Annual Exfiltration Abatement Program Plan 2012

Prepared by

City of Santa Barbara

Santa Barbara, California

March 31, 2013

Table of Contents

List of Figures

List of Tables

Section 1

Document Purpose and Structure

On April 27, 2011, Santa Barbara Channelkeeper filed a lawsuit against the City of Santa Barbara in the United States District Court for alleged violations of the Clean Water Act. The parties engaged in extensive Court-ordered and supervised mediation that resulted in the Court's entry of a Consent Decree on May 14, 2012. A requirement of the Consent Decree is the submission of an Annual Exfiltration Abatement Program Plan to Channelkeeper by March 31st of each year. The Annual Exfiltration Abatement Program (EAP) Plan shall be designed to eliminate the threat to water quality from High Risk Pipes (HRP) and shall:

a. Describe the Exfiltration Abatement Program Activities for the preceding year;
b. Identify all storm sewer pipes and sanitary sewer pipes the City considered for repair, rehabilitation and replacement, and which of those the City intends to repair, rehabilitate or replace during that Year;
c. Include an ESRI GIS Shapefile for the pipes identified in b above that contains the pipe ID number, upstream manhole identifier, downstream manhole identifier, upstream and downstream invert elevations, pipe age (for sanitary sewer pipes only), pipe material (for sanitary sewer pipes only), pipe diameter and whether the specific sanitary sewer pipe was selected for repair, rehabilitation or replacement; and
d. Describe how pipe condition and water quality data were considered in the prioritization of pipes selected for rehabilitation, replacement or repair.

HRP as used in this document refers only to the designation of pipes meeting criteria outlined in the Consent Decree. The Consent Decree effectively creates a subset of sewer pipes in the City's Collection System that were installed prior to 1991, constructed of vitrified clay or reinforced concrete, and cross above or are within 5 meters horizontally of a storm drain pipe. Any pipe meeting these criteria is designated as an HRP and activities related to that pipe are included in the EAP program.

Section 1 – Document Purpose and Structure: Describes the purpose of the EAP Plan and the required components of the EAP Plan.

Section 2 – Exfiltration Abatement Program Activities for the Preceding Year (2012): Discusses EAP activities completed in 2012.

Section 3 – Exfiltration Abatement Plan for 2013: Discusses EAP on-going activities and planned projects to be incorporated into EAP for the 2013 time period and includes the requirements of b and d above.

Appendices – Provides ESRI GIS Shapefile Documentation.

Section 2

Exfiltration Abatement Program Activities for the Preceding Year (2012)

Substantial work was completed for the Exfiltration Abatement Program (EAP) development in 2012. A three-step approach was developed to provide a framework for development and implementation of EAP activities both in 2012 and as a framework for developing future EAP plans. These important activities are summarized below:

- The first step included the completion of an engineering preliminary design which consisted of survey and related assessment work needed to evaluate potential high-risk pipe locations and finalize the identification of HRP from this survey information. This work is fundamental to the design of EAP CIP projects, in that without it the designation of HRP cannot be confidently made. The engineering survey work was completed in 2012. Survey data is included in GIS data files submitted in the appendix to this Plan documentation.
- The second step includes a risk-based, prioritized CCTV inspection plan (criticality ratings established for each pipe) that forms the basis of the initial inspection program. This work is necessary for meaningful CIP project design, in that it is critical to the determination of priority for HRP pipes.
- The third step includes the process for identifying a shortlist of potential pipes for rehabilitation, repair or replacement in the first year that incorporates industry-standard PACP codes and considers other known information such as repair and cleaning history. This initial pipe analysis work was initiated in 2012 and is now on-going. The condition and cleaning history information will be used in conjunction with City information on water quality to finalize the selection of HRP segments for rehabilitation, replacement or repair.

Each of these work efforts builds on the previous to allow the development of a comprehensive approach to prioritizing HRP segments for repair, rehabilitation or replacement. This information is used in conjunction with data from City monitoring to prioritize the development of the EAP plan.

The EAP was initiated in 2012. The first EAP report was submitted to ChannelKeeper on August 12, 2012. It documented the work that had taken place up until that time in 2012, and projected future work. Although the designation of HRP is specific to the Consent Decree, the City has completed Capital Improvement Program sewer main rehabilitation and repair work in preceding years that has included the betterment of pipe segments that meet the Consent Decree definition of HRP. There are eighty-five (85) sewer mains that have been rehabilitated or repaired between 2000 and mid-2012 that are proximate to MS4 storm drain pipe. Because the condition of these 85 HRP pipes was recently restored through rehabilitation, repair, or replacement activities, these sewer mains have been removed from further consideration for HRP prioritization.

In 2012, the City rehabilitated, replaced or repaired twenty-two (22) sewer main segments for a total length of 1.02 miles.

2.1 High Risk Pipe Designation

The Consent Decree required that the City identify as HRP all sewer pipes in the City Collection System for which the City already possessed necessary information to evaluate and make the HRP designation. From this GIS-based evaluation, City staff determined in June 2012, that:

- thirty-eight (38) sanitary sewer segments currently could be identified as HRP because they cross above a MS4 structure;

- twenty (20) sanitary sewer segments currently could be identified as High Risk Pipes because they are within five meters and are above a MS4 structure;

- five thousand nine hundred seventy seven (5977) sanitary sewer segments could be identified as being non-High Risk Pipes because they do not meet the criteria defined for High Risk Pipes; and

- twelve hundred three (1203) sanitary sewer main segments require additional evaluation to determine if they meet the criteria defined for High Risk Pipes.

The Consent Decree requires that the City collect the necessary information to make final determination of all HRP pipes by June 30, 2013. The City has spent considerable effort on this task to ensure it is completed in a timely manner and is accurate. Since June 2012, additional sewer main analyses have been conducted. City staff refined analyses according to the technical criteria documented in Figure 2-1. From this work, a number of sewer main segments were able to be excluded from the High Risk Candidate (HRC) pipe pool, which is now as follows:

- thirty-eight (38) sanitary sewer segments currently can be identified as High Risk Pipes because they cross above a MS4 structure;

- twenty (20) sanitary sewer segments currently can be identified as High Risk Pipes because they are within five meters and are above a MS4 structure;

- six thousand sixty three (6063) sanitary sewer segments can be identified as being non-High Risk Pipes because they do not meet the criteria defined for High Risk Pipes; and

- eleven hundred seventeen (1117) sanitary sewer main segments require additional evaluation to determine if they meet the criteria defined for High Risk Pipes.

Staff is now working to finalize the HRP designation for the 1117 HRC pipes listed above to comply with the June 30, 2013, deadline. These high-risk known and candidate sewer mains are shown in Figure 2-2.

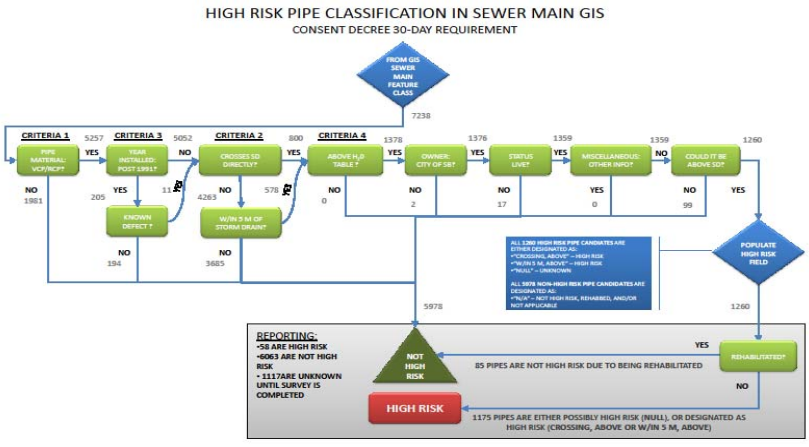

Figure 2-1. High Risk Pipe Classification Criteria Flowchart.

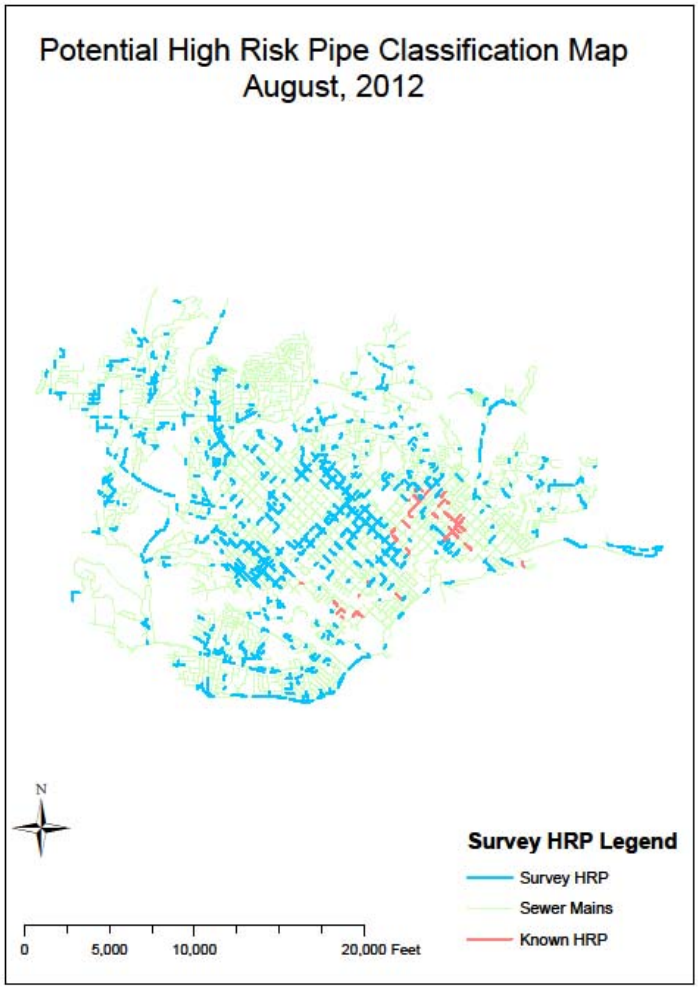

Figure 2-2. Potential High Risk Pipe Classification Map (August 2012)

Since August 2012, City staff focused efforts on managing the High Risk Pipe Surveying contract and refined that newly acquired data as part of the City's overall GIS data update activities. Once data was received from an engineering survey consultant, it was checked for accuracy and submitted to City GIS staff to populate GIS database fields for candidate HRP and adjacent storm drains. City staff also updated sewer main attribute data (such as previous pipe rehabilitation dates, ownership, operation status, and other miscellaneous data fields) to reflect the current status of these GIS assets and prepare the GIS database for HRP analyses. These analyses are being undertaken in 2013, and will be complete by June 30, 2013, as required by the Consent Decree.

The City has completed these first-year program activities in order to complete necessary HRP identification activities before June 30, 2013. The proposed HRP Survey Assessment Activity Schedule originally submitted in August 2012 remains accurate and is presented in Figure 2-3 below.

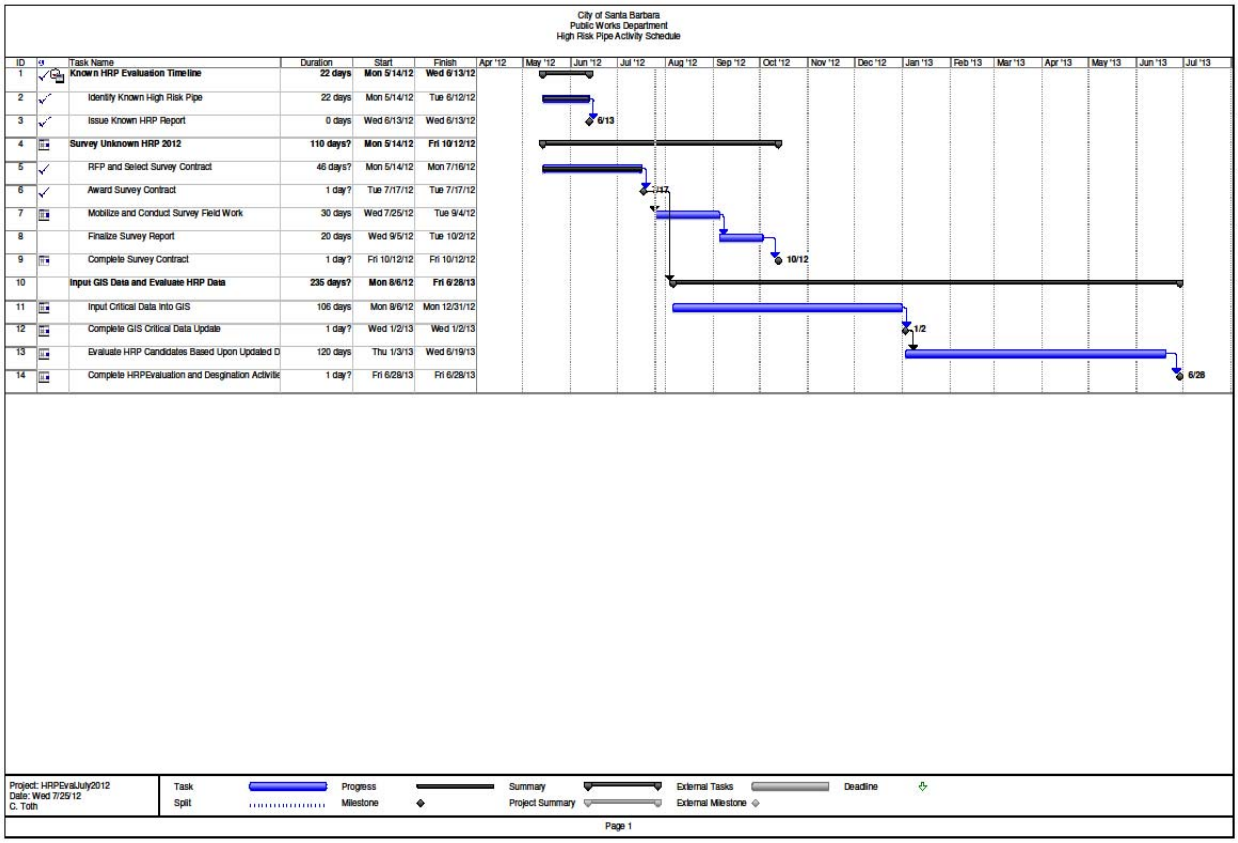

Figure 2-3. Proposed High Risk Pipe Survey Assessment Schedule

2.2 2012 Rehabilitation, Replacement and Repair.

The Consent Decree specifies that pipes in the Laguna Watershed would be prioritized in 2012. Based on information about pipe age, material and water quality, the City believes that rehabilitating these pipes remains a priority to address the concerns that led to the development of the EAP program. A portion of the HRP work completed in 2012 was contained in this Watershed. The City initiated a contract for rehabilitation of two miles of HRP in the Laguna Watershed in January 2013. This work is currently underway and will be discussed more in the next section covering the 2013 EAP plan. Consent Decree related expenditures for 2012 are included in the Table 2-1 below:

Table 2-1 General Consent Decree Expenditures				
Operations	Consent Decree Compliance	Consent Decree Capital Expenditures	High Risk Pipe Capital Expenditures	Total
$2,637,948	$603,914	$2,035,153	$642,922	$5,919,937

A total of 1.02 miles of HRP pipe were repaired, rehabilitated or replaced in 2012. The criteria for the selection of these segments was based on pipe condition. Information related to the pipe location, type of work completed (repair, rehabilitation, replacement) and elevations is included in the ESRI database attached as an appendix to this report. The Figure 2-4 below shows the location of the pipes.

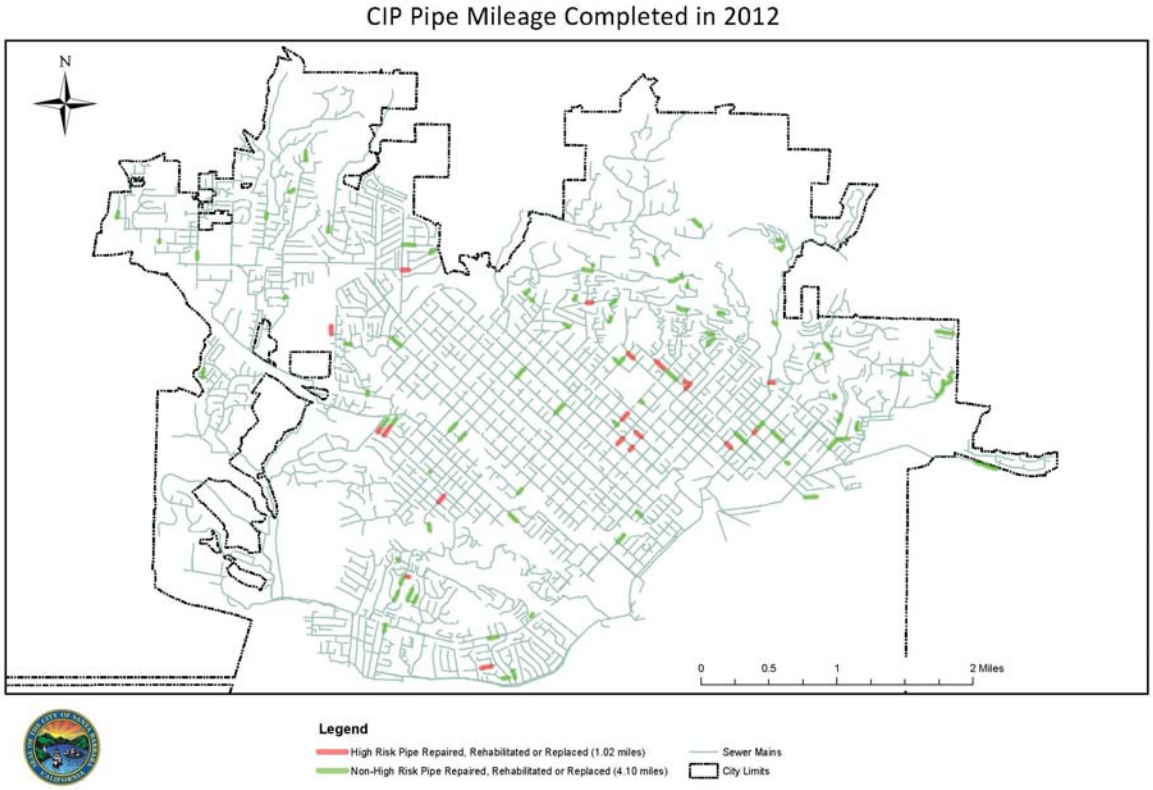

Figure 2-4. CIP Pipe Mileage Completed in 2012

The City's ability to absorb additional costs is limited and resulted in the inability to achieve the full amount of pipe rehabilitation, replacement or repair for the EAP pipe in 2012. Although the EAP pipe mileage was not achieved in 2012, the City intends to catch up in the future as funding and workload allow even though it is not required to do so under the Consent Decree.

2.3 Condition Assessment Work Completed For Preceding Year

In 2012, the City made significant progress in development and implementation of its Condition Assessment Work Plan activities. These activities are applicable to HRP as well as regular sewer mains. Notable developments were the acquisition and implementation of new Condition Assessment Program software. This software product is called POSM (which stands for Pipeline Observation System Management). The new POSM software serves as a repository and condition assessment tool by which City staff can analyze and prioritize sewer mains which have been televised, PACP code-graded, and uploaded into the software system. The existing CCTV and assessment data that has been placed into the new POSM software system is being reviewed by City staff at this time.

In early 2012, the City contracted with National Plant Services to televise many large diameter sewer mains. This work was completed in July 2012. The CCTV Inspection work completed in 2012 by contract work, and that completed by City staff, produced the information which appears in Table 2-2. Sewer segment locations for these candidate High Risk pipes are shown in Figure 2-5. It is envisioned that small variations in HRP candidate pipe selections may continue as new data and information becomes available to City staff in coming months.

Table 2-2. 2012 CCTV Events

CCTV Source	HR Candidate Pipe Mileage
City	4.42
Contract	2.02
Total	6.44

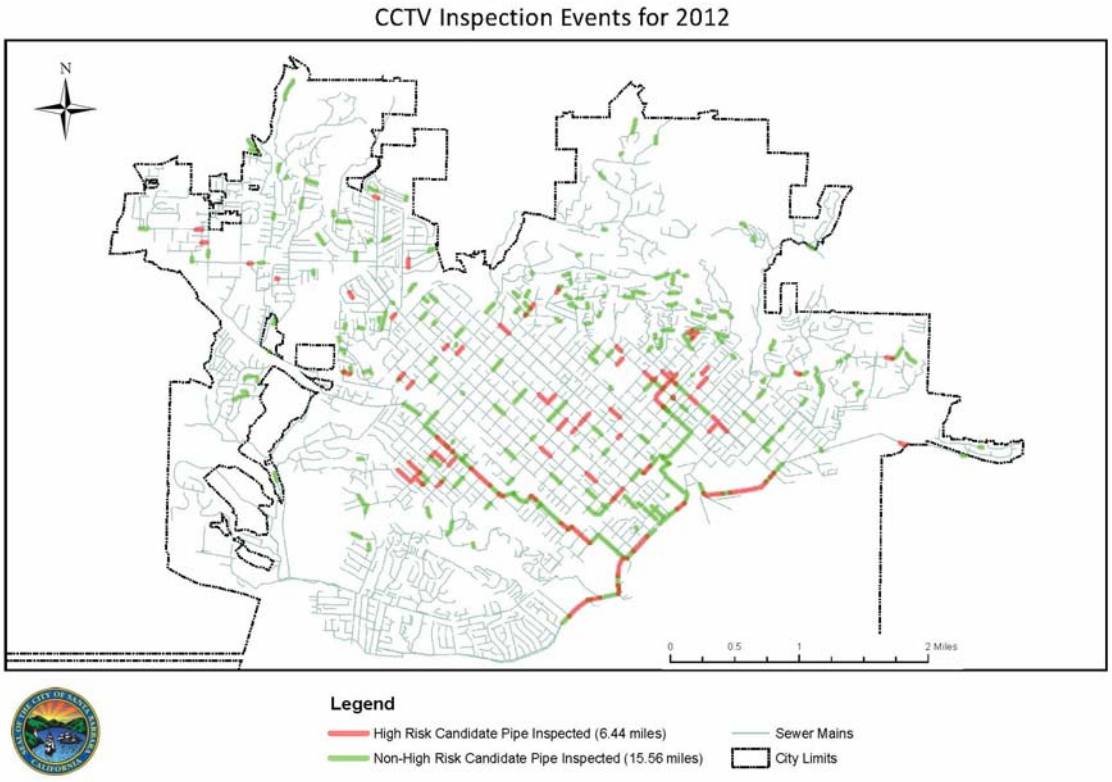

Figure 2-5. 2012 CCTV Events for High Risk Candidate Pipes

In mid-2012, the City initiated activities to develop a CCTV Inspection contract for the 2013 time period. CCTV inspection plans and specifications were developed and requests for proposals were solicited in September 2012. The contractor Advanced Sewer Technologies (AST) was selected as a result of this process. AST was purchased by Pro Pipe during this time period. A contract between Pro Pipe and the City was executed in November 2012.

Section 3

Exfiltration Abatement Plan for 2013

3.1 Introduction

As discussed in Section 2 of this report, the City has developed a comprehensive program to evaluate and prioritize for pipe rehabilitation, replacement, or repair, those gravity sewer lines that are located in such a manner that if water were to leak from them, it could travel through soil and leak into storm drain pipes. As such the City has designed this EAP Annual Plan documentation to address the threat to water quality from HRP. Pipes in the Laguna Watershed were identified in the Consent Decree as the first of the HRP to be rehabilitated, repaired and replaced. This work is currently underway. These sewer mains are shown in Figure 3-1.

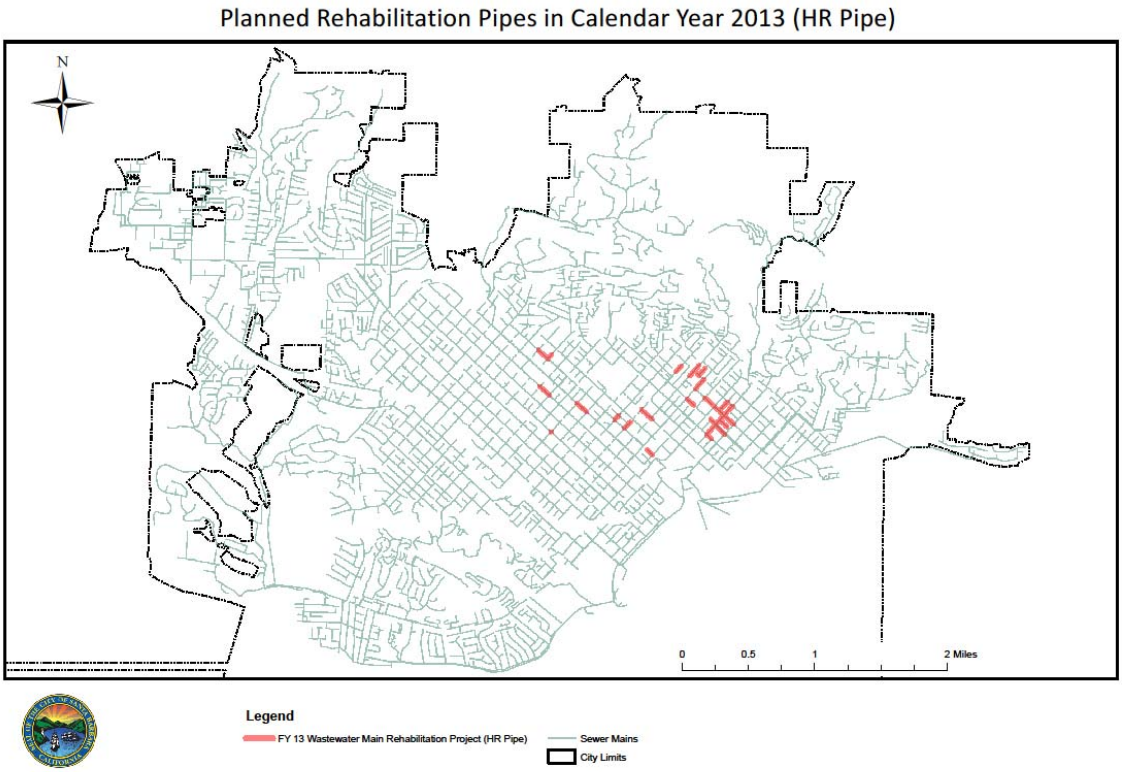

Figure 3-1. CIP Rehabilitation Project for HRP in 2013.

As discussed above, the majority of the work identified for 2013 is HRP in the Laguna Watershed that had been prioritized for completion in the Consent Decree. All HRP pipe segments in the watershed were prioritized for rehabilitation, replacement or repair. The actual method for completing the EAP work on these pipe segments is rehabilitation (such as using cured in place plastic pipe (CIPP)). This technique provides a seamless plastic pipe from manhole to manhole for HRP pipe segments and eliminates any opportunity for exfiltration through leaking joints or cracks.

As required by the Consent Decree, an ESRI GIS Shapefile is attached as an appendix to this report and contains information regarding the collection system pipe elevations, materials and locations and information on the sewer main and storm drain pipes in the area.

To ensure necessary information is available to prioritize High Risk Pipes for future repair, rehabilitation, and replacement, the City is:

- Assessing the condition of all HRP using CCTV and assigning them a PACP grade by the end of 2015;
- Evaluating water quality data in the prioritization of HRP, both for condition assessment and for repair, rehabilitation, or replacement;
- Considering location of sewer pipes relative to MS4 pipes. Sewer pipes that cross above the storm drain pipes will be prioritized over those sewer pipes that do not.

As a part of this Program, the City is identifying sewer segments meeting all of the following criteria:

- Sanitary sewer segments that are constructed of vitrified clay or reinforced concrete;
- Sanitary sewer segments that cross above MS4 pipes or are above and within five (5) meters horizontally of MS4 pipes;
- Sanitary sewer segments installed prior to 1991, or, for those installed since 1991, a condition assessment that identifies that the sanitary sewer segment has a crack, offset joint, or some other structural defect; and
- Sewer segments that are above the water table or have the potential to be above the water table under varying hydrologic conditions. Shallow ground water levels in Santa Barbara can vary from year to year and area to area. There is not comprehensive data for groundwater levels throughout the City, therefore, unless the pipe is known to be significantly below the groundwater level, the pipe shall be considered as a HRP if it meets the rest of the criteria above.

3.2 Water Quality Data Evaluation

Water quality data has played a key role in prioritizing Wastewater section CIP project planning. Based upon historic water quality considerations, and the prioritization of the given to the Laguna Watershed in the Consent Decree, the City plans to utilize Laguna Watershed area sewer mains as the priority pipes for the EAP work in 2013. The current construction contract will rehabilitate the sewer main segments in this basin that were determined to be HRP based upon age and material criteria rather than waiting for individual CCTV investigation results to be determined for each pipe segment. This decision has allowed the City to initiate construction-related activities for these HRP as the first such project(s). The remaining three watersheds for consideration in the near future are: Arroyo Burro, Mission Creek, and Sycamore. Identified HRP in these watersheds will undergo CCTV investigation and evaluation activities. Water quality data available to the City will be a consideration in prioritizing future Wastewater section CIP project planning.

3.2.1 Future Prioritization By Watershed

As discussed above, work on HRP in the Laguna Watershed is currently being completed and will meet the HRP requirement for 2013. In considering the location for additional HRP work in 2013, and HRP work in 2014, the City considered water quality data in the different watersheds. The City finalized a *Source Tracking Protocol Development Project Final Grant Report* in August 2012 (Report). Using the tools and techniques identified in the Report, the lower Westside has been recommended as the next target area for HRP rehabilitation, replacement and repair. CCTV of HRP pipes in this watershed are underway and will allow the prioritization of HRP rehabilitation, repair and replacement based on pipe condition.

The next area the City will focus its EAP work on HRP pipes is the Arroyo Burro and Sycamore watersheds. The condition information will be the basis for watershed selection. The City continues to collect water quality information from these watersheds, and in future years this information will again be considered in the determination of priority for areas to focus EAP work efforts.

3.3 High Risk Pipe MS4 Proximity Evaluation

As described in other sections of this Plan, comprehensive HRP-MS4 proximity evaluation-based activities currently are underway. These activities are summarized in these areas of work:

- Field-related survey of candidate HRP;
- Evaluation of survey data and final determination of HRP candidates;
- CCTV-based activity work (with PACP code evaluation) and related reporting; and
- Final prioritization of HRP for future CIP rehabilitation and repair projects based upon the major pipe structural and maintenance condition, age, material, and proximity to sensitive environmental areas and MS4 locations.

A map showing 2013 CCTV project pipe locations for candidate HRP is shown in Figure 3-2 below.

3.4 Summary

The City's EAP Program for 2012 has identified a number of new recommendations, activities, and related CIP project opportunities for City staff to undertake. Activities undertaken in 2012 are being evaluated in early 2013 for EAP-related process improvements that can be made in coming years.

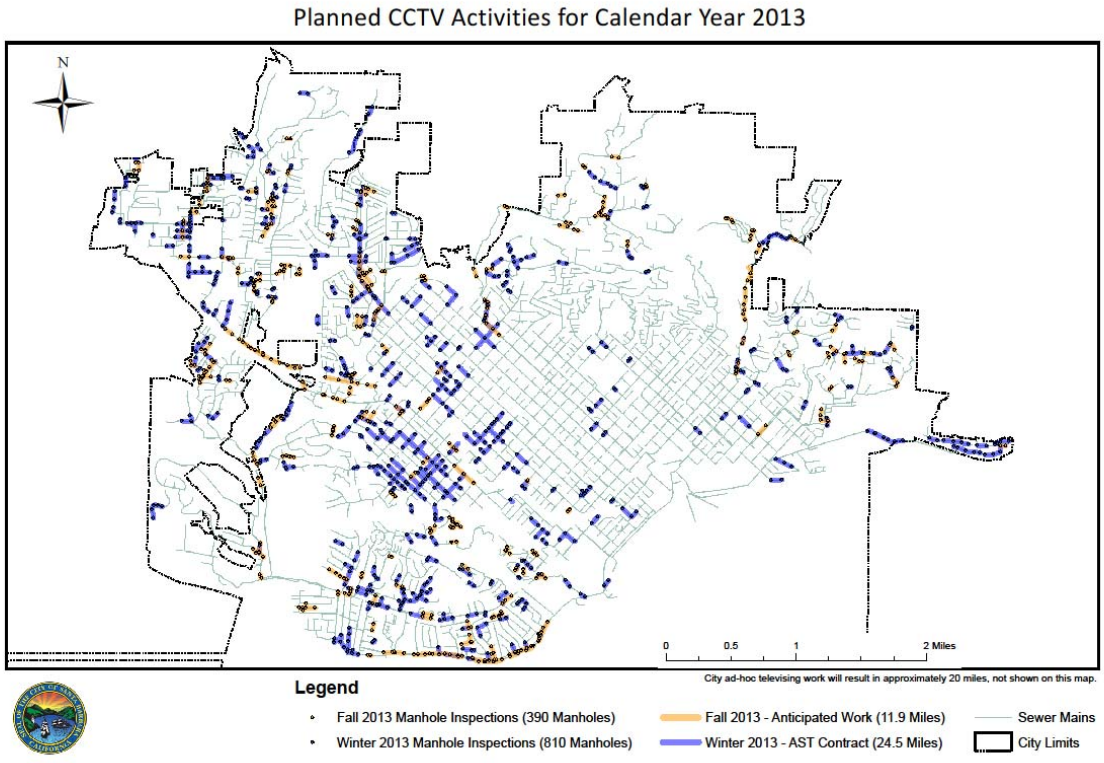

Figure 3-2. Planned CCTV Activities for 2013.

Appendix A: ESRI GIS Shapefile Documentation

ESRI GIS Shapefile documentation associated with the Annual Exfiltration Abatement Program Plan 2012 has been appended electronically here (in CD-ROM format). Each Shapefile's component files are located in individual folders bearing the respective Shapefile name.

The files listed below are found on the accompanying CD-ROM disc:

- Storm sewer pipes the City considered to determine which sanitary sewer pipes are High Risk Pipes:
    - Stormdrainpipes.shp (GIS Data folder)
    - Stormdrainnodes.shp (GIS Data folder)
    - SDatHRPLocations.shp

- Sanitary sewer pipes the City considered to determine which sanitary sewer pipes are High Risk Pipes:
    - Sewermains.shp (GIS Data folder)
    - Sewerstructures.shp (GIS Data folder)
    - KnownHRPAugust2012.shp

- High Risk Pipes the City considered for repair, rehabilitation, and replacement:
    - KnownHRPAugust2012.shp
    - CIP Mileage Completed CY 2012 (folder)

- High Risk Pipes the City intends to repair, rehabilitate, or replace during the current Year:
    - Planned CY 2013 Rehabilitation Pipes (folder)

- List of Planned 2013 CCTV Pipes
    - PlannedCCTVEventsfor2013.shp