

City Pipeline Rating System (CPRS)



CITY OF BURBANK
Public Works Department
December 2019

Introduction

The City of Burbank Department of Public Works prepared the City Pipeline Rating System (CPRS) to provide a customized rating system that will assist with condition assessments of the City's wastewater collection system.

The primary objective is to clean, video inspect through closed-circuit television (CCTV), and rate the condition of approximately 230 miles of City sewer pipelines each year. The televising locations are prioritized to focus on those sewer lines with the highest potential for necessary repairs, considering items such as: maintenance history, prior overflow records, sewer location, and age of facilities.

It is anticipated that the CPRS will help the City attain the following goals:

- Provide a more consistent rating of sanitary sewer pipelines
- Better prioritize repairs to the collection system
- More accurately estimate the remaining service life of facilities
- Allow for the comparison of and changes to pipe condition over time
- Maintain facilities at lowest life cycle cost
- Reduce the number of and severity of pipeline failures and Sanitary Sewer Overflows (SSOs)
- Protect public safety and the environment

Background

The City's Collection Systems Crew cleans gravity sewer lines on a regular basis. All pipes ten inches (10") or less in diameter are typically hydro-jetted with a standard cleaning nozzle or root saw. All pipes greater than ten inches (10") in diameter are hydro-jetted. All sewers serving restaurants and other food service establishments (FSEs) are cleaned on a more frequent basis. If there is evidence of medium to high fat, oil, and grease (FOG) accumulation on a section of sewer pipeline, then the City's Industrial Pretreatment Program (IPP) Inspector(s) are notified. FSEs served by that sewer are inspected to ensure compliance with City sewer ordinances and that BMPs are being properly implemented. Sewer reaches that are subjected to heavy debris accumulation, such as siphons, are hydro-jetted on a more frequent basis.

Sewer lines are currently video inspected on an as-needed basis, with every pipeline in the collection systems on an inspection schedule. This video inspection is an important component of the City's condition assessment process used in the prioritization of preventive maintenance activities and in the prioritization of correcting structural deficiencies. Data collected during the course of these activities is also used to adjust maintenance priorities in order to more effectively prevent SSOs. SSO locations, causes and magnitudes are tracked to identify any trends which may lead to the reprioritization of preventative maintenance activities.

CPRS

Under the previous CPRS, regularly scheduled CCTV inspections of the sewer system were performed and damaged sewer pipes were identified. Each location where damaged pipe was found, was ranked on a scale of 1 to 5 (with a Priority 1 being the most severe, and a Priority 5 being least severe). Those locations that were identified with a ranking of 1 were scheduled for immediate repair. Those locations identified with less critical damage rankings were scheduled for future inspection to evaluate the potential need to repair these sections of pipe.

Under the new CPRS, all pipes will be rated using the criteria below. Sewer mains will still be identified as having grease, roots, or debris, and will be categorized based on the severity of pipe condition. Lateral connections are also classified based on their degree of root infestation or debris at the connection with the City main; however, it should be noted that maintenance of all private sewer laterals is the responsibility of the respective property owner under the Burbank Municipal Code. A more detailed list of criteria under which defects in City sewer mains, and private lateral connections that impact City sewer mains, are classified is shown on Page 5 of this document. In addition to identifying the types of defects, the severity of the defect is noted as follows:

- Heavy/Major
- Moderate/Medium
- Light/Minor

The initial classification is at the discretion of the field crew operator, and is then verified by Engineering staff when the video inspections are subsequently reviewed. Sewer mains which have heavy or moderate debris that could cause an SSO are addressed immediately. Sewer mains with light debris are cleaned in a timely manner based on the maintenance schedule. The overall pipeline rating is a combination of inspection criteria and Engineering judgement.

Description of Pipe Ratings

NUMERICAL RATING	RATING DESCRIPTION	DESCRIPTION OF PIPE CONDITION	EXAMPLES
0	No Defects	No damage.	New pipe, or existing pipe in excellent condition.
1	Minor Defects	Cosmetic defects that do not impact sewer system service but may further deteriorate over time.	Hairline fractures, minor liner delamination, surficial chipping.
2	Minor to Moderate Defects	Damage that does not impact sewer system service, but is more prone to further deterioration.	Minor joint offset, or small cracks in pipe.
3	Moderate Defects	Damage to pipe that is potentially of structural concern.	Small hole in pipe, multiple-intersecting small or moderate cracks in pipe, moderate joint offset.
4	Significant Defects	Damage that prevents regular maintenance efforts, causes a large amount of inflow/infiltration, or is a source for debris to enter the sewer system.	Protruding private laterals, large holes, significantly offset joints, penetrating grounding rods, or missing cap at the end of a pipe.
5	Most Significant Defects	Damage in which immediate attention is required.	Collapsed pipe, heavily deformed pipe, or blockages (i.e. from roots, fats, oils, or grease).

Refer to Exhibit 1 for pictures of pipe with each of the above ratings.

A sewer pipe is considered to be Significantly Defective if it receives a Pipeline Rating of 4 or 5 based on the CPRS.

Description of Pipe Defects

The various types of defects can be generally broken down into the categories of Structural, Operational and Maintenance (O&M), and Construction. Descriptions of various defects in each of the categories is provided below:

- **STRUCTURAL**
 - Cracked or Fracture Pipe (Circumferential)
 - Cracked or Fracture Pipe (Longitudinal)
 - Offset Joints
 - Holes in the Pipe
 - Broken Sections of Pipe
 - Collapsed Pipe
 - Deformed Pipe

- **OPERATIONAL AND MAINTENANCE**
 - Roots – Fine to Medium
 - Root Ball - Major
 - Fats, Oil, Grease (FOG)
 - Obstacles
 - Inflow/Infiltration (I/I)

- **CONSTRUCTION**
 - Protruding Private Lateral
 - Damaged Wye at Private Lateral
 - Damaged Saddle at Private Lateral
 - Joint Seal Issue
 - Alignment changes

- **MISCELLANEOUS**
 - Damaged Pipe Liners
 - Protruding Liners
 - Change in Pipe Material
 - Change in Pipe Size
 - Sag in Pipe

Remaining Service Life

The exact number of years of remaining service life for each pipe cannot be predicted; however, general estimates based on the Pipeline Rating are provided below:

PIPELINE RATING	CONDITION	ESTIMATED REMAINING SERVICE LIFE
0	Excellent	Unlikely to Fail in Foreseeable Future
1	Very Good	Unlikely to Fail in Foreseeable Future
2	Good	Over 20 Years
3	Fair	10 to 20 Years
4	Poor	5 to 10 Years
5	Immediate Attention Required	Has Failed, or Likely to Fail in Less Than 5 years

Exhibit 1 - Pictures

CITY PIPELINE RATING SYSTEM
CITY OF BURBANK

Pipeline Rating 0: No Defects

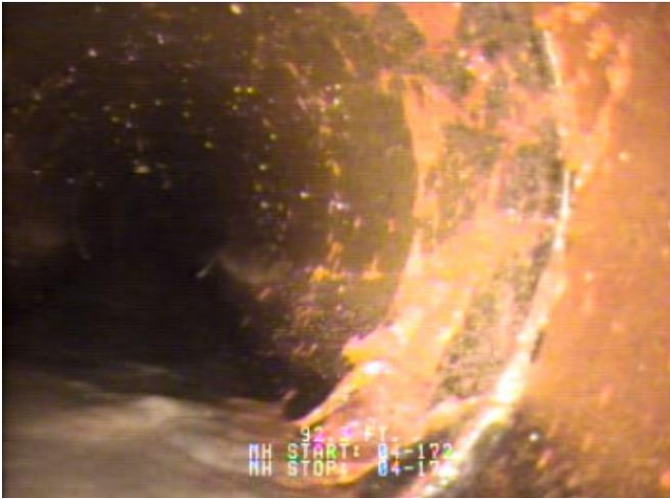


Existing pipe

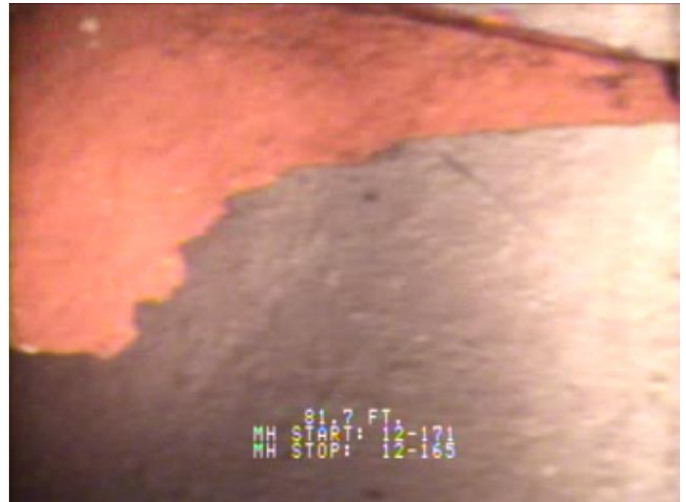


New pipe

Pipeline Rating 1: Minor Defects



Longitudinal hairline fracture near joint

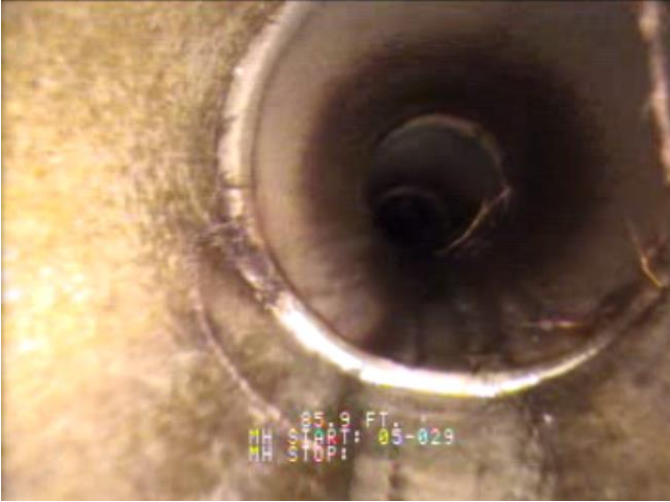


Surficial chip in pipe



Chipped bell joint (exterior)

Pipeline Rating 2: Minor to Moderate Defects

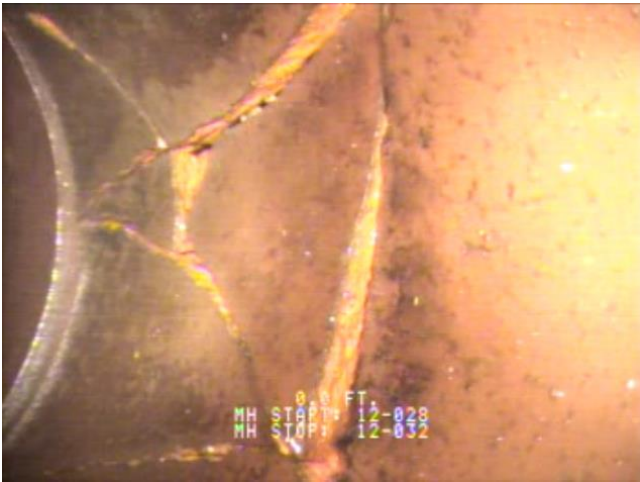


Minor Joint Offset



Minor crack in pipe at joint

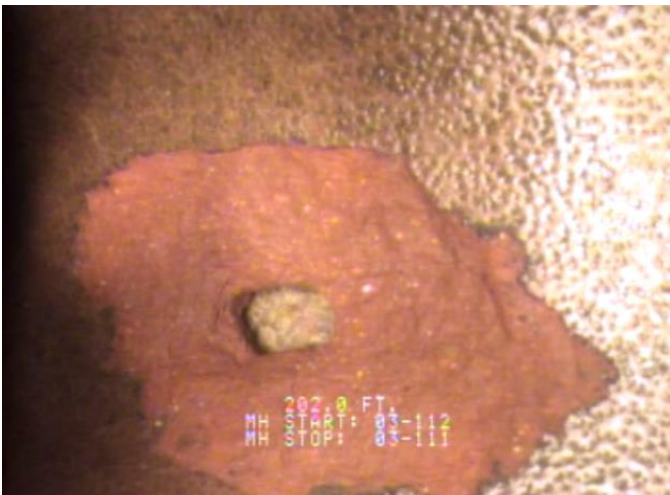
Pipeline Rating 3: Moderate Defects



Moderate cracks intersecting near joint

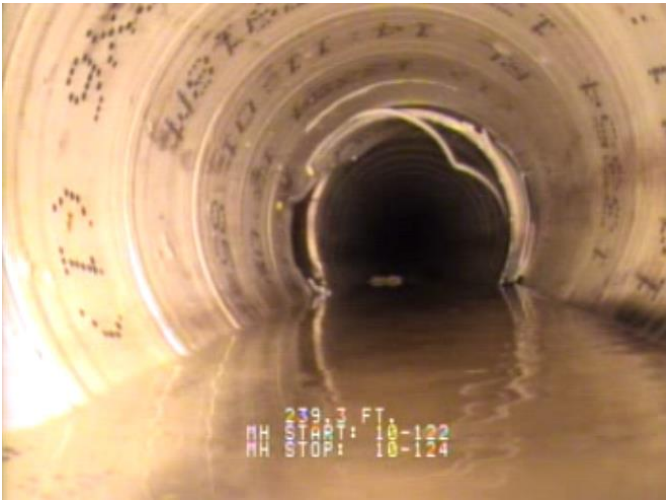


Broken pipe fragment

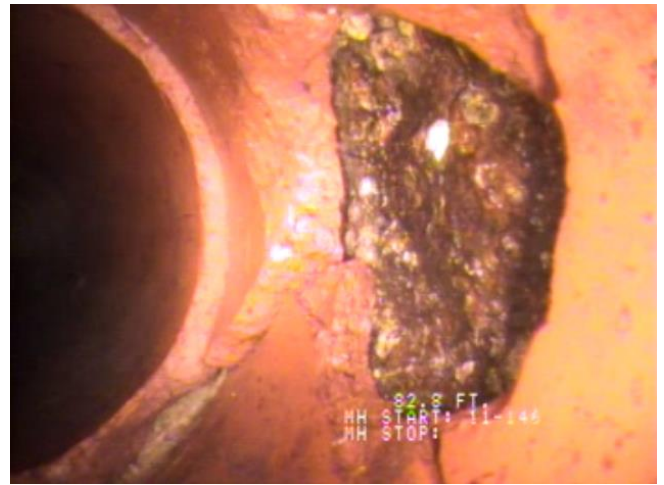


Small hole in pipe with surrounding chipping

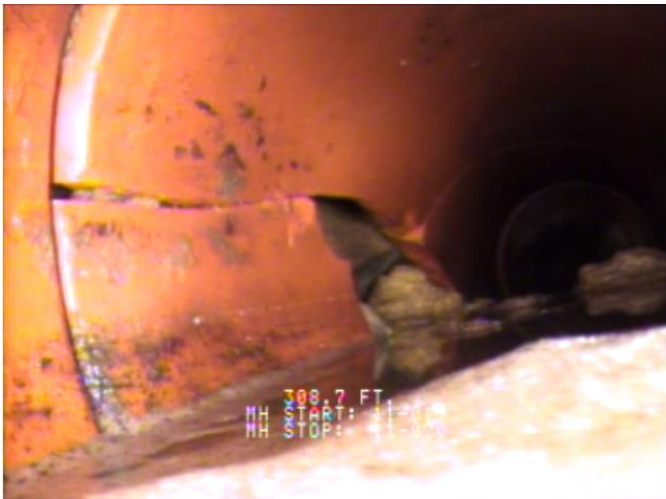
Pipeline Rating 4: Significant Defects



Moderate liner delamination



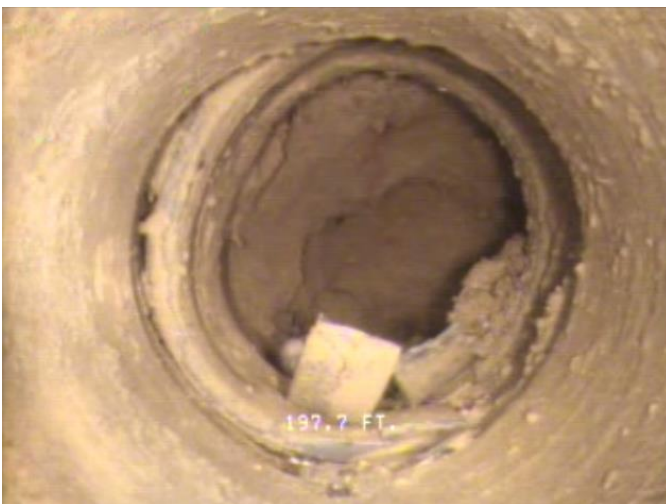
Large hole in pipe



Moderate hole in pipe with moderate cracks



Grounding rod penetrating pipe, preventing maintenance efforts



Missing cap at the end of pipe

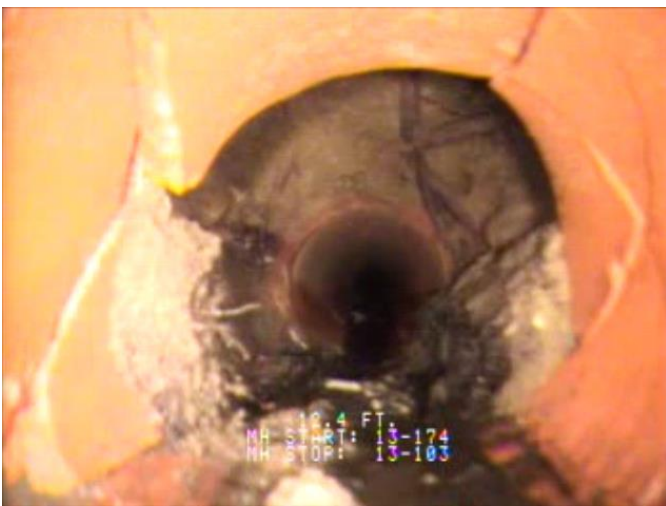
Pipeline Rating 5: Most Significant Defects (Immediate Attention Required)



Lined portion of pipe deformed, unlined pipe beyond collapsed



Blockage from roots and grease



Heavy cracks, missing pipe, with large cavity forming.