sewer Cleaning / Vactor classes attended on an as needed basis for new hires.
- Pumper and Cleaner Show attended annually.
- Traffic Control training attended by all employees every three years.
- Confined space entry training provided to all employees every three years
- Trenching and Shoring training provided to all employees every three years.
- SSO/emergency response training provided to all employees annually.
- Record keeping training provided to all new employees.
- Pump Station operations and maintenance training provided to new employees.
- Pesticide Applicator training provided to applicable employees as required every three years.

2012 EMPLOYEE TRAINING	ESRI User Conference	IPSI	PACP	Sewer Cleaning / Vactor	Pumper and Cleaner Show	Traffic Control	Confined Space Entry	Trenching and Shoring	SSO / Emergency Response	Record Keeping	Pump Station Operation	Pesticide Application
Beard, Jason							Jun-12	Jun-12				
Bennett, Gregg												
Bileck, Bonnie												
Blackburn, Vern							Jun-12	Jun-12				
Broughton, Phillip							Jun-12	Jun-12				
Bunch, Bob							Jun-12	Jun-12				
Call, Pat							Jun-12	Jun-12				
Collins, Joe												
Elder, David							Jun-12	Jun-12				
Frank, Daniel												
Geller, Jeffrey							Jun-12	Jun-12				
Hale, Emmett							Jun-12	Jun-12				
Hannah, Jason							Jun-12	Jun-12				
Higginbotham, John		Oct-12			Feb-12		Jun-12	Jun-12			Mar-12	
Lamm, Bob							Jun-12	Jun-12				
Mclaughlin, Marty							Jun-12	Jun-12				
Midiri, Matt P												
Nases, Tommy E, Jr							Jun-12	Jun-12				
Nation, David												
Potts, Riley							Jun-12	Jun-12			Mar-12	
Raffa, Mark							Jun-12	Jun-12				
Ramirez, Frank							Jun-12	Jun-12				
Snyder, Matt							Jun-12	Jun-12				
Thornhill, Tim												
Todd, Bill							Jun-12	Jun-12				
Wallner, Michael					Feb-12		Jun-12	Jun-12				

2013 EMPLOYEE TRAINING	ESRI User Conference	IPSI	PACP	Sewer Cleaning / Vactor	Pumper and Cleaner Show	Traffic Control	Confined Space Entry	Trenching and Shoring	SSO / Emergency Response	Record Keeping	Pump Station Operation	Pesticide Application
Beard, Jason									Apr-13			Feb-13
Bennett, Gregg											Jun-13	
Bileck, Bonnie									Apr-13			
Blackburn, Vern												
Broughton, Phillip				Aug-13					Apr-13			
Bunch, Bob									Apr-13			Feb-13
Call, Pat					Feb-13				Apr-13			
Collins, Joe												
Elder, David									Apr-13			
Frank, Daniel				Aug-13					Apr-13			
Geller, Jeffrey									Apr-13			
Hale, Emmett									Apr-13			
Hannah, Jason									Apr-13			
Higginbotham, John		Oct-13			Feb-13				Apr-13			Feb-13
Lamm, Bob									Apr-13			
Mclaughlin, Marty									Apr-13			
Midiri, Matt P												
Nases, Tommy E, Jr									Apr-13			Feb-13
Nation, David									Apr-13			
Potts, Riley	Jul-13								Apr-13			
Raffa, Mark									Apr-13			Feb-13
Ramirez, Frank									Apr-13			
Snyder, Matt									Apr-13			Feb-13
Thornhill, Tim									Apr-13			
Todd, Bill												
Wallner, Michael					Feb-13				Apr-13			Feb-13

2014 EMPLOYEE TRAINING	ESRI User Conference	IPSI	PACP	Sewer Cleaning / Vactor	Pumper and Cleaner Show	Traffic Control	Confined Space Entry	Trenching and Shoring	SSO / Emergency Response	Record Keeping	Pump Station Operation	Pesticide Application
Beard, Jason							Jun-14					
Bennett, Gregg			Jan-14				Jun-14					
Bileck, Bonnie			Jan-14									
Broughton, Phillip							Jun-14					
Bunch, Bob												
Cadigan, James							Jun-14					
Call, Pat			Jan-14				Jun-14					
Collins, Joe			Jan-14		Feb-14		Jun-14					
Elder, David												
Frank, Daniel							Jun-14					
Geller, Jeffrey							Jun-14	Jul-14				
Hale, Emmett							Jun-14					
Hannah, Jason			Jan-14		Feb-14		Jun-14	Jul-14				
Higginbotham, John		Oct-14	Jan-14		Feb-14		Jun-14					
Jones, Phil							Jun-14					
Mclaughlin, Marty							Jun-14	Jul-14				
Midiri, Matt P			Jan-14				Jun-14					
Nases, Tommy E, Jr							Jun-14					
Nation, David							Jun-14	Jul-14				
Potts, Riley	Jul-14		Jan-14				Jun-14					
Raffa, Mark							Jun-14					
Ramirez, Frank							Jun-14	Jul-14				
Snyder, Matt							Jun-14					
Thornhill, Tim							Jun-14	Jul-14				
Todd, Bill												
Wallner, Michael			Jan-14		Feb-14		Jun-14	Jul-14				

C. Communication and Customer Service

The Sewer Division office is available to citizens at 217-789-2244 from 7:00 am to 3:00 pm. After hours the Office of Public Works maintains a 24 hour 7 day per week dispatch available at 21-789-2246.

Residents can report sanitary sewer emergencies to either telephone number. Reports of emergencies are immediately dispatched to supervisors and/or maintenance crews as required. The Sewer Division's goal is a 1 hour response time during regular business hours and a 2 hour response time after hours when maintenance workers must be called in.

All reports of sewer emergencies are recorded and maintained in the Sewer Division's Asset Management System.

The Sewer Division maintains a web presence on the City of Springfield's website. Information about collection system operation and contact information is made available to the public through this website.

Each year during the City's budget process the Office of Public Works updates the City Council concerning the activities of the Sewer Division. The Office of Public Works is available to provide information to other community groups such as citizens committees, homeowners associations, business associations and the Chamber of Commerce.

As part of the training provided to employees, customer service is a main topic presented at the Illinois Public Service Institute.

During construction projects, affected residents are typically contacted either through door hangers, mailings, newspapers, and/or press releases. Because of the widely varied scope of projects, management decides the best combination of when residents are contacted, how they are contacted and what type of information is supplied on an individual project basis.

Senior Office of Public Works staff meetings are scheduled bi-weekly. Sewer Division staff meetings are held at least every quarter, or as needed. Senior staff schedules meetings with the Springfield Metro Sanitary District as needed to discuss common issues.

D. Management Information Systems

The Sewer Division maintains an asset management system (AMS). The Cassworks program has been utilized since the mid 1990's to store information regarding repairs, operations and maintenance performed by the Division.

Information is entered into the system daily, and monthly reports are generated showing totals for completed tasks. These reports are produced by staff and distributed to the Operations Coordinator and the Sewer Engineer. This report process and example report is contained in the Monthly Report Tutorial (City of Springfield, MR, 2012). Recent reviews of these reports have identified inconsistencies in the underlying AMS data which affects reported totals for several tasks.

The Office of Public Works is working toward replacing the current AMS with a map based system. This will give employees, management and the public greater insight into operations, maintenance and capital improvement activities. Implementation of Cityworks AMS is scheduled for calendar year 2014.

As a part of the Cityworks AMS implementation, workflows will be developed to document data input, management and reporting.

Information management has been identified as a critical component to the Sewer Division's operation. The Division maintains approximately 20 years of historical information in the current Cassworks AMS. While this information is valuable, inconsistencies present in the data over the years limit some of its usefulness. With the initial implementation of Cassworks, a goal was to have one repository for all Sewer Division information. For the most part this was achieved with varying degrees of success. Limitations either within Cassworks, its implementation or its management over the years have created a system that while functional, does not always provide the most efficient asset management system. Current technologies available in GIS tend to highlight weak areas within the existing AMS.

Currently there are significant overlaps in Cassworks and GIS data management which duplicate effort. This duplication of effort creates two datasets of the same data in separate systems. An example of this is sewer line segment identifiers. Line segments must be identified in Cassworks in order to attach work orders to them. The Division's GIS mapping system already has all line segment identifiers created. The Division is essentially managing two lists of the same information.

Duplication of information creates potential for errors and conflicts and reduces the value and usefulness of both datasets. Planned implementation of Cityworks AMS in 2014 will begin to address much of this duplication. A goal of the Cityworks AMS implementation is to have a single repository for all Division information and to minimize duplication of information to the greatest extent possible.

Information contained in this report could fall into the category of duplicate information. There are compilations of information contained in this report which should not be considered source data, but reporting of source data. This distinction is critical as information in this report is of a more static nature than operational data and could in the immediate future be in conflict with original sources.

E. SSO Notification Program

The Sewer Division maintains an Overflow Emergency Response Plan (OERP) which defines SSO notification, documentation and recording procedures for overflow events. Chronic overflow locations are identified in the OERP. (City of Springfield, OERP, 2013).

F. Legal Authority

The City of Springfield's Sewer Use Ordinance (City of Springfield, SUO) defines regulations governing the use of and connection to the collection system. The City's collection system is upstream from other municipalities or from the SMSD owned infrastructure. There are no significant points where the City's collection system receives flows from other communities.

The SUO defines some of the responsibilities between the City of Springfield and the Springfield Metro Sanitary District.

The SMSD also has a Sewer Use Ordinance (Springfield Metro Sanitary District, SUO)

The City of Springfield and the SMSD have maintained an intergovernmental contract since 1956. This contract has been amended several times, with the current version of the contract dated December 31, 1988. (SMSD, COS, Intergovernmental Contract, 1988)

IV. Collection System Operation

A. Budgeting

Residents of the City connected to the City's collection system are charged a user fee for service. This user charge system is detailed in Section 51.10 of the City of Springfield Municipal Code (City of Springfield, SUO).

Users are assessed a meter charge based on the size of the water meter serving the property. This charge is due irrespective of the amount of water used during the billing period. In addition to the meter charge, a consumption charge is applied to actual water usage.

The first three meter sizes (5/8", ¾" and 1") make up approximately 96% of all bills. This 96% is considered the residential customer base. For the 12 months proceeding June 2013, the average rate paid by the residential customer base (96% of all bills) was $9.81. The average consumption was 7.58 units (1 unit = 750 gallons). This is only for the City portion of the sewer fees. Rates charged by the Springfield Metro Sanitary District are set independently of the City rates.

The City of Springfield passed a rate increase to the City sewer user charge system on April 16th, 2013 which went into effect on July 1, 2013. This ordinance will increase rates 5% per year for the next 10 years. This marks the first rate increase to the sewer fees for the City since 1996.

Table 1 *identifies the rate structure approved by Ordinance 2013-127 which will be in effect until July, 2022.*

Revenues from the user charge system are deposited into the Enterprise Fund commonly referred to as the Sewer Fund. The Sewer Fund has a history of maintaining a positive balance. This Enterprise Fund requires that expenditures be dedicated to the operation and maintenance of the collection system.

The Sewer Fund budget is prepared each year starting in October and finalized in February before the beginning of the next fiscal year which begins March 1st. Budget information for the Sewer Fund is provided by the OPW accounting personnel. The current annual budget is approximately $5.8 million.

The Sewer Division maintains a Capital Improvement Plan (CIP) (City of Springfield, CIP, 2014) to prioritize projects to be funded, designed and constructed. The annual CIP budget is approximately $1 million. The rate increase passed in April 2013 is devoted to increases in the CIP. Plans are underway to increase the CIP spending by up to six times through the use of the State Revolving Fund (SRF) program administered by the Illinois Environmental Protection Agency.

Table 1: Sewer Rates

	Current	July 1st 2013	July 1st 2014	July 1st 2015	July 1st 2016	July 1st 2017	July 1st 2018	July 1st 2019	July 1st 2020	July 1st 2021	July 1st 2022
Meter Charges											
5/8" Meter	$3.10	$3.26	$3.42	$3.59	$3.77	$3.96	$4.15	$4.36	$4.58	$4.81	$5.05
3/4" Meter	$4.65	$4.88	$5.13	$5.38	$5.65	$5.93	$6.23	$6.54	$6.87	$7.21	$7.57
1" Meter	$7.75	$8.14	$8.54	$8.97	$9.42	$9.89	$10.39	$10.91	$11.45	$12.02	$12.62
1-1/4" Meter	$12.40	$13.02	$13.67	$14.35	$15.07	$15.83	$16.62	$17.45	$18.32	$19.24	$20.20
1-1/2" Meter	$15.50	$16.28	$17.09	$17.94	$18.84	$19.78	$20.77	$21.81	$22.90	$24.05	$25.25
2" Meter	$24.80	$26.04	$27.34	$28.71	$30.14	$31.65	$33.23	$34.90	$36.64	$38.47	$40.40
3" Meter	$46.50	$48.83	$51.27	$53.83	$56.52	$59.35	$62.31	$65.43	$68.70	$72.14	$75.74
4" Meter	$77.50	$81.38	$85.44	$89.72	$94.20	$98.91	$103.86	$109.05	$114.50	$120.23	$126.24
6" Meter	$155.00	$162.75	$170.89	$179.43	$188.40	$197.82	$207.71	$218.10	$229.01	$240.46	$252.48
8" Meter	$155.00	$162.75	$170.89	$179.43	$188.40	$197.82	$207.71	$218.10	$229.01	$240.46	$252.48
10" Meter	$155.00	$162.75	$170.89	$179.43	$188.40	$197.82	$207.71	$218.10	$229.01	$240.46	$252.48
Consumption Charges											
First 3 Units	$0.35	$0.37	$0.39	$0.41	$0.43	$0.45	$0.47	$0.49	$0.52	$0.54	$0.57
Over 3 Units	$0.75	$0.79	$0.83	$0.87	$0.91	$0.96	$1.01	$1.06	$1.11	$1.16	$1.22

B. Compliance

The City Of Springfield and the Springfield Metro Sanitary District maintain an intergovernmental agreement (SMSD, COS, Intergovernmental Contract, 1988) which defines responsibilities for various portions of the collection system.

SMSD has jurisdiction over all connections to the sanitary sewer system and enforces grease ordinances for commercial operations (Springfield Metro Sanitary District, SUO). Private residence grease control enforcement is the responsibility of the City (City of Springfield, SUO).

C. Water Quality Monitoring

The City does not monitor water quality. All flows from the City's collection system are received by the SMSD. The SMSD operates the treatment facilities and monitors water quality at the treatment facilities.

D. Hydrogen Sulfide Monitoring and Control

All sewer gas odor complaints are investigated. The Sewer Division receives only a handful of these complaints each year. Typically after checking the sewer main for problems, residents are advised to make sure and keep the traps in their plumbing fixtures filled to block gasses from entering the building. Known areas of reoccurring complaints are inspected and cleaned regularly. Low flows in the combined sewer system during dry periods of the summer typically generate the most calls from residents. Inlet traps on the combined sewer system dry out during extended periods of dry weather. Sewer Division personnel flush hydrants or run water from combination trucks into the traps to minimize the sewer gas escaping from the system.

E. Safety

The Office of Public Works has a safety committee which meets monthly to review and discuss safety related issues. Management and Operations staff are represented on the committee. OPW employs a full time Safety Officer to facilitate safety issues. The Safety Officer is responsible for investigation of all reported incidents.

Formal safety training is presented by both in house and contracted personnel. Training schedules and participants are described in Section III-B.

F. Emergency Preparedness and Response

The Sewer Division maintains an Overflow Emergency Response Plan (OERP) (City of Springfield, OERP, 2013) which details procedures, equipment and processes dealing with emergencies. This plan is reviewed and updated annually. Key personnel and equipment are identified in the plan.

G. Modeling

Modeling of the sewer system has not been performed. The SMSD has modeled the combined sewer system for use in developing the Long Term Control Plan (LTCP). Other modeling efforts are anticipated with future sewer evaluations.

H. Engineering – System Mapping and As-built Plans

The Sewer Division uses a GIS system to maintain maps of the collection system. Originally the GIS maps were produced from record drawings of the entire system. GPS surveys of the system have updated portions of the map as various studies and projects studies have been completed. Currently the Sewer Division considers the entire collection system to be mapped, but at a mapping grade quality. The Sewer Division has begun locating all sewer assets with a survey grade GPS in order to update the accuracy of all maps. Best practices for asset collection and management are currently being developed to facilitate defining the standardized methods of data collection. Once this process is standardized, the collection effort can be delegated either to additional staff or outside consultants. It is anticipated to have a defined best practice completed in 2014 in conjunction with upgrades to the AMS. Once this is completed a program will be developed to complete survey grade mapping of the entire system.

Due to regulations concerning the city owned electric power plant, there is a security policy which prevents the publication of a publicly viewable system map of the city's sewer collection system. Paper maps of portions of the collection system are distributed to interested parties on an as needed basis. Electronic GIS data can be approved for distribution to interested parties through a data license agreement.

Chronic SSO locations are published in the OERP (City of Springfield, OERP, 2013).

As-built plans are required of all new construction. Information from these as-built plans is entered into the GIS system for inclusion in the asset management workflow.

Paper maps showing the data present in the GIS system are printed and updated approximately once per year or as major changes require. Paper maps provide an alternative backup set of data that can also be utilized by personnel without computer access.

All available information about sewer assets is recorded in the GIS system.

Sewer assets are given a unique identifier based on location. This identifier is referenced to the quarter section designators utilized in the tax parcel identification system.

I. Engineering – Design

The Sewer Division relies on industry standard publications for design criteria and standard construction details. Current documents include:

- *Standard Specifications for Water and Sewer Main Construction in Illinois Sixth Edition* (ISPE, Standard Specifications for Water and Sewer Main Construction in Illinois, 7th Edition)

- *Illinois Recommended Standards for Sewage Works* (Illinois Administrative Code, Title 35, Part 370)

The design review for proposed construction involves both engineering staff and operations personnel to ensure that new projects meet both design standards and address any future maintenance concerns.

Design specifications for CIPP projects are currently being developed.

J. Engineering – Capacity

Sewer capacity is generally address by the SMSD and the capacity of the interceptor lines which they maintain. Development is typically limited to 15 P.E. per acre as this was the design criteria for construction of the interceptor lines.

IEPA sewer construction and operation permit applications require certification by the collection system owner, the intermediate system owner and the treatment works owner as to the adequacy of the system to handle proposed additional flows.

K. Engineering – Construction

Typically new construction is performed by the developer of the property being served. Construction contractors must be prequalified by both the City and SMSD to perform work on both new and existing sanitary sewers.

Construction inspection is required full time during sanitary sewer construction. The developer is required to provide a full time inspector who is directly supervised by a Licensed Professional Engineer. City Engineering Technicians also oversee construction projects.

As per the *Standard Specifications for Water and Sewer Main Construction in Illinois*, (ISPE, Standard Specifications for Water and Sewer Main Construction in Illinois, 7th Edition) new sanitary sewer mains and lateral construction is allowed to be tested by air, infiltration or exfiltration depending on site conditions. All new sanitary sewer main construction is televised by the Sewer Division before acceptance by the City.

The Sewer Division has also adopted the NASSCO PACP, LACP and MACP standard inspection format and rating system to identify and prioritize existing infrastructure for rehabilitation or repair.

L. Pump Station Operation

The Sewer Division maintains two storm water pump stations at railroad underpasses. These pump stations connect to the combined sewer system and only service storm runoff entering the underpass. No sanitary sewer services are connected to these pump stations. There is no threat of a sewer overflow occurring if either of these pumps stations fail.

Both pump stations have auto-dialers which alert personnel of high water and failure conditions. Both stations are currently being upgraded to provide web based reporting.

Wet wells at both stations are cleaned twice each year. Inlets tributary to the wet wells are cleaned four times per year, or as needed. The South Grand pump station was upgraded with new pumps and controls in 2009. The Cook Street pump station has original pumps and controls from the construction of the station in the 1980's.

Since the pump stations only transfer storm water, they are not considered critical to the continuous operation of the collection system. The Sewer Division does not maintain a parts inventory for these pump stations. Both stations have multiple pumps in case of pump failure. All pumps are able to be activated manually in case of control system failure. The Division maintains portable pumps suitable for dewatering the underpasses if the in place pumps are completely out of service.

Each fiscal year, the Sewer Division includes a budget line item for pump station emergency repair in case one of the pump stations requires a major pump or control replacement.

1. Inspections

Each pump station is inspected twice per year and also any time an alarm is triggered. Trash and debris is removed from the wet wells and system functions are checked. Maintenance records for work at the pump stations are kept in the asset management system.

2. Emergencies

Both pump stations are equipped with auto-dialers which call the Sewer Division office and Sewer Division personnel during emergency situations. Two pumps are available at each station to provide redundancy in case of pump failure. Power loss requires notification to CWLP.

3. Emergency Response and Monitoring

Elapsed run time meters are located on each pump. Sewer Division personnel inspect and monitor pump run times for unusual activity. The installed auto-dialers notify the Sewer Division Office and personnel of high water conditions. The high water conditions usually occur during rainfall events which exceed the capacity of the downstream receiving system. Street flooding is likely to occur during these events. Public Works staff and/or Police block access to the underpass during these flooding conditions to prevent the public from attempting to cross the flooded underpass.

4. Recordkeeping

Scheduled maintenance activities are recorded in the asset management system. Elapsed run time meter reading are recorded by Sewer Division staff. Upgrades to the monitoring system underway at both stations will allow for automated electronic records of pump run times and well levels.

5. Force Mains and Air/Vacuum Valves

The pump stations maintained by the Sewer Division are somewhat unique in that they do not incorporate traditional force mains. These pump stations at railroad underpasses serve to lift water into a gravity system located next to the actual pumps. As such there is no traditional force main to maintain.

V. Equipment and Collection System Maintenance

A. Maintenance Budgeting

Maintenance costs associated with work orders are tracked in the asset management system. Cost for personnel, equipment and materials for each work order are assigned as work orders are closed. Standard rates for various activities are updated in the AMS yearly. This allows staff the ability to track costs associated with certain activities and make adjustments to budget line items as needed.

Five basic activity categories are defined in the budget:

0DEP – Depreciation

This activity category contains expenses related to unscheduled repairs to the collection system. Generally this work is contracted out as emergency repairs. Through the City's Office of Budget and Management, a yearly contract is being awarded to two sewer contractors for the work performed in this category. This will allow Sewer Division staff access to a preauthorized yearly spending amount with multiple contractors to perform emergency work as needed without delays.

0TAP- Lateral Repair

This activity category contains expenses related to work performed on private laterals in the right of way. The city has an ordinance which reimburses residents for work performed on the portion of their private lateral which is located on public right of way.

BOND – Debt Service

This activity category contains expenses related to bond or loan payments. These payments are for previous capital improvement projects.

SEWR – Sewer Operations and Maintenance

This activity category contains expenses for day to day operations and includes such items as salaries, building expenses, various equipment, computers, fuel, and training expenses.

0SUR – Sewer Surplus

This activity category contains expenses for major purchases such as vehicle replacement and capital improvement expenditures.

Operations and management staff along with accounting department personnel monitor expenditures throughout the year. Accounting tracks encumbered and actual expenses against budgeted line items in the activity categories to track funds throughout the fiscal year. Certain expenditures are also controlled by preset spending limits imposed by city council. Expenditures above certain limits require various levels of upper management approval.

B. Planned Maintenance

Planned maintenance frequencies have been developed primarily through maintenance staff discussions with management. Good communication between maintenance staff and management has been the key to

identifying needed activities and their associated frequencies. Staff observations and citizen reports are also used to gauge the effectiveness of techniques and schedules.

Except for emergencies, all maintenance work is scheduled through the AMS by management staff.

The following manholes are cleaned weekly. These cleanings prevent backups due to problems with the line segments caused by mine subsidence in the area. The city relies on IDNR to determine when mine subsidence in the area has ceased so that corrective action can be made to restore proper operation of the system.

Address	Manhole ID	Cause
312 Natchez Trace	1325EF004	Mine Subsidence
17 Forest Green	1325EF016	Mine Subsidence
3609 Maple Glen	1325EF018	Mine Subsidence
309 Thames River	1336AB016	Mine Subsidence

The following line segments are cleaned weekly.

Address	Line Segment	Cause
3031 Stanton Street	2211EF058-2211EF040	Dip in line
2645 N Dirksen Parkway	1413GH005-1413GH002	Restaurants

C. Maintenance Scheduling

The Operations Coordinator is responsible for planning, prioritization, and scheduling preventative and corrective maintenance activities. Corrective repair work is generally performed immediately upon discovery. Generally there is a minimal amount of backlog in corrective work to be performed.

O&M performance is tracked through the AMS. Monthly reports are produced from daily work order entries and distributed to management staff (City of Springfield, MR, 2012).

Maintenance for other city entities is performed as scheduling permits. Typically this involves storm sewer or culvert cleaning activities. These activities and associated costs are tracked through the AMS and billed to the appropriate department.

D. Maintenance Right-of-Way

The Street Division of OPW maintains easements identified as needed for access to infrastructure. Sewer Division staff maintain and monitor areas around manholes identified as needed for access for vegetation growth. Manholes are located and raised as needed. Current mapping efforts help to identify buried manholes and enable operations staff to prioritize raising them.

E. Sewer Cleaning

The Sewer Division has developed a Condition Based Maintenance (CBM) Program to prioritize collection system cleaning operations.

Historically, it has not been the goal of the city to clean the entire collection system within a given amount of time. It has been the philosophy of the city that not all sewer line segments require the same cleaning frequency. Certain line segments, especially in the combined sewer areas do not require cleaning on a regular 3 to 5 year interval as is typically suggested. Many of these line segments receive significant enough flow rates to

essentially self clean during large rain events. There is also evidence that repeated high water pressure cleanings can accelerate the deterioration of older brick and mortar constructed sewers by removing mortar and dislodging bricks which can result in a weakening of the sewer and lead to a premature collapse or failure. Likewise, the city experiences very few issues with newer PVC sewer pipes installed in newer residential subdivisions. New infrastructure is required to be designed to maintain velocities which promote self cleaning. New infrastructure is inspected during construction and is CCTV'd before acceptance by the city to identify any issues which may cause future maintenance problems. Problem areas with newer infrastructure are typically related to grease issues from larger apartment complexes and restaurants. A majority of these areas are identified on preventative maintenance schedules and account for a large percentage of line segments which are repeatedly cleaned each year. Historically it has not been a priority to devote cleaning operations to newer residential areas that do not create identifiable needs for cleaning.

This CBM program would focus cleaning efforts on the line segments identified as having a higher potential for blockage creating a backup or overflow and less effort on line segments with a low potential for blockage or overflow. Focusing cleaning efforts to clean the worst pipes first should have the effect of reducing overflows versus blanket cleaning of the entire system which would expend time and effort cleaning good lines unnecessarily.

A breakdown of the collection system based on material type was performed. Typically any maintenance, inspection or rating of the individual sewer line segments occurs over the entire sewer line segment regardless of length, and in general any maintenance, inspection or rating of an individual line segment requires approximately the same amount of time regardless of length when factors such as crew transit time and setup time are considered. For these reasons, during this analysis it was decided to analyze data and results based on the number of line segments in the collection system. The table below identifies linier footage for sewer line segments in the city's collection system based on size and material type. This breakdown identifies 10,359 total sewer line segments each with an average length of 253 feet.

To be able to identify and target cleaning operations to the sewer line segments which actually require cleaning instead of simply blanket cleaning the entire collection system, the Sewer Division has purchased the Sewer Line Rapid Assessment Tool (SL-RAT) by Infosense and hired two temporary employees for 6 months to run the system. This system uses sound waves transmitted through sewer line segments to rate the segment on a scale of 0 to 10 with a reported score of 0 indicating a complete blockage an a score of 10 being a line segment in good condition. Typically line segments scoring a 6 or less would be identified as requiring cleaning.

In the previous 4 months of use the Sewer Division has been able to identify the best use of the SL-RAT for the city's collection system. It has been found that scores produced by the system are most reliable in the relatively newer sewer line segments constructed of Polyvinyl Chloride (PVC), Concrete Non-Reinforced (CP), and Cured In Place (CIPP) materials. Sewer line segments constructed of Brick (BR), Reinforced Concrete (RCP) and Vitrified Clay (VCP) materials have had much less consistency in producing actionable scores. Other various material types have mixed results, but make up a very small percentage of the collection system.

Of the 10,359 total sewer line segments, 7,329 are identified to be inspected and scored with the SL-RAT. At the current rate of 2400 per year, with inspection occurring over a 6 month period, it is estimated to take three years to complete the SL-RAT inspections. It is anticipated that subsequent inspections will take less time to do as there are delays with the initial round on inspections related mainly to finding and uncovering buried manholes.

The PVC, CP and CIPP material types make up 65% of the collection system. The BR, RCP and VCP material types make up 30% of the system. The other various material types Cast Iron (CAS), Ductile Iron (DIP) and Reinforced Plastic (RPM) including those sewer line segments which have no material identification type (NULL) or are otherwise unknown (ZZZZ) make up the remaining percentage.

From current assessment results for the PVC, CIPP, CP, CAS, DIP, RPM, NULL and ZZZZ material types, the percentage of “Good”, “Fair” or “Poor” rated sewer line segments has been projected across the total number of sewer line segments to calculate the projected number of line segments requiring either cleaning, CCTV inspection or both.

Due to the inconsistencies in SL-RAT inspection scores of the BR, RCP, and VCP sewer line segments, it was determined that these material types will not be assessed with the SL-RAT and that all segments will require both cleaning and CCTV inspection. These material types are most prevalent in the older parts of the city which are served by a combined sewer system which tend to self flush during large storm events.

The Operations & Maintenance Schedule chart shows the historic yearly cleaning and CCTV inspection totals based on the number of sewer line segments cleaned or inspected, along with the proposed yearly line segment totals for those activities and the SL-RAT Inspections. Historic yearly totals for cleaning and CCTV inspections are known to be low because of inconsistencies in the current asset management database.

A goal of 1800 sewer line segments cleaned per year is based on both the historical high number of 1843 set in 2013 and on data recorded over the last year on a tracking system installed in one of the combination sewer cleaning vehicles. The projected SL-RAT inspection data identifies 5096 out of 10,359 sewer line segments which will require cleaning. The Sewer Division operates five combination sewer cleaning vehicles. Dividing the 5096 identified segments equally among the five crews, results in each crew performing 1019 cleanings to complete the projected work identified by the SL-RAT. At 1800 cleanings per year, it is estimated to take just under three years to complete the work identified by the SL-RAT, which also includes cleaning of sewer line segments not inspected by the SL-RAT.

All stoppages identified in the system are inspected using CCTV equipment to aid in determining the cause. All information about stoppages is recorded and tracked in the AMS. Annual reports are produced summarizing cleaning and stoppage/overflow information.

Sewer Division staff are engaged is researching and evaluating new products and techniques which could improve on the CBM Program.

Areas with chronic problems are assessed by operations personnel for frequency of maintenance and/or corrective action.

In calendar year 2013, there were 13 reportable SSO events and a total of 39 various backup events. This equates to a stoppage rate of less than 8 events per 100 miles.

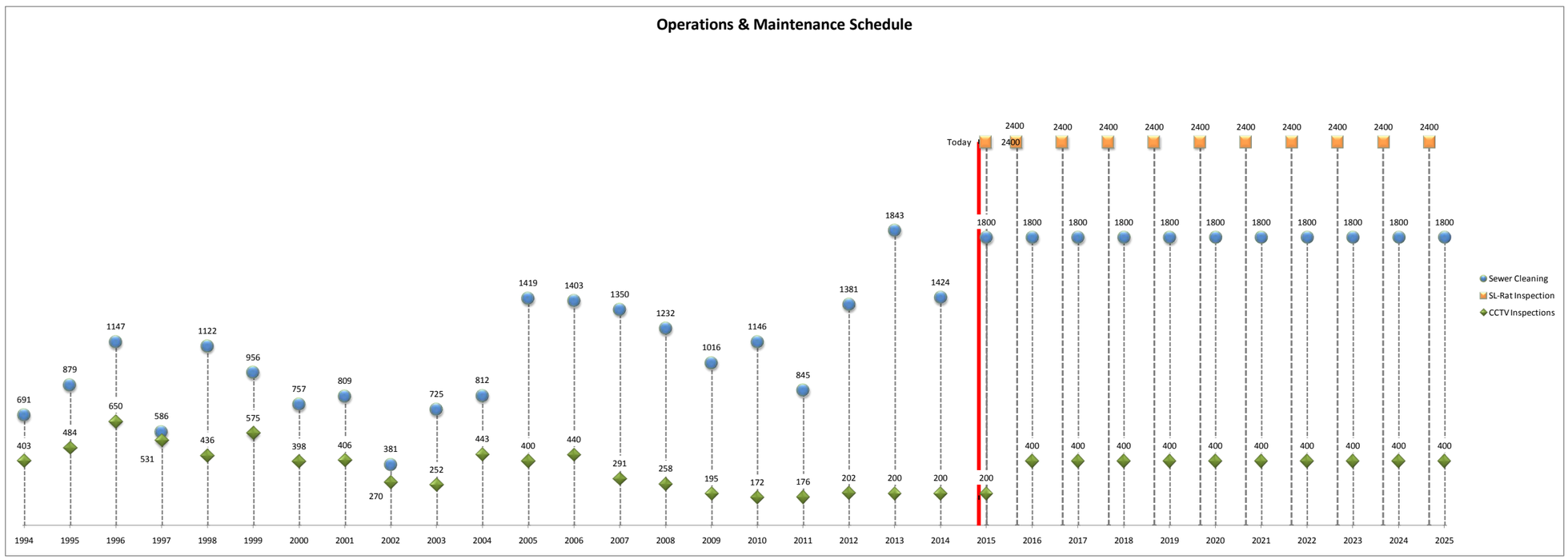
Size / Material	BR	RCP	VCP	CAS	DIP	RPM	NULL	ZZZ	CP	CIPP	PVC
6	0	0	1,834	0	0	0	0	625	0	0	458
8	0	0	119,019	911	93	65,324	0	27,399	321,917	18,493	711,192
10	327	0	48,482	0	0	4,632	0	8,572	67,159	5,531	133,456
12	1,711	152	237,588	169	0	6,165	0	8,844	67,200	9,222	65,091
15	3,522	210	47,444	0	283	120	0	1,780	20,992	2,764	41,399
18	16,480	693	91,957	0	0	0	0	3,976	22,912	1,097	16,340
20	353	0	0	0	0	0	0	0	0	0	0
21	7,511	0	5,213	0	0	0	0	0	5,013	0	0
24	95,401	1,067	10,683	0	136	0	0	1,970	26,366	2,761	21,037
27	3,317	0	253	0	0	0	0	259	5,232	0	191
30	23,730	0	2,424	0	0	0	0	2,564	22,744	995	0
33	2,089	0	430	0	0	0	0	0	3,668	395	0
34	0	0	0	0	0	0	0	0	0	307	0
36	20,768	88	2,087	0	0	0	0	2,205	13,889	1,051	0
38	18	0	0	0	0	0	0	778	0	408	0
40	667	0	0	0	0	0	0	0	0	0	0
42	6,721	387	0	0	0	0	0	62	8,378	0	0
44	324	0	0	0	0	0	0	0	139	0	0
48	7,823	664	204	0	0	0	0	2,752	9,334	0	0
54	2,033	807	0	0	0	0	0	484	9,031	0	0
60	7,279	1,160	0	0	0	0	0	363	8,594	0	0
66	200	0	0	0	0	0	0	979	7,802	0	0
72	4,107	659	0	0	0	0	0	0	13,277	0	0
78	0	802	0	0	0	0	0	0	3,233	0	0
84	2,109	0	0	0	0	0	0	492	3,570	0	0
90	0	0	0	0	0	0	0	0	2,073	0	0
96	306	0	0	0	0	0	0	1,917	845	0	0
108	0	0	0	0	0	0	0	0	1,138	0	0
120	485	0	0	0	0	0	0	440	784	0	0
144	0	0	0	0	0	0	0	0	207	0	0
168	0	0	0	0	0	0	0	0	657	0	0
180	0	0	0	0	0	0	0	0	25	0	0
NULL	0	0	0	0	0	0	0	0	0	0	0
0	350	0	1,522	0	0	0	0	14,711	0	0	0
-1	0	100	0	0	0	0	0	0	0	0	0

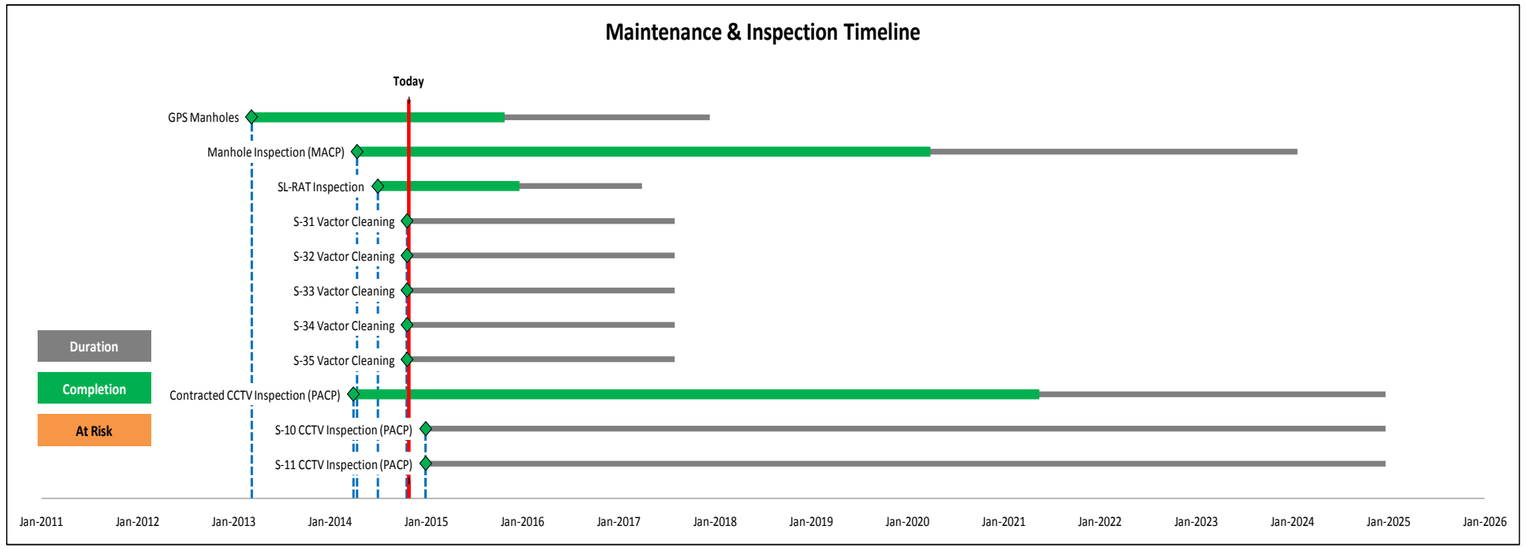
Pipe Diameter *	# of Segments	Ave Segment Length (ft)
6	15	194
8	5,144	246
10	1,007	266
12	1,517	261
15	438	271
18	588	261
20	1	353
21	61	291
24	623	256
27	38	243
30	220	238
33	31	212
34	1	307
36	153	262
38	5	241
40	1	667
42	55	283
44	4	116
48	83	250
54	39	317
60	72	242
66	23	390
72	57	317
78	10	403
84	25	247
90	3	691
96	12	256
108	5	228
120	6	285
144	2	103
168	7	94
180	1	25
NULL	1	0
0	109	152
-1	2	50

Material	BR	RCP	VCP	CAS	DIP	RPM	NULL	ZZZ	CP	CIPP	PVC
Segments	790	28	2,196	5	5	304	0	381	2,543	171	3,920
Ave Segment Length	263	242	259	216	102	251	-	213	254	252	252
Length (Feet)	207,632	6,789	569,140	1,080	512	76,242	0	81,173	646,180	43,024	989,163
Length (Miles)	39.3	1.3	107.8	0.2	0.1	14.4	0.0	15.4	122.4	8.1	187.3
% of System	8%	0%	22%	0%	0%	3%	0%	3%	25%	2%	38%

Totals	# of Segments	Ave Segment Length (ft)
	10,359	253

Operation Required / Material	BR	RCP	VCP	CAS	DIP	RPM	NULL	ZZZ	CP	CIPP	PVC	
% of Segments with 'Good' SL-Rat Assesments (Projected)		0%				50%			60%	70%	80%	
SL-Rat 7-10 Assesment (Projected) - No CCTV or Cleaning Required	0	0	0	3	3	152	0	191	1,526	120	3,136	5,129
% of Segments with 'Fair' SL-Rat Assesments (Projected)		0%				25%			20%	20%	10%	
SL-Rat 0-6 Assessment (Projected) - Cleaning w/ no CCTV Required	0	0	0	1	1	76	0	95	509	34	392	1,109
% of Segments with 'Poor' or 'Blocked' SL-Rat Assesments (Projected)		0%				25%			20%	10%	10%	
SL-Rat 0-3 Assessment (Projected) - Cleaning & CCTV Required	0	0	0	1	1	76	0	95	509	17	392	1,091
% of Segments with No SL-Rat Assesments (Projected)		96%				0%				0%		
No Acoustical Inspection Performed - Cleaning & CCTV Required	696	11	2,189	0	0	0	0	0	0	0	0	2,896
% of Segments with Other Methods of Cleaning & Inspection		4%				0%						
Contract / Self Clean (> 48")	94	17	7	0	0	0	-	104	238	0	0	460


Operations & Maintenance Schedule
Today
Sewer Cleaning
SL-Rat Inspection
CCTV Inspections
1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025
691 879 1147 586 1122 956 757 809 381 725 812 1419 1403 1350 1232 1016 1146 845 1381 1843 1424 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800
403 484 650 531 436 575 398 406 270 252 443 400 440 291 258 195 172 176 202 200 200 200 400 400 400 400 400 400 400 400 400 400 400
2400


Maintenance & Inspection Timeline
Today
GPS Manholes
Manhole Inspection (MACP)
SL-RAT Inspection
S-31 Vactor Cleaning
S-32 Vactor Cleaning
S-33 Vactor Cleaning
S-34 Vactor Cleaning
S-35 Vactor Cleaning
Contracted CCTV Inspection (PACP)
S-10 CCTV Inspection (PACP)
S-11 CCTV Inspection (PACP)
Duration
Completion
At Risk
Jan-2011 Jan-2012 Jan-2013 Jan-2014 Jan-2015 Jan-2016 Jan-2017 Jan-2018 Jan-2019 Jan-2020 Jan-2021 Jan-2022 Jan-2023 Jan-2024 Jan-2025 Jan-2026

		Quantity					Time						Delay		
Description	Units	Prior to Start	Since Start	to Date	Complete	Remaining	Start Date	End Date	Days Past Start (Cal Days)	Completion (Cal Days)	Duration (Cal Day)	% Complete	Height	% Delay	Start Date
							10/30/2014			0%	0%	0%	2300		
							10/30/2014			0%	0%	0%	100		
GPS Manholes	Manhole	2,118	3,275	5,393	9,663	4,270	3/10/2013	12/18/2017	599	963	1744	55.2%	2200	1.3%	12/18/2017
Manhole Inspection (MACP)	Manhole	0	1,200	1,200	9,663	8,463	4/15/2014	1/31/2024	198	2,182	3,579	61.0%	2000		
SL-RAT Inspection	Segment	0	1,490	1,490	7,329	5,839	7/3/2014	4/3/2017	119	539	1005	53.6%	1800		
S-31 Vactor Cleaning	Segment	0	0	0	1,019	1,019	10/22/2014	8/6/2017	8	0	1019	0.0%	1600		
S-32 Vactor Cleaning	Segment	0	0	0	1,019	1,019	10/22/2014	8/6/2017	8	0	1019	0.0%	1400		
S-33 Vactor Cleaning	Segment	0	0	0	1,019	1,019	10/22/2014	8/6/2017	8	0	1019	0.0%	1200		
S-34 Vactor Cleaning	Segment	0	0	0	1,019	1,019	10/22/2014	8/6/2017	8	0	1019	0.0%	1000		
S-35 Vactor Cleaning	Segment	0	0	0	1,019	1,019	10/22/2014	8/6/2017	8	0	1019	0.0%	800		
Contracted CCTV Inspection (PACP)	Segment	704	161	865	1,865	1,000	4/1/2014	1/1/2025	212	2,611	3928	66.5%	600		
S-10 CCTV Inspection (PACP)	Segment	0	0	0	1,495	1,495	1/1/2015	1/1/2025	0	0	3653	0.0%	400		
S-11 CCTV Inspection (PACP)	Segment	0	0	0	2,492	2,492	1/1/2015	1/1/2025	0	0	3653	0.0%	200		

1. Cleaning Equipment

The Sewer Division maintains a fleet of cleaning equipment consisting of five combination vacuum and jetter trucks and one easement jetter. The Sewer Division purchases Vactor equipment. The vehicle replacement program identifies cleaning equipment to be replaced on a 10 year schedule.

All equipment is housed indoor at the OPW Sewer Facility.

2. Chemical Cleaning and Root Removal

The Sewer Division incorporates the use of mechanical cutting and chemical foaming for root control. Root cutting generally occurs when issues are discovered. Line segments with roots are tracked in the AMS and a foaming program is prepared twice each year to apply chemical control to identified segments. This foaming program is done in house with staff personnel licensed and trained in pesticide application. The Sewer Division utilizes a truck mounted Vaporooter system for application.

FOG control is generally treated with the use of enzymes. Chronic problem areas identified by operations staff are dealt with on an individual basis. Common resolutions involve contacting the FOG generators and discussing the issues with them. Typically educating the generators resolves the issue. SMSD is contacted for further enforcement if required.

F. Parts Inventory

Critical spare parts needed for emergency corrective action to the collection system are maintained and stored at the Sewer Facility yard. The repair crew supervisor tracks parts inventory and use in the AMS. Salvaged parts are recycled if appropriate. The Sewer Division maintains accounts with multiple material suppliers for parts not kept on hand.

The Sewer Division considers manhole covers, inlet grates and inlet castings as critical spare parts to maintain on hand for immediate replacement if broken or stolen. A minimum of ten manhole covers are maintained on site and a minimum of five inlet replacement grates and castings are maintained on site.

Equipment parts inventory is maintained by the Office of Budget and Management at the Fleet Maintenance Facility.

G. Equipment and Tools Management

Equipment and tools are managed by the Office of Budget and Management. Records are kept for all equipment including maintenance logs and procedures. Equipment replacement is based either on the Sewer Division's Equipment Inventory & Replacement Program (City of Springfield, EIRP, 2014) or on review and recommendation Sewer Division management staff or maintenance staff assigned to the equipment. All Sewer Division equipment is stored at the Sewer Facility. The Sewer Division maintains accounts with area vendors for mechanical work if it cannot be performed in house.

In October 2014, the city consolidated all city mechanics into one fleet maintenance operation under the Office of Budget and Management. All mechanic operations are now the responsibility of the Office of Budget and Management.

VI. Management Information Systems: Performance Indicators

Through the use of the AMS, the Sewer Division documents all SSO's. Backups caused by problems in private laterals are investigated, but not considered SSO's.

The USEPA Administrative Order issued to the City of Springfield defines what is considered and SSO and what the corresponding reporting requirements are. Annual reports are produced describing SSO's that have occurred.

Chronic SSO locations are delineated in the OERP (City of Springfield, OERP, 2013).

Program elements as contained in the Monthly Report (City of Springfield, MR, 2012) are to be updated and monitored for year over year changes. Significant deviations from historical averages are to be analyzed to monitor changes in production and verify data quality.

Key Performance Indicators (KPI's) are contained in the Operations & Maintenance Schedule shown above. The Sewer Division has a goal of 2400 sewer line segments inspected wit h the SL-RAT each year, 1800 sewer line segments cleaned each year, and 400 sewer line segments CCTV inspected each year. These numbers are to be considered as cleaning or inspections on individual sewer line segments. Multiple cleaning or inspection of the same sewer line segment is not to be counted multiple times.

Additional KPI's identified include obtaining survey grade asset location information using a GPS system to update the GIS mapping of the collection system and performing manhole inspections according to the MACP Level 1 standards. Based on current production, GPS System mapping has an anticipated completion date of December, 2017. Based on the expected production pace of the manhole inspections, the Sewer Division has identified a completion date of January, 2024 for inspection of every manhole in the collection system. Both of these KPI's have the potential to change significantly due to future work which may be required.

KPI's are to be tallied monthly and projected forward over the course of the next year. This data is to be evaluated at least monthly, or as appropriate to determine the progress of the implementation of the CBM Program and to determine if the work being performed is on pace to meet the KPI goals.

This CMOM plan is to be viewed as a living document to be reviewed by the Sewer Engineer and the Operations Coordinator on an annual basis for updates to the program elements. KPI goals versus their actual performance are to be documented in an annual report. Other significant program elements, anticipated timelines and general goals identified in the CMOM plan are to also be discussed within the annual report. As part of the annual report, an evaluation of the previous annual reports will be performed to identify program elements lacking implementation progress. Recommendations will also be made to either change CMOM program element goals or to modify the implementation effort. Additionally this plan and subsequent annual reports are to be made available to OPW staff and the general public for review and comment.

VII. Sewer System Capacity Evaluation

A. Internal TV Inspection

The OPW Sewer Division maintains two CCTV inspection vehicles. Current staff levels only allow for one CCTV crew. Additional staffing has been hired in 2014 to fulfill vacant positions allowing for two full time CCTV inspection crews. Training of new staff has been underway and two full time CCTV Inspection crews are expected to be operational in January, 2015.

The Sewer Division utilizes Ques CCTV inspection equipment and the associated Granite XP inspection software. Upgrades to the Granite XP inspection software were completed in January 2014. With the implementation of Cityworks AMS expected in January, 2015, all CCTV inspections will be linked to the AMS. The Sewer Divisions goal is to continue to stay current with industry inspection hardware, software and management systems which are geocentric in nature.

As part of this goal, the Division has adopted the industry standard PACP format issued by NASSCO for future pipeline rating and defect classifications. This will allow new hires and outside consultants to all have the same training and a common set of standards for assessing pipeline conditions. Nine division employees received training and certification in PACP, LACP and MACP in the first quarter of 2014.

As part of a sewer investigation study being performed, there will be approximately 7.5 miles of sewer televised under contract by an consultant. This will include both areas of initial investigation and areas previously identified for lining projects.

Current in house CCTV operations average approximately 10 miles per year.

With two operational CCTV inspection crews, the Sewer Division has set a goal of 400 unique sewer line segment inspections per year. It is anticipated that this production level will not keep pace with the number of line segments identified in the CBM Program to be inspected. This may result in the need for a third CCTV inspection crew, or the contracting of additional CCTV inspection work. This KPI will need to be monitored for pace and also evaluated during current and potential future sewer investigation studies as CCTV inspection work performed in conjunction with a study may overlap or supplement KPI goals for CCTV inspections.

B. Survey and Rehabilitation (general)

The first formal sewer study conducted in 1949 is considered the beginning of sewer rehabilitation work in the City of Springfield. This study recommended many projects for system improvement which were the basis for the establishment of the Sewer Fund and the associated sewer rates implemented in 1956. This original study was used throughout the following years as the basis for improvement projects and followed by subsequent studies, plans and improvement projects until the present day. The last formal sewer study was conducted in 2006 and recommended improvements in the Central Business District. Recommendations from this 2006 study are a large part of the current Capital Improvement Plan.

In April 2013 the City Council implemented measures to fund the Capital Improvement Plan through the use of the State Revolving Fund Program administered by the IEPA. A rate increase of five percent per year for the next 10 years was passed to fund the loan payments anticipated to be required by the CIP. The current CIP identifies approximately $55 million in projects. The SRF Program will be used to finance these projects.

C. Sewer Cleaning Related to I/I Reduction

The Sewer Division operates combination sewer cleaning trucks. These trucks clean sewers using both jet hoses to wash debris downstream and vacuum to remove debris. Maintenance crews determine the appropriate method based on the situation.

Sewers are typically cleaned before routine CCTV inspections.

D. Flow Monitoring

The Sewer Division currently has two ongoing flow monitoring programs.

The first program is managed by city staff and involves the installation of five flow meters throughout various portions of the collection system as determined by needs. These flow meters are maintained every three months or as needed. This city managed program is ongoing. Locations chosen for monitoring are based on current capacity questions which need to be analyzed. Currently some monitors are placed in locations of recent improvement projects to analyze the effectiveness of the projects. Other monitors are currently installed in a sewer shed which Crawford, Murphy & Tilly, Inc. modeled for the SMSD. Questions concerning post storm event flows in this sewer shed lead to the installation of several monitors within the sewer shed to attempt to isolate issues. Both of these programs are ongoing for the foreseeable future and results of the analysis of the flow data will help to determine if further action is necessary. Results may indicate a need for further study to identify improvement projects which can then be incorporated into the overall Capital Improvement Plan, or in the case of post construction monitoring programs, will indicate what degree of success was accomplished and may indicate a need for further action.

The second flow monitoring program is currently being managed by the local consulting firm Crawford, Murphy & Tilly, Inc. This program was established in response to the Administrative Order the city received from the USEPA. This program consists of nine flow meters installed throughout the northeast area sewer shed. This is a main area of chronic capacity issues during wet weather events. Flow meters have been installed to isolate areas of the sewer shed and analyze wet weather responses in the system. Additional flow monitoring is expected as this program continues. This program was initially contracted for one year. This program will be extended on an annual basis for the foreseeable future. This initial purpose of this program was to collect flow data to use in developing a SWMM model of the sewer shed. Monitoring will remain in place to assess the post construction effectiveness of various improvement projects which will likely be recommended as part of the Alternatives Analysis required for this area by the Administrative Order. Crawford, Murphy & Tilly, Inc. is also performing the required Alternatives Analysis for the city.

Rain gauges are also currently managed in a similar fashion. The Sewer Division maintains both chart reading rain gauges and electronic tipping bucket gauges at two locations in the city. As part of the northeast area flow monitoring program, Crawford, Murphy & Tilly, Inc. maintains two additional electronic tipping bucket rain gauges in the sewer shed being studied. The gauges are maintained to collect actual rainfall data to be used during collection system modeling and also as a historical record of events.

While all of these programs will change somewhat in scope and purpose, it is the intent of the city to manage similar programs into the future. Other goals are to upgrade current city monitoring equipment to the same manufacturer as is currently being used for the northeast area study. This will have the benefit of equipment matching and compatible with that used by both the consultant and by SMSD. Existing flow monitors will be utilized until they show indication of malfunction and then replaced with other equipment. Additionally, new equipment will be connected via cell modem or other real time communication options so that events can be monitored and recorded in real time from remote locations.

E. Smoke Testing and Dyed Water Flooding

The Sewer Division does not have ongoing smoke testing and dyed water flooding programs. Smoke testing has been typically conducted as part of a specific sewer study or investigation. Dyed water flooding is typically performed in response to a specific problem.

F. Manhole Inspection

Historically, the Sewer Division has not had an ongoing manhole inspection program. Manhole inspections are typically performed as part of a specific sewer investigation or study. As a part of the Northeast Area sewer investigation study which will develop the alternatives analysis required by the AO, approximately 800

manholes will be inspected according to the MACP guidelines established by NASSCO. The Sewer Division has developed an ArcGIS Collector Application to facilitate mobile electronic manhole inspection data collection in the MACP format. The Sewer Division intends to analyze the results of these inspections and implement an annual manhole inspection program based off of this experience.

Manhole inspections have been identified as a KPI. A goal to perform 1200 manhole inspections per year has been identified. This KPI may be influenced by current or potential future sewer investigation studies. This KPI will also be evaluated for usefulness in readily identifying actionable maintenance or repairs or improvements beneficial to the collection system.

VIII. Rehabilitation

A. Manhole Repairs

The Sewer Division employs various methods for structure repair including grouting, lining and complete replacement. Manhole repair or replacement priorities are developed through inspections either during formal sewer evaluation studies or by observations of operations and maintenance staff. Manholes to be repaired are tracked in the AMS and repair or replacement projects are completed when determined to be necessary by staff. Typically several manholes are grouped into projects and repaired or replaced at the same time.

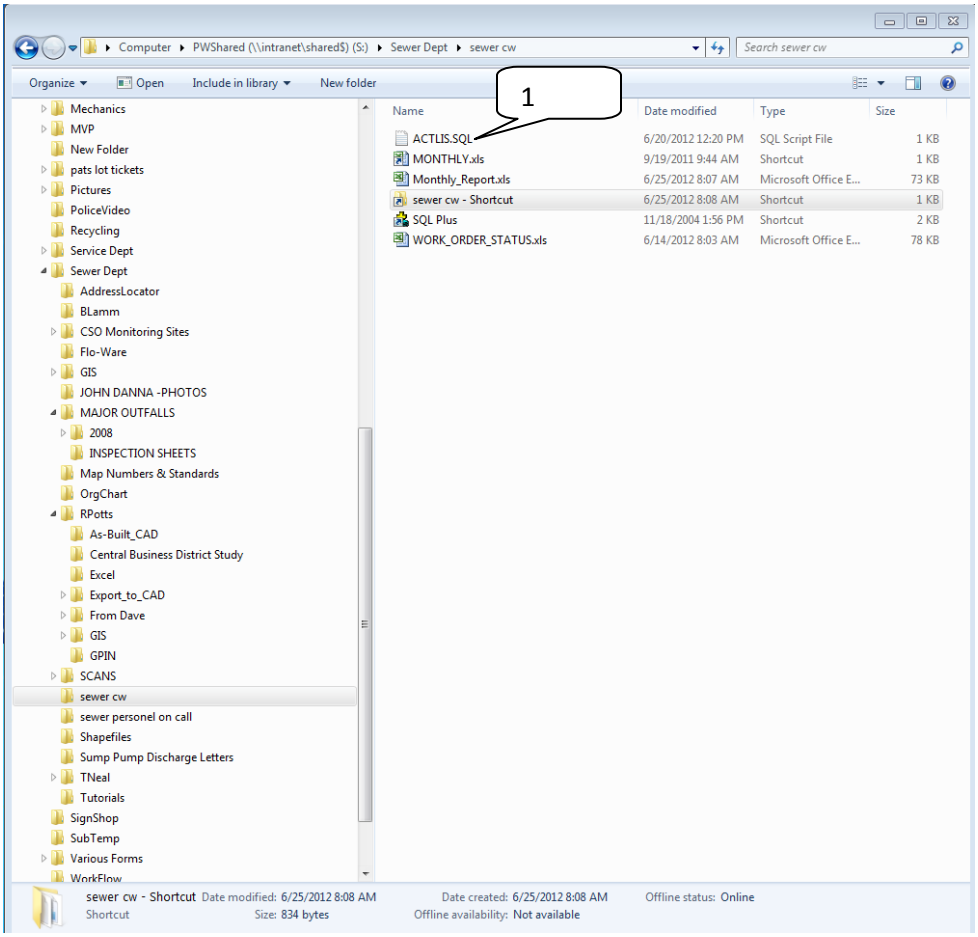
B. Mainline Sewers

The Sewer Division has utilized a variety of methods for mainline rehabilitation including open cut replacement, CIPP lining methods and pipe bursting. Priorities for repairs are typically defined by the Capital Improvement Plan, but can be adjusted by staff based on present need. All projects are monitored by staff and inspected by CCTV if warranted.

IX. APPENDIX –works cited other than online

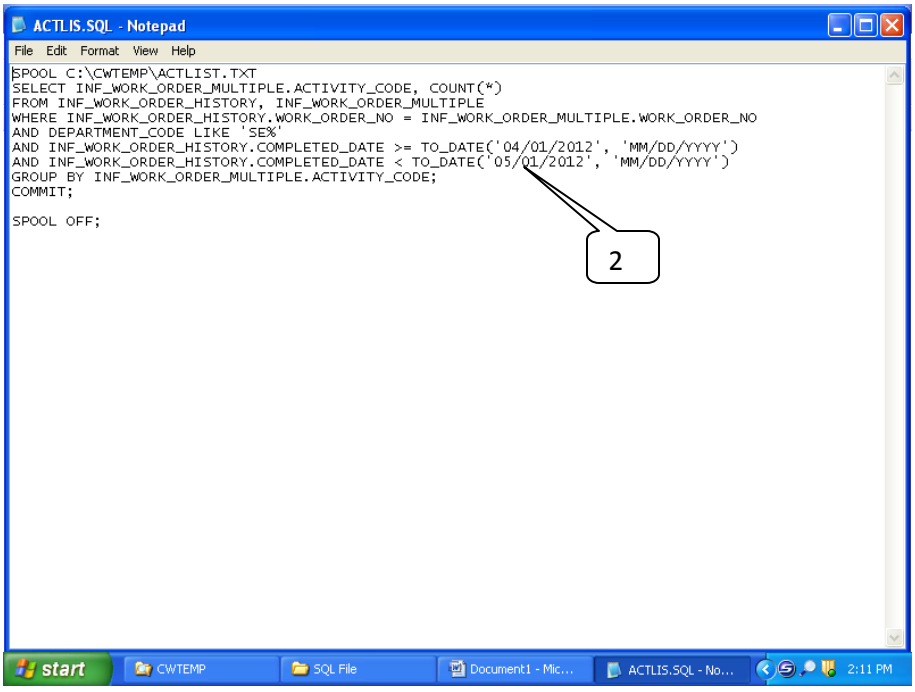
Monthly Report
Sewer Division
S:\Sewer Dept\Tutorials\Monthly Reports Tutorials.doc
6/22/2012

1) Locate file ACTLIS.SQL and open in notepad.
   S:\Sewer Dept\sewer cw

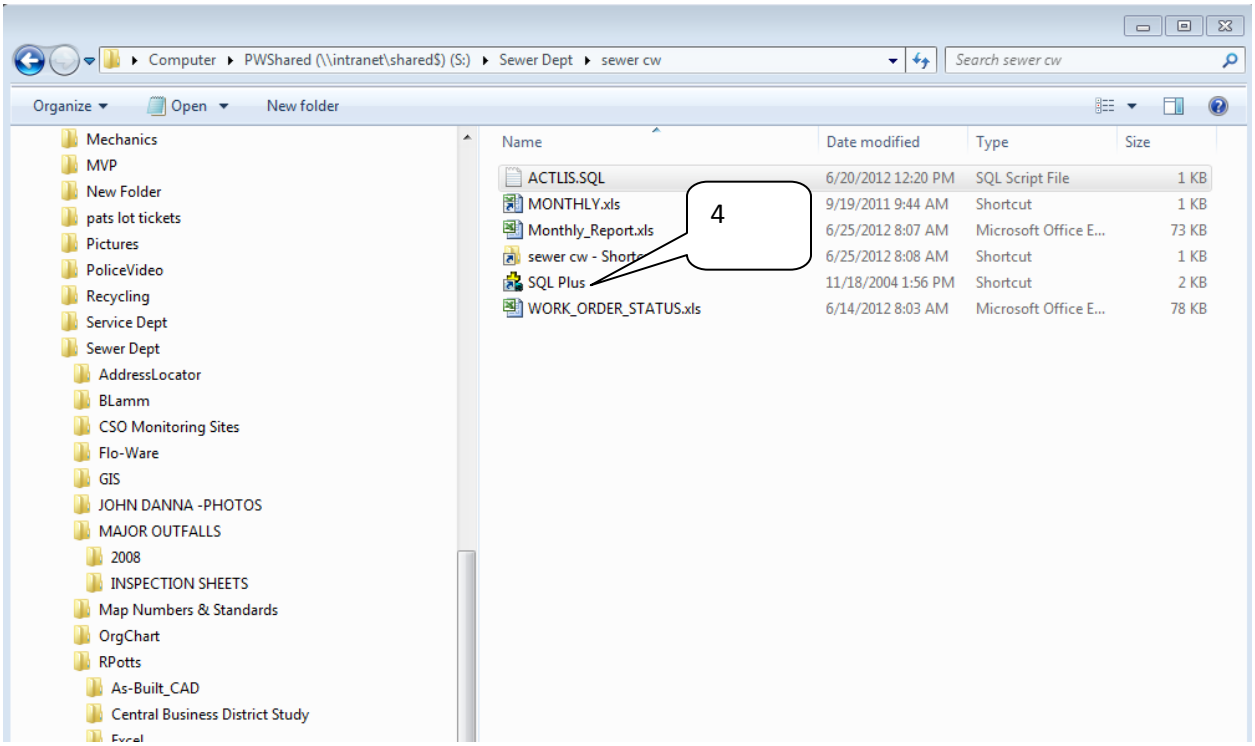


2) Change dates as appropriate

3) Highlight all text and copy to clipboard.



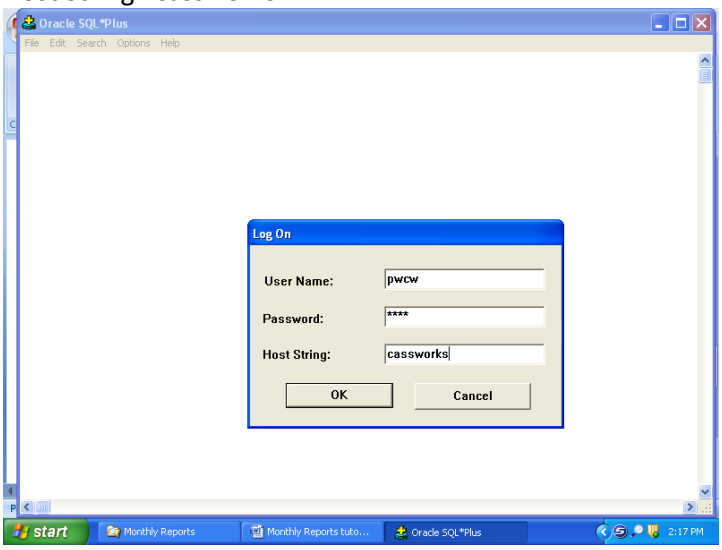
4) Start SQL Plus



5) Log In

UN: pwcw

PW: user
Host String : cassworks

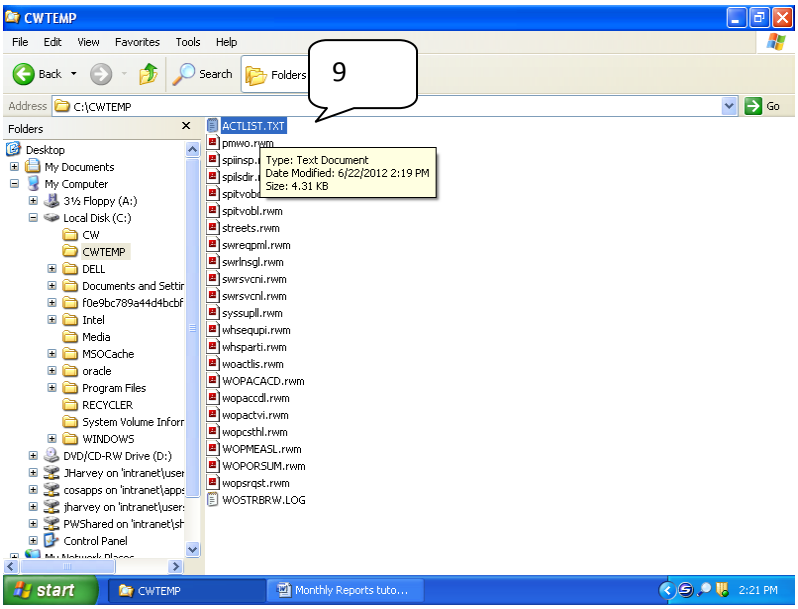


6) Use ctrl-V to paste sql statement into SQL Plus

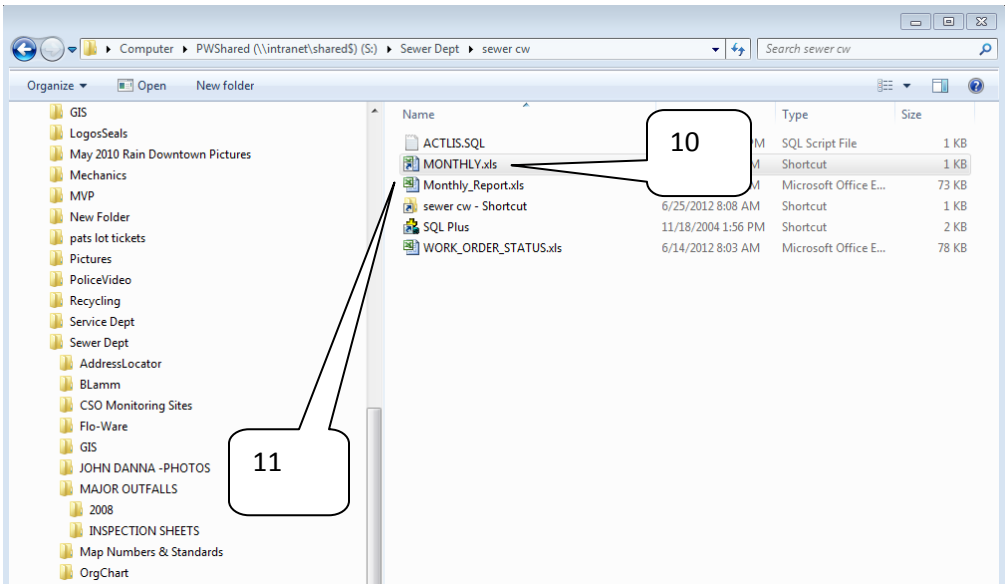
7) Type ";" and enter to end

8) Close SQL Plus

9) Open C:\CWTEMP\ACTLIST.TXT and print it out.



10) Open MONTHLY.xls and type in activity counts on the right hand side. See Step 26 for detail.

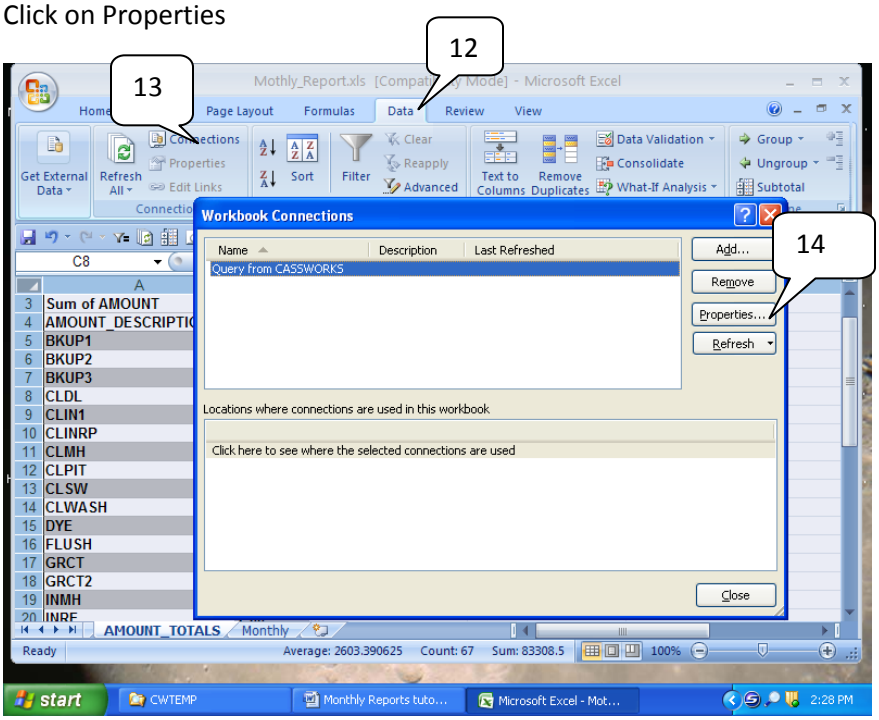


11) Open Monthly report.xls

12) Click on Data

13) Click on Connections

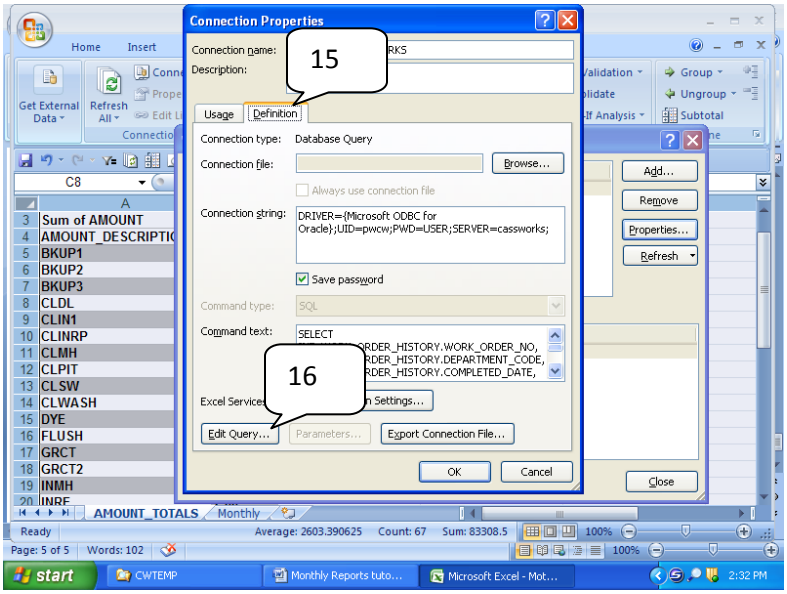
14) Click on Properties



15) Click on Definition

16) Click on Edit Query

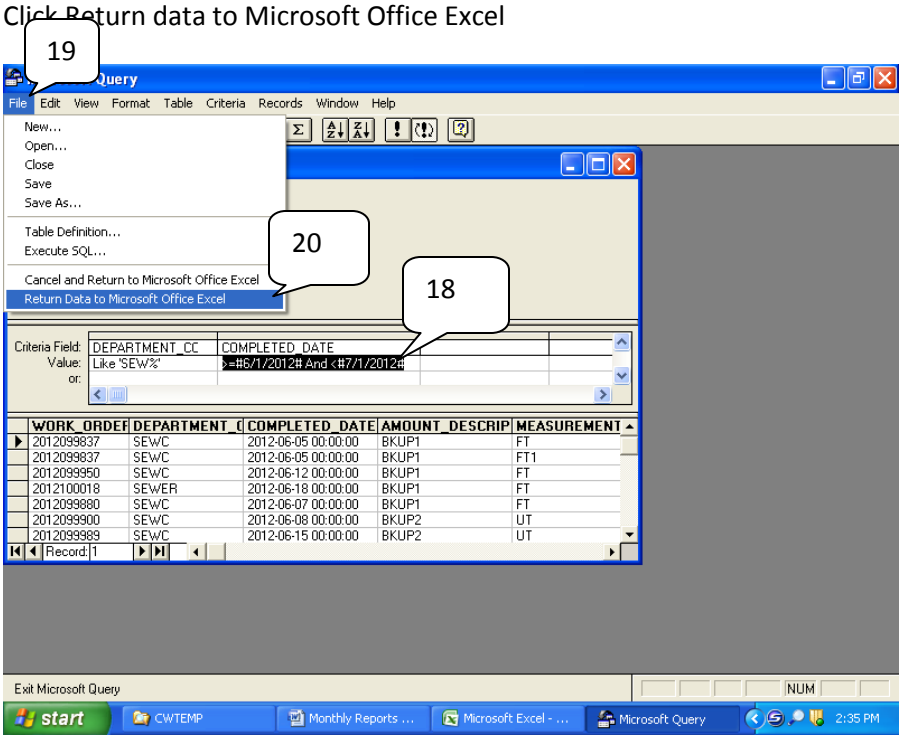
17) Click OK in error dialogue box



18) Adjust dates as appropriate

19) Click File

20) Click Return data to Microsoft Office Excel

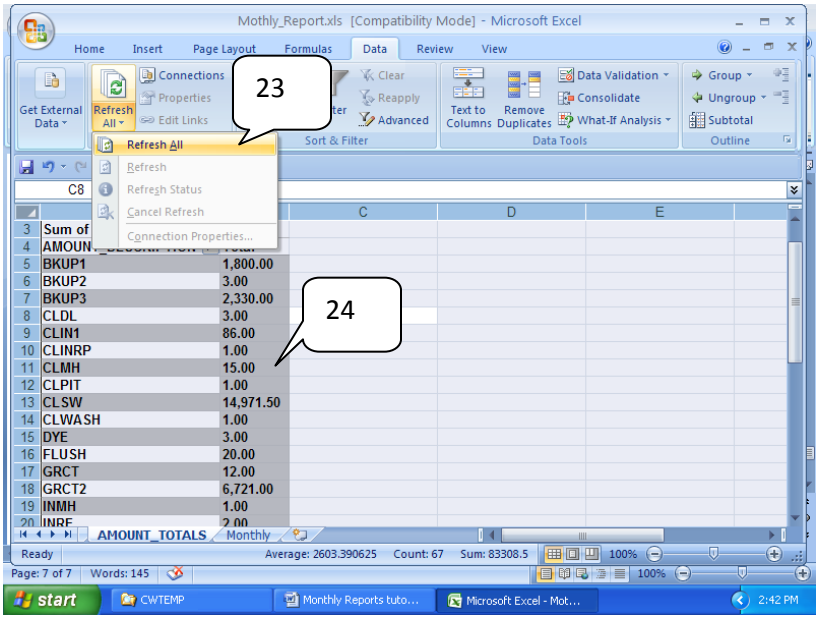


21) Click OK

22) Click Close

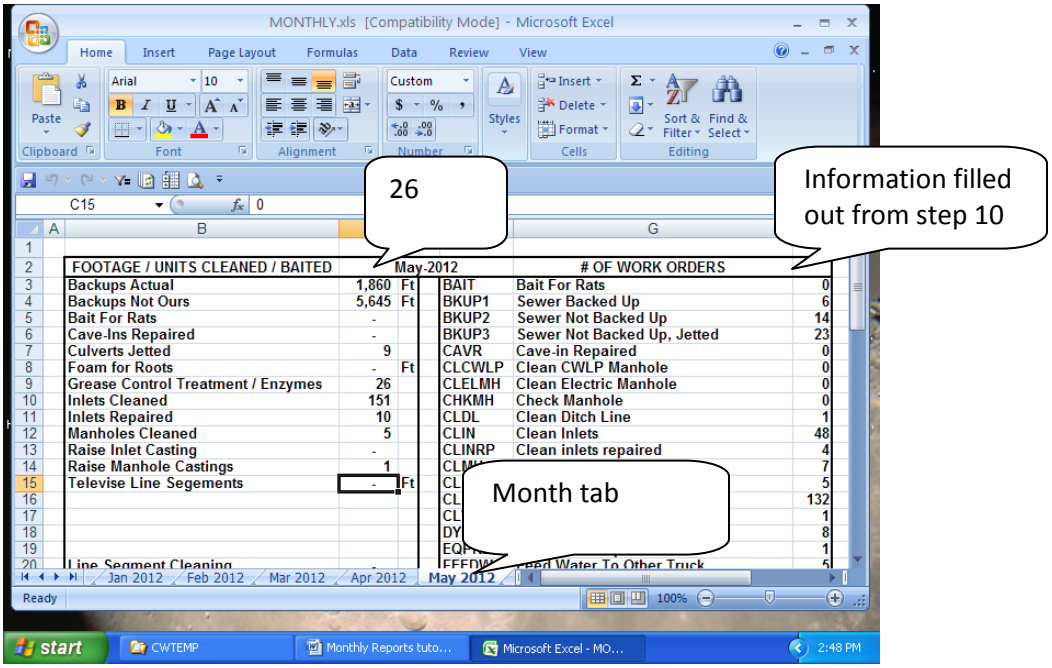
23) Click Refresh All

24) Print out amount Totals

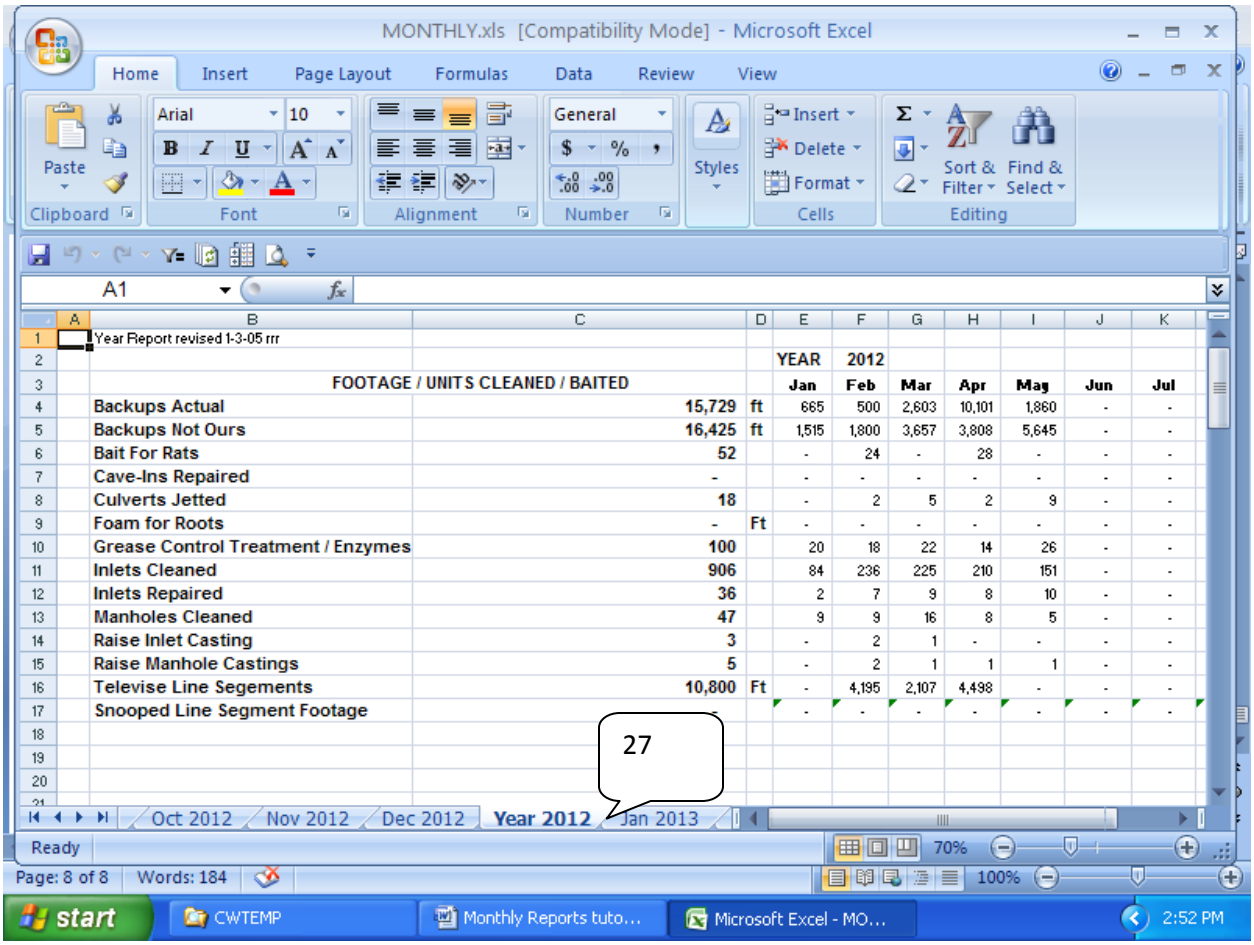


25) Open MONTHLY.xls – same as in step 10

26) Fill out right side of table for appropriate Month Tab



27) Yearly report tab is in same excel file



28) Completed Report Example

FOOTAGE / UNITS CLEANED / BAITED	January-2014	
Backups Actual	-	Ft
Backups Not Ours	6,458	Ft
Bait For Rats	-	
Cave-Ins Repaired	-	
Culverts Jetted	-	
Foam for Roots	-	Ft
Grease Control Treatment / Enzymes	18	
Inlets Cleaned	3	
Inlets Repaired	-	
Manholes Cleaned	14	
Raise Inlet Casting	-	
Raise Manhole Castings	-	
Televise Line Segements	-	Ft
Line Segment Cleaning	-	
Actual Backups	-	Ft
Line Cleaning	11,045	Ft
Backups Jetted, Not Ours	6,458	Ft
Root Cutting	-	Ft
Clean for Televising	-	Ft
Clean Line w/Grease Nozzle	1,685	Ft
TOTAL FOOTAGE CLEANED	**19,188**	**Ft**

water usage 24575.00 gallons

	# OF WORK ORDERS	
BAIT	Bait For Rats	0
BKUP1	Sewer Backed Up	0
BKUP2	Sewer Not Backed Up	0
BKUP3	Sewer Not Backed Up, Jetted	22
CAVR	Cave-in Repaired	0
CLCWLP	Clean CWLP Manhole	0
CLELMH	Clean Electric Manhole	0
CHKMH	Check Manhole	0
CLDL	Clean Ditch Line	0
CLIN	Clean Inlets	2
CLINRP	Clean inlets repaired	0
CLMH	Clean Manholes	14
CLPIT	Clean Pit	2
CLSW	Clean Line Segments	37
CLWASH	Clean Wash Rack	0
DYE	Dye Test	0
EQPREP	Equipment Repair	0
FEEDWA	Feed Water To Other Truck	0
FILL	Fill Holes With Dirt/Rock	0
FLUSH	Flushed Inlets/Line segments	1
GRCT	Grease Control Treatment	18
GRCT2	Grease Control Treatment / grease nozzle	4
GUTT	Gutter repair	0
INMH	Install Manhole	0
INRE	Inlet Repaired	0
INSTIN	Install inlet	0
INSTPI	Install Storm Pipe/Inlet	0
INVEST	Investigate	6
JAKMHC	Jackhammer manhole casting	0
JETBKF	Jet Backfill	0
JETCUL	Jet Culvert	0
LOOKMH	Locate Manhole	0
LOWIN	Lower Inlet Casting	0
LOWMH	Lower Manhole Casting	1
MHRE	Manhole Repair	0
NOWORK	No Work Needed At This Time	0
OTHER	Other	0
PUMP	Pump sewers	0
PUMPSR	Pump Station Pump Service/Repair	0
RAIN	Raise Inlet	0
RAINWK	Rain work	0
RAMH	Raise Manhole Casting	3
RCULV	Repair Culvert	0
REPTAP	Repair Lateral	0
RINPIPE	Repair Inlet Pipe	0
ROOT1	Foam for Roots	0
ROOT2	Cut Roots From Sewer	0
ROPEMH	Rope manhole casting	0
RPIN	Replace Inlet Casting/Lid	0
RPMH	Replace Manhole Casting/Lid	1
RSIN	Reset Inlet Casting	0
RSMH	Reset Manhole Casting	0
SANR	Sanitary Sewer Repair	0
SNOOPD	Snooped Line Segment	0
STOR	Storm Sewer Repair	0
STREP	Street repair	0
STRUNG	Cleaned & Strung Line For Televising	0
TRKREP	Vehicle Repair	0
TRKSRV	Vehicle Service	0
TVLS	Televise Line Segment	0
TVSTLS	Televise Storm Line Segment	0
VACHOL	Vac Hole For Repair	0
WAPU	Water Pick-up	6
WASHST	Wash Down Street/Sidewalk	0
	TOTAL WORK ORDERS COMPLETED	**117**

29) The end

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