Final Sanitary Sewer Main Line Replacement and Rehabilitation Master Plan

McKinleyville Community Services District

GHD | 718 3rd Street, Eureka, California

11218420 | January 2022

Executive Summary

Introduction

Phase 3 of this Sewer Main Line Rehabilitation Master Plan (Master Plan) has been prepared to provide a schedule for implementing replacements, rehabilitation, and upgrades to the McKinleyville Community Service District's (MCSD or District) sewer collection system main lines and appurtenances (collection system) for the next 50 years. This Master Plan effort includes an analysis of all of the pipelines and manholes in the District's sanitary sewer system. No analyses of lift stations or the wastewater management facility are provided as a part of this study, and they are being addressed under other aspects of the District's Capital Improvement Planning (CIP) process.

The original sewer collection system was constructed in 1976, making it 42 years old. The majority of the system is constructed of Asbestos Cement Pipe (ACP), which has an expected life of 50 to 70 years, so the majority of the pipe is reaching the end of its life. As the system continues to age, replacement and rehabilitation of existing infrastructure will be necessary to maintain an effective, functional system. Priorities of the existing system, including the Central Avenue sewer main, the Central and Southern Highway 101 sewer crossings, and the lift station force mains are already at the end of their useful life and will require replacement in the next 5-10 years, and it is important to plan for their replacement now. This report serves as the third and final phase of the Master Plan effort. The work on the various phases is summarized herein and culminates with the development of this Final Sewer Main Line Rehabilitation Master Plan (Final Master Plan). The Final Master Plan will serve as a final planning and budgeting outline to assure the District is able to continue their high level of service to the community well into the future.

Phase 1 of the Master Plan includes a review and analysis of available information that was used to produce a planning-level long-term replacement plan and a near-term rehabilitation plan that identifies areas with performance or capacity constraints that need to be resolved in the next ten years.

Phase 1 of the Master Plan provides the following:

- Overview of the existing collection system.
- Summary of previous related studies.
- Information on anticipated population growth.
- Preliminary needs assessment.
- Long-term replacement analysis including cost and scheduling information.
- Discussion of near-term projects including cost and scheduling information.
- Financial analysis based on the replacement cost estimates.

Phase 2 of the Master Plan effort builds on the system knowledge obtained in Phase 1 to create more detailed phasing information for the systematic replacement of the sewer mains.

Phase 2 of the Master Plan provides the following:

- Discussion of appropriate replacement methodologies (e.g. lining, bursting, or direct replacement) with associated construction cost estimates
- Determination of an appropriate yearly project cost based on the Phase 1 system requirements and financial analysis
- Outline of a schedule for the first 50 years of main line replacement for the MCSD sewer collection system
- A financial analysis to forecast rates necessary to fund these replacements.

Phase 3 of the effort consists of direct physical assessment of portions of the system to determine the condition of the pipe and apply a risk-based prioritization approach to update the schedule established under Phase 2.

Phase 3 of the Master Plan provides the following:

- Determination of pipe condition through physical testing of pipe samples
- Evaluation of prioritization based on risk considering all of the triple bottom line categories. Triple bottom line incorporates three dimensions of performance in the evaluation of risk including social, environmental, and financial instead of just one bottom line (often financial)
- Discussion and comparison of performing construction work in-house or through contract with associated construction cost estimates
- Refinement of the appropriate yearly project cost based on the updated system requirements and financial analysis
- Revision of the schedule for the first 50 years of main line replacement for the MCSD sewer collection system based on the risk assessment

Risk Assessment and Rehabilitation Prioritization

A Risk Framework was developed and applied to the linear assets in the MCSD sewer system. The Risk Framework considers the Probability of Failure and Consequence of Failure and assigns scores to each pipe. Probability of Failure considers the physical mortality failure and uses condition information from physical testing of sample pipes to assign scores. Consequence of Failure considers Triple Bottom Line categories (social, environmental and financial) and assigns values to each pipe using geospatial analysis and proximity to various data layers; for example, critical customers and sensitive habitats like rivers and waterbodies.

Rehabilitation Prioritization

Probability of Failure and Consequence of Failure scores are then used to calculate the Core Risk and Business Risk Exposure scores. The risk scores are used to prioritize the rehabilitation of the system. Based on the results of the physical testing of sample pipes, it was determined that AC pipe with diameter 8-inch and smaller had less remaining wall thickness and therefore should be addressed prior to 10-inch and larger AC pipe. This drives the Probability of Failure score and therefore is a factor in the prioritization.

Conclusions, Recommendations, and Next Steps

The District can replace all critical portions of the MCSD sewer collection system in the next 50 years with a reasonable adjustment to user rates. Spending an average of $1 million per year (2019 dollars) on the system will allow completion of all the near-term projects of concern. Replacement of all pipes identified as priority would be replacement of 100% of the District's vitrified clay pipe (VCP), 100% of the 8-inch or smaller asbestos cement pipe (ACP), and 22% of the 10-inch and greater ACP. However, how much of this the District is able to replace will also depend on pipe conditions and confirmation of the appropriate replacement method during the design phase of each project.

This Master Plan presents a Risk Framework for evaluating and assigning priority for the replacement of MCSD's sewer collection system. Asset condition is largely based on the 3 samples collected and physically tested and then assigned to subsets of assets based on material and diameter; however, condition within a subset can vary. A robust monitoring program including inflow and infiltration (I/I) monitoring, and CCTV inspection is recommended to monitor and update the condition of the assets over time. Pre- and post- flow monitoring can be used to measure project success, especially in areas of high I/I concern.

It is critical that the District begin planning and budgeting for upgrades and replacement of system components. The approved rates from Section 4 state that MCSD began putting aside $1 million (2019 dollars) a year starting in 2019. With rate adjustments approved, the project financing is securely in place, allowing MCSD to begin the planning and design process so that construction of the early proposed projects can begin in 2024. A Hazard Mitigation Grant was awarded in two phases to fund 75% of the replacement of the three Highway 101 undercrossings. Phase one, consisting of design and special permitting studies, is complete and Phase two, which includes the final design and CEQA, is scheduled but, at the time of this writing, waiting on NEPA document approval (NEPA is being done by FEMA) for release of funding. The District may consider beginning replacement of other sections of ACP sooner than shown in this report if the Hazard Mitigation Grant funds free up additional money to replace the other sections of ACP.

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1. Introduction and Background

The purpose of the McKinleyville Community Services District (MCSD, District) Sewer Main Line Rehabilitation Master Plan (Master Plan) is to provide a framework for planning, funding, and implementing replacements, rehabilitation, and upgrades to the District's sewer collection system main lines and appurtenances (collection system) for the next 50+ years. This type of master planning helps the District provide orderly, long-term maintenance and replacement of key elements of the collection system, to manage the timing of major capital projects to secure revenue needed to achieve District goals, and maintain their high level of service for their customers.

1.1 Overview of Existing System

MCSD is a special service district providing parks, recreation, water, wastewater, and streetlight services to residents of McKinleyville in Humboldt County, California (see Figure 1). The MCSD boundary encompasses approximately 19 square miles, ranging from North Bank Road on the south to Patrick Creek on the north.

The original sewer system was constructed in 1976. All sewage for MCSD's approximately 5,180 active sewer customers (as of July 2017) is treated at the wastewater management facility (WWMF) at Hiller Park. MCSD maintains approximately 73 miles of sewer mains (including 1.7 miles of force mains) that convey wastewater to the WWMF. The District also operates and maintains five sewer lift stations (Fischer Rd, B St, Letz Ln, Kelly Ave, and Hiller Rd lift stations). An overview of the District's sewer system is shown in Figures 2 and 3. Figure 2 symbolizes the sewer mains with respect to size, and Figure 3 symbolizes the sewer mains with respect to material.

1.2 Summary of Previous Studies and Findings

Elements of the MCSD collection system have been evaluated periodically since the system was constructed. This section presents background information, findings, and recommendations from the following recent documents and studies regarding the MCSD collection system:

- Wastewater Facilities Plan, SHN – January 2012
- Sewer Capacity Analysis, MCSD Sewer Collection System, Revision 1, SHN – September 2013
- MCSD Sanitary Sewer Management Plan, Freshwater Environmental Services – January 2014
- McKinleyville Capital Improvement Plan, HSU Student Capstone Project – May 2015
- Water and Sewer Capacity Fee Study, Willdan Financial Services – September 2011
- Sewer Rate Analysis, Willdan Financial Services – May 2015

These previous studies are summarized in this report to provide additional context and highlight conclusions that can be drawn from previous work. While a more in-depth assessment of the collection system was undertaken as a part of this Master Plan effort, synthesizing information provided in previous studies served as a foundation for this work. Recent assessment of the sewer collection system was started with a 2012 Wastewater Facilities Plan summarized in the following section.

1.2.1 Wastewater Facilities Plan, SHN – January 2012

SHN Consulting Engineers & Geologists, Inc. (SHN) prepared a Wastewater Facilities Plan Administrative Draft (WWFP) for MCSD in January 2012. A significant portion of the WWFP is focused on the District's wastewater treatment, reclamation, and disposal facilities, none of which are included as a part of this Sanitary Sewer Main Line Replacement and Rehabilitation Master Plan effort. However, the WWFP also discusses population growth forecasts, existing/projected system flows, and critical areas of the sewer collection system that are recommended for upgrades, which are all pertinent to this Master Plan effort.

The WWFP notes that due to regular monitoring and maintenance, the collection system has some of the lowest infiltration and inflow (I/I) rates in Humboldt County. Smoke testing areas of concern was completed to test for leaks, and the District monitors wet weather flows at various manhole locations each winter to identify areas of excessive I/I.

The dry weather (May 15th through October) collection system flows averaged 0.9 million gallons per day (MGD) and 1.1 MGD during the wet weather (November through May 14th) seasons. These flow rates were based upon flows during the period of 2003 to 2010. With an expected annual population increase of 1.8% (based on the "alternative growth rate" given in the McKinleyville Community Plan prepared by Humboldt County in 2002), it was predicted that by 2030 the average daily flows will increase to 1.4 MGD and 1.7 MGD in the dry and wet weather seasons, respectively. The peak daily flow for the period of 2003 through 2010 was approximately 2.0 MGD, with the peak daily flow for year 2030 projected to be approximately 3.1 MGD. The peak instantaneous flow (highest sustained hourly flow resulting from a 5-year storm during high groundwater periods), which is used as the basis of design for the required hydraulic capacity of conveyance and treatment system components, was estimated to be 2.5 MGD for 2010 and 3.8 MGD for 2030.

The WWFP discusses the development of the MCSD collection system hydraulic model. The model was under development as of the publish date of the WWFP, and more information on the model and associated results was given in the subsequent Sewer Capacity Analysis completed by SHN in September 2013. The Sewer Capacity Analysis is summarized in the following section. The model was used during the development of the WWFP as a tool to determine areas in the collection system that are limited in capacity under existing conditions or under projected growth conditions. The model allows for the input of rainfall derived infiltration and inflow (RDII) to account for higher system flows during wet weather periods. The model results indicated that each of the three gravity trunk lines that cross under Highway 101, conveying the majority of the wastewater flows from the east side to the west side of the highway, were able to convey up to the 5-year RDII without surcharging under existing population/flow conditions. The model showed surcharging in Lines 3 (includes the south Highway 101 crossing) and 5 (at the middle Highway 101 crossing) under the 100-year RDII, existing population/flow scenario.

Multiple growth scenarios were presented in the WWFP, based on future development projections provided by Humboldt County. The "Alternative B with Multi-Family (BMID-MF)" scenario was selected to be analyzed using the sewer model, since this growth scenario was most closely aligned with what the population would be in year 2030 under the assumed 1.8% growth rate. Flows in the model were allocated based on a County-provided GIS dataset that included a direct allocation of development by region. Under the BMID-MF scenario, the model showed that the middle crossing would surcharge under dry weather conditions. Both Lines 3 and 5 surcharged under the 5-year RDII event. There was much more extensive surcharging in Lines 3 and 5 in the model under this growth scenario with 100-year RDII conditions.

The WWFP identifies the gravity lines that cross the highway, especially Line 3 (which includes the south Highway 101 crossing) and Line 5 (which includes the middle Highway 101 crossing), as critical areas for upgrades. The WWFP recommends lining the 10-inch asbestos cement (AC) pipes that comprise Line 5 with cured in place pipe (CIPP) and installing a parallel 12-inch pipe to increase capacity. It recommends lining the existing 15-inch Line 3 with CIPP and installing a new parallel 15-inch pipe. Another alternative to these recommended improvements is direct pipe replacement (rather than parallel pipe installation).

Lastly, the Letz, Hiller, and Fischer lift stations were also recommended for upgrade. Recommended upgrades included replacing the pumps, motors, and heating and ventilation systems, as well as installing new motor control centers, variable frequency drives, programmable logic controllers, new level sensing equipment, and updating the electrical systems to comply with current code requirements. The WWFP also recommends a new generator and automatic transfer switch at the Hiller lift station, which was completed as a part of recent WWMF upgrades (the lift station is tied into the WWMF generator).

The WWFP gives an estimated cost of approximately $3.4 million for the recommended collection system and lift station improvements, including construction, contingency, engineering, and administration costs.

1.2.2 Sewer Capacity Analysis, MCSD Sewer Collection System, Revision 1, SHN – September 2013

SHN prepared a Sewer Capacity Analysis (SCA) for MCSD in September 2013. The SCA presented an analysis of the capacity of the three gravity trunk lines that cross Highway 101, as they are the known limiting segments of the collection system. These three lines are referred to as Line 2 (north crossing), Line 5 (middle crossing), and Line 3 (south crossing). The sanitary sewer model that was developed as a part of the Wastewater Facilities Plan was adjusted to reflect verified as-built conditions that were not previously reflected in the model, and then used to perform the necessary modeling for the updated SCA. SHN modeled an existing conditions scenario with no RDII, as well as RDII scenarios that included the 5-year, 25-year, and 100-year, 24-hour events. Pipeline capacity and downstream lift station capacity were both considered in the analysis. Lift station capacity was based on the firm capacity of each respective lift station, which is the capacity of the station under the emergency situation where the largest pump is out of service. The firm capacity for the lift station downstream of the north crossing (Letz lift station) was given as 673 gallons per minute (gpm), while the capacity of the limiting segment of Line 2 was given as 1,484 gpm. Thus, the total flow capacity for Line 2 was set as the firm capacity of the Letz lift station. The firm capacities for the lift stations downstream of Lines 3 and 5 exceeded the total flow capacity of the pipelines themselves. Available flow capacity was determined by subtracting the peak flow rate, based on model results, from the total flow capacity of each segment. A peaking factor of 1.34 was applied as a part of the sanitary time step pattern.

Model results showed that all crossings have capacity to accommodate additional flow beyond the 5-year RDII event. The north crossing (Line 2) does not have enough capacity to accommodate the 25-year RDII event, and the middle and south crossings have additional capacities of 45 and 86 gpm, respectively. None of the crossings have enough capacity to accommodate the 100-year RDII event. However, it should be noted that the modeled peak flow in Line 2 under the 100-year RDII event was given as 794 gpm, which is well under the Line 2 pipe capacity of 1,484 gpm. The 100-year event could also be handled by the Letz lift station if the assumption were not made that the largest pump was out of service. Assuming that all the pumps in the Letz lift station were in service, Line 2 could accommodate both the 25-year and 100-year, 24-hour RDII events.

The SCA recommends that MCSD use the capacity analysis results based on the 25-year, 24-hour RDII scenario for future planning purposes.

1.2.3 MCSD Sanitary Sewer Management Plan, Freshwater Environmental Services – January 2014

Freshwater Environmental Services prepared a Sanitary Sewer Management Plan (SSMP) for MCSD in January 2014. The SSMP was prepared to meet the Statewide General Waste Discharge Requirements (WDR) for Sanitary Sewer Systems. The WDR defines eleven mandatory SSMP elements and associated monitoring, record keeping, reporting, and public notification requirements, all of which are addressed in the SSMP. The SSMP outlines all sanitary sewer management programs, plans, and expectations of the MCSD. The recommended capacity improvement projects were for the following: Line 5 between manholes (MH) 5-2 and 5-3 (middle crossing), Line 6.3 between MH 6-17 and MH 6-6 (section of pipe along McKinleyville Avenue that runs south from the intersection with Hiller Road for approximately 380 feet), and Line 6 between MH 6-3 and 6-4 (section of pipe along Hiller Road between Walker Avenue and Taves Avenue). However, these sections of the system (aside from the middle crossing) were not identified as areas of concern in the SHN modeling analyses.

1.2.4 McKinleyville Capital Improvement Plan, HSU Student Capstone Project – May 2015

A group of Humboldt State University (HSU) engineering students prepared the McKinleyville Capital Improvement Plan as part of a school project. Among other information and analyses, the report provides recommendations for infrastructure upgrades of MCSD's water distribution and sewer collection systems, preliminary designs for specific projects, and a schedule and estimated costs for systematically replacing the entire sanitary sewer collection and water distribution systems, accounting for expansion of each system to accommodate projected population growth. This report also analyzed how the "full buildout" scenario (developed based on potential rezoning and projected population growth per the Humboldt County General Plan) would affect the capacity and performance of each system.

This report developed design parameters for replacement of the aforementioned, under-capacity Lines 3 (south crossing) and Line 5 (middle crossing). The report recommended replacement of

1,300 feet of Line 3 with 15” high density polyethylene (HDPE) pipe at a slope of 1.8%. The report noted that the portion of new pipe that would be under the highway would need to be inside a 250-foot-long 21” steel casing to comply with Caltrans requirements. The report recommended replacing the southern crossing with 24” HDPE pipe at the original slope. The 250-foot portion of this new pipe that went under the highway would be inside a 30” steel casing. The report notes that even with this replacement, Line 5 would still surcharge near the lift station west of the highway (Hiller lift station), likely due to undersized pumps in the lift station.

The recommended replacement schedule for the entire collection system was broken into two sections, replacing 6,500 ft/year until 2060 and then 4,200 ft/year until 2096. The total present worth cost for replacement of the sewer collection system was given as $24 million.

Model results showed that the current collection system is not sufficient to accommodate the “full buildout” scenario, which included RDII from a 25-year design storm. The largest problem was surcharging at the south Highway 101 crossing, and model results showed surcharging in the area of the middle crossing as well. The report notes that the lift station downstream of the south crossing (Fischer Road lift station) is undersized to accommodate this scenario, and that a 1,500 gpm increase in capacity is required to prevent surcharging in the south crossing.

1.2.5 Water and Sewer Capacity Fee Study, Willdan Financial Services – September 2011

Willdan Financial Services (Willdan) prepared a Water and Sewer Capacity Fee Study for MCSD in September 2011. Capacity fees are one-time charges that are collected as a condition of establishing a connection to the District’s systems. These fees are proportional and related to the capital facility demands of new development. Capacity fees are collected separately from connection fees, which are used to offset the costs associated with the physical connection to the utility. Willdan recommended a sewer capacity fee of $4,497 per equivalent residential unit (ERU), which is defined as any single-family residential structure. This was an increase from the previously existing sewer capacity fee of $1,761 per ERU, which was established in 1999.

1.2.6 Sewer Rate Analysis, Willdan Financial Services – May 2015

Willdan prepared a Sewer Rate Analysis (Rate Analysis) for MCSD in May 2015. The Rate Analysis was largely prepared to propose an increased rate structure to ensure sufficient funding to repay debt for the construction of upgrades to the WWMF, as well as to pay for projected increased operation costs after construction. The existing sewer charges for single family residences at the time the Rate Analysis was prepared (fiscal year 2014/2015) included a fixed monthly charge of $17.57 and a variable monthly charge of $1.49 per hundred cubic feet (HCF) of water used. The recommended sewer rates increase annually through fiscal year 2019/20. The recommended charges for fiscal year 2019/20 include monthly fixed charge of $33.94 and a variable charge of $2.84 per HCF of water used.

1.3 Anticipated Growth

It is important to consider future demand when planning future rehabilitation and replacement of sewer main pipelines. Appropriate growth considerations can be used to determine if a pipe should be replaced in kind, or if the size should be increased to provide additional capacity.

The 2002 McKinleyville Community Plan (a subsection of the Humboldt County General Plan) notes that the most probable growth projection for McKinleyville was 1.8%, based on the growth trends at the time. The McKinleyville Community Plan has not since been updated.

McKinleyville had a population of 13,599 in 2000 (based on the 2000 census) and 15,177 in 2010 (based on the 2010 census). Based on data from the American Community Survey (ACS) 5-year Estimate performed by the United States Census Bureau, McKinleyville had a population of 16,291 in 2015. Using these figures, population growth from 2000 to 2015 was approximately 1.21% per annum, and growth from 2010 to 2015 was approximately 1.43% per annum. The District has indicated that they would consider using a rate of 1% per annum for growth projections when considering future development potential within District service boundaries.

The only major subdivision development that has occurred since 2010 was the Central Estates Subdivision. Any population increase that resulted from this subdivision likely would have been captured in the 2015 ACS 5-year Estimate, and the contributing flows from this subdivision were also included in the sewer modeling that was performed by SHN (as presented in the 2012 Wastewater Facilities Plan and the 2013 Sewer Capacity Analysis). Additionally, the Humboldt County General Plan has not been updated since the sewer modeling was performed. Modeling scenarios described in the Wastewater Facilities Plan included projected flows for 2030 that were developed based on a 1.8% annual increase in population, which is conservative when considering the recent population growth trends described above.

1.4 Overview of Master Planning Effort

This Master Plan effort includes an analysis of all of the sewer mains and manholes in the District's sanitary sewer collection system. While sewer lift stations and the wastewater management facility (WWMF) are mentioned in this report, they are discussed in the context of the overall wastewater system. No analyses of lift stations or the WWMF are provided as a part of this study, and they are being addressed under separate Capital Improvement Planning (CIP) efforts.

The overall Master Plan was developed through multiple major phases of effort which culminated in the development of this Final Sewer Main Line Rehabilitation Master Plan (Final Master Plan). This document supersedes the Phase 1 and Phase 2 reports and summarizes the effort and recommendations from the three phases of master planning:

- Phase 1: High-level overview of sewer collection main lines and more detailed review of selected known issues
- Phase 2: More detailed cost analysis and phasing of the systematic replacement of sanitary sewer main lines
- Phase 3: Revise and update replacement prioritization and schedule through physical assessment of some sewer collection main lines and risk analysis

The Phase 1 effort included the results of the high-level assessment of the District's collection system for use in initial planning for replacement, rehabilitation, and upgrades. The Phase 1 effort helped to quantify the overall nature, scope, and magnitude of long-term main line maintenance and replacement.

The Phase 1 study focused on the following:

- General overview of MCSD and the existing collection system
- Summary of previous related studies and findings that pertain to rate structure, capacity, maintenance and repair requirements, and other identified limitations of system components
- Description of the anticipated growth for the McKinleyville area
- Discussion on areas anticipated to have capacity issues within the next approximately ten years
- Discussion on areas of excessive maintenance and excessive infiltration and inflow (I&I)
- Summary of MCSD's existing collection system main lines, including information pertaining to size, age, material, and condition
- Discussion on considerations for replacement of the collection system main lines
- Preliminary design of an upgrade for the middle sewer crossing, including a presentation of alternatives, construction cost estimates for each alternative, and a recommended replacement alternative
- Long-term replacement analysis with associated costs for systematically replacing the entire collection system
- Financial analysis to assess the rate impacts to pay for the long-term systematic replacement of the entire system. It is important to note that we are not recommending the rate increases presented in the financial analysis section of the Phase 1 document, but merely assessing what it would cost to systematically replace the entire distribution system over a period of time.
- Rehabilitation plan with costs for projects that are recommended to be completed in the near-term (i.e. within the next approximately ten years)

Phase 2 of the Master Plan effort built upon the system knowledge presented in Phase 1 to develop more detailed phasing information for the systematic replacement of the sewer mains.

Based on planning with District staff, the Phase 2 effort focused on the following:

- Discussion of appropriate replacement methodologies (e.g. lining, bursting, or direct replacement) with associated construction cost estimates
- Determination of an appropriate yearly project cost based on the Phase 1 system requirements and recent Willdan Rate Study
- Development of a schedule for the first 50 years of main line replacement for the MCSD sewer collection system
- An MCSD budget including costs for these projects for the next 100 years, and review of the financial analysis of forecasted rates necessary to fund these replacements.

This Phase 3 effort consists of direct physical assessment of portions of the system to determine the condition of the pipe and revision of the replacement schedule established under Phase 2 based on risk assessment. Phase 3 of the Master Plan provides the following:

- Determination of pipe condition through physical testing of pipe samples
- Evaluation of prioritization based on risk considering all of the triple bottom line categories: social, environmental, and financial
- Discussion and comparison of performing construction work in-house or through contract with associated construction cost estimates
- Refinement of the appropriate yearly project cost based on the updated system requirements and financial analysis
- Revision of the schedule for the first 50 years of main line replacement for the MCSD sewer collection system based on the risk assessment

1.5 Key Points from the Phase 1 Report

MCSD is a community service district providing parks, recreation, water, wastewater, and streetlight services to residents of McKinleyville in Humboldt County, California. The MCSD boundary encompasses approximately 19 square miles, ranging from North Bank Road on the south to Patrick Creek on the north, of which a large majority is provided sewer service

The original sewer system was constructed in 1976. All sewage for MCSD's approximately 5,180 active sewer customers (as of July 2017) is treated at the wastewater management facility (WWMF) at Hiller Park. MCSD maintains approximately 73 miles of sewer mains (including 1.7 miles of force mains) that convey water to the WWMF. The District also operates and maintains five sewer lift stations (Fischer Rd, B St, Letz Ln, Kelly Ave, and Hiller Rd lift stations).

The majority of the system is currently in good condition with a few near-term areas of concern:

- Both the middle and southern Highway 101 crossings have known capacity issues that will need to be addressed in the near future. The District applied for and was awarded a FEMA Hazard Mitigation Grant to replace both these and the northern Highway 101 crossings. Work on phase one of this project has been completed.
- An 8-inch asbestos cement pipe (ACP) on Central Avenue from Sutter Road to Hiller Road has become severely corroded by hydrogen sulfide gas. If the problem is not addressed in the near term (next approximately 5-10 years), this section of pipe could present serious issues with I&I and pipe failure.
- Approximately half of the force mains in the system are over 40 years old, and the majority of the force mains are ACP. If one of the force mains were to fail, it would pose a very serious issue for the District. It would be very difficult and time-consuming to bypass flows around the failed force main to allow for repair. The lift station associated with the failed force main would likely overflow with sewage within hours, which would also cause backup within the pipe network. This could lead to serious environmental impacts as well as fines imposed on the District.

- The original sewer collection system was constructed in 1976, making it 42 years old in 2018. The original piping comprises 55% of the current total collection system piping and is predominately composed of ACP. With an ACP design life of 50-70 years, the original system piping will likely have corrosion and failure issues in the next 10 to 30 years if the District does not begin the process of replacing system main lines.

The total cost estimate for replacing the entire sewer collection system is $142 million in today's dollars. The multi-year pro forma analysis on the MCSD sewer system found that MCSD could not afford replacement of the sewer collection without an increase in rates. Using a phased-in approach of rate increases, it is projected that replacing the entire system over 50, 75, or 100 years would require annual rate increases of 7.25%, 6.10%, or 5.50%, respectively.

1.6 Key Points from the Phase 2 Report

The District can replace all critical portions of the MCSD sewer collection system in the next 50 years with a reasonable adjustment to user rates. Spending an average of $1 million (2019 dollars) per year on the system will allow replacement of all near term projects of concern, 100% of 8-inch or larger ACP, and 70% of 6-inch ACP depending on pipe conditions. Note that the replacement schedule from Phase 2, which prioritized replacement of the larger diameter ACP, is updated in Phase 3.

It is critical that the District begin planning and budgeting for upgrades and replacement of system components. The approved rates from Phase 2 anticipated that MCSD would begin putting aside $1 million (2019 dollars) a year starting in 2019. With rate adjustments approved, the project financing is securely in place, allowing MCSD to begin the planning and design process for the early proposed projects so that construction can begin in 2024. It should be noted that a Hazard Mitigation Grant application was awarded to fund 75% of the replacement of the three Highway 101 undercrossings and two of the projects are in process. Initial studies have been completed and currently FEMA is developing the NEPA documents. The grant being awarded for these projects frees up additional money to replace the other sections of ACP sooner.

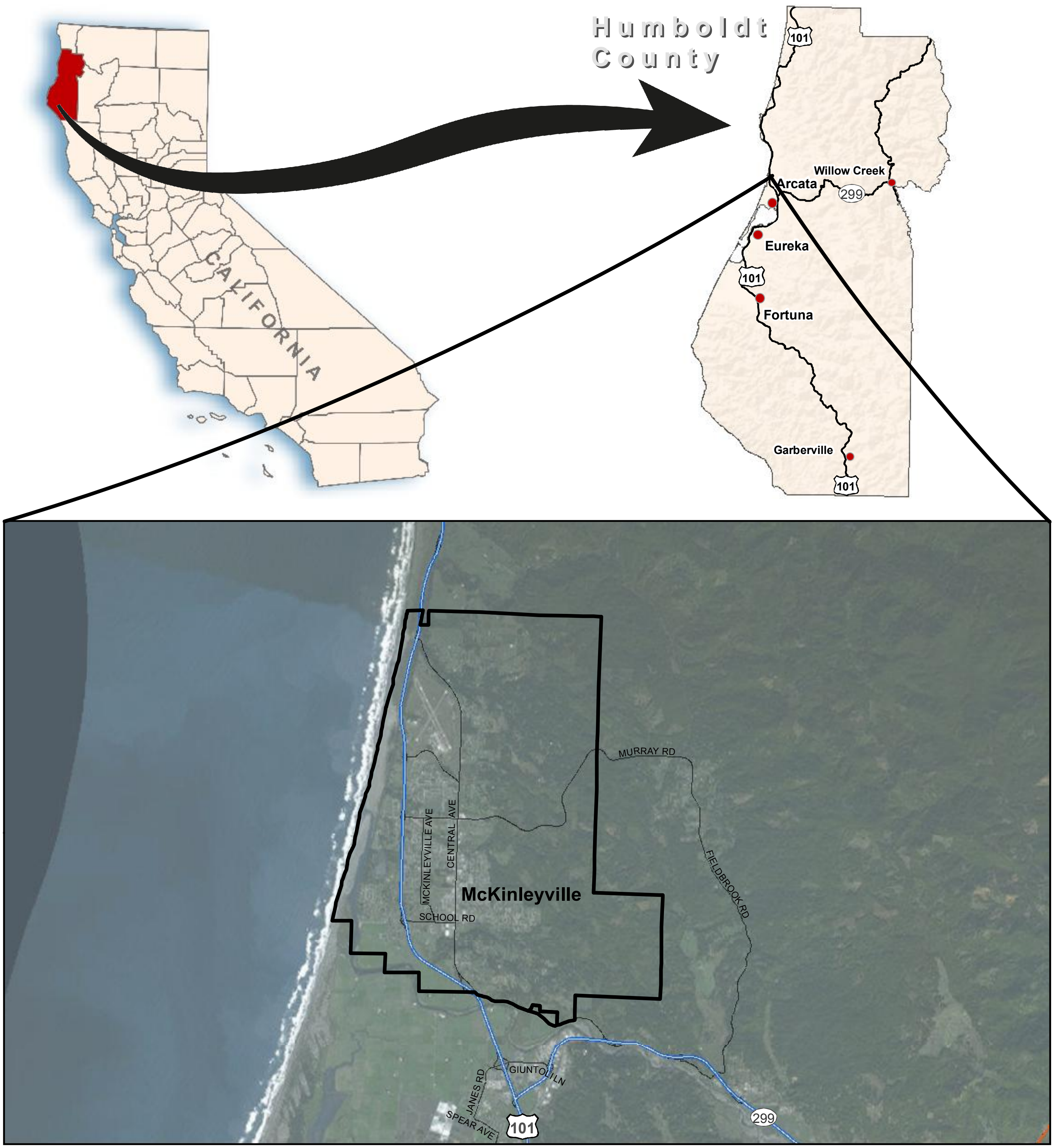
The three replacement methods assessed during Phase 2 are:

- direct replacement,
- pipe bursting, and
- pipe lining.

For direct replacement, the entire pipe length is trenched, old pipe is removed, and new pipe is installed. Pipe bursting accesses the section for replacement with an entrance and exit pit on both ends of the section. A bursting tool then breaks up the existing pipe while pulling the new pipe into place. Pipe lining also uses an entrance and exit pit to access the pipe, the existing pipe is cleaned out and a liner is either pulled or inverted through the existing pipe. Since pipe lining uses the existing pipe, it is only possible if the existing pipe has general structural integrity.

Direct replacement is often the most costly of the three due to the increase in earth movement, additional paving, and traffic control costs. Replacing ACP has added costs for the handling and disposal of asbestos material. The District could choose to self-perform the direct replacement, which could reduce labor costs by 10 to 15% or more. However, performing the work in-house will require special consideration for staffing requirements, material and equipment procurement and the rehabilitation plan. Pipe bursting or lining requires special equipment and expertise, and the District would likely contract out those services. Costs for each method were determined on a linear foot basis to estimate project costs in the yearly replacement schedule.

A major unknown in Phase 2 was the condition of the AC pipes, which affects the chosen replacement method and the prioritization. Further refinement and final recommendations for the actual extent of main line replacement and scheduling using a risk-based approach and results from physical testing was performed in Phase 3 of the Master Planning effort and supersedes the Phase 2 schedule. It is recommended that pipelines scheduled for replacement in the first 10 to 20 years be physically assessed in Phase 3 to confirm replacement methods.



McKinleyville Community Services District Boundary

Paper Size ANSI A

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Miles

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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McKinleyville Community Services District
Sanitary Sewer Main Line Rehabilitation Master Plan (Phase 1)

Job Number	11125090.03
Revision	1
Date	17 Oct 2017

Project Vicinity and Location Map

Figure 1

718 Third Street Eureka, CA 95501 T 707 443 8326 F 707 444 8330 E eureka@ghd.com W www.ghd.com

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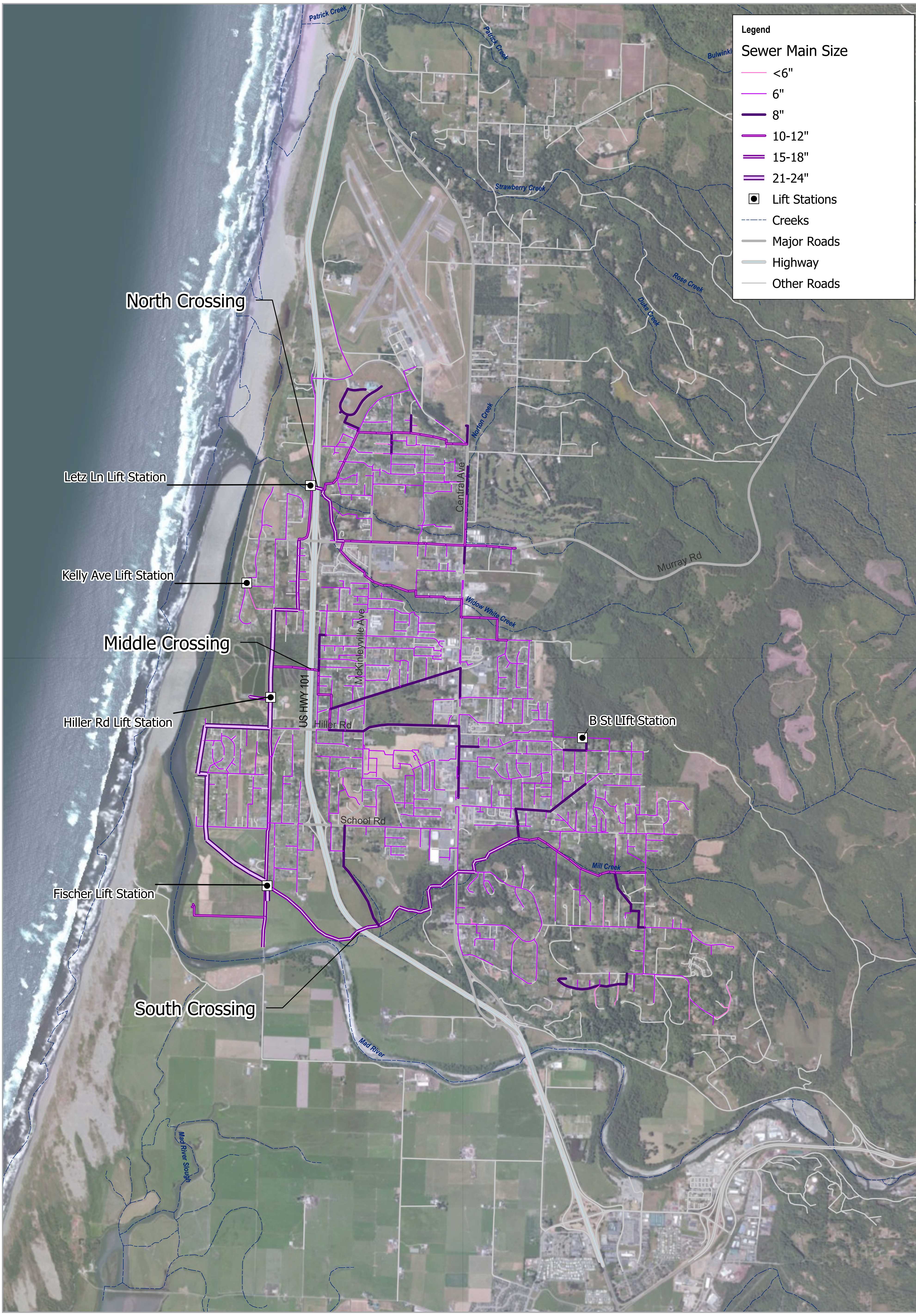
 Data source: ESRI: Street Map USA; Humboldt County: Community Service District boundaries. Created by:jclark2



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Map Projection: Lambert Conformal Conic
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GHD

McKINLEYVILLE COMMUNITY SERVICES DISTRICT

McKinleyville Community Service District
Sanitary Sewer Main Line Rehabilitation
Master Plan (Phase 3)

Sewer System Overview
by Pipe Material

Project No. **11228420**
Revision No. **-**
Date **Jan 2022**

FIGURE 2

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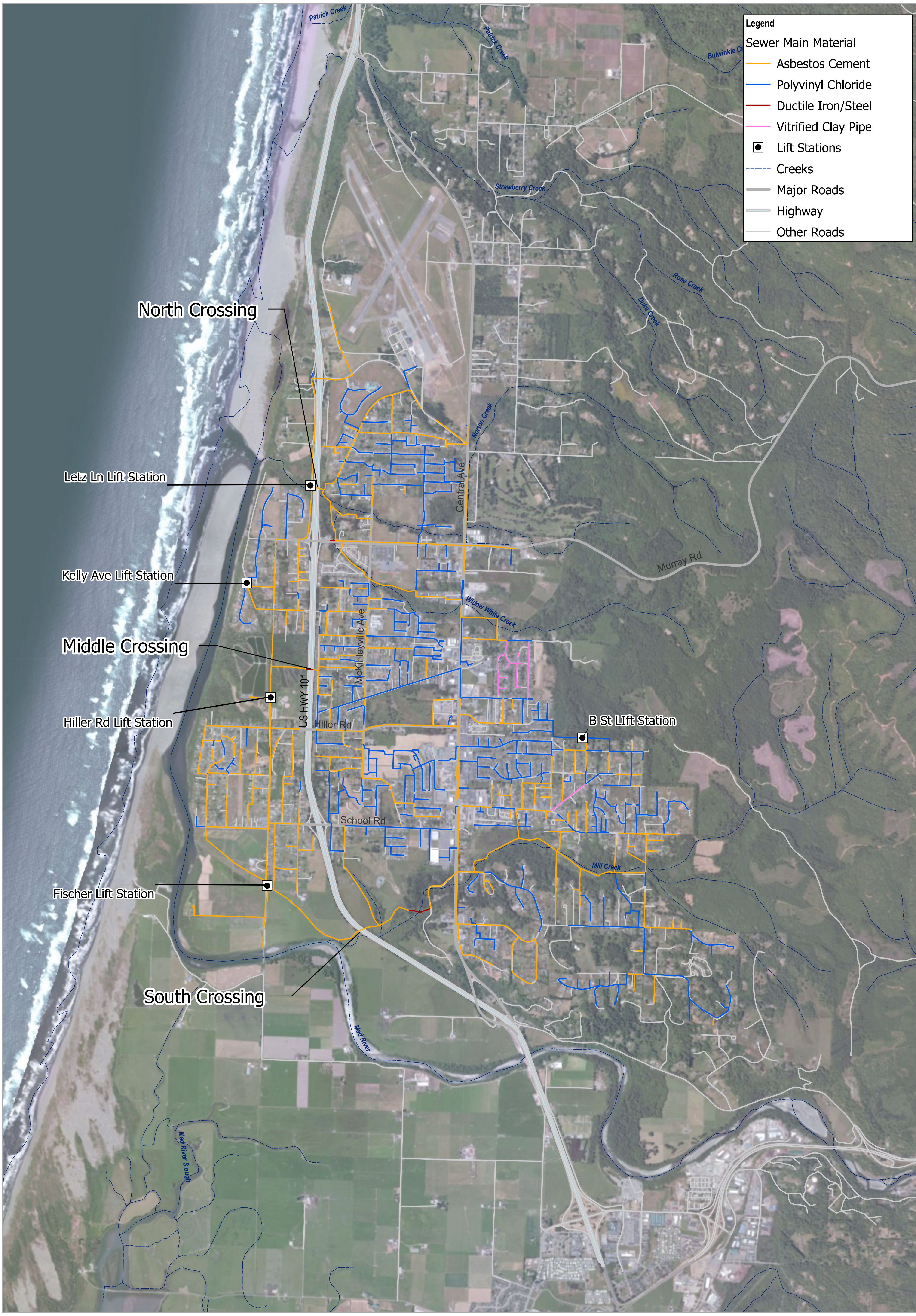
Print date: 18 Jan 2022 - 09:56

Data source: World Imagery (Clarity); Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: djones3



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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McKinleyville Community Service District
Sanitary Sewer Main Line Rehabilitation
Master Plan (Phase 3)

Sewer System Overview by Pipe Material

Project No. **11228420**
Revision No. **A**
Date **Jan 2022**

FIGURE 3

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Print date: 18 Jan 2022 - 09:48

Data source: World Imagery (Clarity); Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: djones3

2. Risk Assessment and Prioritization Process

During Phase 3 of the master planning effort, GHD and the District developed a Risk Framework that was applied to all the sewer pipes in order to update the material- and diameter- based rehabilitation prioritization approach from Phase 2. This section describes the risk assessment methodology and prioritization of rehabilitation of the collection system.

2.1 Physical Testing

As part of Phase 3, soil sampling was conducted to support the assessment and development of an Engineer's opinion of present-day pipeline condition within the sewer (as well as the water) system with respect to the proposed schedule for the District's future replacement. Twenty-one (21) soil samples were obtained by GHD staff on December 2, 3 and 5, 2019 and sent to an independent California certified laboratory for analysis. MCSD provided equipment and labor related to excavation.

Based on soil sample results, a pipe sample collection plan was prepared, and three (3) pipe samples obtained by GHD on April 14, 15 and 17, 2020 with excavation equipment and labor provided by MCSD. The pipe samples obtained were delivered to an independent analytical laboratory for analysis. AC pipe samples were analyzed for the following characteristics: interior and exterior hardness; pH profile; and crush strength.

Based on the laboratory evaluation of the AC pipe samples, it was concluded that:

1. Based on dimensional measurements obtained as a part of the laboratory testing, the AC pipe tested is likely pressure Class 150.
2. Internal degradation, not external degradation, of AC pipe is the limiting factor in AC pipe fitness for continued service
   a) The exterior depth of loss of alkalinity is nominal
   b) The exterior loss of hardness is nominal
   c) The interior depth of loss of alkalinity, greater than 50% of total pipeline wall thickness of Sample AC3, is significant.
   d) The interior loss of hardness of all samples tested is significant.
3. The crushing strength of the three samples varied significantly and relates, as expected, to pipeline wall thickness. The measured crushing strength relationship with respect to the design crushing strength, as itemized in Table 7, is related to pipeline wall thickness. Wall thickness increases as pipeline diameter increases. Based on the data available, pipes with nominal wall thickness of 0.635 inches or less, corresponding to pipeline diameters of 8-inches or less, have experienced significant reduction in residual crushing strength; and pipes with nominal wall thickness of 1.040 inches or more, corresponding to pipeline diameters of 12-inches or greater, have not experienced significant reduction in residual crushing strength. Although there is presently no laboratory data for crushing strength on 10-inch diameter (0.910 inch wall thickness pipe), 10-inch pipe is considered to have likely retained much of the design crushing strength and is classified along with AC pipe of larger diameters.

The establishment of, and broad delineation based on, risk categories is a result of the destructive analysis of three (3) pipe samples. The extent of laboratory analysis was limited and the resulting classifications are therefore limited. Additional destructive evaluation, specifically of pipeline crushing strength, may result in a resolution of data facilitating development of additional risk categories and/or revision to the risk categories presented herein.

In addition to the destructive sampling of AC pipe, non-destructive assessment of ductile iron (DI) pipe was performed at two (2) locations. Ultrasonic thickness (UT) testing was performed at one location on the 18-inch water main near N. Bank Road and Hunts Drive by the Mad River Crossing. This location was selected, in part, based on the corrosivity of soils identified. Pipeline wall thickness was measured at twelve (12) circumferential locations. The UT measurement of pipeline wall thickness identified substantial remaining wall thickness and minor loss of wall thickness. CCTV was performed on a segment of sewer pipe, approximately 212 linear feet, at the middle crossing on Highway 101 near Thiel Road and Hiller East Field. CCTV footage was reviewed by a qualified engineer. Internal lining degradation of ductile iron pipe was identified, and with respect ductile iron pipe, and with respect to the extremely limited nature of the sample size, may be indicative of mortar lining performance of similar vintage and time in service.

For additional information on the physical testing and laboratory results, refer to the *Phase 3b: Water and Sewer Mainline Replacement and Rehabilitation Master Plans Letter Report* dated July 6, 2020 which included in Appendix A.

2.2 Probability of Failure

Probability of Failure (PoF) of an asset is the chance that the asset will failure to serve it's intended purpose and is directly related to its failure mode. Failure may include physical failure (i.e. break, fracture, or collapse), hydraulic capacity failure which can lead to sanitary sewer overflows, level of service failures such as odor issues or not meeting regulations, or efficiency failures when operational costs exceed alternative actions. The probability of physical breakdown and the probability of capacity reduction for a particular asset may not be similar. Asset failure modes are explained in the following subsection.

2.2.1 Modes of Failure

An important component of asset management is to identify and manage the imminent and dominant failure modes of an individual asset. From an asset management perspective, assets can fail in one of four ways shown in Table 1.

Table 1: Modes of Failure Descriptions

Failure Mode	Definition	Tactical Aspects	Management Strategies
Physical Mortality	Consumption of asset reduces performance below acceptable level	Physical deterioration due to age, usage, and acts of nature	O&M optimization, renewal or replacement
Capacity	Demand exceeds capacity	Growth, evolving usage, climate change	Redesign or replacement
Level of Service	Functional requirements not met	Regulations, codes, permits, safety, noise, odors, etc.	O&M optimization, renewal or replacement
Efficiency	Operation costs exceed that of feasible alternatives	Pay-back period for alternatives	Replacement

Understanding the **imminent failure mode** of an asset allows an organization to apply the right strategy option in order to maximize the service benefit per cost spent. Each failure mode, where appropriate, has a time period associated with it. For example, an asset could have 20 years remaining before physical failure, five years before level of service failure, and 10 years before financial failure, but two years remaining before capacity failure. In this scenario, the remaining useful life of the asset would be two years, and the appropriate strategy might be to increase the capacity of the asset through redesign.

The **dominant failure mode** for an asset is the failure mode that results in the greatest consequence of failure. Generally, the dominant failure mode is physical mortality.

The risk framework was developed to evaluate MCSD's sewer systems and prioritize known capacity deficiencies identified in earlier phases of the master planning effort and physical mortality deficiencies based on condition assumptions from the physical testing described in Section 2.1 above.

2.2.2 PoF Scoring Criteria

Each linear asset was assigned a score of 1-5, with 1 being very good condition and 5 being very poor condition. The score for each asset is provided in the asset register in Appendix B. The Probability of Failure scores for each pipe were assigned as follows:

1. Pipes identified as having hydraulic capacity deficiencies in previous phases of the master planning effort were give a score of 5 (i.e. if they fell in CIP years 1-10)
2. From Phase 3 physical testing:
   a) AC pipes with diameter of 8-inches or less were given a score of 4
   b) AC pipes with diameter greater than 8-inches were given a score of 3
   c) DI pipes were given a score of 2

2.3 Consequence of Failure

The consequence of failure (CoF) for an asset is determined by first setting the context of a potential failure that can be expressed in Triple Bottom Line (TBL) categories as shown in Table 2 below.

Table 2: Consequence of Failure Triple Bottom Line Elements

Category	Associated Elements
Social / Community	Health & Safety
Financial	Cost of Failure
Environmental/Regulatory	Sanitary Sewer Overflows (SSOs), Regulatory (Permit) Compliance

2.3.1 CoF Scoring Criteria

Table 3 shows CoF scoring table developed for the MCSD sewer system. The table includes CoF elements associated with each TBL category and the associated value definitions for CoF scores of 1 to 5, with 1 indicating a low consequence and 5 indicating a high consequence. When determining thresholds for scores, it is best to begin with threshold that results in a score of 4. As an asset moves from a score of 3 to a score of 4, the asset crosses the tolerable threshold to the intolerable. The orange shading of scores 4 and 5 indicates intolerable thresholds.

Table 3: Consequence of Failure Scoring Table – Wastewater Collection System

	Definition	1	2	3	4	5
Social / Community						
Health & safety	The direct or indirect impact on individual(s)' health & safety (including employees) as a result of the failure. This is measured in terms of the potential for detrimental impacts on individual(s) health and safety.	No impact	No impact	No impact	Potential for low impact	Potential for severe impact
Financial						
Cost of failure	The total direct and indirect cost (including labor, equipment, fines etc.) to restore the service as a result of the failure. This is not the replacement cost of a failed asset.	<=$5,000	$5,001-$20,000	$20,001-$50,000	$50,001-$100,000	$100,000+
Environment / Regulatory						
SSOs	The category (1, 2 or 3) associated with a Sanitary Sewer Overflow (SSO)	No impact	Category 3	Category 2	Category 1 < 50,000 gallons	Category 1 ≥ 50,000 gallons
Regulatory (permit) compliance	Regulatory permit compliance by Mandatory Minimum Penalty (MMP)	No impact	Potential MMP	MMP	Multiple MMP	Cease and Desist

2.3.2 CoF Score Assignment

Proximity analysis using geospatial data is used to assign consequence of failure scores. Different attributes that help measure the impact associated with each of the elements shown in Table 3. In the case of buried assets (e.g., pipes), attributes shown in Table 4 can be used to estimate the consequence of failure ratings for each of the elements shown in Table 3. Not every pipe attribute applies to every element and the relationship (when exists) between the attributes and the elements are shown with an "X" in Table 4. GHD reviewed data available in the GIS database for the sewer system, as well as data available online for the consequence of failure analysis. The findings and data availability of key layers are summarized in Table 5. The GIS data layers used for the proximity analysis are shown in Figure 6 at the end of this Chapter.

Table 4: Consequence of Failure Scoring Element Attribute

Attributes	Consequence of Failure Elements				
	Public Health & Safety	Loss of Service	Cost of Failure	SSOs	Regulatory Compliance
Critical Customers (hospitals, schools, fire stations, etc)		X			
Proximity to other utilities (stormwater)	X		X		X
Proximity to roads (and type of road)	X		X		
Proximity to environmentally sensitive areas (rivers, streams, open water)	X		X	X	X
Proximity to buildings	X	X	X		
Repair costs (material, diameter, depth)			X		
Zoning and land use		X		X	

As part of the risk-based prioritization approach, each asset in wastewater collection systems is scored using geospatial proximity analysis and the scoring criteria defined in the Risk Framework. All CoF scores for each pipe are provided in the asset register in Appendix B.

Table 5: Consequence of Failure Element Attribute Data Sources

Attributes	Source	Data Availability
Date of installation	GIS	No - Water - 1973 No - Sewer - 1976
Material	GIS	Yes
Size/Diameter	GIS	Yes
Length	GIS	Yes
Proximity to roads	GIS online	Yes
Proximity to other utilities	ArcGIS Online – Humboldt County Public Works	"McKinleyville Storm Drain 180918"
Proximity to environmentally sensitive areas (e.g., wetlands, open water)	GIS online	Yes
Critical customers (hospital, schools, fire stations, etc)	Create	None exist but could be created Fire Stations - https://humboldtgov.org/276/GIS-Data-Download
Proximity to other buildings	Remote sensing data online	Web layer created via remote sensing, so many need verification

2.3.3 Dominant CoF Score

Assets are assigned scores from 1 to 5 for each of the four elements. The highest individual score across these elements for each asset is the Dominant CoF score. Dominant CoF score range from 1 to 5.

2.3.4 Triple Bottom Line CoF Score

TBL CoF score also uses the score from 1 to 5 for each of the four CoF elements, but instead of taking the highest individual CoF score, TBL adds together the highest score in each of the three triple bottom line categories, social/community, financial, and environmental/regulatory. TBL CoF score ranges from 3 to 15.

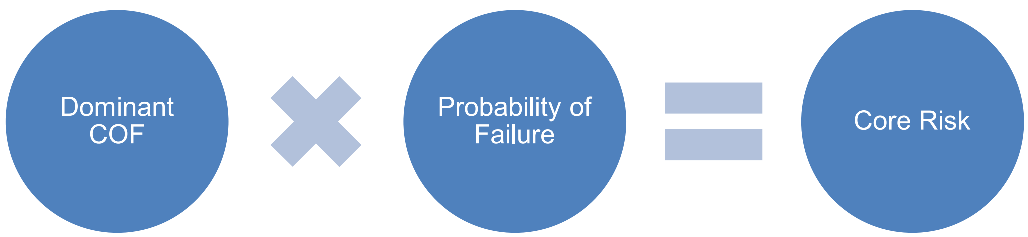
2.4 Risk and Rehabilitation Prioritization

The Business Risk Exposure (BRE) framework provides a process by which risk can be categorized, and activities to mitigate risk can be prioritized (i.e. rehabilitation and renewal) which helps management teams focus on high-risk assets. A BRE framework provides a set of rules for determining the direct and indirect consequences of the failure of an asset and facilitates the prioritization of assets for targeted renewal, rehabilitation, and inspection investment with available capital funds. For this project, GHD performed a risk assessment that considers Probability of Failure (PoF) and Consequence of Failure (CoF) of an asset. The probability of failure component of the risk assessment is a function of asset condition, which incorporates physical mortality (physical life), levels of service (service life; efficiency), and capacity (capacity life) related issues. Any available risk mitigation is also considered.

This section describes how Core Risk and Business Risk Exposure are calculated from the Probability of Failure and Consequence of Failure scores described in the preceding Section 3.3 and how the risk scores are used to prioritize rehabilitation of the wastewater system. All risk scores and priority ranking are provided for each pipe in the asset register in Appendix B.

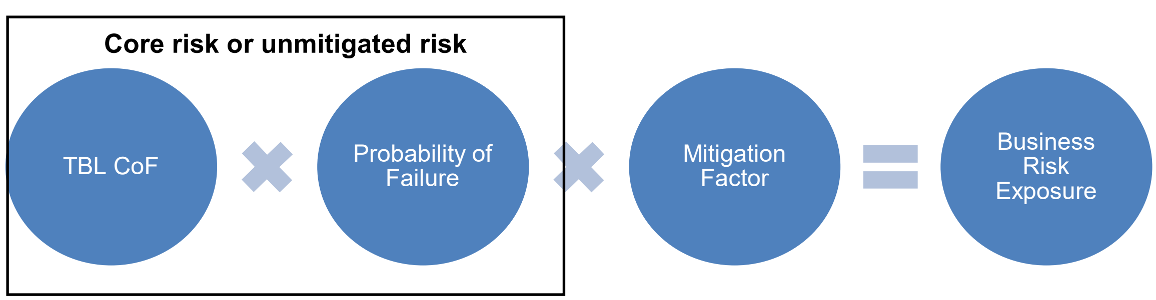
2.4.1 Core Risk Score

The product of the probability of failure and consequence of failure is defined as the core risk. The core risk rating assigned to the assets can be used to drive O&M activities and decisions. The dominant CoF score is used to calculate the dominant core risk score.



2.4.2 BRE Score

Unlike the core risk score, the BRE score uses the TBL CoF score instead of the dominant CoF score and the mitigation factor. The main mitigation factor considered is available, either installed or spare, asset redundancy. Other mitigation factors of note would be actions such as the development of emergency response plans, setting up contracts with external parties in order to facilitate faster reaction or implementing a standard operating procedure for manual operations. For linear assets, the mitigation factor is 1. When identifying management strategies, agencies might consider emergency response plans or monitoring in SCADA as a strategy to reduce risk.



2.4.3 Risk Zones

Once the non-tolerable risk is identified, a BRE chart can be plotted with the unmitigated consequence of failure on the x-axis and the probability of failure on the y-axis. The BRE chart can be segmented into management zones based on what a utility's threshold is for acceptable risk. BRE chart is then used to identify assets that fall into each management zone, including those that are in non-tolerable zones, i.e., those assets that would results in unacceptable impact on service delivery upon failure. Figure 4 shows the BRE chart as a result of the assessment of MCSD's sewer system and the different management strategies for each of the zones. The BRE zones are described as follows:

Zone 5: Non-tolerable risk zone that contains assets that their failure can impose significant risk to the organization. In general, these assets are approaching the end of their useful life and upon failure, may cause significant social, financial, and environmental impacts. Assets in this zone need to be addressed immediately. Appropriate management strategies must be carried out so that the number of assets in Zone 5 are minimized.

Zone 4: Contains assets that have high consequence of failure but have not deteriorated enough to be included in the non-tolerable risk zone (Zone 5). Increased visual and/or predictive condition assessments may be justified as their condition deteriorates and as they move vertically in the graph approaching Zone 5 over time.

Zone 3: Contains assets that would experience failure consequences that can be made tolerable through designed redundancy and operational mitigation such as spares and condition monitoring. Zone 3 assets can also migrate into Zone 5 over time and as such require additional focus by management.

Zones 2 & 1: Contains assets with lower consequences of failure. Applicable management strategies to consider for these assets may be run to fail and maintenance optimization.

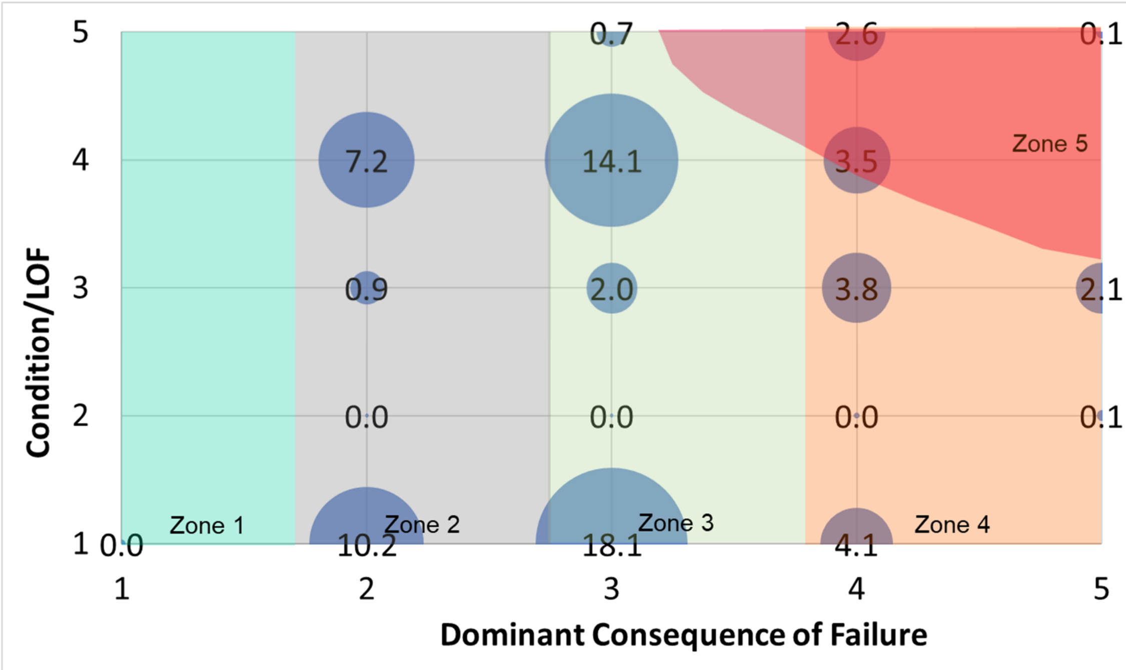


Figure 4: Business Risk Exposure Plot[1]

Notes:

1. Bubble size and number correspond to the length of pipe with that combination of LOF and Dominant COF (in miles of pipe).

2.4.4 Prioritization

Risk Zone is calculated from unmitigated CoF and Core Risk scores. There are five risk zones; Risk Zone 5 is the highest risk, Risk Zone 1 the lowest. In the plot shown in Figure 4:

Risk Zone 5: Core Risk score greater than or equal to 16

Risk Zone 4: CoF score greater than or equal to 4

Risk Zone 3: CoF score greater than or equal to 3

Risk Zone 2: CoF score great than or equal to 2

Risk Zone 1: CoF less than 2

Assets are organized into four 'priority buckets' based on risk zone and condition. Assets that do not meet the requirements below are not assigned to a priority bucket. Figure 5 shows the priority buckets on the BRE Chart.

Priority Bucket 1: Risk Zone 5

Priority Bucket 2: Risk Zone 3 or 4 AND Condition greater than or equal to 4

Priority Bucket 3: Risk Zone 2 AND Condition greater than or equal to 4

Priority Bucket 4: Risk Zone 1 AND Condition equal to 5

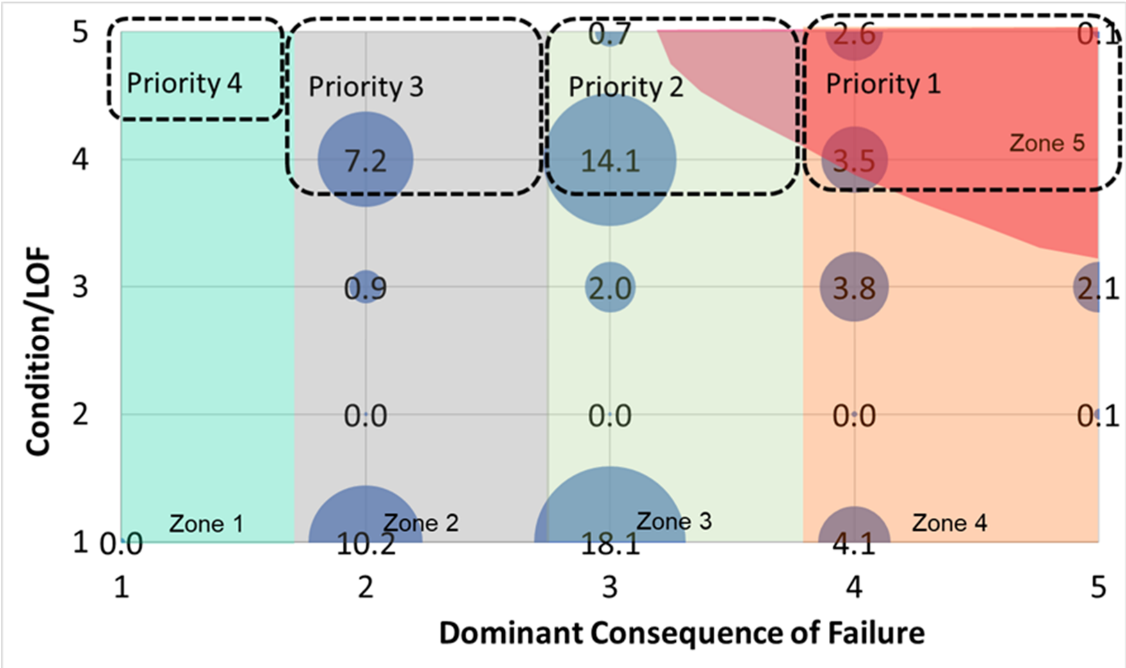
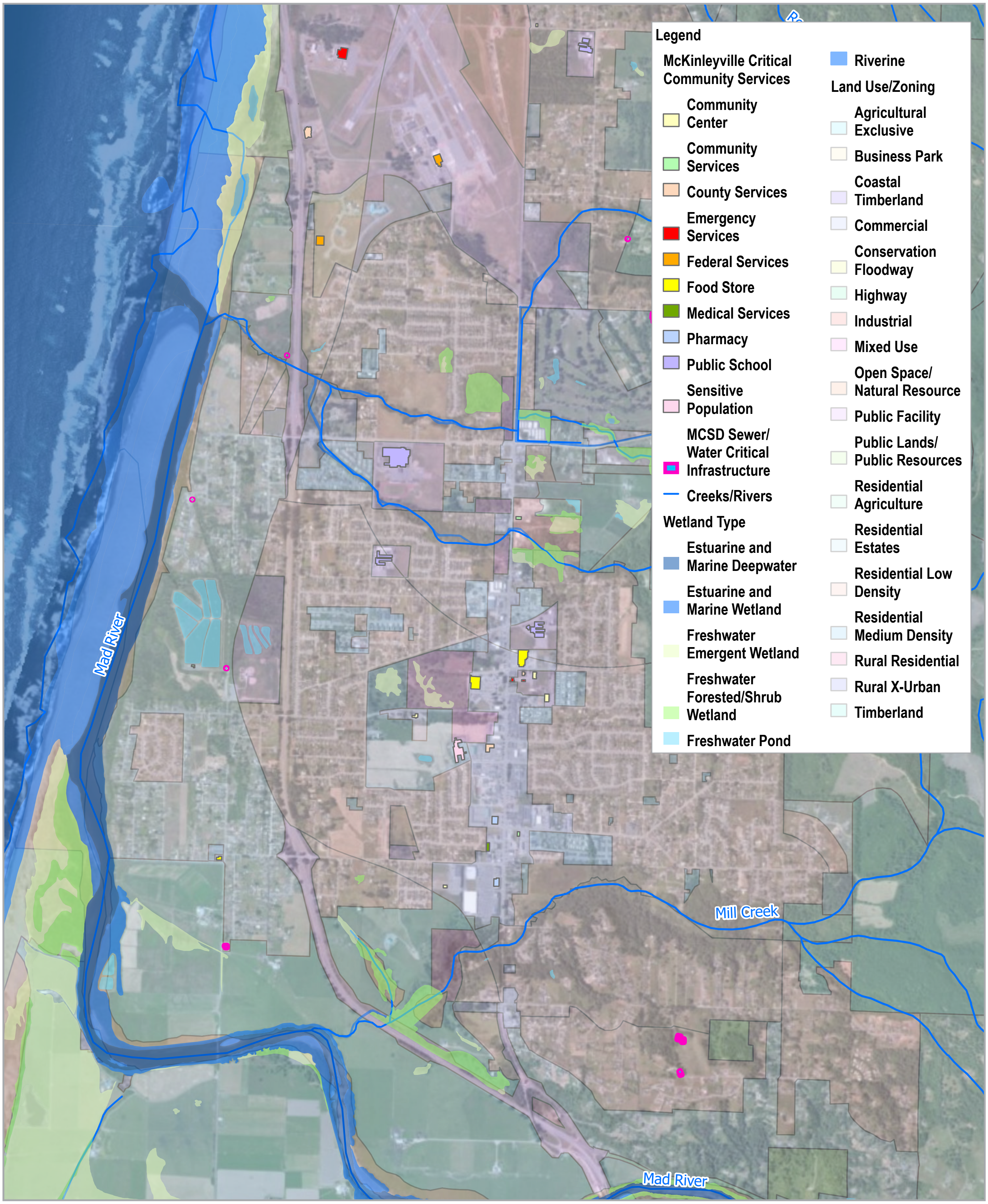


Figure 5: BRE Chart with Priority Buckets

Note that there are no pipes with a dominant COF equal to 1 and therefore no assets in the Priority 4 bucket. Within each priority bucket, the BRE score is used to prioritize replacement. The BRE score considers all triple bottom line categories, effectively prioritizing pipes with higher combined score across all categories and not the single highest, i.e. could have social, financial and environmental consequences.



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Feet

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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

McKinleyville Community Service District
Sanitary Sewer Main Line Rehabilitation
Master Plan (Phase 3)

Proximity Analysis Attribute Layers

Project No. **11218420**
Revision No. **-**
Date **July 2021**

FIGURE 6

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Print date: 16 Dec 2021 - 05:51

Data source: World Imagery (Clarity): Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, World_Hillshade: Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community. Created by: djones3

3. Replacement Methods and Costs

This section describes three replacement methods that were assessed for the MCSD sewer system rehabilitation plan, direct replacement, pipe bursting, and pipe lining.

3.1 Opinions of Probable Cost

The opinions of probable cost for each asset is included in the asset register in Appendix B and should be considered as order-of-magnitude estimates for planning purposes only. The total project cost consists of the construction cost, design and technical effort, construction management effort, and a contingency fund. Land acquisition and/or City degradation fees are not included. Construction costs are based on a Class 5 (planning-level) estimate of probable cost as defined by the Association for the Advancement of Cost Engineering, International (AACE). AACE defines the "Class 5" estimate as follows:

Generally prepared on very limited information, where little more than proposed plan type, its location, and the capacity are known, and for strategic planning purposes such as but not limited to market studies, assessment of viability, evaluation of alternate schemes, project screening, location and evaluation of resource needs and budgeting, long-range capital planning, etc. Some examples of estimating methods used would include cost/capacity curves and factors, scale-up factors, and parametric and modeling techniques. Typically, very little time is expended in the development of this estimate. The typical expected accuracy ranges for this class estimate are -20% to -50% on the low side and +30% to +100% on the high side.

Construction costs are based on the July 2021 Engineering News Record Construction Cost Index (ENR CCI) for San Francisco, CA (13,762.01).

3.2 Direct Replacement

Direct replacement is the most traditional pipe replacement method. It involves digging a trench along the entire length of pipe to be replaced, installing a new parallel pipeline, connecting the new pipeline to the existing laterals, likely removing and disposing of the existing piping, backfilling the trench, and repaving the street. Trenching for direct replacement of piping in roadways interrupts normal traffic flow in the project area more than trenchless methods. Additionally, the large amount of earth movement required for trenching, potential dewatering, the additional traffic control and paving, and the special handling and disposal of the asbestos containing pipes can add significant cost to this method as opposed to trenchless methods. Due to the higher associated costs, direct replacement costs were estimated in Phase 1 to allow for conservative scenario budgeting in the preliminary Master Planning financial analysis.

Values from the overall long-term replacement cost estimate from Phase 1 were updated for 2021 dollars and compared with recent bids in California and used develop per linear foot costs to apply to individual projects for Phase 3. There are construction costs associated with replacing MCSD main lines that would generally be represented as a percentage of the material and installation (which includes excavation and backfill) cost. The first step was determining an industry standard percentage of material and installation costs for these base cost items. Through experience working with clients across California, GHD compiled the following assumptions for various construction activities as shown in Table 6 below.

Table 6: Assumptions for construction costs as a percent of pipe material and install cost.

Item	Description	Percent of Project Cost
1	General Conditions, including: Mobilization/Demobilization Construction Staking Temporary Traffic Control Bypass Pumping Stormwater Pollution Prevention Plan (SWPPP)	20% (Construction Subtotal)
2	Contingency (10% change order, 15% estimating allowance)	25% (Construction Subtotal)
3	Design / Survey / Geotechnical / Environmental Review / Permitting	25% (Construction)
4	Inspection / Construction Management / Engineering Services During Construction (ESDC)	20% (Construction)

Construction subtotal percentages are applied to the material and installation unit costs for pipes ($/lf) and manholes ($/manhole based on depth) to form the construction subtotal to which the construction percentages are then applied. The material, installation, excavation, backfill and paving costs for direct replacement are summarized in Table 7.

Table 7: Direct replacement total project cost per linear foot by pipe size.

Size (in)	Pipe & Install ($/lf)	Excavation/ Backfill ($/lf)	Paving ($/lf)	Total Cost ($/lf)
<=4	185	42	23	250
6	185	42	23	250
8	229	42	29	300
10	279	42	29	350
12	304	42	29	375
15	309	57	34	400
18	384	57	34	475
24	453	57	40	550

3.3 Pipe Bursting

Pipe bursting is a trenchless pipe replacement method. The process involves digging an access pit on both ends of the pipe to be replaced. Then, most typically, a pneumatic system with a pipe bursting tool breaks up the existing pipe as the new pipe is pulled into place behind the pipe bursting tool. Lastly the access pits are backfilled and repaved. For this method the existing pipe is left broken up in the ground around the new pipe. This is particularly helpful in reducing construction risk when replacing old ACP, which is a brittle material that is difficult to excavate around and requires special handling and disposal due to its asbestos content. Furthermore, this method requires approximately 80% less digging than traditional direct replacement. This significant reduction in earth movement, paving, and ACP handling is the reason why pipe bursting tends to cost between 15 to 35% less than direct replacement. The large variation in savings is due to variation in location, soil types, pipe depth, contractor schedules, etc.

Pipe bursting costs (Table 8) were obtained from recent bid comparisons for northern California construction projects and the result is 8-31% less than the Phase 3 calculated direct replacement costs shown in Table 7.

Table 8: Pipe bursting total project cost per linear foot by pipe size.

Size (in)	Total Cost ($/lf)
<=4	204
6	204
8	207
10	251
12	345
14	345
16	345
18	444

3.4 Pipe Lining

Pipe lining, also known as cured in place pipe (CIPP), is a trenchless pipe rehabilitation method. An entry and exit access pit is excavated at the ends of the section to be rehabilitated, similar to pipe bursting, but typically smaller. The existing pipe is then cleaned out using high velocity water pressure jets. When the existing pipe passes inspection, the pipe liner is either pulled through the pipe or inverted into the pipe section. The pipe liner is a resin saturated tube typically made of polyester or fiberglass cloth. The liner is then cured in place over a day or two, the process can be hastened with hot water. Once cured, a special cutting tool is used to reinstate lateral connections. The new CIPP acts just like a new pipe, adding strength and resilience while reducing friction factors in the pipe. Since the process utilizes the existing pipe, it is important that the existing pipe be in an acceptable condition to support the CIPP. Small cracks are generally acceptable, but the pipe must maintain structural integrity.

Costs per linear foot were obtained from recent bid comparisons for northern California construction projects to provide a per linear foot cost for various pipe sizes as detailed in Table 9. It should be noted that 4-inch CIPP is not possible given the limited space inside the pipe and existing 4-inch pipe would have to be replaced via pipe bursting or direct replacement.

Table 9: Pipe lining total project cost per linear foot by pipe size.

Size (in)	CIPP ($/lf)
4[1]	n/a
6	50
8	47
10	59
12	60
14	195
16	206
18	233

[1] 4-inch pipe is too small to allow for pipe lining

4. Replacement Plan

This section presents the prioritization for systematic replacement of the District's sewer collection system. The Phase 3 replacement plan only includes replacement of the assets falling within a priority bucket based on the risk assessment. The goal of the replacement plan is to include replacement of all the critical portions of the system and addressing the greatest risk first. Replacement of smaller diameter (8-inch and smaller) ACP was prioritized given that half of the system is ACP that will be 48 years old at the proposed start of the replacement schedule in year 2024 and physical testing of sample portions indicated that smaller diameter ACP pipes had less wall thickness remaining.

Rehabilitation methods presented in this master plan are used to estimate opinion of probable construction cost. The rehabilitation method will depend on the condition of the pipe and site conditions and therefore should be determined in the design phase. Rehabilitation method for ACP, which the majority of the system is, will also be impacted by the District's preferred method of handling asbestos containing pipe, i.e. pipe bursting and leaving in ground or direct replacement and removal of the asbestos containing pipe.

4.1 Yearly Budget

A yearly budget for the replacement plan was determined in discussion with District staff and approved by the MCSD Board of Directors during Phase 2. Based on the Phase 1 financial analysis, the plan is to replace the system over 100 years to minimize rate adjustments to users. The Phase 1 analysis also determined that the District does not need to replace the entire collection system. There are sections where it would be much more cost effective to repair the occasional leak rather than replace the whole section of main line, particularly in less densely populated areas with smaller pipes. An analysis of the existing system revealed the following:

- 15% of the system is PVC that is less than 20 years old, and
- 17% of the sewer main lines serve 10 or fewer users.

These portions of the system were deemed less critical for replacement, per District staff recommendation the MCSD Board of Directors decided to budget for 80% system replacement over the 100-year replacement plan to reduce the total project cost. Based on the Phase 1 cost estimate, this amount of replacement would require spending an average of $1 million per year (in 2019 dollars).

4.2 Replacement Schedule

Figure 7 shows the replacement plan for all priority assets, while Figures 7.1-7.5 show the replacement plan by priority bucket, with Priority 2 further broken down into three groups based on replacing pipes with the highest BRE scores first. The costs for replacing each group are summarized in Table 10. Note that the specific ordering and grouping pipes into capital projects will be done by the District with the Priority and BRE Scores as guides. The costs presented below assume each pipe segment is treated as a separate project; therefore, costs are conservative. The

Asset Register in Appendix B is listed in order of priority beginning with priority projects identified in Phase 1 of the Master Plan, and then prioritized by descending Priority bucket and BRE score.

Table 10: Priority Buckets based on Priority and BRE Score

Priority	BRE Score	Length (lf)	Cost ($)
1	All	32,757	22.6M
2.1	>35	34,747	17.7M
2.2	30-35	29,188	17.0M
2.3	<30	17,068	9.6M
3	All	38,180	22.1M
	Total	**148,938**	**88.9M**

The plan begins with the near-term projects identified in Phase 1 which are expected to be replaced in the first 10 years: Central Avenue main from Sutter Road to Hiller Road with known corrosion issues, the three Highway 101 crossings, and the four force mains. These projects are included in the Priority 1 bucket. The pipe along Central Avenue will need to be directly replaced via trenching or pipe bursting due to the poor existing pipe conditions. The four force mains will also require direct replacement, and the Highway 101 crossings are anticipated to be replaced via auger boring. It should be noted that Figure 7.1 shows all three crossings replaced and a FEMA Hazard Mitigation Grant (HMG) has been awarded and covers 75% of the cost to replace all three crossings. The original grant monies for 75% of the replacement of the three Highway 101 crossings comprise $3,384,400 of the $22.6M of the Priority 1 cost listed in Table 10. Note, the District is currently in the process of requesting a funding increase due to higher construction costs. In addition, Grace Park was identified by District staff as priority and pipes in this area were added to Priority Group 2.1.

After the near-term projects of concern are complete, the replacement plan begins the general replacement based on risk and the prioritization approach outlined in Section 3. The plan assumes that the existing pipes will be in sufficient condition to allow for pipe lining, the cheapest rehabilitation method. Pipe condition will need to be evaluated prior to the design of each project to confirm lining is a viable option. Should the pipes be degraded beyond the point where lining will be effective, which some likely will be, those segments will need to be replaced via pipe bursting or direct replacement.

The cost for replacement of all manholes and stream crossings were included for each project using the estimated costs of each item updated in Phase 3 based on bids for construction services received for projects in northern California. Cost for replacement of sewer service lines laterals was not included, as pipe lining does not require exposure or replacement of lateral connections. Should the sewer laterals be found to be a major source of inflow and infiltration, it would be prudent to also replace the sewer laterals from the mainline up to the meter.

With the proposed replacement schedule of all priority pipes, 100% (1.3 miles) of the District's VCP, 100% (24.1 miles) of the 8-inch or smaller ACP, and 22% (2.5 miles) of the 10-inch and larger ACP will be replaced.

4.3 In-House vs Contracting Construction Projects

It was suggested in Phase 2 that completing the rehabilitation projects in-house could reduce project construction costs by approximately 15%. The District is interested in further evaluation of the costs and feasibility of performing the construction work in-house. This section aims to summarize the factors that MCSD should consider when making this decision. These considerations include: staffing and equipment, replacement project schedule and budget.

4.3.1 Staff and Equipment

Potential crew costs per year were calculated using MCSD provided cost of $45/hour which includes salary, retirement, and health insurance. With 260 calendar days in a year, a 6-person crew would cost approximately $562,000/year, which is a significant portion of the annual replacement budget. Although the productivity of a specific crew is difficult to estimate, a motivated and efficient 6-person contracted crew might complete roughly 400 feet of pipe per day. If $562,000 is spent on labor costs, the balance of the $1 million (2019 dollars) per year allocation could be dedicated to material. Assuming 8-inch pipe including foundation, bedding, trench zone material, and repair zone (asphalt) material at $170/lf, the material budget would allow purchase of approximately 2,500 feet of pipe. If the crew can install approximately 400 feet per day, the installation might take two weeks. Allowing a couple of weeks at the start for layout and utility mark-out and a couple of weeks at the end for services and restoration would mean a six to seven-week project.

Excluding the percentage assumptions in Table 5 for general conditions and contingencies; assuming the same percentage of project cost applies for design, survey, geotechnical, environmental review and permitting (25%); and approximately half for inspection, construction management, engineering services during construction (ESDC) (10%); the annual cost for a crew working full time and having the materials for the work, is $1.38M. This cost does not include personnel management, training, equipment procurement, or operational and maintenance costs. Balancing the available funding in a given year while keeping the crew busy with materials available can be a challenge for the District. This amount exceeds the annual budget of $1M per year for sewer rehabilitation. The District could consider cross training the crew for water system rehabilitation work, thereby splitting the labor cost between the sewer and water system budgets.

If only half of the crew cost was allocated to the annual sewer project, the $1M budget would then also cover the design, survey, geotechnical, environmental review, permitting, materials testing, and project management costs associated with installation of approximately 2,500 feet of pipe. Similarly, for the water line installation, the crew should be able to install the annual length of pipe in less than three months. Any potential cost savings associated with using in-house staff, is lost because the crew is only productive for roughly half of the year.

Additionally, some projects require specialized skills and equipment which, assuming not all staff have the same skills, could present project delays with a particular crew members absence for training, vacation, sick leave, or other leave. Additional cost uncertainties that make construction efforts potentially risky are equipment costs. Typical equipment would include an excavator, a back hoe, material transport vehicles, a loader, pick-up trucks, shoring, dewatering pumps, and various accessories and smaller tools. A failed piece of equipment or damaged material can cause costly delays for an in-house crew while a contractor will likely have resources available for spare equipment or materials. Relationships with local suppliers will be essential for an in-house crew.

4.3.2 Project Schedule and Budget

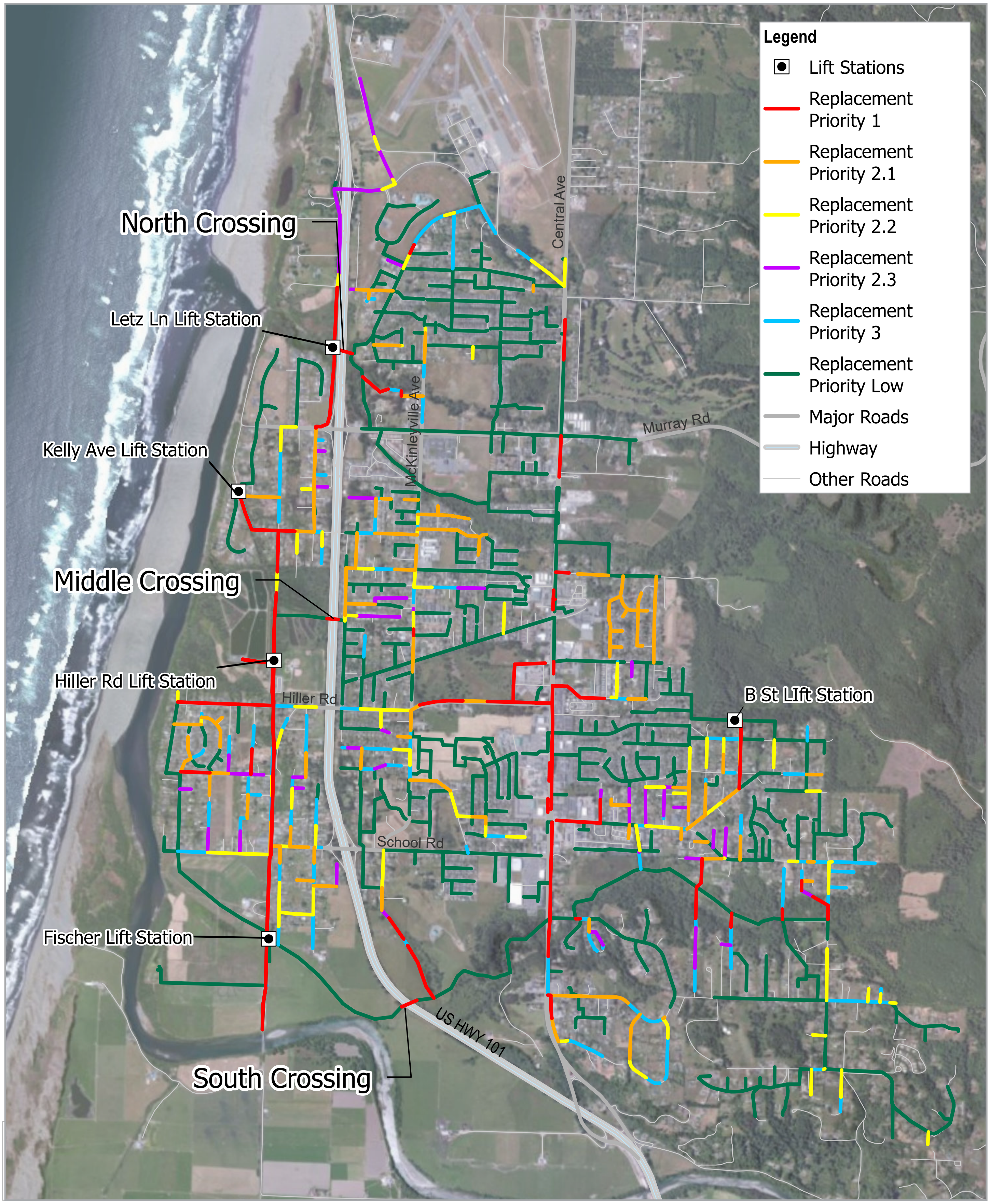
Based on the recommended rehabilitation plan, the projects in the first eight years, identified as priority projects in Phase 1 of the master planning effort are summarized in Table 11.

Table 11: CIP Year 1-10 Projects

Year	Project Description	Project Detail
1	Central Ave from Sutter Rd to Hiller Rd	2,020 feet of 8-inch pipe
2-4	North, Middle, and South Highway 101 Crossings	895 feet of Highway 101 Crossings
5	Kelly Ave Force Main and B St Force Main	1,280 feet of 4-inch pipe / 1,416 feet of 6-inch pipe
6&7	Fischer Rd Force Main	5,858 feet of 12-inch pipe
8	Letz Force Main	1,729 feet of 10-inch pipe

The projects in the first 8 years vary in character, requiring different equipment and skills. The 8-inch pipe the first year is straightforward, but then the highway crossings in years 2-4 require expensive specialized equipment and skilled operators. Smaller pipes are then required (4- and 6-inches) in year 5, and mid-sized pipe 10-12-inches in years 6 through 8. Because of the specialized skills needed and the variability, the early program is not well suited for completing with a small dedicated in-house team. The District could evaluate performing the construction in-house after the first 8 years of CIP projects when the work becomes less varied. Sharing a crew with another near-by district might be a means of reducing labor costs and avoiding either inefficient production or idle time.

Flexibility can be reduced when a utility has an in-house crew performing work. Projects with special circumstances may pose a challenge or risk to the in-house crew, or special equipment or training may be necessary in any given future year and may require contracting out the work. Staff costs and associated materials to maintain production are not easily reduced to accommodate special circumstances or unique projects that require specialized skills.



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Map Projection: Lambert Conformal Conic
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McKinleyville Community Service District
Sanitary Sewer Main Line Rehabilitation
Master Plan (Phase 3)

Project No. **11218420**
Revision No. **Rev A**
Date **Jan 2022**

Sewer Replacement Analysis
All Priority Rankings

FIGURE 7

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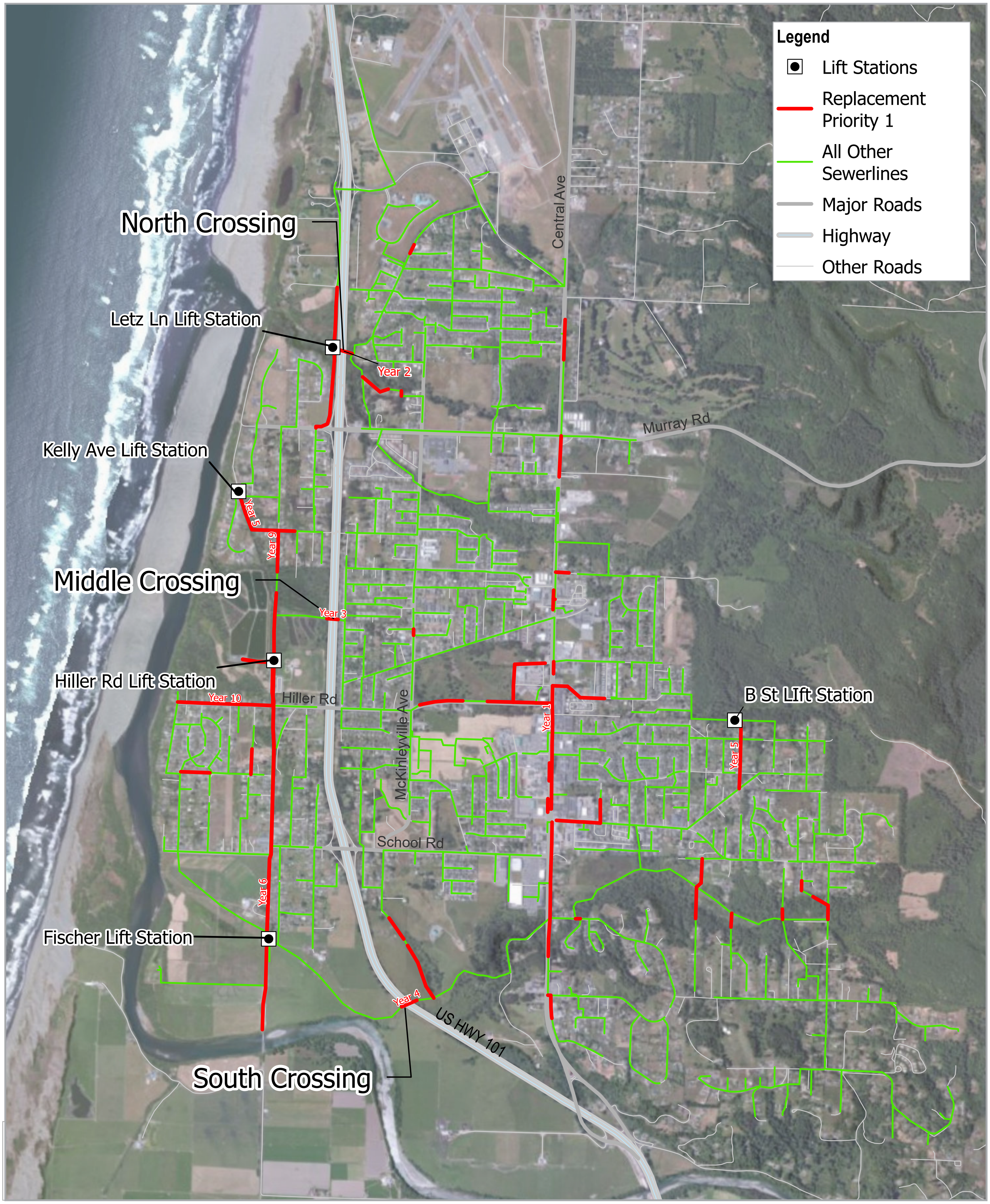

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McKinleyville Community Service District
Sanitary Sewer Main Line Rehabilitation
Master Plan (Phase 3)

Sewer Replacement Analysis
Priority 1

Project No. 11218420
Revision No. -
Date Dec 2021

FIGURE 7.1

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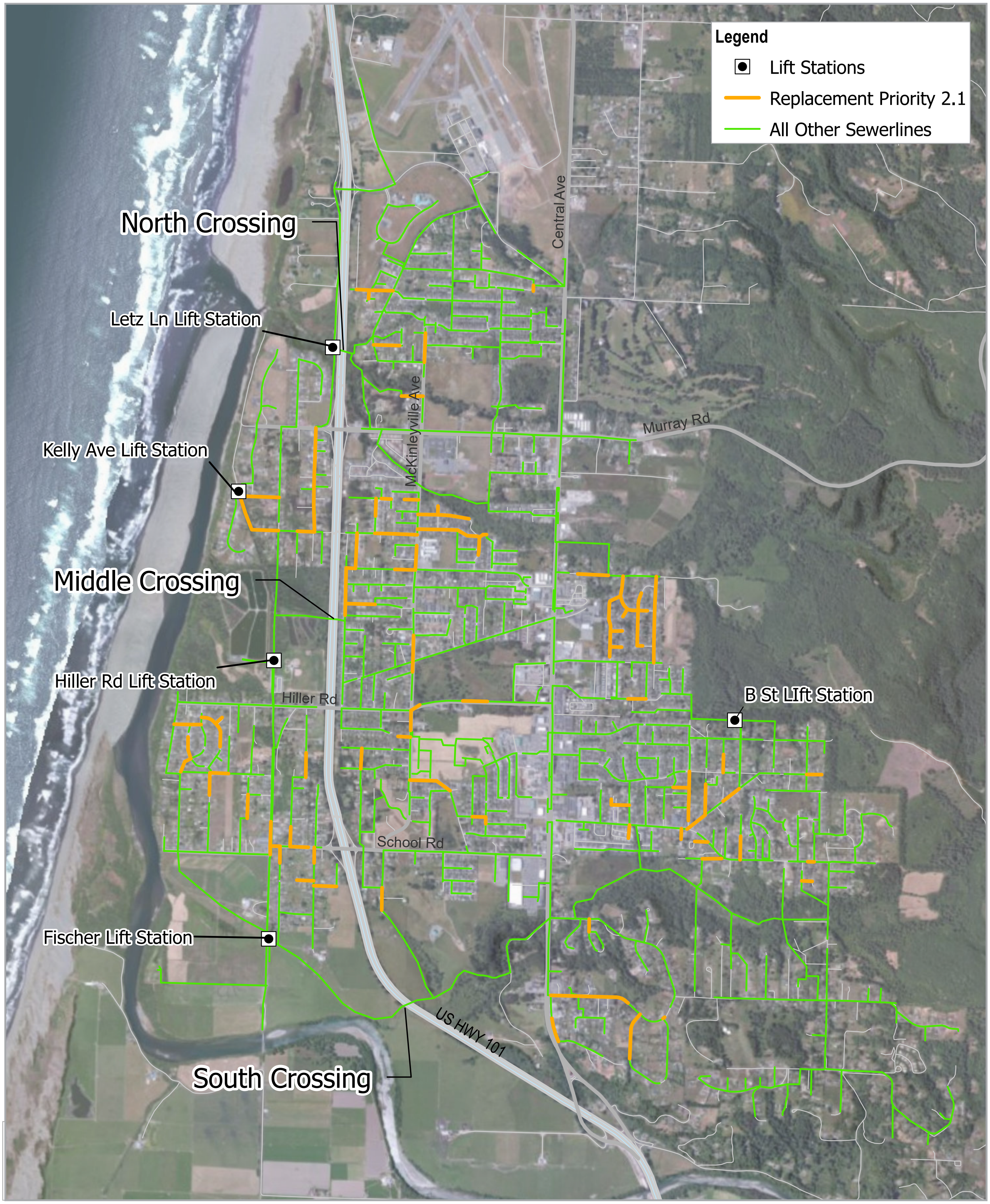

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GHD

McKINLEYVILLE COMMUNITY SERVICES DISTRICT

McKinleyville Community Service District
Sanitary Sewer Main Line Rehabilitation
Master Plan (Phase 3)

Sewer Replacement Analysis
Priority 2.1 BRE > 35

Project No. **11218420**
Revision No. **A**
Date **Dec 2021**

FIGURE 7.2

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GHD

McKINLEYVILLE COMMUNITY SERVICES DISTRICT

McKinleyville Community Service District
Sanitary Sewer Main Line Rehabilitation
Master Plan (Phase 3)

Sewer Replacement Analysis
Priority 2.2 BRE 30-35

Project No. **11218420**
Revision No. **A**
Date **Dec 2021**

FIGURE 7.3

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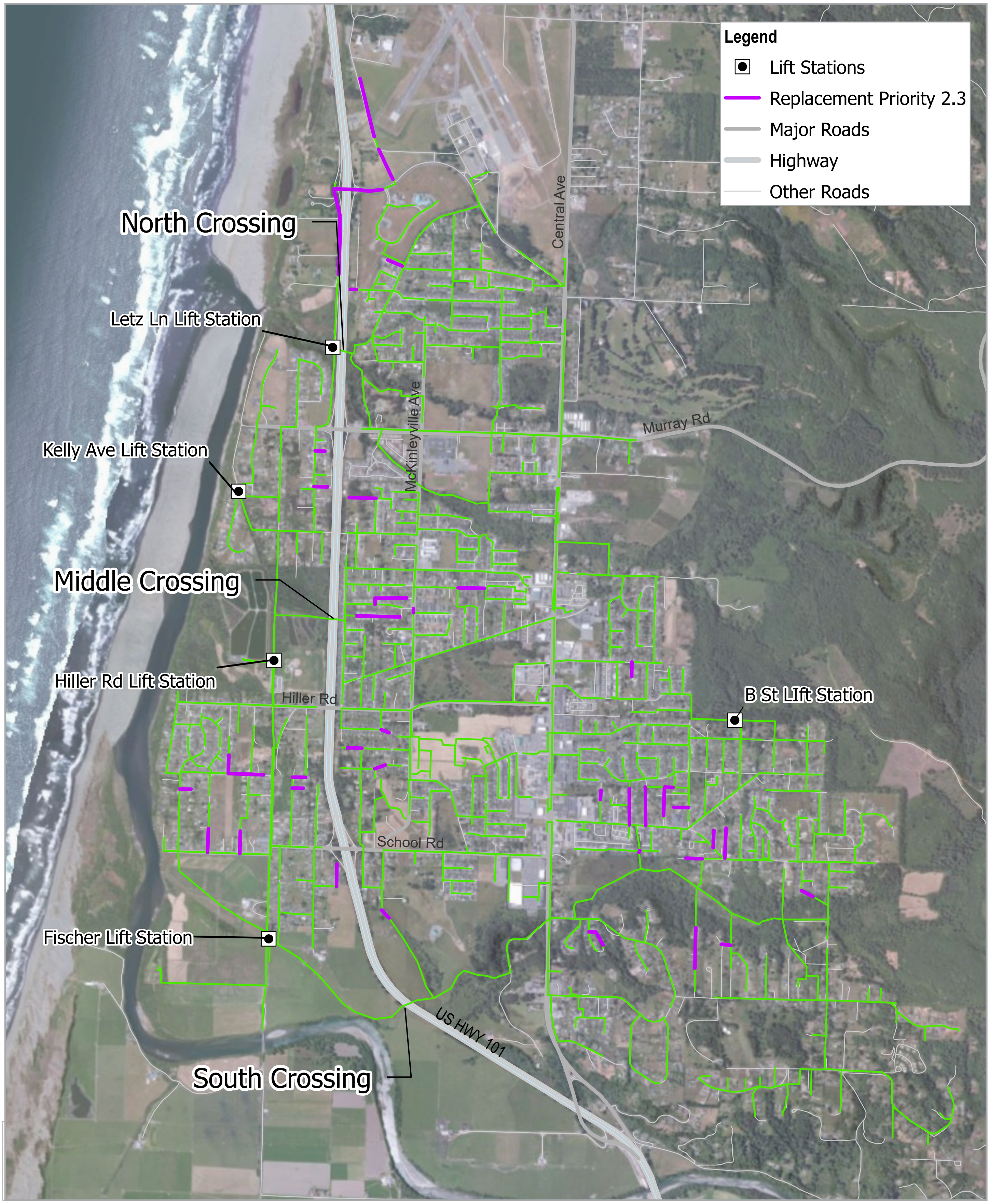

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McKinleyville Community Service District
Sanitary Sewer Main Line Rehabilitation
Master Plan (Phase 3)

Sewer Replacement Analysis
Priority 2.3 BRE < 30

Project No. **11218420**
Revision No. **A**
Date **Dec 2021**

FIGURE 7.4

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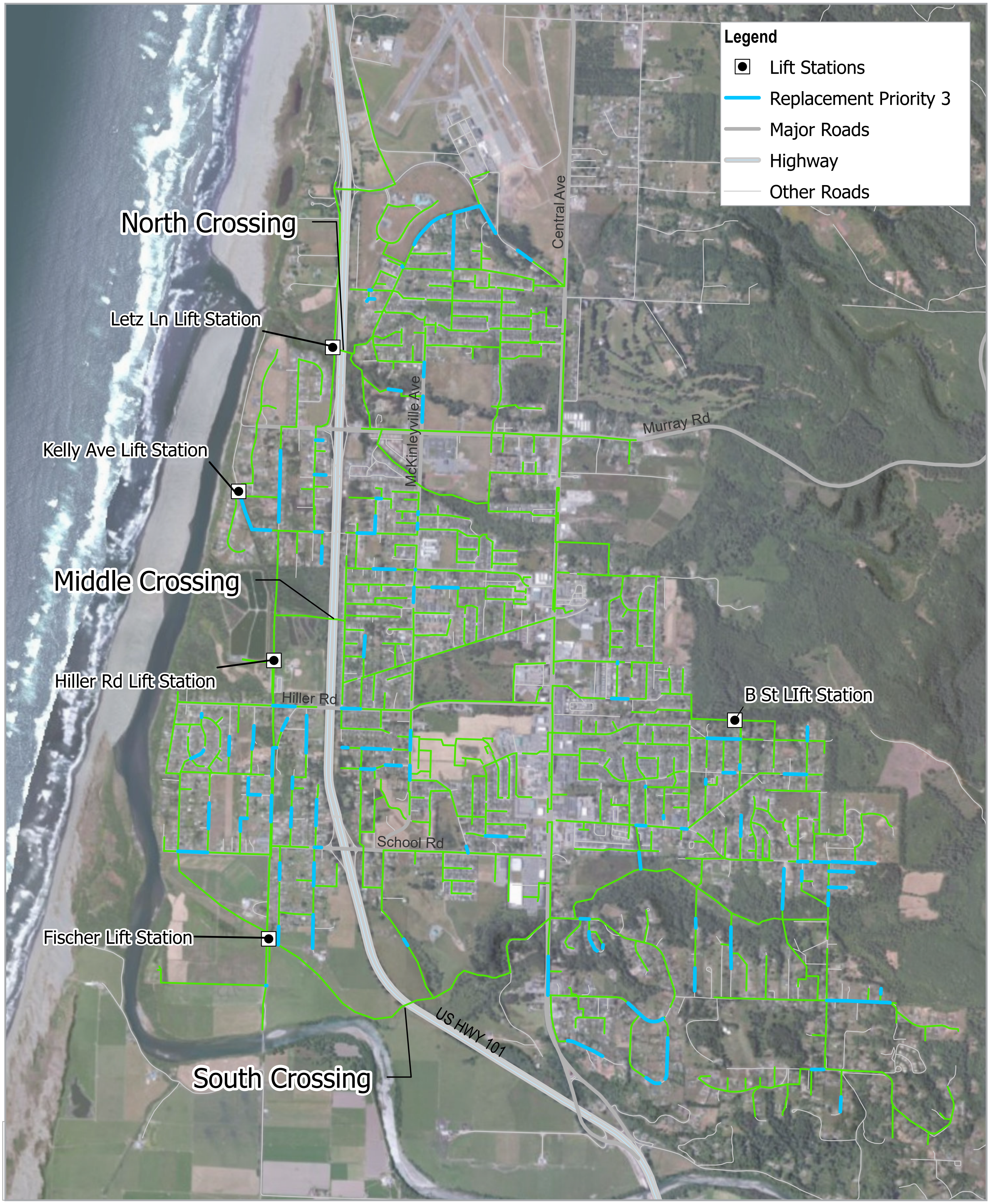

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GHD

McKINLEYVILLE COMMUNITY SERVICES DISTRICT

McKinleyville Community Service District
Sanitary Sewer Main Line Rehabilitation
Master Plan (Phase 3)

Sewer Replacement Analysis
Priority 3

Project No. **11218420**
Revision No. **A**
Date **Dec 2021**

FIGURE 7.5

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5. Financial Analysis

Willdan Financial Services (Willdan) was retained by the District to develop a multi-year pro forma analysis for the sewer system reflecting the potential financial impact of the long-term systematic replacement of the entire collection system as discussed in Phase 1 of this Master Plan. The results of that analysis and the total projected project cost were used to determine a reasonable yearly budget of $1 million (in 2019 dollars) for the replacement of the MCSD sewer system mainlines over 100 years. For Phase 2 of this Master Plan, Willdan was retained to prepare a rate study to see how MCSD ratepayers will be affected by the replacement of the sewer collection system main lines.

The rate study consisted of three main steps: a revenue requirement analysis, cost of service analysis, and a rate design analysis. The first step, revenue requirement analysis, provides a five-year plan comparing the utility revenues to expenses in order to determine the overall rate adjustment required to maintain the system. The second step, cost of service analysis, allots the revenue requirements established in the first step as functional components distributed to customers based upon usage. The final step is to apply the revenue allotments to propose a new rate structure that covers MCSD sewer system costs in both the near and long term.

Willdan produced a report that has been included as Appendix C. The report provides the following:

- The general approach of the analysis and the assumptions that were made
- Projected revenues and expenses
- Required rate adjustments to achieve a positive net income
- Distribution of expenditures with existing and proposed rates
- Proposed sewer rates by land use category

The rates proposed by Willdan were approved by the MCSD Board of Directors at their November 2018 meeting. A summary of the approved rates is provided in Table 12. With these rates MCSD can begin building adequate reserves to support the long-term replacement of the sewer system with $1 million per year (in 2019 dollars).

Table 12: Proposed Sewer Rate Structure

	2019	2020	2021	2022	2023
Monthly Base Charge:					
All Customers	$ 30.47	$ 32.60	$ 33.58	$ 34.59	$ 35.63
Volumetric Per 100 Cubic Feet (CCF):					
Apartment/Multi Unit (Each)	$ 2.55	$ 2.73	$ 2.81	$ 2.89	$ 2.98
Bakery	$ 10.43	$ 11.79	$ 12.79	$ 13.81	$ 14.90
Barber/Beauty Shop	$ 2.63	$ 2.78	$ 2.84	$ 2.89	$ 2.98
Brewery	$ 5.10	$ 10.92	$ 16.86	$ 23.12	$ 29.80
Car Wash	$ 1.58	$ 1.34	$ 1.01	$ 0.66	$ 0.30
Church & Residence	$ 4.39	$ 4.20	$ 3.82	$ 3.41	$ 2.98
Churches	$ 3.06	$ 3.14	$ 3.09	$ 3.03	$ 2.98
Coast Guard Station/Airport	$ 3.06	$ 3.14	$ 3.09	$ 3.03	$ 2.98
Coming Attractions	$ 2.63	$ 2.78	$ 2.84	$ 2.89	$ 2.98
Dialysis Clinic	$ 2.98	$ 3.28	$ 3.46	$ 3.61	$ 3.73
Fire Station/School	$ 2.12	$ 2.13	$ 2.05	$ 1.97	$ 1.94
Gas Stations (No Market)	$ 3.29	$ 3.25	$ 3.06	$ 2.86	$ 2.68
Laundromats	$ 2.32	$ 2.38	$ 2.33	$ 2.28	$ 2.24
Market	$ 10.00	$ 10.78	$ 11.18	$ 11.56	$ 11.92
Metered Septage Vault	$ 4.39	$ 4.15	$ 3.71	$ 3.24	$ 2.98
Mobile Homes (Each)	$ 2.55	$ 2.73	$ 2.81	$ 2.89	$ 2.98
Motels/Hotels	$ 6.96	$ 7.29	$ 7.33	$ 7.37	$ 7.45
Office Building/Post Office	$ 2.63	$ 2.78	$ 2.84	$ 2.89	$ 2.98
Restaurant/Tavern	$ 10.43	$ 11.79	$ 12.79	$ 13.81	$ 14.90
Retail/Banks/Theater/Other	$ 3.06	$ 3.14	$ 3.09	$ 3.03	$ 2.98
Round Table/Market	$ 8.52	$ 9.12	$ 9.39	$ 9.65	$ 9.95
Sewer Only Accounts	$ 0.00	$ 0.00	$ 0.00	$ 0.00	$ 0.00
Sewer Units - Commercial	$ 3.29	$ 3.25	$ 3.06	$ 2.86	$ 2.68
Single Family Residential	$ 2.55	$ 2.73	$ 2.81	$ 2.89	$ 2.98
Two Sewer Units/Business	$ 3.06	$ 3.14	$ 3.09	$ 3.03	$ 2.98
Two Sewer Units/Commercial	$ 3.06	$ 3.14	$ 3.09	$ 3.03	$ 2.98
Two Sewer Units/Daycare	$ 2.96	$ 3.03	$ 2.98	$ 2.92	$ 2.98

A bar graph comparing the approved rate structure to the other rates in the local region for a residential customer receiving 800 cubic feet per month in fiscal year 2018-2019 is provided in Figure 8. The approved MCSD sewer rate structure has a residential customer paying less than the average rates of other communities in the region.

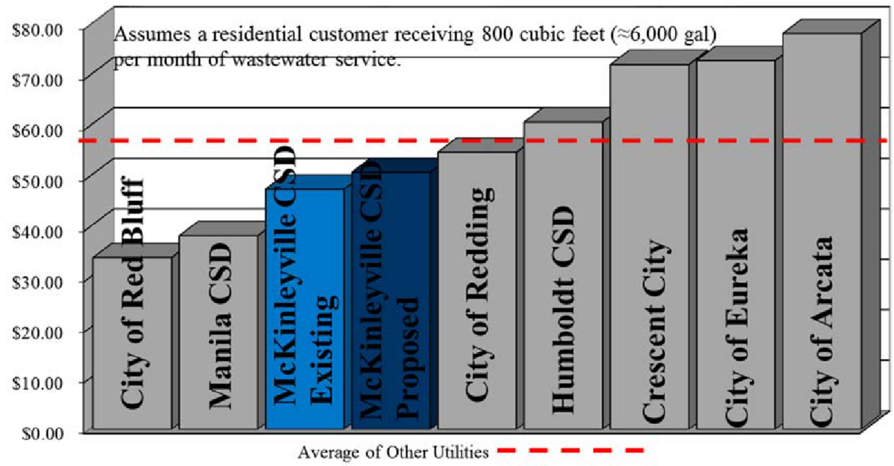

Figure 8: Residential Customer Regional Rate Comparison (800 Cubic Feet)

6. Conclusions, Recommendations, and Next Steps

This document presents a summary of all 3 phases of the MCSD Sanitary Sewer Main Line Replacement and Rehabilitation Master Plan, a high-level assessment of the District's sewer collection system for use in initial planning for rehabilitation and upgrades to the system.

Phase 3 has provided the following:

- Highlights of the Phase 1 system analysis
- Highlights of the Phase 2 information on viable replacement methods and financial analysis based on the Phase 2 proposed spending plan
- Discussion of in-house or contracting of construction work and comparison of costs
- Summary of physical testing results
- Risk Framework for evaluating the District's system
- Updated replacement plan using a risk-based prioritization approach

This final section presents conclusions, recommendations, and information on the next steps in the overall process.

6.1 Conclusions

The District can replace all critical portions of the MCSD sewer collection system in the next 50 years with a reasonable adjustment to user rates. Spending an average of $1 million (2019 dollars) per year on the system will allow for completion of all the near-term projects of concern. Replacement of all pipes identified as Priority Group 1-3 would be replacement of 100% of the District's VCP, 100% of the 8-inch or smaller ACP, and 22% of the 10-inch and greater ACP. However, how much of this the District is able to replace will also depend on pipe conditions and confirmation of the appropriate replacement method during the design phase of each project.

6.2 Recommendations and Next Steps

This Master Plan presents a Risk Framework for evaluating and assigning priority for the replacement of MCSD's sewer collection system. Asset condition is largely based on the 3 samples collected and physically tested and then assigned to subsets of assets based on material and diameter; however, condition within a subset can vary. A robust monitoring program including inflow and infiltration (I/I) monitoring, and CCTV inspection is recommended to monitor and update the condition of the assets, as well as additional physical testing. Pre- and post- flow monitoring can be used to measure project success, especially in areas of high I/I concern.

It is critical that the District begin planning and budgeting for upgrades and replacement of system components. The approved rates from Section 4 state that MCSD will begin putting aside $1 million (2019 dollars) a year starting in 2019. With rate adjustments approved, the project financing is securely in place, allowing MCSD to begin the planning and design process for the early proposed projects so that construction can begin in five years or in 2024.

Appendices

Appendix A – Phase 3b: Water and Sewer Mainline Replacement and Rehabilitation Master Plans Letter Report

July 6, 2020

Patrick Kaspari, PE
General Manager
McKinleyville Community Services District
P. O. Box 2037
1656 Sutter Rd
McKinleyville, CA 95519

Ref: 11125090

Re: Phase 3b: Water & Sewer Mainline Replacement & Rehabilitation Master Plans Letter Report

Dear Mr. Kaspari,

GHD respectfully submits this summary to the McKinleyville Community Services District (MCSD) of the sub-phase, Phase 3b, of assessment related to fitness of MCSD's water and sewer systems. The overarching goal of the assessments is to develop an Engineer's opinion of present-day pipeline condition within the water and sewer systems with respect to the proposed schedule for the District's future replacement. Phase 3b is directly linked to the previous project sub-phase, Phase 3a, which included: 1) desktop analysis related to pipeline performance in environmental exposures and assessment of comparable documented pipeline performance based on environment, material, and time of exposure; 2) development of a soil sampling plan; soil sampling; laboratory analysis; corrosivity analysis of laboratory results; and 3) provision of recommendations related to scoping a destructive and non-destructive test plan for deployment in a subsequent project phase.

The Phase 3b work is focused on the assessment related to developing an Engineer's opinion of present-day pipeline condition within the water and sewer systems. In this context, "condition" is used to represent estimation of the risk of future failure based on the data available. The Phase 3b scope includes assessment of the water main under the Mad River as well as the other ductile iron (DI) and asbestos cement (AC) pipe in the water system and in the sewer collection system. Phase 3b includes: 1) the development of a destructive and non-destructive test plan for the pipe; 2) the collection and analysis of pipe samples and the non-destructive assessment of segments of pipe; and 3) the analysis and reporting of the destructive and non-destructive sample results and recommendations to review, revisit and/or revise the schedule and priorities for time-based pipeline replacement, if applicable.

Project Overview

The scope includes assessment of the Ductile Iron[1] water main in the vicinity of the Mad River crossing, forcemains from the Letz, Kelly, Fischer, and B Street lift stations, as well as the other ductile iron (DI) and asbestos cement (AC) pipe in the water and sewer systems. Attachment A and Attachment C includes a System Site Plan that includes pipe material designations. The majority of project piping is AC with a much

[1] Record Drawings reference the pipe material as "Ductile Cast Iron".

lower percentage of DI and PVC piping presently in service. Based on available Record Drawings, sewer system piping was installed in 1976 and water system piping was installed in 1973, and has been in service since installation.

The findings and conclusions from the Phase 3a assessment found that the soil environment identified per the laboratory analysis is negligibly corrosive with respect to ductile iron pipe. GHD's experience, based on direct assessment of ductile iron pipe in similar soil environments over similar time of exposure scenarios, is that external corrosion-related degradation in terms of pipeline wall thickness loss, is typically nominal. However, the soil environment identified per the laboratory analysis is generally highly aggressive with respect to asbestos-cement pipe in various areas within the District boundary. The pH of the boring samples tested ranged from 4.5 to 7.8. Based on AC pipeline installation in the 1970s, the time of exposure to the soil environment is greater than 40 years. Degradation of AC pipe resulting in a reduction of pipeline strength was identified as a possible risk and destructive laboratory evaluation of AC pipe samples was recommended in order to quantify the AC pipe degradation-to-date. The focus of Phase 3b including quantification of the present-day condition of selected piping. The Phase 3b tasks included:

1. Three (3) AC pipe samples were obtained and underwent destructive laboratory evaluation. The results of the laboratory evaluation are summarized in Table 2. The laboratory evaluation included the following parameters:
    a. Cross sectional hardness assessment was performed on the interior and the exterior of each pipeline cross section at 0.10 inch increments using a shore D durometer. The shore D durometer test results in an empirical number from 0 to 100: the higher the number the harder the material. The intent of this testing was to estimate the depth of the softer/weaker material on both the interior and exterior surfaces of each AC pipe sample.
    b. Cross sectional pH evaluation was conducted on the entire cross section of each AC pipe sample at eight (8) locations per sample evenly spaced around the pipe circumference. The intent of this testing was to identify locations and quantify depths, on both the interior and exterior surfaces of each AC pipe sample, where the alkalinity has been reduced.
    c. Crushing strength testing was conducted in accordance with ASTM C 500 – Standard Test Methods for Asbestos-Cement Pipe. The intent of this testing was to identify the present-day residual strength of the AC piping.
2. Ultrasonic thickness (UT) testing of ductile iron pipe was conducted at one (1) location that was selected, in part, based on consideration of the corrosivity of soils identified as a part of Phase 3a. UT data is summarized and presented in Table 3. Pipeline wall thickness was measured at twelve (12) circumferential locations.
3. CCTV was deployed on one selected ductile iron pipe runs of approximately 212 linear feet. CCTV footage was reviewed by a qualified engineer[2].

[2] Parastou Hooshialsadat, PE, NASSCO PACP (Pipeline Assessment Certification Program), GHD

Introduction

Asbestos cement (AC) pipe was a popular pipe material alternative for various installations in the mid-20th century. It is estimated that more than 12% of water mains presently in service within the United States are AC pipe[3]. Asbestos Cement (AC) is a mixture of asbestos fibers, which serves as a reinforcing element, and cement paste, which serves as a binding agent. The conditions that lead to AC degradation may be present in the conveyed substance (internal degradation) or the surrounding soil environment (external degradation). AC pipe degrades primarily as a result of chemical reactions with the soil environment, thus degradation of AC pipe is primarily a function of the aggressiveness of the environment of exposure and the time of exposure[4].

External degradation of AC is generally caused by acid or sulfate attack. Sulfate contained in the soil environment can react with hydrated calcium aluminate creating ettringite that expands and leads to the destruction of the cementitious portion of AC pipe. Internal degradation of AC is generally caused by leaching of the cementitious matrix by soft water; or sulfuric acid in the case of wastewater pipelines. Hydrogen sulfide in wastewater reacts with moisture to form sulfuric acid on the pipe wall which results in leaching of calcium, causing softening and loss of mechanical strength[5]. The free lime that maintains the strength of the cement matrix can be leached from the cement by liquids in contact with the pipe surface. External AC degradation, internal AC degradation, or the combination of internal and external degradation may result in a reduction in the structural integrity of the pipe cross section, which could lead to pipe failure. For the purpose of the subject assessment, the aggressiveness of the soil environment with respect to AC pipe is categorized primarily based on quantification on the sulfate ion content of the soil, reported in parts per million (ppm) and the pH of the soil. When pH increases above 7.0 (the neutral value) the conditions become increasingly more alkaline. Lower pH (more acidic) environments represent increased corrosivity with respect to buried metallic structures.

GHD developed a pipe sampling plan with the objective of obtaining and testing three (3) representative AC pipe samples. Two pipe samples, AC1 and AC2, were selected from locations with nearby available soil laboratory data, from Phase 3a, identifying the soil as highly aggressive with respect to AC pipe. Pipe sample AC3 was selected from a location where the adjacent soil data did not demonstrate highly aggressive soil. MCSD provided equipment and labor related to excavation. The three (3) pipe samples were obtained on April 14, 15, and 17 at the approximate locations depicted in Attachment B “Water Pipe Sampling Plan” and Attachment D “Sewer Pipe Sampling Plan”. GHD’s Daily Logs related to pipe sampling operations are included as Attachment E.

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[3] Ghirmay, Abiy Melles “Asbestos Cement Pipe Condition Assessment and Remaining Service Life Prediction”, University of Arkansas, Fayetteville, August 2016

[4] Denison, Irving A. and Romanoff, Melvin “Effect of Exposure to Soils on the Properties of Asbestos-Cement Pipe”, Journal of Research of the National Bureau of Standards, November 1951

[5] Bowker, Colin, “Corrosion of an Asbestos Cement Sewer Rising Main due to Hydrogen Sulphide”, 75th Annual Victorian Water Industry Engineers & Operators Conference, September 2012

The pipe samples obtained were delivered to an independent analytical laboratory for analysis. AC pipe samples were analyzed for the following characteristics: interior and exterior hardness; pH profile; and crush strength. The report with the laboratory analysis results are included in Attachment F "Voss Laboratory Analysis Report dated April 29, 2020".

Ultrasonic Thickness (UT) testing was used to measure pipeline wall thickness at one exposed section of ductile iron pipe in the vicinity of The Mad River Crossing in the general vicinity of pipeline Station 30+85 per Record Drawings date 1972. UT testing was conducted by GHD on April 17, 2020. Pipe wall thickness was measured using an Olympus 38 DL Plus Ultrasonic Thickness Gage Dual Transducer and glycerin couplant. The Olympus 38 DL Plus Ultrasonic Thickness Gage is factory-calibrated a minimum of one time per year; is shop-calibrated before each continuous multi-day use or approximately once every two weeks; and is field-calibrated using calibration blocks each day prior to testing. The standard resolution of the Olympus 38 DL Plus Ultrasonic Thickness Gage is one (1) mil (.001 inches). Test locations were cleaned and prepared for assessment by removing soil, contaminants and corrosion product, where appropriate. Six (6) wall thickness measurements were recorded at each of the twelve (12) test locations, which were used to determine the average thickness at each assessed location. The results of the UT testing are summarized in Table 5.

Closed Caption Television (CCTV) inspection was deployed by MCSD on one selected run of Ductile Iron Pipe of approximately 212 linear feet and provided to GHD for review. CCTV footage titled "10 Ductile Iron From Hiller Marsh to Thiel_Mh 5-3-Mh 5—562" was reviewed in general conformance with NASSCO (National Association of Sewer Service Companies) recommended best practices. The results of the engineer's review of the CCTV inspection footage is summarized in Table 6.

Findings:

Tables 1, 2, 3 and 4 summarize the laboratory findings based on the destructives testing performed on the three (3) selected AC pipe samples.

Table 1 AC Pipe Sample Identification

Pipe Sample ID	Sample Location	As-Received Sample Length (in.)	Sample Average Internal Diameter (in.)	Sample Average Wall Thickness (in.)
AC 1	Murray Road	13.0	9.93	1.07
AC 2	Lycoming Road	12.0	6.08	0.53
AC 3	School Road	12.75	8.00	0.63

Table 2 Pipe Sample Interior and Exterior Hardness

Pipe Sample ID	Interior Hardness Depth[6] (in.)	Exterior Hardness Depth[7] (in.)
AC 1	0.20	N/A
AC 2	0.10	N/A
AC 3	0.20	N/A

Table 3 Pipe Sample pH Profile Testing

Pipe Sample ID	Average Wall Thickness (in.)	Maximum Interior Degraded Depth[8] (in.)	Maximum Exterior Degraded Depth[9] (in.)
AC 1	1.07	0.30	0.02
AC 2	0.53	0.22	0.04
AC 3	0.63	0.36	0.03

Table 4 Pipe Sample Crush Strength Testing

Pipe Sample ID	Internal Diameter (in.)	Average Wall Thickness (in.)	Tested Pipe Length (in.)	Ultimate Load (lbs.)
AC 1	9.93	1.07	11.9	11,300
AC 2	6.08	0.53	11.3	3,200
AC 3	8.00	0.63	11.2	2,400

UT testing was conducted at 12 locations corresponding approximately to the hours of a clock. The baseline orientation was established as west-facing.

[6] The depth to which the Hardness Value is less than 85 Shore D.

[7] The depth to which the Hardness Value is less than 85 Shore D; N/A indicates that values were greater than 85 Shore D.

[8] The depth to which the measured pH is less than 9.5.

[9] The depth to which the measured pH is less than 9.5.

Table 5 12" Diameter Ductile Iron Pipe Ultrasonic Thickness Testing Results[10]

No.	12 O'c	1 O'c	2 O'c	3 O'c	4 O'c	5 O'c	6 O'c	7 O'c	8 O'c	9 O'c	10 O'c	11 O'c
1	0.403	0.423	0.408	0.401	0.393	0.397	0.368	0.402	0.408	0.413	0.407	0.403
2	0.402	0.422	0.409	0.401	0.408	0.393	0.372	0.401	0.409	0.412	0.414	0.404
3	0.404	0.426	0.410	0.399	0.408	0.395	0.369	0.401	0.408	0.415	0.416	0.408
4	0.404	0.431	0.410	0.398	0.408	0.395	0.371	0.401	0.410	0.416	0.417	0.406
5	0.405	0.438	0.410	0.379	0.405	0.393	0.407	0.400	0.409	0.417	0.415	0.395
6	0.406	0.437	0.407	0.380	0.412	0.404	0.406	0.400	0.408	0.416	0.415	0.404
Avg.	**0.404**	**0.429**	**0.409**	**0.393**	**0.406**	**0.396**	**0.382**	**0.401**	**0.409**	**0.415**	**0.414**	**0.403**

CCTV footage was assessed by a NASSCO accredited engineer. It was noted that the CCTV was not performed per NASSCO standards; primarily based on the level of the lighting. Video Internal pipeline defects/damage noted based on review of CCTV footage is characterized as a combination of minimal, moderate and significant damage scenarios as summarized in Table 6. The significant damage locations to the pipeline lining are noted along the pipeline invert from 104 ft. to 123 ft. General degradation and surface damage including erosion were noted in the vicinity of the flow line for the majority of the pipeline run. Lining damage in the vicinity of the pipeline crown, suspected due to hydrogen sulfide (H_2S) attack, was noted along the length of the pipe run. Aside from the defects itemized; the following pipeline characteristics were noted:

- No lateral connection
- No crack, fracture or hole
- No joint displacement/offset
- No infiltration
- No root intrusion
- No coating/lining
- No material or size change

[10] Adjusted data based on calibration and velocity factors

Table 6 Summary of CCTV Inspection Review: 10-inch Ductile Iron Pipe

Upstream Manhole	Downstream Manhole	Pipe Diameter (inches)	Assessed Pipe Length (ft.)	Defects Noted
MH5-2 at 2280 Thiel Avenue	MH5-3 at Hiller East Field	10	214	1. Minor deposits at pipe joints at: 54.6 ft., 147.9 ft. and 211.2 ft. 2. Minor surface deterioration at: 90.3 ft. and 200.4 ft. 3. Continuous erosion at invert from: 104 ft. to 123 ft.

Discussion

The soil environment identified per the laboratory analysis of Phase 3a identified various zones of soil based on aggressiveness with respect to asbestos cement pipe. The majority of the soil data obtained within the MCSD service area can be generalized as highly aggressive with respect to AC pipe and negligibly aggressive with respect to ductile iron pipe. Based on AC pipeline installation in the 1970s and the time of exposure to the soil environment the lifespan is expected to be greater than 40 years. External degradation of AC pipe resulting in a reduction of pipeline strength is expected. GHD's experience, based on direct assessment of ductile iron pipe in similar soil environments over similar time of exposure scenarios, is that external corrosion-related degradation in terms of pipeline wall thickness loss, is typically nominal. However, anomalous conditions may exist which include concentrations of corrosive soils or DC current pickup from foreign sources and related current discharge.

The previous project phase, Phase 3a, quantified soil aggressiveness throughout MCSD's water and sewer system with respect to ductile iron pipe and asbestos cement pipe; based on the hypothesis that a correlation existed between soil composition and external pipe condition; i.e., that pipes located in highly aggressive soil conditions may have experienced a greater degree of external corrosion-related degradation to-date than pipelines in less aggressive or negligibly aggressive soil environments. Phase 3a was limited to evaluation of noted factors related to external pipeline corrosion-related degradation; internal pipeline degradation was not included in the scope of the evaluation. In general, the soil was determined to be negligibly aggressive to DIP and highly aggressive to AC pipe.

A key objective of Phase 3b was to quantify the present day condition of selected samples of DIP and AC pipe; an ancillary objective of which was to investigate the hypothesized correlation between soil aggressiveness and pipe condition. A sampling and test plan was developed which was subsequently scaled back, based on directive from MCSD, to include, as noted: CCTV of a limited run of DIP; UT testing of wall thickness at one exposed section of DIP; and destructive laboratory evaluation of three AC pipe samples; two from areas identified as having highly aggressive soil conditions. Based on the results of the laboratory evaluation, the key metric available to serve as a leading indicator of risk of AC pipeline failure is the loss of crushing strength as evidenced by the present-day crushing strength of samples analyzed versus the design crushing strength. A correlation between soil environment and AC pipeline condition, as evidenced in loss of pipeline external alkalinity and/or loss of external hardness, was not established based on the limited data available as the internal degradation of each of the AC pipe samples analyzed was significantly more advanced than the external degradation. Table 2 reports the interior and exterior hardness of each of the three samples based on the depth to which the hardness is less than an established value (0.85 Shore D). The interior depth ranges from 0.1 inch to 0.2 inch; the exterior depth is reported as "N/A" indicating that it was not less than the established value at any depth tested. The anticipated, nominal, internal and external value for new AC pipe is "N/A". Table 3 reports the interior and exterior depth to which the measured pH of each of the three samples is less than an established value (9.5). The interior depth ranges from 0.22 inch to 0.36 inch; the exterior depth ranges from 0.02 inch to 0.04 inch. The anticipated, nominal, internal and external value for new AC pipe is "N/A".

Laboratory analysis revealed a direct correlation between crushing strength, or loss of crushing strength, and wall thickness. As AC pipeline wall thickness increases, crushing strength increases. As AC pipeline wall thickness decreases, crushing strength decreases. Furthermore; there is a direct correlation between AC pipeline wall thickness and pipe diameter. Two categories of AC pipe, Category 1 and Category 2, were developed in order to represent the risk of pipeline failure based on the destructive laboratory analysis performed. The risk of failure of the Category 1 Pipe (8-inch diameter and less) is significantly greater than Category 2 Pipe (10-inch diameter and greater) based on consideration of the crushing strength (only). The existing in-service AC pipe may be categorized according to wall thickness based on the following two categories: 1) pipelines with 8-inch diameter or less; and 2) pipelines with 10-inch diameter or greater. There is approximately 131,965 linear feet of Category 1 piping in MCSD's sewer system which composes 34.1% of the total sewer system pipe and 67,264 linear feet of Category 2 piping which composes 17.4% of the sewer system pipe. There is approximately 215,930 linear feet of Category 1 piping in MCSD's water system which composed 45.3% of MCSD's water system pipe and 87,154 linear feet of Category 2 piping which composes 18.1% of MCSD's water system pipe. The establishment of, and broad delineation based on, risk categories is a result of the destructive analysis of three (3) pipe samples. The extent of laboratory analysis was limited and the resulting classifications are therefore limited. Additional destructive evaluation, specifically of pipeline crushing strength, may result in a resolution of data facilitating development of additional risk categories and/or revision to the two risk categories presented herein.

Conclusions

<u>Asbestos Cement Pipe</u>: The extent of internal degradation of both asbestos-cement pipe and ductile iron pipe was previously unknown; and in both cases it was assumed that external degradation is the controlling factor in pipeline degradation. The findings, based on the laboratory evaluation of AC pipe, include:

1. Based on dimensional measurements obtained as a part of the laboratory testing, the AC pipe tested is likely pressure Class 150[11].
2. Internal degradation, not external degradation, of AC pipe is the limiting factor in AC pipe fitness for continued service
    a. The exterior depth of loss of alkalinity is nominal
    b. The exterior loss of hardness is nominal
    c. The interior depth of loss of alkalinity, greater than 50% of total pipeline wall thickness of Sample AC3, is significant.
    d. The interior loss of hardness of all samples tested is significant.
3. The crushing strength of the three samples varied significantly and relates, as expected, to pipeline wall thickness. The measured crushing strength relationship with respect to the design crushing strength, as itemized in Table 7, is related to pipeline wall thickness. Wall thickness increases as pipeline diameter increases. Based on the data available, pipes with nominal wall thickness of 0.635 inches or less, corresponding to pipeline diameters of 8-inches or less, have experienced significant reduction in residual crushing strength; and pipes with nominal wall thickness of 1.040 inches or more, corresponding to pipeline diameters of 12-inches or greater, have not experienced significant reduction in residual crushing strength. Although there is presently no laboratory data for crushing strength on 10-inch diameter (0.910 inch wall thickness pipe), 10-inch pipe is considered to have likely retained much of the design crushing strength and is classified along with AC pipe of larger diameters.

Table 7 Pipe Sample Crush Strength vs. Design Crush Strength[12]

Pipe Sample ID	Internal Diameter (in.)	Average Wall Thickness (in.)	Ultimate Load (lbs.)	Design Load (lbs.)	Percent (%) of Design Load
AC 1	9.93	1.07	11,300	7,600	149%
AC 2	6.08	0.53	3,200	5,400	59%
AC 3	8.00	0.63	2,400	5,400	44%

[11] AWWA C400-03 “Asbestos-Cement Pressure Pipe, 4 In. Through 16 In. (100 mm Through 400 mm), for Water Distribution Systems

[12] AWWA C400-03, Table 2 “Design internal pressure and design external load”

Ductile Iron Pipe: Internal lining degradation of ductile iron pipe was identified, and with respect to the extremely limited nature of the sample size, may be assumed to be indicative of mortar lining performance of similar vintages and time in service. The UT measurement of pipeline wall thickness identified substantial remaining wall thickness and minor loss of wall thickness.

Recommendations

Asbestos Cement Pipe: The results of the Phase 3b efforts have established a direct relationship between crushing strength and nominal wall thickness. A risk of pipe failure, based on residual crushing strength, is thus considered to have an inverse relationship to nominal pipe diameter as discussed; which lead to development of Category 1 and Category 2; based on presumed risk of failure. Category 1 and Category 2 piping is depicted in Attachment B. GHD recommends that the subsequent project phase, Phase 3c, establish multiple classifications, numerical or otherwise, in order to quantify the consequence of AC pipe failure. The Consequence of Failure may be based on a number of factors including: 1) number, quantity and regularity of service outages; 2) environment impact including contamination; 3) increased cost; 4) access for repair; 5) legal penalties based on non-compliance; and 6) other collateral damage. The ASCE-published paper "Consequence-of-Failure Model for Risk-Based Asset Management of Wastewater Pipes Using AHP"[13] "presents a consequence-of-failure model using a weighted-sum multi-criteria decision-making method to evaluate the economic, social, and environmental consequences of wastewater pipe failure. The model incorporates 14 factors consisting of pipe characteristics and demographic parameters arranged into a hierarchical model to determine one final consequence-of-failure score". There are many such studies available on the topic; a multi-criteria model such as that mentioned in the referenced study is recommended. The quantification of consequence of failure should be applied to both Category 1 and Category 2 piping. The remaining useful service life, and inversely the time-based phasing of replacement, of asbestos cement pipe throughout the greater MCSD service area, may be prioritized according to the risk of failure (Category 1 or Category 2) weighted according to the Consequence of Failure. The existing time-phased plan for AC pipeline replacement may then be reviewed in parallel with the priority rankings sorted by the two wall thickness/residual crushing strength categories to determine if modifications to the replacement scheduling are prudent.

Ductile Iron Pipe: Based on the time in service of the ductile iron pipe, 48 years at the time of this memorandum, additional engineered measures for external corrosion control of ductile iron pipe are not presently recommended. Repair or remediation of lining and internal surfaces should be investigated and lining repair work initiated prior to widespread lining failure.

[13] ASCE Technical Papers, Greta J. Vladeanu, Ph.D., A.M.ASCE; and John C. Matthews, Ph.D., A.M.ASCE

GHD appreciates the opportunity to provide corrosion engineering services. Should you have any questions, comments, please do not hesitate to contact us directly.

Respectfully submitted,

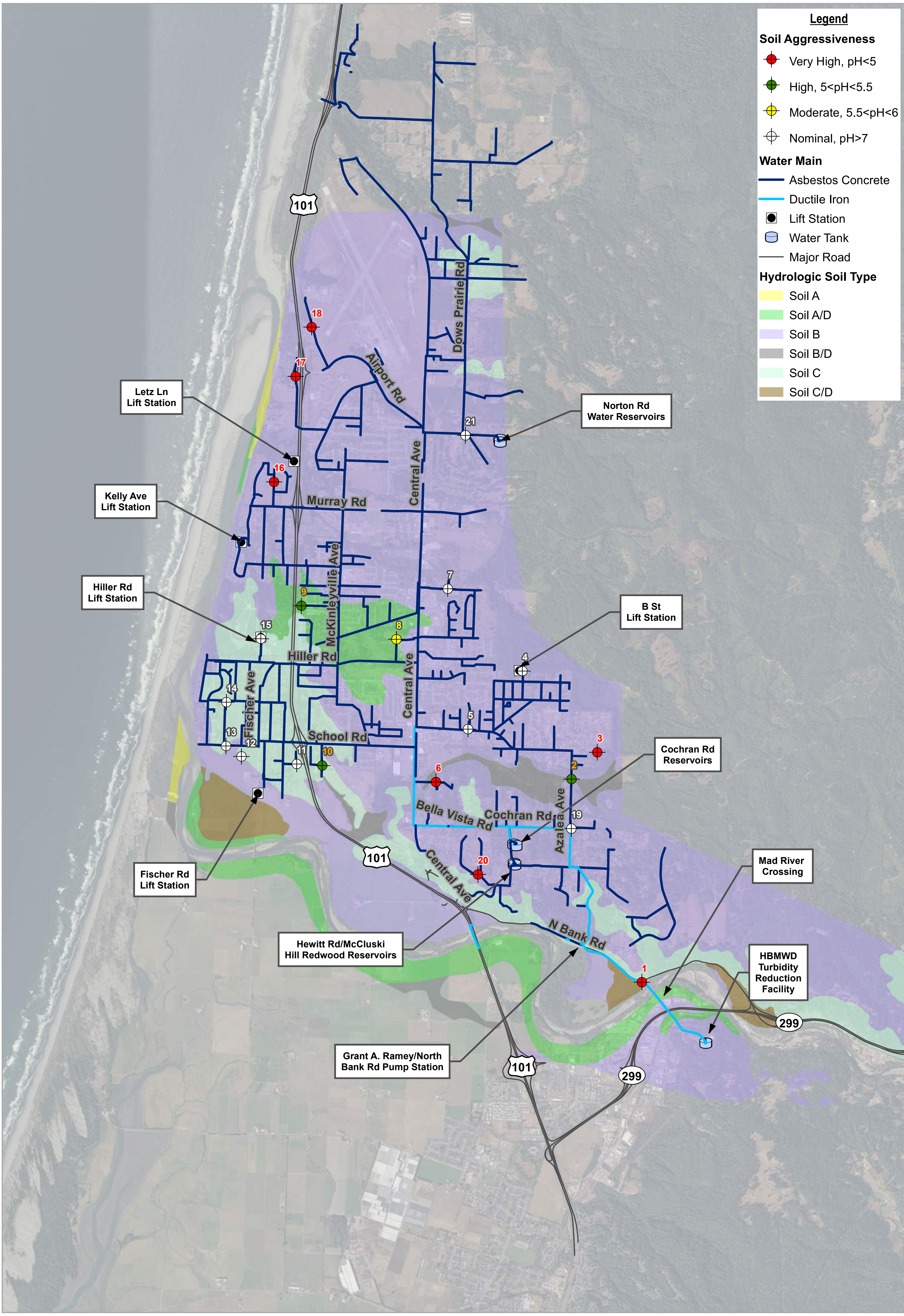
GHD Inc.

Jeff Knauer, PE, NACE Specialist
Senior Corrosion Engineer

Patrick Sullivan, P.E.
Project Manager

Attachments:

Attachment A: Water Soil Sampling Plan
Attachment B: Water Pipe Sampling Plan
Attachment C: Sewer Soil Sampling Plan
Attachment D: Sewer Pipe Sampling Plan
Attachment E: Daily Observation Logs
Attachment F: Voss Laboratory Analysis Report dated April 29, 2020



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Map Projection: Lambert Conformal Conic
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GHD

McKinleyville Community Services District
Water Sewer Master Plan

Water Soil Sampling Site Plan

Project No. **11125090**
Revision No. **-**
Date **Jan 2020**

ATTACHMENT A

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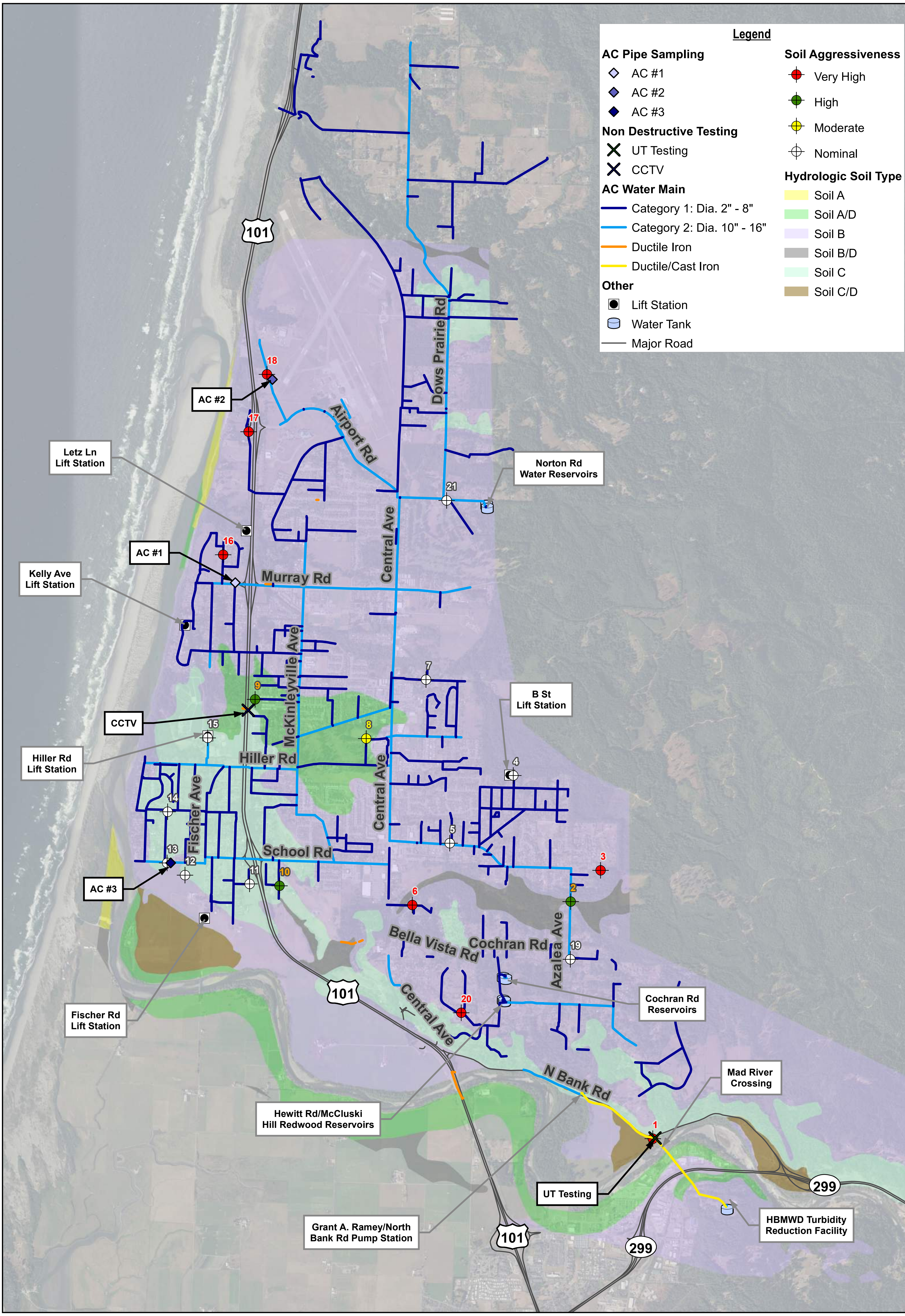

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McKinleyville Community Services District
Water Sewer Master Plan

Water Pipe Sampling Plan

Project No. 11125090
Revision No. -
Date June 2020

ATTACHMENT B

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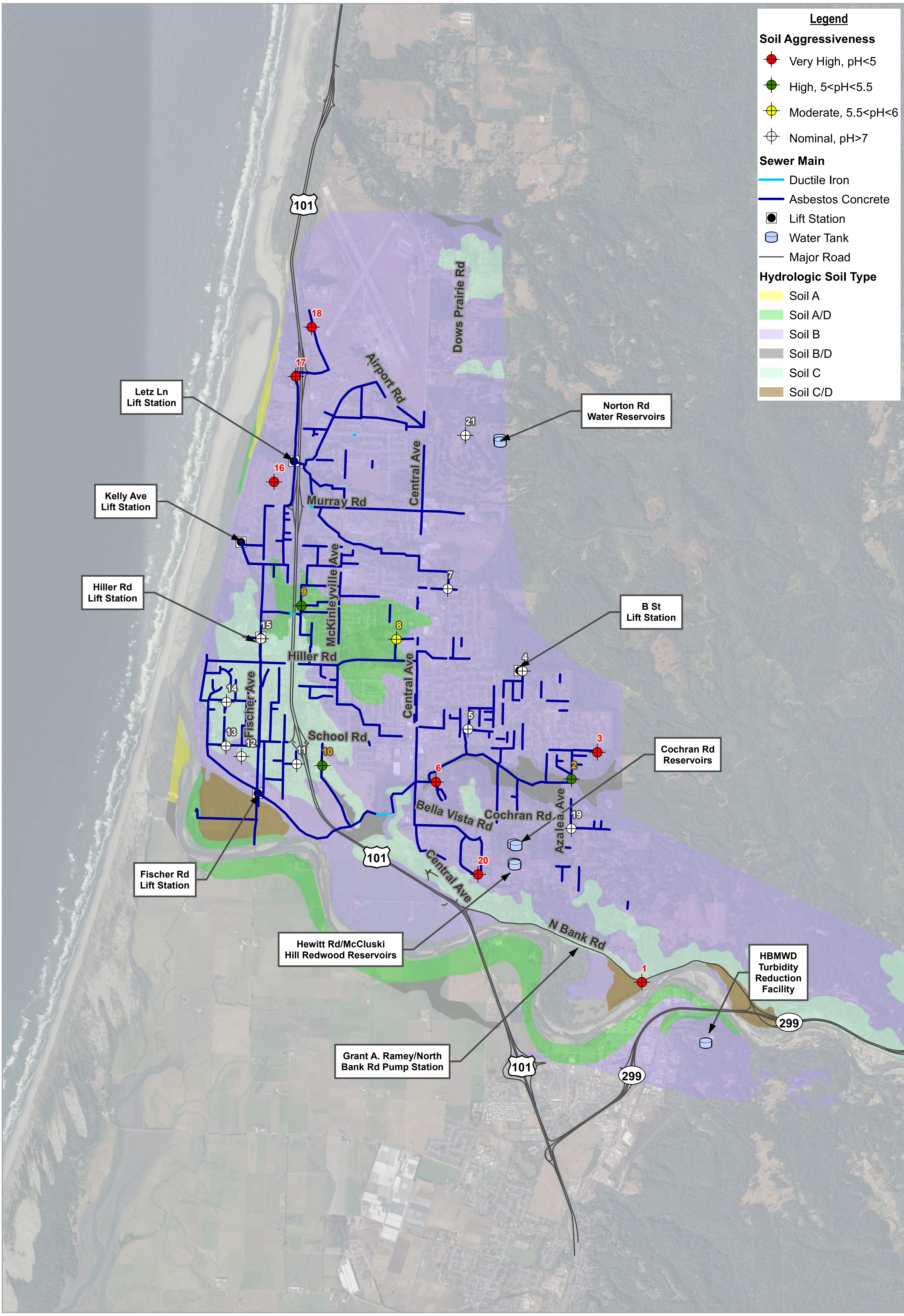

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GHD

McKinleyville Community Services District
Water Sewer Master Plan

Sewer Soil Sampling Site Plan

Project No. **11125090**
Revision No. **-**
Date **Jan 2020**

ATTACHMENT C

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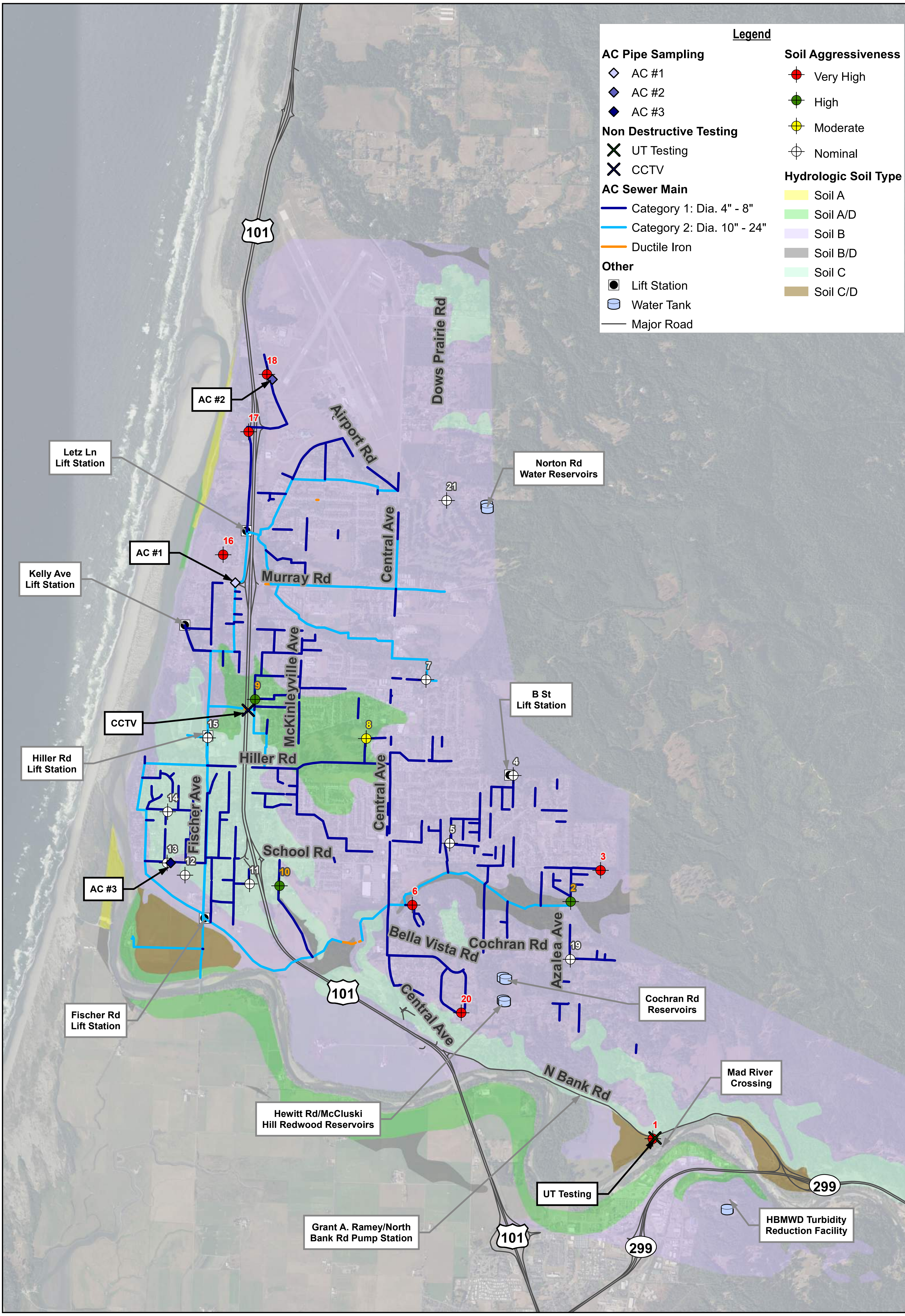

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GHD

McKinleyville Community Services District
Water Sewer Master Plan

Sewer Pipe Sampling Plan

Project No. **11125090**
Revision No. **-**
Date **June 2020**

ATTACHMENT D

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DAILY OBSERVATION REPORT

TITLE AND LOCATION:	DATE:
MCSD – Work Plan Phase 3B	4/14/20

Status

	YES	NO	IF NO, WHY NOT:
WORKING?	X	☐	

WEATHER CONDITIONS:					SITE OBSERVATION HOURS:
AM:	FOG	RAIN	OVC	CLEAR	10:40 – 12:30
PM:	FOG	RAIN	OVC	CLEAR	

Check Points

	YES	NO	REMARKS:
SUPERINTENDENT ON SITE?	☐	X	
ANY SUBCONTRACTORS ON SITE?	☐	X	
EQUIPMENT ONSITE?	X	☐	(1) MCSD F-250, (1) MCSD F-250 W/TRAILER, BACK HOE 580 SUPER-M, (1) MCSD VAC TRUCK
VISITORS ONSITE?	☐	X	
AS-BUILTS CURRENT?	☐	☐	NA
SUBMITTALS APPROVED FOR FOR ONGOING WORK?	☐	☐	NA
MEETINGS HELD?	X	☐	QUICK UPDATE ON WHAT WAS DONE BEFORE I ARRIVED AND WHAT THE PLAN IS

WORK OBSERVED/DEFICIENCIES NOTED/SAFETY ISSUES DISCUSSED/MATERIAL TESTS AND RESULTS:

Schedule Activity No/Time	OBSERVATIONS/LOCATIONS:
10:40	ARRIVED AT AC #3 ON SCHOOL ROAD. SETH, CHRIS, CHRIS, AND LANCE ON-SITE. PIPE IS READY FOR SNAPPING/CRUSHING AS THE TRENCH IS DUG OUT AND SHORED.
10:50	SOIL SAMPLE COLLECTED FROM EXCAVATED PILE FROM DIGGING UP TRENCH. SOIL SAMPLE STORED IN ZIP-LOCK AND LABELED AC #3, SCHOOL ROAD, 4/14/2020 10:50AM.
10:50	SETH AND CHRIS PLUG THE UPSTREAM PIPE WITH A PRESSURIZED AIR PLUG VALVE.
11:00	UPSTREAM PIPE IS PLUGGED, AND THE DOWNSTREAM PIPE IS READY TO BE SNAPPED.
11:00	CHRIS DOWN IN THE TRENCH. WRAPPING THE PIPE WITH A MANNUAL PIPE SNAP CUTTER. ISSUES WITH USING THIS TOOL, AS THE TRENCH WAS NOT WIDE ENOUGH TO EXPAND AND CONTRACT THE SNAP CUTTER.
11:10	CHRIS OFF-SITE TO RETRIEVE THE HYDRAULIC PIPE SNAP CUTTER.
11:30	CHRIS BACK ON-SITE, AND STARTING TO SET UP THE HYDRAULIC PIPE SNAP CUTTER.
12:00	PIPE SUCCESSFULLY SNAPPED. PIPE BAGGED AND DUCT TAPED W/ LABEL STATING: AC #3 SCHOOL ROAD, 4/14 NOON.
12:30	MALIA OFF-SITE

MALIA GONZALES — SITE OBSERVER

4/14/2020 — DATE

DAILY OBSERVATION REPORT

TITLE AND LOCATION:	DATE:
MCSD – Work Plan Phase 3B	4/15/20

Status

	YES	NO	IF NO, WHY NOT:
WORKING?	X	☐	

WEATHER CONDITIONS:

AM: FOG RAIN OVC CLEAR

PM: FOG RAIN OVC CLEAR

SITE OBSERVATION HOURS: 9:00 – 10:30

Check Points

	YES	NO	REMARKS:
SUPERINTENDENT ON SITE?	☐	X	
ANY SUBCONTRACTORS ON SITE?	☐	X	
EQUIPMENT ONSITE?	X	☐	(2) MCSD F-250, (1) MCSD F-250 W/TRAILER
VISITORS ONSITE?	☐	X	
AS-BUILTS CURRENT?	☐	☐	NA
SUBMITTALS APPROVED FOR FOR ONGOING WORK?	☐	☐	NA
MEETINGS HELD?	X	☐	QUICK UPDATE ON WHAT WAS DONE BEFORE I ARRIVED AND WHAT THE PLAN IS

WORK OBSERVED/DEFICIENCIES NOTED/SAFETY ISSUES DISCUSSED/MATERIAL TESTS AND RESULTS:

Schedule Activity No/Time	OBSERVATIONS/LOCATIONS:
9:00	ARRIVED AT AC #2 ON LYCOMING AVE. SETH, CHRIS, AND LANCE ON-SITE. PIPE IS READY FOR SNAPPING/CRUSHING AS THE TRENCH IS DUG OUT AND SHORED.
9:15	SOIL SAMPLE COLLECTED AROUND PIPE. STORED IN ZIP-LOCK BAG AND LABELED: AC#2, LYCOMING AVENUE, 4/15/2020 9:15 AM.
9:25	CHRIS PLUGGED THE UPSTREAM PIPE WITH A PRESSURIZED AIR PLUG VALVE.
9:30	UPSTREAM PIPE IS PLUGGED, AND THE DOWNSTREAM PIPE IS READY TO BE SNAPPED.
9:45	SETH DOWN IN THE TRENCH. WRAPPING THE PIPE WITH A HYDRAULIC PIPE SNAP CUTTER.
10:00	PIPE SUCCESSFULLY SNAPPED. PIPE BAGGED AND DUCT TAPED W/ LABEL STATING: AC #2 LYCOMING AVENUE, 4/15 10 AM.
10:30	MALIA OFF-SITE

MALIA GONZALES — SITE OBSERVER

4/15/2020 — DATE

DAILY OBSERVATION REPORT

TITLE AND LOCATION:	DATE:
MCSD – Work Plan Phase 3B	4/16/20 & 4/17/2020

Status

	YES	NO	IF NO, WHY NOT:
WORKING?	X	☐	

WEATHER CONDITIONS:	SITE OBSERVATION HOURS:
AM: FOG RAIN OVC CLEAR	4/16: 1:30 – 2:00 PM
PM: FOG RAIN OVC CLEAR	4/17: 5:30 – 7:45 AM

Check Points

	YES	NO	REMARKS:
SUPERINTENDENT ON SITE?	X	☐	
ANY SUBCONTRACTORS ON SITE?	☐	X	
EQUIPMENT ONSITE?	X	☐	(2) MCSD F-250; (1) MCSD F-250 W/PORTABLE LIGHT GENERATOR TRAILOR; (1) PRIVATE VEHICLE
VISITORS ONSITE?	☐	X	
AS-BUILTS CURRENT?	☐	☐	NA
SUBMITTALS APPROVED FOR FOR ONGOING WORK?	☐	☐	NA
MEETINGS HELD?	X	☐	QUICK UPDATE ON WHAT WAS DONE BEFORE I ARRIVED AND WHAT THE PLAN IS

WORK OBSERVED/DEFICIENCIES NOTED/SAFETY ISSUES DISCUSSED/MATERIAL TESTS AND RESULTS:

Schedule Activity No/Time	OBSERVATIONS/LOCATIONS:
4/16/2020 1:30 PM	ARRIVATED AT AC #1 ON MURRAY ROAD. LANCE ON-SITE. TRENCH AND SHORE DONE. PIPE IS EXPOSED. NO CUTTING TODAY SINCE TOOK ALL DAY TO FIND PIPE - TRENCHED IN MULTIPLE LOCATIONS TO FIND THE PIPE.
4/16/2020 1:30 PM	SOIL SAMPLE COLLECTED FROM EXCAVATED PILE. STORED IN ZIP-LOCK BAG AND LABELED: AC #1, MURRAY ROAD, 4/16/2020 1:30 PM.
4/16/2020 2:00 PM	MALIA OFF-SITE
4/17/2020 6:00 AM	ARRIVED AT AC #1 ON MURRAY AVE. ERIK, CHRIS, AND LANCE ON-SITE. HYDRAULIC PIPE SNAP CUTTER ALREADY WRAPPED AROUND PIPE AND READY FOR SNAPPING/CRUSHING.
4/17/2020 6:10 AM	ERIK CONTACTED SETH AND CHRIS TO TURN PUMPS OFF AT LETZ LANE LIFT STATION.
4/17/2020 6:20 AM	JAMES ON-SITE
4/17/2020 6:30 AM	LANCE AND CHRIS IN TRENCH. PIPE SUCCESSFULLY SNAPPED BY THE HYDRAULIC PIPE SNAP CUTTER.
4/17/2020 7:00 AM	LANCE AND CHRIS INSTALLING NEW PVC PIPE AND STEEL MECHANICAL COUPLING ADAPTER.
4/17/2020 7:15 AM	PIPE SUCESSFULLY PUT BACK TOGETHER.
4/17/2020 7:30 AM	PIPE BAGGED AND DUCT TAPED W/ LABEL STATING: AC #1 MURRAY ROAD, 4/17 6:30 AM.
4/17/2020 7:45 AM	MALIA OFF-SITE. STOPPING BY MCSD OFFICE TO COLLECT SOQ FOR 4.5MG RESERVOIR PROJECT.

MALIA GONZALES — SITE OBSERVER

4/17/2020 — DATE

April 29, 2019

VL Project No. 20017

Mr. Jeff Knauer
GHD
6001 Shellound Street, Suite 850
Emeryville, CA 94608

Re: Laboratory Testing of AC Pipe Samples
McKinleyville, California

Dear Mr. Knauer:

Voss Laboratories, Inc. has completed laboratory testing of materials from the above referenced project. The purpose of the testing was to determine material properties and provide this information to assist future remedial work, etc. This report includes a description of laboratory procedures and test results.

LABORATORY TESTING

Visual Examination/ Dimensional Measurement of Samples

The following examination and/or measurements were performed on each AC sample:

i) Visual inspection of pipe section for defects, deposits, and other visible anomalies. Each sample was photographed in the as-received condition.

ii) Measurement of the length and inside diameter of the AC samples. Wall thickness measurements were made at 8 locations evenly spaced around the circumference.

A summary sheet containing photographs and pertinent data is compiled for each AC pipe sample and included in Appendix A. A summary of measurements is shown in Table 1.

Cross Sectional Hardness Assessment

At eight locations evenly spaced around the circumference a series hardness tests were performed from the interior to the exterior of the pipeline cross section. Testing was performed at 0.10 inch increments. A shore D durometer was used for these measurements. The intent of this testing is to estimate the depth of the softer/weaker material on both the interior and exterior surfaces of each pipe sample. The test gives an empirical number from 0 to 100. The higher the number the harder the material. Degraded area was classified of having a hardness value less than 85. A summary of results is shown in Table 2.

pH Cross Sectional Evaluation

A section of pipeline is trimmed to create a smooth surface for staining. The entire cross section of the pipe sample was stained. At eight locations evenly spaced around the circumference the areas with pH lower than 9.5 were measured at the interior and exterior of the pipe surfaces at each of the eight locations. Results are summarized in Table 3 with complete tabulated results shown in Appendix B. Photos of stained samples are shown in the Appendix A summary sheets.

Crushing Strength of AC Samples

The crushing strength testing on the submitted samples was determined in accordance with ASTM C 500 – *Standard Test Methods for Asbestos-Cement Pipe.* A section of pipe is place in a saddle and loaded along the length to determine the crushing strength. The test method specifies a 12-inch-long section of pipe to be used. Some pipe sections that were submitted for testing were shorter than 12 inches. Short samples were tested using the same test method. Results are summarized in Table 4.

If you have any questions, please call.

Very truly yours,

VOSS LABORATORIES, INC.

Thomas A. Voss

Thomas A. Voss.
Civil Engineer

TABLE 1: AC PIPE SAMPLE DIMENSIONAL MEASUREMENTS				
Sample ID	Location	As-Received Length (in.)	Average Internal Diameter (in.)	Average Wall Thickness (in.)
AC 1	MURRAY ROAD	13.0	9.93	1.07
AC 2	LYCOMING	12.0	6.08	0.53
AC 3	SCHOOL ROAD	12.75	8.00	0.63

TABLE 2: AC PIPE SAMPLE HARDNESS				
Sample ID	Location	Average Wall Thickness (in.)	Interior Hardness Depth (<85 Shore D Reading) (in.)	Exterior Hardness Depth (<85 Shore D Reading) (in.)
AC 1	MURRAY ROAD	1.07	0.20	N/A
AC 2	LYCOMING	0.53	0.10	N/A
AC 3	SCHOOL ROAD	0.63	0.20	N/A

* Exterior hardness measurements were consistently greater than 85 Shore D

TABLE 3: AC PIPE SAMPLE pH TESTING				
Sample ID	Location	Average Wall Thickness (in.)	Max. Interior Degraded Depth (in.)	Max. Exterior Degraded Depth (in.)
AC 1	MURRAY ROAD	1.07	0.30	0.02
AC 2	LYCOMING	0.53	0.22	0.04
AC 3	SCHOOL ROAD	0.63	0.36	0.03

TABLE 4: AC PIPE SAMPLE CRUSH STRENGTH TESTING					
Sample ID	Location	Internal Diameter (in.)	Average Wall Thickness (in.)	Tested Pipe Length (in.)	Ultimate Load (lbs)
AC 1	MURRAY ROAD	9.93	1.07	11.9	11,300
AC 2	LYCOMING	6.08	0.53	11.3	3,200
AC 3	SCHOOL ROAD	8.00	0.63	11.2	2,400

*Test results from pipe sections shorter than 12 inches are not in accordance with ASTM C500

Appendices

A. Visual Examination Sheets

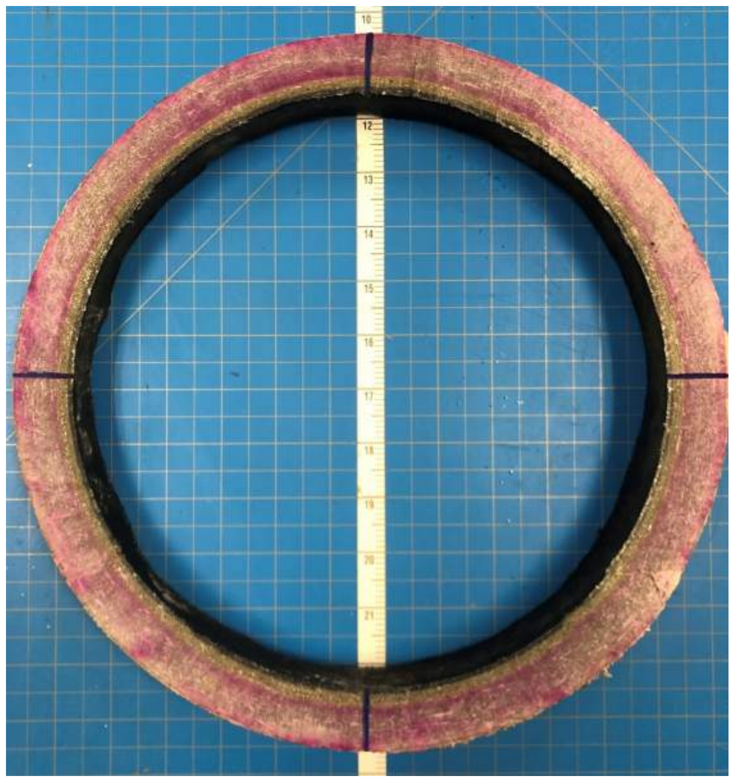
B. pH Cross-Section Tabulated Results

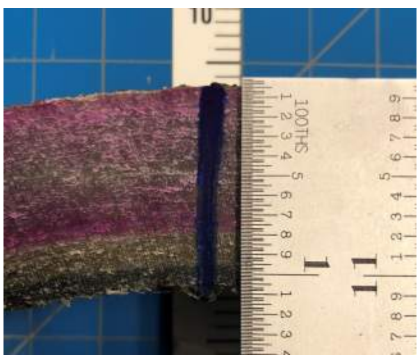
Appendix A

Visual Examination Sheets

AC Pipe Data Sheet

Client:	GHD	Internal Dia.	9.93"	Pipe Length (in.):	13.0"
Date:	4/29/20	Wall Thick.	1.07"		
Pipe ID:	#1	Ext. Corrosion	0.02"	Int. Corrosion	0.30"
Location	Murray Road	Crush Test Length	11.9"	Crushing Strength	11,300lbs





The sample ends were fractured as received. The ends were sawcut and stained.

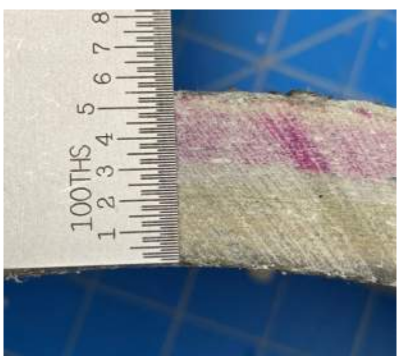
AC Pipe Data Sheet

Client:	GHD	Internal Dia.	6.08"	Pipe Length (in.):	12.0"
Date:	4/29/20	Wall Thick.	0.53"		
Pipe ID:	#2	Ext. Corrosion	0.04"	Int. Corrosion	0.22"
Location	Lycoming Road	Crush Test Length	11.3"	Crushing Strength	3,200lbs

The sample ends were fractured as received. The ends were sawcut and stained.

AC Pipe Data Sheet

Client:	GHD	Internal Dia.	8.00"	Pipe Length (in.):	12.8"
Date:	4/29/20	Wall Thick.	0.63"		
Pipe ID:	#3	Ext. Corrosion	0.03"	Int. Corrosion	0.36"
Location	School Road	Crush Test Length	11.2"	Crushing Strength	2,400lbs



The sample ends were fractured as received. The ends were sawcut and stained.

Appendix B

pH Cross-Section Tabulated Results

VL Sample #	PIPE DIAMETER	LOCATION	Length of pipe (in)	pH Cross Sectional Inner/Outer (in)																	
				12:00		1:30		3:00		4:30		6:00		7:30		9:00		10:30		Max Interior	Max Exterior
1	10	Murray Road	13.0	0.30	0.00	0.24	0.01	0.26	0.02	0.24	0.00	0.28	0.00	0.22	0.00	0.26	0.01	0.28	0.00	0.30	0.02
2	6	Lycoming Road	12.0	0.22	0.01	0.14	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.01	0.12	0.00	0.22	0.04
3	8	School Road	12.8	0.20	0.01	0.15	0.03	0.23	0.00	0.24	0.00	0.30	0.00	0.36	0.03	0.25	0.00	0.24	0.00	0.36	0.03

Appendix B – Asset Register

UniqueID	Length (ft)	Dia (in)	USMH depth (ft)	DSMH depth (ft)	Material	Ph 2 CIP Year	Replacement Method	Manholes (<10ft)	Manholes (10-20ft)	Manholes (>20ft)	Laterals	Matrl & Install Cost ($)	Const Cost ($)	Land Use Type	ProxTo Building (ft)	ProxTo Road (ft)	RoadType	ProxTo WaterMains (ft)	ProxTo StormWaterFeature (ft)	ProxTo StormWaterDitch (ft)	ProxToESA (ft)	Type of ESA	Repair Cost ($)	Depth (ft)	Proximity to and Types of Roads CO1	Proximity to and Types of Roads CO2	Proximity to Environmentally Sensitive Areas CO1	Proximity to Environmentally Sensitive Areas CO2	Proximity to Environmentally Sensitive Areas CO3	Proximity to Environmentally Sensitive Areas CO4	Proximity to Buildings CO1	Proximity to Buildings CO2	Land Use CO3	Repair Costs CO2	Proximity to Other Utilities CO1	Proximity to Other Utilities CO2	Proximity to Other Utilities CO4	CO1 Health and Safety	CO2 Cost of Failure	CO3 SSOs	CO4 Environmental Impact	Dominant COF	Condition LOF	Core Risk	Mitigation Factor	Risk Zone	Priority	TBL COF	BRE	COF Driver
654	223.8748955	8	12	13.87	AC	1	Trench - In road	0	1	0	1	80,662.47	169,592.84	CS	63.8285558	0	Local	6.454951996	12.86017805	0	10000	N/A	10000	12.935	2	1	1	1	1	1	1	1	4	2	3	3	3	3	3	4	3	4	5	20	1	5	1	10	50	Land Use
657	341.0736613	8	12	8	AC	1	Trench - In road	0	1	0	0	114,322.10	240,362.21	CS	65.45618816	0	Local	0	169.3124439	43.50301904	10000	N/A	10000	10	2	1	1	1	1	1	1	1	4	2	2	3	3	2	3	4	3	4	5	20	1	5	1	9	45	Land Use
663	170.515613	8	12	12.52	AC	1	Trench - In road	0	1	0	0	63,154.68	132,782.72	CS	98.43894449	0	Local	8.490869454	15.21858901	0	10000	N/A	10000	12.26	2	1	1	1	1	1	1	1	4	2	3	3	3	3	3	4	3	4	5	20	1	5	1	10	50	Land Use
664	240.9968474	8	13	12.41	AC	1	Trench - In road	0	1	0	0	84,299.05	177,238.76	CS	54.63934875	1.275842	Local	0	40.6450527	39.8124833	10000	N/A	10000	12.705	2	1	1	1	1	1	1	1	4	2	2	3	3	2	3	4	3	4	5	20	1	5	1	9	45	Land Use
665	428.3804157	8	10	11.8	AC	1	Trench - In road	0	1	0	0	142,014.12	298,584.70	CS	48.69377431	4.846849	Local	0	41.95410848	36.52946253	10000	N/A	10000	10.9	2	1	1	1	1	1	2	2	4	2	2	3	3	2	3	4	3	4	5	20	1	5	1	9	45	Land Use
666	336.7274296	8	10	10.28	AC	1	Trench - In road	0	1	0	3	117,518.23	247,082.08	CS	47.78586651	32.17536	Local	5.938088063	10.03669684	0	10000	N/A	10000	10.14	1	1	1	1	1	1	2	2	4	2	3	3	3	3	3	4	3	4	5	20	1	5	1	10	50	Land Use
667	272.6048604	8	11	10.03	AC	1	Trench - In road	0	1	0	1	104,281.46	219,251.77	CS	39.8717528	31.04808	Local	0	11.43615865	11.43621079	10000	N/A	10000	10.515	1	1	1	1	1	1	2	2	4	2	2	3	3	2	3	4	3	4	5	20	1	5	1	9	45	Land Use
743	264.9656956	15	22	19.56	AC	2	Auger Bore	0	0	1	9		112,813.33	PF	10000	0	Highway	10000	10000	0	136.4200901	Permanent River	30000	20.78	5	5	1	1	1	1	2	2	3	3	3	3	4	5	5	3	4	5	5	25	1	5	1	14	70	Proximity to and Types of Roads
973	193.8732528	10	19	14.49	DI	2	Auger Bore	0	1	0	6		112,813.33	RL	37.1141958	0	Highway	104.5567778	86.78638777	13.40422658	10000	N/A	12000	16.745	4	4	1	1	1	1	3	2	2	2	1	1	1	4	4	2	1	4	5	20	1	5	1	10	50	Proximity to and Types of Roads
1197	365.7659827	15	13	8	AC	2	Auger Bore	0	1	0	3		112,813.33	PF	164.3440992	0	Highway	41.32518769	10000	0	123.4172866	Permanent River	18750	10.5	5	5	1	1	1	1	2	2	3	2	3	3	4	5	5	3	4	5	5	25	1	5	1	14	70	Proximity to and Types of Roads
57	1415.731298	6	8	11.98	PVC	5	Trench - In road	1	0	0	10	376,932.82	792,501.26	RL	3.569074717	0	Local	0	156.6989964	156.0854933	10000	N/A	4000	9.99	1	1	1	1	1	1	4	3	2	1	2	3	3	4	3	2	3	4	5	20	1	5	1	10	50	Proximity to Buildings
1336	1280.237526	4	8	14.82	AC	5	Trench - In road	1	0	0	2	331,059.38	696,052.35	RE	20.83653518	0	Local	0	10000	10000	10000	N/A	5000	11.41	1	1	1	1	1	1	3	2	2	2	2	3	3	3	3	2	3	3	5	15	1	3	2	9	45	Proximity to Buildings, Proximity to Other Utilities
181	4257.376945	12	8	8	AC	6	Trench - In road	1	0	0	11	1,621,016.35	3,408,186.88	RE	12.02810485	0	Local	0	2.985450771	0	10000	N/A	8000	8	2	1	1	1	1	1	4	3	2	2	3	3	4	4	3	2	4	4	5	20	1	5	1	11	55	Proximity to Buildings, Proximity to Other Utilities
317	708.680633	10	8	4.5	AC	8	Trench - In road	1	0	0	3	260,538.22	547,781.61	CR	66.98280477	4.838939	Local	10.75674609	10000	10000	0	Permanent River	8000	6.25	2	1	4	3	4	4	2	2	4	2	1	1	1	4	3	4	4	4	5	20	1	5	1	11	55	Proximity to Environmentally Sensitive Areas, Land Use
80	126.280355	18	8	8	AC	9	CIPP	1	0	0	1	38,982.25	81,960.19	RE	39.51498443	3.017314	Local	0	10000	10000	10000	N/A	15000	8	3	1	1	1	1	1	3	3	2	2	2	3	3	3	3	2	3	3	5	15	1	3	2	9	45	Proximity to and Types of Roads, Proximity to Buildings, Proximity to Other Utilities
174	232.4459391	18	8	6.01	AC	9	CIPP	1	0	0	2	65,268.38	137,226.77	RE	35.40411542	0	Local	0	10000	10000	10000	N/A	15000	7.005	3	1	1	1	1	1	3	3	2	2	2	3	3	3	3	2	3	3	5	15	1	3	2	9	45	Proximity to and Types of Roads, Proximity to Buildings, Proximity to Other Utilities
180	47.22325199	18	15	14	AC	9	CIPP	0	1	0	0	23,025.06	48,410.18	RE	61.05399584	10.22674	Local	9.534862831	10000	10000	10000	N/A	18750	14.5	3	1	1	1	1	1	2	2	2	2	1	1	1	3	2	2	1	3	5	15	1	3	2	7	35	Proximity to and Types of Roads
218	208.0282059	18	6	8.29	AC	9	CIPP	1	0	0	4	62,567.65	131,548.49	RE	25.64109123	2.24593	Local	9.032329914	10000	10000	10000	N/A	15000	7.145	3	1	1	1	1	1	3	3	2	2	1	1	1	3	3	2	1	3	5	15	1	3	2	8	40	Proximity to and Types of Roads, Proximity to Buildings
301	284.7315675	18	17	15.21	AC	9	CIPP	0	1	0	2	81,475.33	171,301.88	RE	28.68500159	0	Local	6.164770396	10000	10000	10000	N/A	22500	16.105	3	1	1	1	1	1	3	3	2	3	1	1	1	3	3	2	1	3	5	15	1	3	2	8	40	Proximity to and Types of Roads, Proximity to Buildings, Repair Costs
964	315.2314695	18	14	14.82	AC	9	CIPP	0	1	0	7	96,096.04	202,041.92	RE	19.10177305	0.926885	Local	9.534862831	10000	10000	10000	N/A	18750	14.41	3	1	1	1	1	1	4	3	2	2	1	1	1	4	3	2	1	4	5	20	1	5	1	9	45	Proximity to Buildings
1000	402.1066315	21	12	16.24	AC	9	CIPP	0	1	0	7	138,467.55	291,128.03	RE	120.1736739	73.64229	Local	10000	10000	10000	10000	N/A	31250	14.12	1	1	1	1	1	1	2	2	2	3	1	1	1	2	3	2	1	3	5	15	1	3	2	7	35	Repair Costs
1001	427.9388741	21	16	16.61	AC	9	CIPP	0	1	0	4	141,417.57	297,330.44	RE	10000	0.513639	Local	10000	10000	10000	10000	N/A	37500	16.305	4	2	1	1	1	1	2	2	2	3	1	1	1	4	3	2	1	4	5	20	1	5	1	9	45	Proximity to and Types of Roads
1002	302.4524592	21	17	18.34	AC	9	CIPP	0	1	0	10	114,227.29	240,162.88	RE	10000	0	Local	10000	10000	10000	10000	N/A	37500	17.67	4	2	1	1	1	1	2	2	2	3	1	1	1	4	3	2	1	4	5	20	1	5	1	9	45	Proximity to and Types of Roads
1006	392.9163771	21	17	12.49	AC	9	CIPP	0	1	0	7	125,317.08	263,479.17	RE	29.30754451	0.416178	Local	17.01024177	10000	10000	10000	N/A	31250	14.745	4	2	1	1	1	1	3	3	2	3	1	1	1	4	3	2	1	4	5	20	1	5	1	9	45	Proximity to and Types of Roads
1007	392.4061188	21	15	16.38	AC	9	CIPP	0	1	0	1	126,669.92	266,323.52	RE	40.63862007	0	Local	0	10000	10000	10000	N/A	37500	15.69	4	2	1	1	1	1	3	3	2	3	2	3	3	4	3	2	3	4	5	20	1	5	1	10	50	Proximity to and Types of Roads
1008	264.6391341	18	15	15.19	AC	9	CIPP	0	1	0	4	79,784.42	167,746.74	RE	28.42950923	6.959576	Local	0	10000	10000	10000	N/A	22500	15.095	3	1	1	1	1	1	3	3	2	3	2	3	3	3	3	2	3	3	5	15	1	3	2	9	45	Proximity to and Types of Roads, Proximity to Buildings, Repair Costs, Proximity to Other Utilities
1009	49.96091023	18	13	16.68	AC	9	CIPP	0	1	0	2	26,664.21	56,061.50	RE	40.41559027	1.7929	Local	0	10000	10000	10000	N/A	18750	14.84	3	1	1	1	1	1	3	3	2	2	2	3	3	3	3	2	3	3	5	15	1	3	2	9	45	Proximity to and Types of Roads, Proximity to Buildings, Proximity to Other Utilities
1016	228.6443238	18	11	12.82	AC	9	CIPP	0	1	0	7	75,880.83	159,539.44	RE	40.41559027	1.885507	Local	0	10000	10000	10000	N/A	18750	11.91	3	1	1	1	1	1	3	3	2	2	2	3	3	3	3	2	3	3	5	15	1	3	2	9	45	Proximity to and Types of Roads, Proximity to Buildings, Proximity to Other Utilities
1017	325.1605732	18	8	11.43	AC	9	CIPP	1	0	0	6	92,914.16	195,352.01	RE	44.37046577	3.017314	Local	11.30643775	10000	10000	10000	N/A	15000	9.715	3	1	1	1	1	1	3	3	2	2	1	1	1	3	3	2	1	3	5	15	1	3	2	8	40	Proximity to and Types of Roads, Proximity to Buildings
1378	311.7844819	18	17	15.21	AC	9	CIPP	0	1	0	2	87,791.28	184,581.17	RE	25.18233352	0	Local	8.659454012	10000	10000	10000	N/A	22500	16.105	3	1	1	1	1	1	3	3	2	3	1	1	1	3	3	2	1	3	5	15	1	3	2	8	40	Proximity to and Types of Roads, Proximity to Buildings, Repair Costs
977	464.6059758	24	16	8.98	AC	10	CIPP	0	1	0	4	151,992.36	319,563.94	RE	48.88293014	0	Local	0	10000	10000	10000	N/A	31250	12.49	4	2	1	1	1	1	3	3	2	3	2	3	3	4	3	2	3	4	5	20	1	5	1	10	50	Proximity to and Types of Roads
978	522.2324132	24	18	16.28	AC	10	CIPP	0	1	0	0	162,611.83	341,891.37	RE	47.22002059	2.889896	Local	8.030842995	10000	10000	10000	N/A	37500	17.14	4	2	1	1	1	1	3	3	2	3	1	1	1	4	3	2	1	4	5	20	1	5	1	9	45	Proximity to and Types of Roads
979	182.5091769	24	15	18.87	AC	10	CIPP	0	1	0	0	64,635.65	135,896.45	RE	47.33731348	3.555337	Local	0	10000	10000	10000	N/A	37500	16.935	4	2	1	1	1	1	3	3	2	3	2	3	3	4	3	2	3	4	5	20	1	5	1	10	50	Proximity to and Types of Roads
980	161.9526858	24	22	15.67	AC	10	CIPP	0	0	1	0	61,707.15	129,739.29	RE	44.6824719	3.523252	Local	9.398070691	10000	10000	10000	N/A	37500	18.835	4	2	1	1	1	1	3	3	2	3	1	1	1	4	3	2	1	4	5	20	1	5	1	9	45	Proximity to and Types of Roads
981	484.6124268	24	28	21.9	AC	10	CIPP	0	0	1	0	154,762.22	325,387.58	RE	42.34998285	0	Local	0	10000	10000	10000	N/A	50000	24.95	4	2	1	1	1	1	3	3	2	4	2	3	3	4	4	2	3	4	5	20	1	5	1	11	55	Proximity to and Types of Roads, Repair Costs
1003	498.1535458	24	19	22.73	AC	10	CIPP	0	1	0	0	155,667.48	327,290.88	RE	247.1243242	0	Local	78.18048297	10000	10000	10000	N/A	50000	20.865	4	2	1	1	1	1	2	2	2	4	1	1	1	4	4	2	1	4	5	20	1	5	1	10	50	Proximity to and Types of Roads, Repair Costs
1004	422.9892234	24	23	26.64	AC	10	CIPP	0	0	1	4	142,990.09	300,636.67	RE	72.68265058	9.868404	Local	0	10000	10000	10000	N/A	50000	24.82	4	2	1	1	1	1	2	2	2	4	2	3	3	4	4	2	3	4	5	20	1	5	1	11	55	Proximity to and Types of Roads, Repair Costs
1005	502.1941972	24	27	27.97	AC	10	CIPP	0	0	1	1	161,332.81	339,202.23	RE	67.31612382	0	Local	0	10000	10000	10000	N/A	50000	27.485	4	2	1	1	1	1	2	2	2	4	2	3	3	4	4	2	3	4	5	20	1	5	1	11	55	Proximity to and Types of Roads, Repair Costs
1168	504.3797551	8	9	14.87	AC	25	CIPP	1	0	0	0	31,705.65	66,661.55	CS	29.63108747	14.33179	Local	0	59.17851751	56.65664981	87.32867146	Permanent River	10000	11.935	2	1	4	3	4	4	2	2	4	2	2	3	3	4	3	4	4	4	4	16	1	5	1	11	44	Proximity to Environmentally Sensitive Areas, Land Use
1181	498.1222055	8	12	13.65	AC	25	Pipe Burst	0	1	0	1	140,521.16	295,445.74	RL	100.1348976	32.31361	Major	0	10000	10000	45.70775621	Permanent River	10000	12.825	3	1	4	3	4	4	1	1	2	2	2	3	3	4	3	4	4	4	4	16	1	5	1	11	44	Proximity to Environmentally Sensitive Areas
1182	268.908604	8	8	12.35	AC	25	Pipe Burst	1	0	0	5	84,071.69	176,760.74	RL	103.5997651	34.0701	Major	12.52720049	10000	10000	47.47947449	Permanent River	10000	10.175	3	1	4	3	4	4	1	1	2	2	1	1	1	4	3	4	4	4	4	16	1	5	1	11	44	Proximity to Environmentally Sensitive Areas
747	270.8109327	8	12	17.59	AC	30	Pipe Burst	0	1	0	16	105,056.79	220,881.90	AE	10000	10000	N/A	0	10000	10000	75.21354021	Permanent River	10000	14.795	1	1	4	3	4	4	1	1	1	2	1	1	1	4	3	4	4	4	4	16	1	5	1	11	44	Proximity to Environmentally Sensitive Areas
750	491.2039764	8	13	12.27	AC	30	Pipe Burst	0	1	0	9	150,757.01	316,966.62	AE	70.75600522	10000	N/A	215.9882074	10000	10000	68.94389549	Permanent River	10000	12.635	1	1	4	3	4	4	1	1	1	2	1	1	1	4	3	4	4	4	4	16	1	5	1	11	44	Proximity to Environmentally Sensitive Areas
677	398.2592151	6	28	22.75	AC	44	Pipe Burst	0	0	1	0	326,630.08	686,739.75	RL	39.9473494	0	Local	0	88.94016784	86.19383806	0	Permanent River	8000	25.375	1	1	4	3	4	4	2	1	2	2	2	3	3	4	3	4	4	4	4	16	1	5	1	11	44	Proximity to Environmentally Sensitive Areas
678	334.4145567	6	26	28.5	AC	44	Pipe Burst	0	0	1	0	86,063.09	180,947.65	RL	116.2140009	14.67192	Major	29.68566672	10000	10000	36.39303046	Permanent River	8000	27.25	2	1	4	3	4	4	1	1	2	2	1	1	1	4	3	4	4	4	4	16	1	5	1	11	44	Proximity to Environmentally Sensitive Areas
461	268.0571119	6	8	12.18	AC	48	Pipe Burst	1	0	0	3	296,462.14	623,311.64	RL	57.04266904	0	Local	5.717257353	10000	10000	0	Permanent River	5000	10.09	1	1	4	3	4	4	1	1	2	2	1	1	1	4	3	4	4	4	4	16	1	5	1	11	44	Proximity to Environmentally Sensitive Areas
436	262.9007459	6	18	20.5	AC	100	Pipe Burst	0	1	0	5	75,366.41	158,457.87	RL	221.0266064	10000	N/A	0	10000	10000	82.17351887	Permanent River	6000	19.25	1	1	4	3	4	4	1	1	2	2	1	1	1	4	3	4	4	4	4	16	1	5	1	11	44	Proximity to Environmentally Sensitive Areas
450	197.5074655	6	14	15.5	AC	100	Pipe Burst	0	1	0	0	59,970.34	126,087.63	RL	234.973369	10000	N/A	0	10000	193.1514594	22.75591822	Permanent River	5000	14.75	1	1	4	3	4	4	1	1	2	2	1	1	1	4	3	4	4	4	4	16	1	5	1	11	44	Proximity to Environmentally Sensitive Areas
575	460.2909305	6	13	9.86	AC	100	Pipe Burst	0	1	0	1	111,311.82	234,033.11	RL	17.01487473	0	Local	0	10000	4.833361708	88.73643363	Permanent River	5000	11.43	1	1	4	3	4	4	3	2	2	2	2	3	3	4	3	4	4	4	4	16	1	5	1	11	44	Proximity to Environmentally Sensitive Areas
576	116.884127	6	10	10.09	AC	100	Pipe Burst	0	1	0	7	263,837.88	554,719.14	RL	109.1578434	10000	N/A	211.5540218	10000	10000	0	Permanent River	5000	10.045	1	1	4	3	4	4	1	1	2	2	1	1	1	4	3	4	4	4	4	16	1	5	1	11	44	Proximity to Environmentally Sensitive Areas
577	574.8813669	6	1	10.09	AC	100	Pipe Burst	1	0	0	2	133,162.29	279,973.72	RL	164.6090794	10000	N/A	0	10000	10000	23.75682454	Permanent River	4000	5.545	1	1	4	3	4	4	1	1	2	1	1	1	1	4	3	4	4	4	4	16	1	5	1	11	44	Proximity to Environmentally Sensitive Areas
593	92.15339225	6	10	11.28	AC	100	Pipe Burst	0	1	0	6	40,582.60	85,324.91	RL	67.54753242	6.917028	Local	5.98742664	12.85089931	0	81.8826531	Permanent River	5000	10.64	1	1	4	3	4	4	1	1	2	2	3	3	3	4	3	4	4	4	4	16	1	5	1	11	44	Proximity to Environmentally Sensitive Areas
1191	409.5180863	6	9	7.71	AC	100	Pipe Burst	1	0	0	9	331,022.59	695,975.00	CS	199.3955376	10000	N/A	0	10000	10000	0	Permanent River	4000	8.355	1	1	4	3	4	4	1	1	4	1	1	1	1	4	3	4	4	4	4	16	1	5	1	11	44	Proximity to Environmentally Sensitive Areas, Land Use
958	415.4045495	8	17	16.12	AC	29	Pipe Burst	0	1	0	2	120,928.16	254,251.46	CS	62.46882209	12.54986	Local	33.95151228	1.142760371	0	10000	N/A	12000	16.56	2	1	1	1	1	1	1	1	4	2	3	3	3	3	3	4	3	4	4	16	1	5	1	10	40	Land Use
1091	311.3299082	8	14	12.47	AC	29	Pipe Burst	0	1	0	1	92,889.13	195,299.39	CS	25.68017353	0	Local	0	177.6320668	0	10000	N/A	10000	13.235	2	1	1	1	1	1	2	2	4	2	3	3	3	3	3	4	3	4	4	16	1	5	1	10	40	Land Use
165	439.9089211	6	17	15.9	AC	44	Pipe Burst	0	1	0	5	112,980.65	237,541.81	CS	16.1746692	5.724811	Local	0	10000	10000	10000	N/A	6000	16.45	1	1	1	1	1	1	3	2	4	2	2	3	3	3	3	4	3	4	4	16	1	5	1	10	40	Land Use
911	185.6138822	6	13	11.48	AC	46	Pipe Burst	0	1	0	9	64,942.95	136,542.55	CS	22.70911363	0	Local	8.560675911	13.70500872	0	10000	N/A	5000	12.24	1	1	1	1	1	1	3	2	4	2	3	3	3	3	3	4	3	4	4	16	1	5	1	10	40	Land Use
912	326.8591768	6	12	12.22	AC	46	Pipe Burst	0	1	0	11	99,457.58	209,109.55	CS	17.40618479	0	Local	8.560675911	19.70779063	0	10000	N/A	5000	12.11	1	1	1	1	1	1	3	2	4	2	3	3	3	3	3	4	3	4	4	16	1	5	1	10	40	Land Use
1084	283.2857968	6	12	11.94	AC	46	Pipe Burst	0	1	0	0	72,198.23	151,796.78	CS	41.42033743	0	Local	0	7.839480436	0	10000	N/A	5000	11.97	1	1	1	1	1	1	2	1	4	2	3	3	3	3	3	4	3	4	4	16	1	5	1	10	40	Land Use
1085	406.312176	6	11	13.51	AC	46	Pipe Burst	0	1	0	9	111,841.34	235,146.41	MU	29.43454373	12.13963	Local	24.20892464	3.234623942	0	10000	N/A	5000	12.255	1	1	1	1	1	1	2	1	4	2	3	3	3	3	3	4	3	4	4	16	1	5	1	10	40	Land Use
175	182.0851205	6	9	7.13	AC	100	Pipe Burst	1	0	0	1	48,193.09	101,325.97	RL	4.878284735	0	Local	0	16.75717063	15.64068849	10000	N/A	4000	8.065	1	1	1	1	1	1	4	3	2	1	2	3	3	4	3	2	3	4	4	16	1	5	1	10	40	Proximity to Buildings
323	169.5488721	6	8	16.1	AC	100	Pipe Burst	1	0	0	0	44,029.14	92,571.26	CS	37.63067612	17.59944	Local	3.487444976	10.80918789	0	10000	N/A	5000	12.05	1	1	1	1	1	1	2	1	4	2	3	3	3	3	3	4	3	4	4	16	1	5	1	10	40	Land Use
459	330.8653359	6	8	8.6	AC	100	Pipe Burst	1	0	0	0	78,308.88	164,644.43	RL	0	1.73856	Local	0	80.63387136	0	116.4018818	Permanent River	4000	8.3	1	1	1	1	1	1	4	3	2	1	3	3	3	4	3	2	3	4	4	16	1	5	1	10	40	Proximity to Buildings
1082	229.7216476	6	8	11.71	AC	100	Pipe Burst	1	0	0	6	65,815.85	138,377.82	CS	33.2267254	5.26384	Local	8.92067584	37.2519729	0	10000	N/A	4000	9.855	1	1	1	1	1	1	2	1	4	1	3	3	3	3	3	4	3	4	4	16	1	5	1	10	40	Land Use
1154	29.30783493	6	16	16.44	AC	100	Pipe Burst	0	1	0	5	25,727.91	54,092.54	CS	55.3439879	0	Local	5.143390349	74.59808131	0	10000	N/A	6000	16.22	1	1	1	1	1	1	1	1	4	2	3	3	3	3	3	4	3	4	4	16	1	5	1	10	40	Land Use
1089	370.6101786	8	12	11	AC	29	Pipe Burst	0	1	0	6	115,505.60	242,850.51	CS	124.7885	0	Local	9.400497559	170.4618679	170.4618679	10000	N/A	10000	11.5	2	1	1	1	1	1	1	1	4	2	2	3	3	2	3	4	3	4	4	16	1	5	1	9	36	Land Use
831	555.3607235	6	16	15.78	AC	35	Pipe Burst	0	1	0	5	137,514.15	289,123.51	RL	0	5.273667	Local	0	77.30037212	24.04470258	10000	N/A	6000	15.89	1	1	1	1	1	1	4	3	2	2	1	1	1	4	3	2	1	4	4	16	1	5	1	9	36	Proximity to Buildings
1373	115.3429721	6	12	18.26	AC	37	Pipe Burst	0	1	0	4	47,010.38	98,839.33	CS	60.92508656	0	Local	0	23.97502397	23.3246492	10000	N/A	6000	15.13	1	1	1	1	1	1	1	1	4	2	2	3	3	2	3	4	3	4	4	16	1	5	1	9	36	Land Use
310	424.5276167	6	11	11.32	AC	45	Pipe Burst	0	1	0	2	102,212.12	214,900.98	CS	23.60498604	45.55021	Local	12.66529348	27.20056598	27.19055676	10000	N/A	5000	11.16	1	1	1	1	1	1	3	2	4	2	1	1	1	3	2	4	1	4	4	16	1	5	1	9	36	Land Use
311	404.3069266	6	11	16.2	AC	45	Pipe Burst	0	1	0	7	108,415.22	227,943.00	CS	24.68610171	38.83039	Local	6.844856274	5.531954808	5.541168457	10000	N/A	5000	13.6	1	1	1	1	1	1	3	2	4	2	1	1	1	3	2	4	1	4	4	16	1	5	1	9	36	Land Use
555	313.4193225	6	8	8.9	AC	45	Pipe Burst	1	0	0	0	74,601.61	156,849.88	CS	38.2532766	0	Major	0	176.5205445	176.5167405	10000	N/A	4000	8.45	2	1	1	1	1	1	2	1	4	1	2	3	3	2	3	4	3	4	4	16	1	5	1	9	36	Land Use
151	561.7483237	6	9	11.25	AC	46	Pipe Burst	1	0	0	12	145,371.52	305,643.62	CS	16.71576977	0.482819	Local	20.21959269	30.67274448	30.42873405	10000	N/A	5000	10.125	1	1	1	1	1	1	3	2	4	2	1	1	1	3	2	4	1	4	4	16	1	5	1	9	36	Land Use
551	362.9112369	6	11	11.57	AC	100	Pipe Burst	0	1	0	8	101,118.64	212,601.94	CS	16.19030555	0	Local	9.590308875	10000	0	10000	N/A	5000	11.285	1	1	1	1	1	1	3	2	4	2	1	1	1	3	2	4	1	4	4	16	1	5	1	9	36	Land Use
669	195.875019	6	8	9.5	AC	100	Pipe Burst	1	0	0	1	51,123.44	107,487.04	CS	74.27819489	19.25341	Local	0	117.0392942	117.0400135	10000	N/A	4000	8.75	1	1	1	1	1	1	1	1	4	1	2	3	3	2	3	4	3	4	4	16	1	5	1	9	36	Land Use
671	264.7714742	6	8	9.37	AC	100	Pipe Burst	1	0	0	1	65,763.94	138,268.68	CS	59.45105552	15.60895	Local	0	79.56886495	11.27968839	10000	N/A	4000	8.685	1	1	1	1	1	1	1	1	4	1	2	3	3	2	3	4	3	4	4	16	1	5	1	9	36	Land Use
824	484.0955968	6	11	12.77	AC	100	Pipe Burst	0	1	0	0	114,870.31	241,514.84	RE	2.377401502	9.213002	Local	6.229684653	10000	0	10000	N/A	5000	11.885	1	1	1	1	1	1	4	3	2	2	1	1	1	4	3	2	1	4	4	16	1	5	1	9	36	Proximity to Buildings
1078	253.2252131	6	8	14.71	AC	100	Pipe Burst	1	0	0	3	66,310.36	139,417.53	CS	31.30431112	0	Local	0	38.29534113	14.58275214	10000	N/A	5000	11.355	1	1	1	1	1	1	2	1	4	2	2	3	3	2	3	4	3	4	4	16	1	5	1	9	36	Land Use
1167	277.4474771	6	8	9.33	AC	100	Pipe Burst	1	0	0	0	66,957.59	140,778.33	CS	69.4356882	0	Local	0	111.1820158	0	10000	N/A	4000	8.665	1	1	1	1	1	1	1	1	4	1	2	3	3	2	3	4	3	4	4	16	1	5	1	9	36	Land Use
959	297.3126988	8	18	17.28	AC	29	Pipe Burst	0	1	0	6	96,814.74	203,552.99	CS	74.2375942	10.8094	Local	33.54352312	199.4397719	12.45798926	10000	N/A	12000	17.64	2	1	1	1	1	1	1	1	4	2	1	1	1	2	2	4	1	4	4	16	1	5	1	8	32	Land Use
1088	285.1776463	8	11	19.97	AC	29	Pipe Burst	0	1	0	4	90,720.30	190,739.43	MU	209.9616768	12.67115	Local	34.13121836	227.7990107	20.9420633	10000	N/A	12000	15.485	2	1	1	1	1	1	1	1	4	2	1	1	1	2	2	4	1	4	4	16	1	5	1	8	32	Land Use
1090	59.03590901	8	13	12.19	AC	29	Pipe Burst	0	1	0	1	28,554.16	60,035.11	CS	98.29994789	20.50922	Local	51.79047447	170.2558048	170.2558048	10000	N/A	10000	12.595	2	1	1	1	1	1	1	1	4	2	1	1	1	2	2	4	1	4	4	16	1	5	1	8	32	Land Use
1211	129.038949	6	12	11.15	AC	41	Pipe Burst	0	1	0	6	48,420.78	101,804.68	CS	28.18996547	0	Local	7.511735242	10000	0	10000	N/A	5000	11.575	1	1	1	1	1	1	2	1	4	2	1	1	1	2	2	4	1	4	4	16	1	5	1	8	32	Land Use
312	335.6053977	6	16	19.88	AC	45	Pipe Burst	0	1	0	5	90,816.15	190,940.95	CS	40.81305984	33.9562	Local	2.890190725	1.11897605	1.12210751	10000	N/A	6000	17.94	1	1	1	1	1	1	2	1	4	2	2	1	2	2	2	4	2	4	4	16	1	5	1	8	32	Land Use
313	477.5326476	6	27	22.75	AC	45	Pipe Burst	0	0	1	0	116,475.69	244,890.13	CS	41.60752862	0.549774	Local	5.384557648	73.20962629	72.50449978	10000	N/A	8000	24.875	1	1	1	1	1	1	2	1	4	2	1	1	1	2	2	4	1	4	4	16	1	5	1	8	32	Land Use
556	420.7266028	6	8	12.34	AC	45	Pipe Burst	1	0	0	2	100,404.40	211,100.26	CS	47.14698627	0	Local	9.026289121	72.56187886	70.87417562	10000	N/A	5000	10.17	1	1	1	1	1	1	2	1	4	2	1	1	1	2	2	4	1	4	4	16	1	5	1	8	32	Land Use
1320	101.4695864	6	12	8.9	AC	45	Pipe Burst	0	1	0	1	35,062.29	73,718.46	CS	45.48627627	7.797125	Local	10.2023882	95.29769025	95.29004473	10000	N/A	5000	10.45	1	1	1	1	1	1	2	1	4	2	1	1	1	2	2	4	1	4	4	16	1	5	1	8	32	Land Use
125	205.148662	6	8	16.1	AC	100	Pipe Burst	1	0	0	3	56,094.09	117,937.83	CS	49.29667862	17.56162	Local	4.205879869	16.77716641	14.14432635	10000	N/A	5000	12.05	1	1	1	1	1	1	2	1	4	2	1	1	2	2	2	4	2	4	4	16	1	5	1	8	32	Land Use
122	303.9677611	8	10	9.3	AC	30	Pipe Burst	0	1	0	0	89,511.78	188,198.52	NR	10000	10000	N/A	0	10000	123.0938282	122.8320553	Permanent River	8000	9.65	1	1	1	1	1	1	1	1	4	2	1	1	1	1	2	4	1	4	4	16	1	5	1	7	28	Land Use
748	367.4201577	8	10	12.38	AC	30	Pipe Burst	0	1	0	3	113,192.14	237,986.47	NR	10000	10000	N/A	0	10000	150.5081277	130.7421223	Permanent River	10000	11.19	1	1	1	1	1	1	1	1	4	2	1	1	1	1	2	4	1	4	4	16	1	5	1	7	28	Land Use
679	55.5642379	6	16	16.79	AC	44	Pipe Burst	0	1	0	0	23,807.40	50,055.06	CS	78.78577451	6.941692	Local	12.4594498	10000	0	10000	N/A	6000	16.395	1	1	1	1	1	1	1	1	4	2	1	1	1	1	2	4	1	4	4	16	1	5	1	7	28	Land Use
114	161.768756	6	20	26.57	AC	45	Pipe Burst	0	1	0	2	49,375.86	103,812.75	CS	118.0480468	33.9562	Local	2.890190725	70.40723567	69.35511324	10000	N/A	8000	23.285	1	1	1	1	1	1	1	1	4	2	1	1	2	1	2	4	2	4	4	16	1	5	1	7	28	Land Use
1083	331.5556215	6	12	13.87	AC	46	Pipe Burst	0	1	0	4	88,455.57	185,977.64	CS	80.38587658	6.183659	Local	20.91022987	45.61790974	42.79250425	10000	N/A	5000	12.935	1	1	1	1	1	1	1	1	4	2	1	1	1	1	2	4	1	4	4	16	1	5	1	7	28	Land Use
1086	316.6869592	6	13	11	AC	46	Pipe Burst	0	1	0	3	83,795.98	176,181.05	MU	86.59044233	10.17408	Local	31.6321852	71.73313017	71.60037397	10000	N/A	5000	12	1	1	1	1	1	1	1	1	4	2	1	1	1	1	2	4	1	4	4	16	1	5	1	7	28	Land Use
670	70.62764766	6	10	10.4	AC	100	Pipe Burst	0	1	0	3	34,508.38	72,553.86	CS	53.95440154	0	Local	7.793265189	155.2639795	155.2588433	10000	N/A	5000	10.2	1	1	1	1	1	1	1	1	4	2	1	1	1	1	2	4	1	4	4	16	1	5	1	7	28	Land Use
672	77.46257752	6	8	9.37	AC	100	Pipe Burst	1	0	0	0	24,460.80	51,428.83	CS	58.94043784	15.60895	Local	9.637554919	11.85924138	1.270247321	10000	N/A	4000	8.685	1	1	1	1	1	1	1	1	4	1	2	1	2	2	1	4	2	4	4	16	1	5	1	7	28	Land Use
673	47.77808482	6	9	10.28	AC	100	Pipe Burst	1	0	0	0	18,154.97	38,170.82	CS	48.69377431	0	Local	5.938088063	79.54315151	12.02939354	10000	N/A	4000	9.64	1	1	1	1	1	1	2	1	4	1	1	1	1	2	1	4	1	4	4	16	1	5	1	7	28	Land Use
1287	228.042546	6	9	8	AC	42	Pipe Burst	1	0	0	0	56,459.04	118,705.13	CR	10000	10000	N/A	12.63416118	10000	225.7869546	123.4172866	Permanent River	4000	8.5	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	4	1	4	4	16	1	5	1	6	24	Land Use
1288	369.0848852	6	11	6.94	AC	42	Pipe Burst	0	1	0	8	102,430.54	215,360.21	CR	228.9380678	0	Local	10.23450267	10000	0	10000	N/A	4000	8.97	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	4	1	4	4	16	1	5	1	6	24	Land Use
1296	306.841912	6	4	8.09	AC	42	Pipe Burst	1	0	0	4	79,203.91	166,526.21	CR	10000	24.66037	Local	12.62373051	10000	225.7869546	10000	N/A	4000	6.045	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	4	1	4	4	16	1	5	1	6	24	Land Use
1297	178.5234443	6	7	3.83	AC	42	Pipe Burst	1	0	0	2	45,936.23	96,580.93	CR	10000	13.11726	Local	10.23450267	10000	0	10000	N/A	4000	5.415	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	4	1	4	4	16	1	5	1	6	24	Land Use
668	60.65276586	6	8	9.5	AC	100	Pipe Burst	1	0	0	1	22,388.71	47,072.27	CS	74.41576706	39.07295	Local	18.48529499	94.73339363	94.72850224	10000	N/A	4000	8.75	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	4	1	4	4	16	1	5	1	6	24	Land Use
1188	94.67037906	6	6	2.99	AC	100	Pipe Burst	1	0	0	2	31,117.46	65,424.45	CS	108.8632572	10000	N/A	0	10000	10000	130.4261629	Permanent River	3000	4.495	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	4	1	4	4	16	1	5	1	6	24	Land Use
1190	142.3903607	6	6	8.99	AC	100	Pipe Burst	1	0	0	0	38,257.95	80,437.34	CS	198.5055816	10000	N/A	0	10000	10000	131.1846133	Permanent River	4000	7.495	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	4	1	4	4	16	1	5	1	6	24	Land Use
1044	303.9579939	8	14	14.2	AC	28	Pipe Burst	0	1	0	1	91,009.27	191,347.00	RL	22.28000668	1.233493	Local	0	2.946919072	0	10000	N/A	10000	14.1	2	1	1	1	1	1	3	3	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
1045	176.0684126	8	10	14.06	AC	28	Pipe Burst	0	1	0	0	58,397.45	122,780.63	RL	32.373818	0	Local	6.170570146	1.973160887	0	10000	N/A	10000	12.03	2	1	1	1	1	1	2	2	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
1104	374.7247695	8	15	10.17	AC	28	Pipe Burst	0	1	0	8	119,554.82	251,364.00	RL	39.37622902	0	Local	10.75818951	5.220780537	0	10000	N/A	10000	12.585	2	1	1	1	1	1	2	2	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
1105	222.9251747	8	10	15.02	AC	28	Pipe Burst	0	1	0	3	73,345.92	154,209.80	RL	62.44717965	3.044465	Local	0	5.731567135	0	10000	N/A	10000	12.51	2	1	1	1	1	1	1	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
1087	271.2588138	8	20	18.69	AC	29	Pipe Burst	0	1	0	9	94,671.00	199,045.77	RM	87.4336028	15.08161	Local	40.39633338	14.61988566	0	10000	N/A	12000	19.345	2	1	1	1	1	1	1	1	3	2	3	3	3	3	3	3	3	3	4	12	1	3	2	9	36	Land Use, Proximity to Other Utilities
1125	166.7860502	8	16	18.63	AC	29	Pipe Burst	0	1	0	7	65,030.44	136,726.51	RM	83.59571483	0	Local	0	20.78358721	0	10000	N/A	12000	17.315	2	1	1	1	1	1	1	1	3	2	3	3	3	3	3	3	3	3	4	12	1	3	2	9	36	Land Use, Proximity to Other Utilities
752	409.5382042	8	11	16.05	AC	30	Pipe Burst	0	1	0	6	125,432.24	263,721.29	RL	21.04136328	0	Local	0	10000	10000	10000	N/A	10000	13.525	2	1	1	1	1	1	3	3	2	2	2	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
217	455.6776947	6	8	9.32	AC	31	Pipe Burst	1	0	0	0	104,831.51	220,408.25	RE	16.1421997	0	Local	0	10000	10000	10000	N/A	4000	8.66	1	1	1	1	1	1	3	2	2	1	2	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
298	467.0735795	6	10	13.76	AC	31	Pipe Burst	0	1	0	3	100,282.81	210,844.62	RE	14.20235364	0	Local	0	77.30037212	48.23303571	10000	N/A	5000	11.88	1	1	1	1	1	1	3	2	2	2	2	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
790	413.095598	6	8	15.76	AC	31	Pipe Burst	1	0	0	3	111,253.14	233,909.72	RE	24.88638645	0	Local	0	9.216562234	9.200617554	10000	N/A	5000	10.84	1	1	1	1	1	1	3	2	2	2	2	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
813	164.4991296	6	12	12.33	AC	32	Pipe Burst	0	1	0	1	46,956.07	98,725.13	RE	27.08110614	3.877133	Local	6.682260677	12.84135479	0	10000	N/A	5000	12.165	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
853	317.5929024	6	8	11.34	AC	32	Pipe Burst	1	0	0	6	78,488.49	165,022.05	RE	20.22748625	0.732748	Local	6.657717876	10.5292843	0	10000	N/A	4000	9.67	1	1	1	1	1	1	3	2	2	1	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
783	296.9331131	6	14	14.47	AC	33	Pipe Burst	0	1	0	7	85,598.29	179,970.40	RE	37.04378992	0	Local	4.911042363	10.82800097	0	10000	N/A	5000	14.235	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
800	399.5256329	6	18	21.07	AC	33	Pipe Burst	0	1	0	6	96,899.20	203,730.56	RE	17.17393223	0	Local	0	10000	10000	10000	N/A	6000	19.535	1	1	1	1	1	1	3	2	2	2	2	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
805	377.9049317	6	11	11.01	AC	34	Pipe Burst	0	1	0	3	93,804.80	197,224.59	RE	35.78508243	2.479396	Local	0	9.645626722	0	10000	N/A	5000	11.005	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
808	186.0500799	6	11	11.68	AC	34	Pipe Burst	0	1	0	0	51,535.64	108,353.69	RE	27.08110614	0	Local	6.682260677	23.21832018	0	10000	N/A	5000	11.34	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
78	206.054561	6	17	9.56	AC	35	Pipe Burst	0	1	0	4	61,788.59	129,906.31	RL	31.35203108	6.762858	Local	0	6.354411267	0	10000	N/A	5000	13.28	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
829	33.80717749	6	16	15.76	AC	35	Pipe Burst	0	1	0	2	22,184.03	46,641.91	RL	14.20235364	2.305335	Local	0	43.49363623	27.23949593	10000	N/A	6000	15.88	1	1	1	1	1	1	3	2	2	2	2	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
830	307.5473442	6	14	15.25	AC	35	Pipe Burst	0	1	0	1	78,853.81	165,790.14	RL	23.39359096	0	Local	0	4.372903366	0	10000	N/A	5000	14.625	1	1	1	1	1	1	3	2	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
833	207.0841892	6	16	15.78	AC	35	Pipe Burst	0	1	0	5	68,005.39	142,981.33	RL	25.34672283	0	Local	4.211156683	88.46570391	0	10000	N/A	6000	15.89	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
834	128.0369024	6	16	15.64	AC	35	Pipe Burst	0	1	0	15	61,707.84	129,740.74	RL	31.27357293	0.460997	Local	0	21.57739007	0	10000	N/A	6000	15.82	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
870	286.923754	6	11	12.51	AC	35	Pipe Burst	0	1	0	5	68,971.30	145,012.15	RL	22.75229048	0	Local	0	9.796182728	0	10000	N/A	5000	11.755	1	1	1	1	1	1	3	2	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
688	512.9744802	6	20	23.7	AC	36	Pipe Burst	0	1	0	0	121,007.08	254,417.38	RL	32.32442409	0	Local	6.708995002	16.92593426	0	10000	N/A	8000	21.85	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
692	378.9185778	6	18	19.44	AC	36	Pipe Burst	0	1	0	7	103,020.20	216,599.97	RL	37.22302208	9.528671	Local	4.479555075	20.07286403	0	10000	N/A	6000	18.72	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
725	127.973325	6	16	16.55	AC	36	Pipe Burst	0	1	0	0	39,194.33	82,406.08	RL	40.65272544	0	Local	8.569282458	15.35555731	0	10000	N/A	6000	16.275	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
729	258.874884	6	17	17.59	AC	36	Pipe Burst	0	1	0	0	67,010.93	140,890.44	RL	29.42470705	0	Local	0	14.47222313	0	10000	N/A	6000	17.295	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
733	318.7162658	6	20	20.49	AC	36	Pipe Burst	0	1	0	5	85,727.21	180,241.45	RL	25.65788396	0	Local	1.560304291	13.69307816	0	10000	N/A	8000	20.245	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
760	391.0116187	6	17	18.84	AC	36	Pipe Burst	0	1	0	7	95,089.97	199,926.66	RL	8.603510729	0	Local	0	10000	10000	10000	N/A	6000	17.92	1	1	1	1	1	1	3	2	2	2	2	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
1092	312.3121424	6	12	17.26	AC	37	Pipe Burst	0	1	0	5	82,866.33	174,226.46	RL	38.80271513	0	Local	0	14.29271178	0	10000	N/A	6000	15.13	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
1127	427.3741933	6	8	10.17	AC	37	CIPP	1	0	0	3	32,368.71	68,055.21	RM	36.02330261	1.549894	Local	9.913306102	38.1737561	0	10000	N/A	4000	9.085	1	1	1	1	1	1	2	1	3	1	3	3	3	3	3	3	3	3	4	12	1	3	2	9	36	Land Use, Proximity to Other Utilities
1130	196.1012776	6	16	18.26	AC	37	Pipe Burst	0	1	0	15	76,171.52	160,150.62	RL	38.66130771	0	Local	8.163383933	13.32166863	0	10000	N/A	6000	17.13	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
1046	677.7105361	6	12	10.28	AC	37	Pipe Burst	0	1	0	1	157,513.49	331,172.11	RL	31.6165457	0	Local	0	3.38597399	0	10000	N/A	5000	13.14	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
1049	390.1077739	6	19	16.64	AC	38	Pipe Burst	0	1	0	3	96,397.90	202,676.59	RL	21.44513096	0	Local	0	25.08900975	23.6591471	10000	N/A	6000	17.82	1	1	1	1	1	1	3	2	2	2	2	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
1051	455.9981199	6	16	18.52	AC	38	Pipe Burst	0	1	0	1	110,399.60	232,115.16	RL	39.13322154	0	Local	0	12.11407374	0	10000	N/A	6000	17.26	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
92	477.7340897	6	14	18.19	AC	39	CIPP	0	1	0	15	58,386.70	122,758.05	RL	33.5427778	0	Local	0	192.2083005	0	10000	N/A	6000	16.095	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
215	335.7455132	6	12	17.88	AC	39	Pipe Burst	0	1	0	6	92,345.92	194,157.30	RL	23.39060242	0	Local	0	34.54187053	34.53781606	10000	N/A	5000	14.44	1	1	1	1	1	1	3	2	2	2	2	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
962	394.2485448	6	19	17.88	AC	39	Pipe Burst	0	1	0	0	95,777.82	201,372.86	RL	34.75340294	0	Local	7.67822855	13.97316144	0	10000	N/A	6000	18.44	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
1019	187.556259	6	34	10.39	AC	39	Pipe Burst	0	0	1	4	56,355.71	118,487.87	RL	17.19003636	0	Local	0	34.64309959	0	10000	N/A	8000	22.195	1	1	1	1	1	1	3	2	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
1038	379.4638196	6	11	14.14	AC	39	CIPP	0	1	0	10	30,973.19	65,121.13	RL	32.12263095	0	Local	9.844752036	7.984327888	0	10000	N/A	5000	12.57	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
1042	415.0791206	6	19	18.74	AC	39	Pipe Burst	0	1	0	0	100,204.31	210,679.57	RL	21.47508138	0	Local	0	190.5139935	18.20143569	10000	N/A	6000	18.87	1	1	1	1	1	1	3	2	2	2	2	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
965	380.4285501	6	20	9.35	AC	40	Pipe Burst	0	1	0	0	97,341.07	204,659.59	RE	16.57595784	5.647662	Local	0	13.25966988	0	10000	N/A	5000	14.675	1	1	1	1	1	1	3	2	2	2	2	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
994	366.1231198	6	21	20.16	AC	40	Pipe Burst	0	0	1	0	92,801.16	195,114.45	RE	16.99383671	2.333211	Local	0	10000	10000	10000	N/A	8000	20.58	1	1	1	1	1	1	3	2	2	2	2	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Buildings, Proximity to Other Utilities
168	421.8250491	6	11	8.61	AC	43	Pipe Burst	0	1	0	2	100,637.82	211,591.02	RL	50.16005543	0	Local	0	11.69623988	0	10000	N/A	4000	9.805	1	1	1	1	1	1	1	1	2	1	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
171	400.6291572	6	9	9.83	AC	43	Pipe Burst	1	0	0	2	94,633.70	198,967.35	RL	62.80802636	0	Local	0	31.11260567	0	10000	N/A	4000	9.415	1	1	1	1	1	1	1	1	2	1	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
366	286.7481653	6	9	15.9	AC	43	Pipe Burst	1	0	0	2	70,433.99	148,087.45	RL	45.1255607	2.398332	Local	0	10.96668833	0	10000	N/A	5000	12.45	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities
367	576.0027791	6	11	8.66	AC	43	Pipe Burst	0	1	0	4	135,900.59	285,730.89	RL	34.0004034	0	Local	8.025067757	21.56370519	0	10000	N/A	4000	9.83	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	4	12	1	3	2	9	36	Proximity to Other Utilities

UniqueID	Length (ft)	Dia (in)	USMH depth (ft)	DSMH depth (ft)	Material	Ph 2 CIP Year	Replacement Method	Manholes (<10ft)	Manholes (10-20ft)	Manholes (>20ft)	Laterals	Matrl & Install Cost ($)	Const Cost ($)	Land Use Type	ProxTo Building (ft)	ProxTo Road (ft)	RoadType	ProxTo WaterMains (ft)	ProxTo StormWaterFeature (ft)	ProxTo StormWaterDitch (ft)	ProxToESA (ft)	Type of ESA	Repair Cost ($)	Depth (ft)
368	496.1324881	6	14	9.37	AC	43	Pipe Burst	0	1	0	1	118,928.15	250,046.44	RL	67.5679781	2.996371	Local	11.13019099	22.07862894	0	10000	N/A	5000	11.685
370	39.04526091	6	8	11.35	AC	43	Pipe Burst	1	0	0	1	17,797.12	37,418.44	RL	46.96203787	0.779361	Local	8.493502704	7.175759561	0	10000	N/A	4000	9.675
166	397.6941856	6	9	16.25	AC	44	Pipe Burst	1	0	0	4	98,510.01	207,117.31	PF	20.2150887	0	Local	0	10000	10000	10000	N/A	5000	12.625
552	242.5347135	6	8	13.78	AC	45	Pipe Burst	1	0	0	0	59,538.63	125,179.96	RM	9.639718389	0	Local	0	86.96131531	86.42904248	10000	N/A	5000	10.89
509	347.2691436	6	12	11.84	AC	47	Pipe Burst	0	1	0	0	85,794.69	180,383.34	RL	21.7356923	0	Local	0	145.6529554	145.6529554	10000	N/A	5000	11.92
524	592.1029779	6	3	14.61	AC	47	Pipe Burst	1	0	0	5	141,321.88	297,129.26	RL	31.08132129	0	Local	0	18.89338597	0	10000	N/A	4000	8.805
620	246.3505251	6	8	10.42	AC	47	Pipe Burst	1	0	0	7	70,849.49	148,961.05	RL	16.90099944	0	Local	0	210.7591109	210.7591109	10000	N/A	4000	9.21
622	267.0089977	6	11	9.45	AC	47	Pipe Burst	0	1	0	3	73,239.41	153,985.86	RL	22.51383584	0	Local	0	6.904236951	0.506404003	10000	N/A	5000	10.225
624	71.2415079	6	9	9.45	AC	47	Pipe Burst	1	0	0	9	36,638.82	77,033.12	RL	33.78465493	17.19803	Local	5.086085017	3.721892569	0	10000	N/A	4000	9.225
629	304.7243008	6	9	15.35	AC	47	Pipe Burst	1	0	0	10	87,753.91	184,502.60	RL	7.273800029	23.22643	Local	0	11.05966467	0	10000	N/A	5000	12.175
631	311.9572769	6	10	9.15	AC	47	Pipe Burst	0	1	0	5	85,790.92	180,375.41	RL	41.62924924	3.540269	Local	5.086085017	0.512950327	0	10000	N/A	4000	9.575
474	123.8381957	6	11	11.73	AC	48	Pipe Burst	0	1	0	5	45,815.62	96,327.33	RL	42.01590382	6.091687	Local	6.442929028	11.17551476	0	10000	N/A	5000	11.365
33	168.1157576	6	7	10.2	AC	100	Pipe Burst	1	0	0	1	45,224.60	95,084.72	RL	13.65005134	0	Local	0	157.7064698	157.7064698	10000	N/A	4000	8.6
58	329.2295076	6	11	8.86	VCP	100	Trench - In road	0	1	0	5	101,807.38	214,050.01	RL	44.04999516	0	Local	8.499422706	19.9577849	0	10000	N/A	4000	9.93
59	254.8072185	6	8	10.5	VCP	100	Trench - In road	1	0	0	4	77,701.80	163,368.04	RL	39.84030148	0	Local	0	15.08399889	0	10000	N/A	4000	9.25
61	200.3428533	6	13	13.58	VCP	100	Trench - In road	0	1	0	1	63,585.71	133,688.96	RL	39.45152452	2.454242	Local	6.178247461	12.75227423	0	10000	N/A	5000	13.29
472	203.0489707	6	8	8.72	AC	100	Pipe Burst	1	0	0	8	63,147.91	132,768.47	RL	36.04236334	0	Local	8.556351047	121.5174553	0	10000	N/A	4000	8.36
477	204.101058	6	12	13.23	AC	100	Pipe Burst	0	1	0	1	56,871.47	119,572.28	RL	18.17590645	5.359613	Local	0	10000	10000	10000	N/A	5000	12.615
483	450.3879287	6	8	10.93	AC	100	Pipe Burst	1	0	0	3	108,207.43	227,506.13	RL	24.54841588	0	Local	7.236887058	29.56157715	0	10000	N/A	4000	9.465
494	287.3836933	6	8	10.38	AC	100	Pipe Burst	1	0	0	1	70,569.03	148,371.40	RL	22.29443472	0	Local	0	101.4059252	10000	10000	N/A	4000	9.19
525	390.6808453	8	12	14.61	VCP	100	Trench - In road	0	1	0	10	144,204.25	303,189.44	RL	45.16848212	5.185508	Local	10.31958048	10.25196686	0	10000	N/A	10000	13.305
527	432.2186966	8	14	11.98	VCP	100	Trench - In road	0	1	0	5	149,165.61	313,620.69	RL	21.42277657	0	Local	0	10000	10000	10000	N/A	10000	12.99
538	107.1483746	6	8	8.95	AC	100	Pipe Burst	1	0	0	0	30,769.03	64,691.88	RL	12.67360075	0.703087	Local	0	10000	10000	10000	N/A	4000	8.475
550	207.1330079	6	9	12.01	AC	100	Pipe Burst	1	0	0	3	56,515.76	118,824.39	RL	10.82821091	0	Local	0	242.5630014	166.0303932	10000	N/A	5000	10.505
573	371.6786848	6	12	13.06	AC	100	Pipe Burst	0	1	0	5	98,481.72	207,057.82	RL	15.5822475	4.770572	Local	12.41098982	0.072247686	0	10000	N/A	5000	12.53
592	241.6100675	6	8	12.96	AC	100	Pipe Burst	1	0	0	2	62,342.14	131,074.35	RL	28.70160301	0	Local	0	21.08073735	0	10000	N/A	5000	10.48
604	250.0974813	6	11	13.37	AC	100	Pipe Burst	0	1	0	2	68,145.71	143,276.37	RL	21.5215433	0.151863	Local	0	10000	10000	10000	N/A	5000	12.185
691	239.8331818	6	8	19.37	AC	100	Pipe Burst	1	0	0	2	61,964.55	130,280.47	RL	21.42757124	9.205764	Local	0	25.24490529	25.24490529	10000	N/A	5000	13.685
710	323.1651955	6	8	15.48	AC	100	Pipe Burst	1	0	0	4	82,672.60	173,819.15	RE	19.94357594	4.527324	Local	0	10000	10000	10000	N/A	5000	11.74
776	436.9549675	6	16	17.44	AC	100	Pipe Burst	0	1	0	3	109,352.93	229,914.54	RE	24.15877673	0	Local	0	10000	10000	10000	N/A	6000	16.72
806	344.8800174	6	8	11.01	AC	100	Pipe Burst	1	0	0	6	90,287.00	189,828.43	RE	39.00684131	0	Local	9.072058806	5.098661812	0	10000	N/A	4000	9.505
836	419.459291	6	8	15.64	AC	100	Pipe Burst	1	0	0	2	100,135.10	210,534.05	RL	36.22375597	0	Local	0	6.209857542	0	10000	N/A	5000	11.82
875	130.9588663	6	11	12.15	VCP	100	Trench - In road	0	1	0	0	44,739.72	94,065.25	RL	41.62520709	0	Local	8.011262482	24.79998333	0	10000	N/A	5000	11.575
882	219.5255362	6	9	8	VCP	100	Trench - In road	1	0	0	2	65,881.38	138,515.61	RL	32.39899055	0	Local	0	5.098029051	0	10000	N/A	4000	8.5
883	200.4059818	6	8	8.5	VCP	100	Trench - In road	1	0	0	0	58,101.50	122,158.39	RL	38.34510723	2.154579	Local	19.63945177	0.854209108	0	10000	N/A	4000	8.25
913	344.3110698	6	15	8	AC	100	Pipe Burst	0	1	0	8	97,166.10	204,291.73	RL	11.99265035	0	Local	0	227.984346	227.9892541	10000	N/A	5000	11.5
927	553.0472722	6	12	11.3	AC	100	Pipe Burst	0	1	0	0	129,522.55	272,321.15	RL	29.08848227	1.080665	Local	5.903495367	10000	10000	10000	N/A	5000	11.65
1020	213.6472486	6	8	8.75	AC	100	Pipe Burst	1	0	0	12	71,400.04	150,118.58	RL	5.312983337	2.630538	Local	0	14.73126115	14.73126115	163.3929309	Permanent River	4000	8.375
1187	385.1065253	6	3	6.19	AC	100	Pipe Burst	1	0	0	0	89,835.14	188,878.37	RL	23.38717635	0	Local	0	10000	10000	139.4080344	Permanent River	3000	4.595
1218	110.7989516	6	8	11.56	AC	100	Pipe Burst	1	0	0	11	48,044.78	101,014.14	RL	12.86463207	5.134731	Local	0	195.8847276	195.886953	10000	N/A	4000	9.78
1230	238.8338666	6	10	10.2	AC	100	Pipe Burst	0	1	0	4	68,752.20	144,551.49	RL	38.87510669	0	Local	7.48393887	5.833485373	0	10000	N/A	5000	10.1
1231	378.2832079	6	11	9.6	AC	100	Pipe Burst	0	1	0	7	102,885.18	216,316.09	RL	16.30780061	3.139452	Local	0	43.14050632	13.33855731	10000	N/A	5000	10.3
1240	457.3211234	6	8	17.22	AC	100	Pipe Burst	1	0	0	0	105,180.74	221,142.50	RL	36.24713728	1.582346	Local	9.166005829	80.81744558	0	10000	N/A	5000	12.61
1250	248.4500227	6	13	15.88	AC	100	Pipe Burst	0	1	0	4	70,795.63	148,847.81	RL	18.55970994	0.383506	Local	0	178.4211518	177.8257647	10000	N/A	5000	14.44
1251	231.5803772	6	8	12.27	AC	100	Pipe Burst	1	0	0	1	58,710.83	123,439.52	RM	20.61874344	0	Local	5.868687854	9.104081957	0	10000	N/A	5000	10.135
1369	177.1582268	6	8	8	VCP	100	Trench - In road	1	0	0	2	55,289.56	116,246.29	RL	39.41278459	0	Local	0	24.14295732	0	10000	N/A	4000	8
515	353.373747	8	13	10.2	AC	20	Pipe Burst	0	1	0	10	117,110.31	246,224.42	RL	35.00175453	3.503743	Local	0	10000	10000	10000	N/A	10000	11.6
545	354.8509444	8	13	12.49	AC	20	Pipe Burst	0	1	0	3	106,986.99	224,940.15	RL	44.15085932	0	Local	0	10000	10000	10000	N/A	10000	12.745
546	326.2191402	8	13	11.15	AC	20	Pipe Burst	0	1	0	7	105,685.88	222,204.56	RL	41.88537637	0	Local	0	169.9628993	170.1172015	10000	N/A	10000	12.075
559	474.4723663	8	14	12.75	AC	20	Pipe Burst	0	1	0	0	132,990.45	279,612.43	RM	34.5050299	0	Local	0	30.63521174	4.59188997	10000	N/A	10000	13.375
1203	517.7062726	8	12	13.7	AC	24	CIPP	0	1	0	7	46,832.19	98,464.69	PF	106.6310632	9.093898	Major	10.36027524	10000	10000	10000	N/A	10000	12.85
1113	106.7146285	8	15	19.56	AC	28	Pipe Burst	0	1	0	13	58,712.23	123,442.46	RL	58.19164391	12.38651	Local	0	21.78582813	14.70983607	10000	N/A	12000	17.28
1123	392.8739365	8	20	21.88	AC	29	Pipe Burst	0	1	0	4	118,182.85	248,479.45	RL	43.98311955	1.64646	Local	0	10000	10000	10000	N/A	16000	20.94
1124	59.59346744	8	20	20.12	AC	29	Pipe Burst	0	1	0	1	28,696.33	60,334.04	RL	47.74794287	0	Local	0	10000	10000	10000	N/A	16000	20.06
1126	513.48316	8	18	19.83	AC	29	Pipe Burst	0	1	0	4	148,938.21	313,142.58	RL	50.64136786	0.636798	Local	0	25.20530058	19.03675182	10000	N/A	12000	18.915
179	359.3953251	8	17	11	AC	30	Pipe Burst	0	1	0	4	109,645.81	230,530.31	RL	31.85442644	0	Local	0	10000	10000	10000	N/A	10000	14
753	359.3403935	8	5	16.18	AC	30	Pipe Burst	1	0	0	4	105,631.80	222,090.86	RL	29.86185417	0	Local	0	10000	10000	10000	N/A	10000	10.59
810	280.5812889	6	11	11.38	AC	31	Pipe Burst	0	1	0	7	82,123.52	172,664.71	AE	27.99584444	0.722142	Local	0	10000	10000	10000	N/A	5000	11.19
811	334.8892703	6	14	10.99	AC	31	Pipe Burst	0	1	0	0	83,163.97	174,852.25	AE	43.90642915	2.68948	Local	0	10000	10000	10000	N/A	5000	12.495
812	579.4794137	6	12	14.46	AC	31	Pipe Burst	0	1	0	3	139,639.38	293,591.79	AE	53.94449048	0	Local	0	75.30898023	12.9344045	10000	N/A	5000	13.23
815	371.4434026	6	12	10.33	AC	32	Pipe Burst	0	1	0	12	108,931.72	229,028.95	RE	43.45916999	0	Local	0	10000	10000	10000	N/A	5000	11.165
818	348.8329765	6	19	15.42	AC	32	Pipe Burst	0	1	0	1	87,627.01	184,235.78	RE	28.72380183	0	Local	0	10000	10000	10000	N/A	6000	17.21
855	560.7645122	6	5	12.15	AC	32	Pipe Burst	1	0	0	10	142,162.46	298,896.57	RE	26.56072567	0	Local	0	191.1873989	191.1420263	10000	N/A	4000	8.575
856	275.5178427	6	12	13.75	AC	32	Pipe Burst	0	1	0	3	75,047.54	157,787.46	RE	33.05755693	5.220162	Local	0	198.6521164	196.485223	10000	N/A	5000	12.875
777	356.2843086	6	12	21.48	AC	33	Pipe Burst	0	1	0	9	101,210.42	212,794.90	RE	36.73994706	3.444209	Local	0	10000	10000	10000	N/A	6000	16.74
780	552.0722012	6	17	19.11	AC	33	Pipe Burst	0	1	0	2	132,315.34	278,193.01	RE	33.71699643	0	Local	0	10000	10000	10000	N/A	6000	18.055
786	418.3520465	6	15	13.37	AC	33	Pipe Burst	0	1	0	2	103,899.81	218,449.35	RE	45.82903523	0	Local	0	15.05383089	13.32936573	10000	N/A	5000	14.185
852	296.6942051	6	21	12.15	AC	33	Pipe Burst	0	0	1	3	82,547.52	173,556.16	RE	35.54524829	0	Local	0	229.6410207	196.485223	10000	N/A	6000	16.575
803	374.4318525	6	13	13.29	AC	34	Pipe Burst	0	1	0	3	96,066.77	201,980.38	RE	48.55623996	5.410955	Local	0	10000	10000	10000	N/A	5000	13.145
807	194.3672331	6	11	11.34	AC	34	Pipe Burst	0	1	0	4	59,303.04	124,684.64	RE	40.98391515	0	Local	0	24.91567534	9.011681285	10000	N/A	5000	11.17
982	408.874259	6	8	18.43	AC	34	Pipe Burst	1	0	0	1	96,385.78	202,651.10	RL	52.73457949	0	Local	0	10000	10000	10000	N/A	5000	13.215
846	59.57891132	6	8	17.92	AC	35	Pipe Burst	1	0	0	1	22,160.52	46,592.49	RL	42.40358849	6.406898	Local	0	10000	10000	10000	N/A	5000	12.96
849	139.2573875	6	16	16.87	AC	35	Pipe Burst	0	1	0	3	46,092.19	96,908.84	RL	36.21618947	6.762858	Local	0	25.93744121	12.82544029	10000	N/A	6000	16.435
719	349.4524923	6	9	15.04	AC	36	Pipe Burst	1	0	0	16	106,258.65	223,408.82	RL	40.97589775	2.702798	Local	0	10000	10000	10000	N/A	5000	12.02
721	231.036925	6	15	15.58	AC	36	Pipe Burst	0	1	0	1	62,595.35	131,606.72	RL	40.83615014	0	Local	0	80.53422579	79.42666328	10000	N/A	6000	15.29
732	279.878473	6	18	17.97	AC	36	Pipe Burst	0	1	0	4	77,474.18	162,889.45	RL	35.582147	0	Local	0	24.43516022	16.24517227	10000	N/A	6000	17.985
734	507.3259665	6	18	19.51	AC	36	Pipe Burst	0	1	0	2	122,806.77	258,201.23	RL	33.66860492	0	Local	0	22.49756514	16.24517227	10000	N/A	6000	18.755
766	291.7617428	6	22	8	AC	36	Pipe Burst	0	0	1	13	96,499.37	202,889.93	RL	37.21563813	0	Local	0	10000	10000	10000	N/A	6000	15
767	305.8710219	6	8	19.85	AC	37	Pipe Burst	1	0	0	4	78,997.59	166,092.44	RL	37.4278632	0	Local	0	10000	10000	10000	N/A	5000	13.925
1093	188.2487033	6	11	11.88	AC	37	Pipe Burst	0	1	0	2	55,002.85	115,643.49	RM	26.8107796	1.154451	Local	0	23.8371075	23.8081967	10000	N/A	5000	11.44
1112	208.3492076	6	8	15.66	AC	37	Pipe Burst	1	0	0	7	62,774.21	131,982.77	RL	40.91578714	0.267221	Local	0	103.7353769	33.21896442	10000	N/A	5000	11.83
1048	340.4013347	6	13	10.28	AC	38	Pipe Burst	0	1	0	0	84,335.28	177,314.93	RL	34.76099937	0	Major	0	8.108513154	8.006403605	10000	N/A	5000	11.64
1053	329.5274481	6	11	16.1	AC	38	Pipe Burst	0	1	0	2	85,024.58	178,764.19	RL	47.27079984	0	Local	0	23.93585342	23.6591471	10000	N/A	5000	13.55
1096	343.4483809	6	14	10.82	AC	38	Pipe Burst	0	1	0	4	90,982.78	191,291.30	RL	29.18291228	0	Local	0	10000	10000	10000	N/A	5000	12.41
1027	146.3139009	6	13	17.37	AC	39	Pipe Burst	0	1	0	3	47,591.70	100,061.56	RL	39.63663874	0	Local	0	22.0062006	19.03250709	10000	N/A	6000	15.185
1029	108.2020198	6	18	19.34	AC	39	Pipe Burst	0	1	0	5	42,492.93	89,341.38	RL	40.80126222	0	Local	0	10000	18.07792105	10000	N/A	6000	18.67
988	286.1286821	6	19	11.62	AC	40	Pipe Burst	0	1	0	0	72,802.34	153,066.93	RE	59.81318876	0	Local	0	10000	10000	10000	N/A	6000	15.31
997	457.0738572	6	12	16.67	AC	40	Pipe Burst	0	1	0	3	113,628.19	238,903.28	RE	52.27658708	0.064617	Local	0	10000	10000	10000	N/A	5000	14.335
307	255.6993772	6	4	10.91	AC	41	Pipe Burst	1	0	0	7	72,836.12	153,137.94	PF	10000	0	Local	0	10000	10000	10000	N/A	4000	7.455
343	190.6882755	6	13	10.67	AC	41	Pipe Burst	0	1	0	1	54,021.26	113,579.70	RL	50.18001684	0	Local	0	10000	10000	10000	N/A	5000	11.835
1212	315.1364906	6	12	8.61	AC	41	Pipe Burst	0	1	0	4	84,966.50	178,642.08	RL	29.42373102	0	Local	0	156.9071242	156.9084008	10000	N/A	5000	10.305
1306	78.46552642	6	11	9.71	AC	41	Pipe Burst	0	1	0	4	34,673.92	72,901.93	MB	159.6850683	0	Local	0	65.66163629	65.66163629	10000	N/A	5000	10.355
1298	231.353815	6	11	8.5	AC	42	Pipe Burst	0	1	0	2	64,162.69	134,902.05	PF	237.8841541	6.922027	Local	0	10000	10000	10000	N/A	4000	9.75
1305	268.1569569	6	10	9.31	AC	42	Pipe Burst	0	1	0	13	88,483.35	186,036.25	MB	111.3773271	0	Local	0	14.76065405	14.76065405	10000	N/A	4000	9.655
170	507.0517983	6	10	13.68	AC	43	Pipe Burst	0	1	0	4	125,748.51	264,386.24	RL	33.40320606	0.456985	Local	0	229.9148156	229.6002626	10000	N/A	5000	11.84
355	136.9075093	6	11	9.15	AC	44	Pipe Burst	0	1	0	1	42,592.85	89,551.46	RE	31.40104385	0	Local	0	10000	10000	10000	N/A	5000	10.075
892	90.2774492	6	8	14.08	AC	46	Pipe Burst	1	0	0	5	34,683.96	72,923.02	RM	17.5159373	1.809761	Local	40.00916713	10000	10000	10000	N/A	5000	11.04
893	140.2432323	6	8	14.08	AC	46	Pipe Burst	1	0	0	9	51,301.69	107,861.80	RM	16.81994704	2.60168	Local	130.2655637	10000	10000	10000	N/A	5000	11.04
894	100.4503428	6	8	14.08	AC	46	Pipe Burst	1	0	0	7	39,845.70	83,775.58	RM	16.6789974	2.522216	Local	10000	10000	10000	10000	N/A	5000	11.04
895	100.4141077	6	8	14.08	AC	46	Pipe Burst	1	0	0	4	35,338.00	74,298.14	RM	17.26083258	2.235733	Local	10000	10000	10000	10000	N/A	5000	11.04
896	99.70586504	6	8	14.08	AC	46	Pipe Burst	1	0	0	1	30,687.50	64,520.46	RM	14.99427924	1.745923	Local	151.8794983	10000	10000	10000	N/A	5000	11.04
897	117.8938339	6	8	14.08	AC	46	Pipe Burst	1	0	0	4	39,052.44	82,107.75	RM	15.89633338	1.745923	Local	33.98568998	10000	10000	10000	N/A	5000	11.04
898	100.120023	6	8	14.08	AC	46	Pipe Burst	1	0	0	4	35,275.50	74,166.75	RM	11.95274878	2.155626	Local	33.98568998	10000	10000	10000	N/A	5000	11.04
1134	331.8600592	6	9	16.38	AC	46	CIPP	1	0	0	2	27,593.00	58,014.29	RL	32.32162273	0	Local	0	51.1403613	51.1403613	10000	N/A	5000	12.69
510	298.8726105	6	12	11.17	AC	47	Pipe Burst	0	1	0	2	78,510.43	165,068.18	RL	31.49730924	0	Local	0	10000	10000	10000	N/A	5000	11.585
630	363.2078645	6	13	13.69	AC	47	Pipe Burst	0	1	0	8	101,181.67	212,734.46	RL	26.42844063	0	Local	0	149.3111432	132.0573433	10000	N/A	5000	13.345
634	447.7679395	6	13	10.44	AC	47	Pipe Burst	0	1	0	6	116,150.69	244,206.82	RL	30.50522202	0	Local	0	31.57590041	31.57590041	10000	N/A	5000	11.72
464	116.0491576	6	11	10.48	AC	48	Pipe Burst	0	1	0	1	38,160.45	80,232.34	RL	41.17381317	0.250945	Local	0	10000	10000	10000	N/A	5000	10.74
468	302.8314909	6	13	10.56	AC	48	Pipe Burst	0	1	0	1	77,851.69	163,683.18	RL	45.47073966	0.209794	Local	0	196.7622701	195.4898308	10000	N/A	5000	11.78
469	171.1731709	6	17	12.76	AC	48	Pipe Burst	0	1	0	2	51,374.30	108,014.46	RL	52.39341236	0.663286	Local	0	35.36031791	24.34820988	10000	N/A	5000	14.88
476	169.5041851	6	8	10.92	AC	48	Pipe Burst	1	0	0	0	44,019.64	92,551.29	RL	40.73634535	8.364712	Local	0	26.67468925	26.23095322	10000	N/A	4000	9.46
1397	61.66691026	6	6	17.55	AC	48	Pipe Burst	1	0	0	3	25,604.22	53,832.87	RL	44.19567651	0	Local	0	18.48857894	18.49092731	10000	N/A	5000	11.775
106	91.38038269	6	8	12.27	AC	100	Pipe Burst	1	0	0	2	30,418.33	63,954.54	RM	20.61874344	6.843035	Local	6.952350776	31.38167489	8.829224782	10000	N/A	5000	10.135
154	161.5864022	6	8	13.44	AC	100	Pipe Burst	1	0	0	0	42,337.11	89,013.77	RL	28.91027948	0	Local	0	10000	10000	10000	N/A	5000	10.72
173	381.8003622	6	10	11.35	AC	100	Pipe Burst	0	1	0	2	96,132.58	202,118.74	RL	59.9702268	0	Local	0	16.94017203	9.628948312	10000	N/A	5000	10.675
221	27.00128912	6	16	9.47	AC	100	Pipe Burst	0	1	0	12	35,737.77	75,138.67	RE	76.10626995	0	Local	0	10000	10000	10000	N/A	5000	12.735
393	467.4137928	6	8	7.4	AC	100	Pipe Burst	1	0	0	3	111,825.43	235,112.97	RE	35.17034298	6.17048	Local	0	10000	10000	10000	N/A	4000	7.7
394	250.3692242	6	11	15.33	AC	100	Pipe Burst	0	1	0	1	66,703.46	140,244.02	RE	35.05234515	0	Local	0	10000	10000	10000	N/A	5000	13.165
399	239.6097729	6	10	13.48	AC	100	Pipe Burst	0	1	0	2	65,917.08	138,590.65	RE	30.3022864	0	Local	0	10000	10000	10000	N/A	5000	11.74
401	455.7778143	6	10	12.29	AC	100	Pipe Burst	0	1	0	2	111,852.79	235,170.48	RE	28.41953871	0	Local	0	10000	10000	10000	N/A	5000	11.145
420	60.30964791	6	12	13.06	AC	100	Pipe Burst	0	1	0	3	29,315.80	61,636.47	RL	50.17816521	1.658958	Local	0	24.22816833	18.89729722	10000	N/A	5000	12.53
424	245.6705795	6	8	12.89	AC	100	Pipe Burst	1	0	0	1	61,705.00	129,734.76	RL	39.95679049	0	Local	0	10000	10000	10000	N/A	5000	10.445
426	108.3065958	6	8	1.13	AC	100	Pipe Burst	1	0	0	0	31,015.15	65,209.36	RL	77.97373337	7.542868	Local	0	10000	10000	10000	N/A	3000	4.565
446	469.2366313	6	16	13.58	AC	100	Pipe Burst	0	1	0	0	111,712.78	234,876.13	RL	55.25427224	0	Local	0	10000	10000	10000	N/A	5000	14.79
447	512.1914329	6	8	16.16	AC	100	Pipe Burst	1	0	0	1	118,340.68	248,811.28	RL	51.78159001	0	Local	0	10000	10000	10000	N/A	5000	12.08
497	263.2807181	6	13	12.02	AC	100	Pipe Burst	0	1	0	10	82,947.15	174,396.39	RL	27.99043598	0	Local	0	211.1054134	211.1063976	10000	N/A	5000	12.51
507	553.8289859	6	11	12.86	AC	100	Pipe Burst	0	1	0	11	146,188.66	307,361.66	RL	34.6675592	0	Local	0	10000	10000	10000	N/A	5000	11.93
513	494.8553908	3	12	12.91	AC	100	Pipe Burst	0	1	0	9	130,656.77	274,705.86	RL	34.56413064	0	Local	0	10000	10000	10000	N/A	5000	12.455
517	525.2143123	6	10	23.89	AC	100	Pipe Burst	0	1	0	10	138,608.04	291,423.41	RL	31.55374626	0	Local	0	10000	10000	10000	N/A	6000	16.945
526	431.5717057	8	14	14.61	VCP	100	Trench - In road	0	1	0	17	166,971.51	351,057.60	RL	45.71924316	0	Local	0	234.5417409	232.4488815	10000	N/A	10000	14.305
623	298.3849948	6	8	9.45	AC	100	Pipe Burst	1	0	0	3	75,906.81	159,594.07	RL	26.32858616	9.600591	Local	0	56.78430056	0.506404003	10000	N/A	4000	8.725
773	329.4112565	6	8	20.12	AC	100	Pipe Burst	1	0	0	0	77,999.89	163,994.77	RL	43.0553291	4.293003	Local	0	10000	10000	10000	N/A	5000	14.06
876	265.2929168	6	11	12.15	VCP	100	Trench - In road	0	1	0	0	78,323.23	164,674.59	RL	40.27471714	6.006688	Local	0	30.65574758	4.411870597	10000	N/A	5000	11.575
879	166.0395585	6	13	13.58	VCP	100	Trench - In road	0	1	0	11	70,009.89	147,195.79	RL	29.12418889	2.454242	Local	0	10.9063793	9.850657849	10000	N/A	5000	13.29
886	179.077912	6	8	9.95	VCP	100	Trench - In road	1	0	0	10	67,769.48	142,485.33	RL	42.88666552	4.471762	Local	0	10000	10000	10000	N/A	4000	8.975
920	292.423908	6	8	12.69	VCP	100	Trench - In road	1	0	0	6	90,105.98	189,447.82	RL	36.59605665	0	Local	0	10000	10000	10000	N/A	5000	10.345
923	553.4832495	6	11	13.61	VCP	100	Trench - In road	0	1	0	0	150,370.81	316,154.63	RL	38.0680553	0	Local	0	10000	10000	10000	N/A	5000	12.305
976	191.6160144	6	8	8.98	AC	100	Pipe Burst	1	0	0	3	53,218.40	111,891.69	RE	28.79144222	2.001442	Local	0	10000	10000	10000	N/A	4000	8.49
986	272.7067772	6	12	16.02	AC	100	Pipe Burst	0	1	0	3	74,450.19	156,531.52	RL	29.16244574	0	Local	0	10000	10000	10000	N/A	5000	14.01
998	234.1737322	6	8	16.68	AC	100	Pipe Burst	1	0	0	3	62,261.92	130,905.68	RE	28.07628188	3.137056	Local	0	10000	10000	10000	N/A	5000	12.34
999	418.0800291	6	8	15.19	AC	100	Pipe Burst	1	0	0	1	98,342.01	206,764.07	RE	39.06557633	0	Local	0	10000	10000	10000	N/A	5000	11.595
1205	391.4194571	6	11	11.63	AC	100	Pipe Burst	0	1	0	7	105,676.63	222,185.12	PF	18.97620797	13.4494	Local	24.8620622	10000	10000	10000	N/A	5000	11.315
1206	393.9180407	6	11	13.7	AC	100	Pipe Burst	0	1	0	7	106,207.58	223,301.44	PF	46.53312523	5.624057	Local	0	10000	10000	10000	N/A	5000	12.35
1232	47.57285772	6	8	9.22	AC	100	Pipe Burst	1	0	0	3	22,609.23	47,535.91	RL	27.19216924	2.241028	Local	0	172.0784088	172.0784088	10000	N/A	4000	8.61
1254	227.4152925	6	8	16.13	AC	100	Pipe Burst	1	0	0	12	74,325.75	156,269.89	RL	47.71565823	0	Local	0	10000	10000	10000	N/A	5000	12.065
558	33.91836088	8	12	15.67	AC	20	Pipe Burst	0	1	0	0	20,649.18	43,414.91	RM	30.95883517	32.37477	Local	10.21561274	91.32762103	10.77242705	10000	N/A	10000	13.835
751	200.9408886	8	16	13	AC	30	Pipe Burst	0	1	0	9	76,739.93	161,345.70	AE	24.10312593	0	Local	27.43100067	10000	10000	164.7039639	Permanent River	10000	14.5
792	435.365426	6	23	11.38	AC	31	Pipe Burst	0	0	1	1	109,015.15	229,204.36	RE	6.36936819	0	Local	7.220521822	10000	10000	10000	N/A	6000	17.19
793	405.1837552	6	10	8	AC	31	Pipe Burst	0	1	0	7	108,601.55	228,334.75	RE	15.17371096	0	Local	7.793067944	10000	10000	10000	N/A	4000	9
801	251.6501806	6	18	14.7	AC	34	Pipe Burst	0	1	0	0	65,475.66	137,662.58	RE	17.11076714	4.31031	Local	4.03575175	10000	10000	10000	N/A	6000	16.35
825	243.6910559	6	8	10.83	AC	35	Pipe Burst	1	0	0	1	61,284.35	128,850.34	RE	9.558463216	9.213002	Local	6.229684653	10000	10000	10000	N/A	4000	9.415
826	428.6756589	6	11	13.42	AC	35	Pipe Burst	0	1	0	2	106,093.58	223,061.75	RE	21.11304119	9.213002	Local	6.229684653	10000	10000	10000	N/A	5000	12.21
204	215.1397514	6	20	23	AC	37	Pipe Burst	0	1	0	3	62,217.20	130,811.66	RL	24.73528847	0	Local	6.14493199	10000	10000	10000	N/A	8000	21.5
769	267.1914977	6	8	18.84	AC	37	Pipe Burst	1	0	0	3	69,278.19	145,657.40	RL	23.59689067	2.106933	Local	4.421353851	10000	10000	10000	N/A	5000	13.42
1110	414.7634909	6	8	14.51	AC	37	Pipe Burst	1	0	0	6	105,137.24	221,051.05	RM	40.25985655	0.188845	Local	16.31581554	221.6056233	122.7888699	10000	N/A	5000	11.255
1111	405.373271	6	14	15.66	AC	37	Pipe Burst	0	1	0	2	101,141.82	212,650.68	RM	40.31299928	0	Local	15.76279546	230.738652	122.8761231	10000	N/A	5000	14.83

UniqueID	Length (ft)	Dia (in)	USMH depth (ft)	DSMH depth (ft)	Material	Ph 2 CIP Year	Replacement Method	Manholes (<10ft)	Manholes (10-20ft)	Manholes (>20ft)	Laterals	Matrl & Install Cost ($)	Const Cost ($)	Land Use Type	ProxTo Building (ft)	ProxTo Road (ft)	RoadType	ProxTo WaterMains (ft)	ProxTo StormWaterFeature (ft)	ProxTo StormWaterDitch (ft)	ProxToESA (ft)	Type of ESA	Repair Cost ($)	Depth (ft)
1022	512.8896293	6	8	10.29	AC	39	Pipe Burst	1	0	0	6	125,989.05	264,891.97	RL	20.27437236	0	Local	5.917930888	124.3676687	118.8875121	10000	N/A	4000	9.145
540	314.069301	6	12	12.01	AC	45	Pipe Burst	0	1	0	5	86,239.73	181,319.02	RL	19.4172697	0	Local	5.409874451	206.0852747	161.4267846	10000	N/A	5000	12.005
549	373.0302409	6	12	13.78	AC	45	Pipe Burst	0	1	0	0	91,268.93	191,892.92	RL	15.35189063	0	Local	7.064296002	89.92717825	89.56375544	10000	N/A	5000	12.89
206	163.9565886	6	16	13.85	AC	47	Pipe Burst	0	1	0	2	49,840.78	104,790.23	RL	10.8490438	10000	N/A	89.38389674	219.252444	190.5359042	10000	N/A	5000	14.925
542	371.783378	6	14	11.24	AC	47	Pipe Burst	0	1	0	0	91,003.97	191,335.84	RL	16.23791662	16.62189	Local	17.69077206	158.2633816	132.0573433	10000	N/A	5000	12.62
543	369.767287	6	11	11.15	AC	47	Pipe Burst	0	1	0	5	98,075.55	206,203.84	RL	15.7547851	0	Local	12.35346373	146.702404	141.7817901	10000	N/A	5000	11.075
100	191.9882558	6	10	8	AC	100	Pipe Burst	0	1	0	8	64,797.50	136,236.75	RL	23.97002362	0	Local	14.59600053	8.385632558	8.388330077	10000	N/A	4000	9
201	109.7381635	6	8	10.18	AC	100	Pipe Burst	1	0	0	2	34,319.36	72,156.45	RL	18.75695328	3.461181	Local	8.588879521	44.79378669	44.57614108	10000	N/A	4000	9.09
321	182.7842671	6	8	12.57	AC	100	Pipe Burst	1	0	0	4	52,841.66	111,099.58	RL	16.55160429	0	Local	7.039780714	10000	10000	10000	N/A	5000	10.285
460	250.3571243	6	8	8	AC	100	Pipe Burst	1	0	0	5	68,700.89	144,443.62	RL	9.52314309	10000	N/A	78.39006702	60.09383564	0.317228394	10000	N/A	4000	8
484	572.6533494	6	11	11.45	AC	100	Pipe Burst	0	1	0	5	141,188.84	296,849.53	RL	17.31534567	0	Local	8.236637312	46.6829628	46.6829628	10000	N/A	5000	11.225
489	330.0363016	6	8	11.07	AC	100	Pipe Burst	1	0	0	6	87,132.71	183,196.53	RL	20.78679593	0	Local	9.403715891	237.1650393	210.6343089	10000	N/A	4000	9.535
491	542.785114	6	7	13.85	AC	100	Pipe Burst	1	0	0	5	130,841.84	275,094.96	RL	24.65037708	1.546494	Local	4.885290983	219.252444	190.5359042	10000	N/A	5000	10.425
537	178.560559	6	8	11.17	AC	100	Pipe Burst	1	0	0	2	48,944.12	102,905.01	RL	16.42023743	0	Local	4.244927751	10000	10000	10000	N/A	4000	9.585
574	309.2375989	6	8	13.06	AC	100	Pipe Burst	1	0	0	2	76,712.99	161,289.06	RL	16.94634136	0	Local	11.6835217	10000	4.833361708	10000	N/A	5000	10.53
579	223.6377586	6	8	5.69	AC	100	Pipe Burst	1	0	0	4	61,523.02	129,352.16	RL	16.25933681	8.483086	Local	16.51283498	10000	10000	10000	N/A	4000	6.845
580	542.720533	6	16	7.62	AC	100	Pipe Burst	0	1	0	1	128,828.11	270,861.11	RL	5.210883102	8.483086	Local	11.88974356	10000	10000	10000	N/A	5000	11.81
590	281.3775005	6	3	17.55	AC	100	Pipe Burst	1	0	0	6	76,792.72	161,456.69	RL	24.59576778	0	Local	6.050225136	15.49735029	15.49802945	10000	N/A	5000	10.275
591	129.0848606	6	7	8.16	AC	100	Pipe Burst	1	0	0	3	39,930.53	83,953.95	RL	24.59576778	0	Local	6.050225136	35.44890367	35.43905764	10000	N/A	4000	7.58
621	280.2779161	6	8	22.61	AC	100	Pipe Burst	1	0	0	2	70,559.06	148,350.42	RL	14.02321038	1.451405	Local	5.93464067	210.7591109	210.7591109	10000	N/A	6000	15.305
770	160.0692129	6	8	8	AC	100	Pipe Burst	1	0	0	9	55,514.71	116,719.67	RL	12.40441912	0	Local	9.716997668	10000	10000	10000	N/A	4000	8
775	425.6075282	6	8	15.54	AC	100	Pipe Burst	1	0	0	5	105,941.60	222,742.21	RE	21.76712779	0.105337	Local	5.408353262	207.0612148	207.0623109	10000	N/A	5000	11.77
789	214.9809322	6	8	18.14	AC	100	Pipe Burst	1	0	0	2	56,683.45	119,176.95	RE	15.4421372	0	Local	5.397459995	10000	10000	10000	N/A	5000	13.07
797	210.0870314	6	8	13.7	AC	100	Pipe Burst	1	0	0	6	61,643.49	129,605.45	RE	17.18916063	0	Local	3.597637539	10000	10000	10000	N/A	5000	10.85
828	351.0794736	6	9	13.42	AC	100	Pipe Burst	1	0	0	1	84,104.39	176,829.48	RE	9.356222161	2.656236	Local	9.447326587	183.7574159	183.769885	10000	N/A	5000	11.21
880	167.2164429	6	5	7.72	VCP	100	Trench - In road	1	0	0	4	55,804.11	117,328.14	RL	9.340569079	14.89439	Local	24.71875642	141.7603605	121.5660298	10000	N/A	4000	6.36
1012	261.4548624	6	8	12.82	AC	100	Pipe Burst	1	0	0	3	68,059.16	143,094.38	RE	22.6279386	0	Local	4.179284489	10000	10000	10000	N/A	5000	10.41
1015	183.9913302	6	8	8.29	AC	100	Pipe Burst	1	0	0	5	54,598.16	114,792.63	RE	24.9247118	0	Local	9.032329914	10000	10000	10000	N/A	4000	8.145
1106	113.2577111	6	11	13.89	AC	100	Pipe Burst	0	1	0	7	46,567.26	97,907.67	RM	33.18029502	0	Local	9.913306102	243.2643092	242.8407721	10000	N/A	5000	12.445
1107	601.1966332	6	8	10.59	AC	100	Pipe Burst	1	0	0	7	146,254.28	307,499.63	RL	21.02632384	0	Local	6.093080658	242.2072411	242.2072411	10000	N/A	4000	9.295
1135	299.9987632	6	14	17.02	AC	100	Pipe Burst	0	1	0	5	83,249.74	175,032.57	RL	24.17859224	6.852273	Local	4.391559721	24.65716273	17.83588933	10000	N/A	6000	15.51
1094	74.05804551	6	10	10.61	AC	37	Pipe Burst	0	1	0	12	45,737.33	96,162.75	RM	55.64413014	2.555826	Local	6.821393975	25.94410805	25.94452595	10000	N/A	5000	10.305
306	304.642486	6	9	14.94	AC	41	Pipe Burst	1	0	0	3	77,236.53	162,389.80	PF	242.029168	26.20392	Local	14.35032748	10000	10000	10000	N/A	5000	11.97
1307	290.1458131	6	10	10.92	AC	41	Pipe Burst	0	1	0	0	73,655.99	154,861.71	PF	10000	61.39104	Local	10.00006543	131.621065	131.621065	10000	N/A	5000	10.46
1308	339.8706259	6	11	10.34	AC	41	Pipe Burst	1	0	0	2	87,222.51	183,385.32	PF	10000	19.10159	Local	8.082482235	10000	10000	10000	N/A	5000	10.67
124	504.2392792	6	12	11.71	AC	42	Pipe Burst	1	0	0	1	120,650.85	253,668.41	PF	10000	0	Local	19.07848445	10000	10000	10000	N/A	5000	11.855
1301	436.1593365	6	11	9.27	AC	42	Pipe Burst	1	0	0	6	113,683.86	239,020.31	PF	10000	11.2129	Local	22.89890013	10000	10000	10000	N/A	5000	10.135
1302	426.4919896	6	10	12.19	AC	42	Pipe Burst	0	1	0	0	102,629.55	215,778.62	PF	10000	0	Local	25.7875944	10000	10000	10000	N/A	5000	11.095
899	165.4855433	6	8	8	AC	100	Pipe Burst	1	0	0	6	52,165.68	109,678.34	RM	25.90633582	2.940283	Local	4.519863679	10000	10000	10000	N/A	4000	8
304	316.9405367	6	6	6	AC	41	Pipe Burst	1	0	0	8	87,349.86	183,653.09	PF	10000	34.20886	Local	28.95344416	10000	10000	10000	N/A	4000	6
305	320.7719972	6	6	8.89	AC	41	Pipe Burst	1	0	0	4	82,164.05	172,749.91	PF	10000	29.29753	Local	16.19908556	10000	10000	10000	N/A	4000	7.445
1309	199.9715338	6	14	4.5	AC	41	Pipe Burst	1	0	0	13	73,993.95	155,572.28	PF	10000	21.31255	Local	12.49816808	10000	10000	10000	N/A	4000	9.25
1299	207.6750413	6	9	8.5	AC	42	Pipe Burst	1	0	0	7	62,630.95	131,681.56	PF	10000	18.48359	Local	35.12427441	10000	10000	10000	N/A	4000	8.75
1300	498.0066696	6	9	8.96	AC	42	Pipe Burst	1	0	0	1	115,326.42	242,473.79	PF	10000	15.96982	Local	34.95779442	10000	10000	10000	N/A	4000	8.98
1303	210.7748148	6	10	9.35	AC	42	Pipe Burst	0	1	0	8	68,789.65	144,630.24	MB	10000	14.0776	Local	10000	10000	10000	10000	N/A	4000	9.675
1304	250.4273951	6	9	9.21	AC	42	Pipe Burst	1	0	0	1	62,715.82	131,860.01	MB	170.97814	28.02015	Local	84.48796768	116.6575962	116.6589995	10000	N/A	4000	9.105
511	315.9051901	8	11	12.86	AC	20	Pipe Burst	0	1	0	0	92,555.82	194,598.62	RL	43.51079574	2.888063	Local	11.33382668	10000	10000	10000	N/A	10000	11.93
512	320.3301006	8	13	11.17	AC	20	Pipe Burst	0	1	0	7	104,184.18	219,047.23	RL	38.67281187	2.888063	Local	12.67081023	10000	10000	10000	N/A	10000	12.085
544	110.0471432	8	13	13.23	AC	20	Pipe Burst	0	1	0	1	41,562.02	87,384.15	RL	42.84783205	5.377534	Local	6.109978976	10000	10000	10000	N/A	10000	13.115
547	185.3887555	8	12	13.97	AC	20	Pipe Burst	0	1	0	0	59,274.13	124,623.86	RL	46.35611567	0	Local	12.35346373	35.12694573	5.140381589	10000	N/A	10000	12.985
557	235.5818001	8	16	17.46	AC	20	Pipe Burst	0	1	0	0	72,073.36	151,534.24	RL	26.84904438	61.42014	Local	36.69763937	91.32762103	5.764712307	146.4771661	Permanent River	12000	16.73
791	486.460724	6	11	11.38	AC	31	Pipe Burst	0	1	0	6	124,372.90	261,494.03	RE	26.07275199	0	Local	6.346340203	10000	10000	10000	N/A	5000	11.19
816	537.8982856	6	15	11.69	AC	32	Pipe Burst	0	1	0	2	129,303.39	271,860.37	RE	27.81714153	0	Local	6.686038071	10000	10000	10000	N/A	5000	13.345
819	247.3880155	6	8	18.66	AC	32	Pipe Burst	1	0	0	6	69,569.95	146,270.83	RE	27.53401624	6.176436	Local	4.745443768	10000	10000	10000	N/A	5000	13.33
781	95.1504185	6	16	17.44	AC	33	Pipe Burst	0	1	0	0	32,219.46	67,741.42	RE	42.48626058	0	Local	7.830645044	10000	10000	10000	N/A	6000	16.72
782	341.0244032	6	14	15.48	AC	33	Pipe Burst	0	1	0	6	93,467.69	196,515.81	RE	37.02796847	0	Local	8.385151571	38.23569411	37.05575513	10000	N/A	5000	14.74
787	492.2762904	6	17	14.87	AC	33	Pipe Burst	0	1	0	12	119,608.71	251,477.32	RE	46.12042786	7.064004	Local	9.413768274	10000	10000	10000	N/A	6000	15.935
798	401.0809785	6	8	22.92	AC	34	Pipe Burst	1	0	0	5	100,729.71	211,784.21	RE	44.11480167	0	Local	6.240775354	10000	10000	10000	N/A	6000	15.46
799	307.4285847	6	23	21.07	AC	34	Pipe Burst	0	0	1	0	80,328.57	168,890.83	RE	32.246946	0.667946	Local	6.232350235	10000	10000	10000	N/A	8000	22.035
804	358.8058476	6	13	11.34	AC	34	Pipe Burst	0	1	0	3	92,746.24	194,998.98	RE	36.17100901	5.410955	Local	6.32240128	10000	10000	10000	N/A	5000	12.17
803	286.0180827	6	18	27.97	AC	34	Pipe Burst	0	1	0	5	75,778.84	159,325.02	RE	46.6760415	0.631354	Local	15.6088582	10000	10000	10000	N/A	8000	22.985
842	158.6721039	6	8	17.92	AC	35	Pipe Burst	1	0	0	6	50,717.82	106,634.22	RL	41.16241582	2.582541	Local	12.61020551	10000	10000	10000	N/A	5000	12.96
843	253.7106034	6	8	17.92	AC	35	Pipe Burst	1	0	0	10	76,913.50	161,710.64	RL	41.15331314	2.341948	Local	14.44674453	151.4402372	151.387463	10000	N/A	5000	12.96
844	249.1473215	6	18	16.47	AC	35	Pipe Burst	0	1	0	8	76,943.81	161,774.35	RL	38.44653879	0	Local	9.792422668	150.4239168	150.4347792	10000	N/A	6000	17.235
845	54.12301286	6	18	16.47	AC	35	Pipe Burst	0	1	0	2	26,501.14	55,718.65	RL	38.64140523	0	Local	7.317017844	143.2636194	143.2743458	10000	N/A	6000	17.235
847	169.7574441	6	8	17.92	AC	35	Pipe Burst	1	0	0	13	63,573.46	133,663.19	RL	42.55808253	0	Local	8.56753002	10000	10000	10000	N/A	5000	12.96
848	71.44286921	6	8	16.47	AC	35	Pipe Burst	1	0	0	12	41,181.61	86,584.33	RL	38.62359668	10.11305	Local	7.007976574	143.2636194	143.2743458	10000	N/A	5000	12.235
302	127.1440561	6	19	19.37	AC	36	Pipe Burst	0	1	0	1	39,018.11	82,035.58	RL	35.13771212	9.205764	Local	5.537998142	23.57143808	23.30419862	10000	N/A	6000	19.185
690	247.5176072	6	20	19.85	AC	36	Pipe Burst	0	1	0	6	64,597.49	135,816.23	RL	26.16656099	0	Local	3.375547479	25.24490529	25.24490529	10000	N/A	6000	19.925
720	406.1102467	6	16	15.25	AC	36	Pipe Burst	0	1	0	2	101,298.43	212,979.94	RL	39.26569703	2.702798	Local	8.803994503	10000	10000	10000	N/A	6000	15.625
765	281.8506648	6	24	22.09	AC	36	Pipe Burst	0	0	1	10	89,893.27	189,000.59	RL	28.75256612	1.95438	Local	5.727147432	10000	10000	10000	N/A	8000	23.045
762	236.2474547	6	22	16.69	AC	37	Pipe Burst	0	1	0	3	69,702.58	146,549.68	RL	44.75661622	0	Local	7.616032035	10000	10000	10000	N/A	6000	19.345
763	31.30487575	6	23	21.73	AC	37	Pipe Burst	0	0	1	3	26,152.29	54,985.18	RL	45.00913717	0.837016	Local	7.616032035	10000	10000	10000	N/A	8000	22.365
764	300.0293331	6	8	20.48	AC	37	Pipe Burst	1	0	0	0	71,756.23	150,867.48	RL	36.5825902	0.898907	Local	3.393423608	10000	10000	10000	N/A	5000	14.24
768	541.6554788	6	20	18.84	AC	37	Pipe Burst	0	1	0	4	133,101.79	279,846.51	RL	38.13556746	0	Local	4.846727612	10000	10000	10000	N/A	6000	19.42
1047	411.0081462	6	16	12.83	AC	38	Pipe Burst	0	1	0	3	99,339.23	208,860.73	RL	29.61852039	0	Local	4.414493096	10000	10000	10000	N/A	5000	14.415
1095	217.9310156	6	10	10.82	AC	38	Pipe Burst	0	1	0	4	64,310.34	135,212.49	RL	31.55954895	0	Local	6.354884894	206.2014601	198.863279	10000	N/A	5000	10.41
1136	496.0015777	6	17	13.44	AC	38	Pipe Burst	0	1	0	1	118,900.34	249,987.95	RL	43.3870025	5.595544	Local	2.12671571	10000	10000	10000	N/A	6000	15.22
963	334.0037659	6	18	16.27	AC	39	Pipe Burst	0	1	0	4	93,475.80	196,532.87	RL	31.46674156	4.444887	Local	7.477851873	54.08092306	54.08092306	10000	N/A	6000	17.135
1028	110.9534473	6	18	8	AC	39	Pipe Burst	0	1	0	9	49,077.61	103,185.67	RL	39.16195636	0.879459	Local	9.419525871	180.7674537	18.07792105	10000	N/A	5000	13
1040	328.4232431	6	14	14.07	AC	39	Pipe Burst	0	1	0	0	81,789.94	171,963.35	RL	37.27710167	5.866077	Local	7.67822855	123.385646	123.3871888	10000	N/A	5000	14.035
1330	99.97269795	6	10	10.29	AC	39	Pipe Burst	0	1	0	10	48,244.20	101,433.43	RL	29.05021158	11.57686	Local	5.917930888	42.19054194	18.92189377	10000	N/A	5000	10.145
1374	47.84565324	6	13	17.37	AC	39	Pipe Burst	0	1	0	0	22,167.20	46,606.54	RL	46.63941423	2.605051	Local	9.844752036	20.21198888	20.21198888	10000	N/A	6000	15.185
991	333.2671325	6	12	9.35	AC	40	Pipe Burst	0	1	0	2	85,819.27	180,435.01	RE	25.26707191	0	Local	108.2806721	10000	10000	10000	N/A	5000	10.675
995	455.4434668	6	17	21.01	AC	40	Pipe Burst	0	1	0	3	113,281.74	238,174.85	RE	42.44450242	2.333211	Local	7.236655191	10000	10000	10000	N/A	6000	19.005
996	438.7388137	6	17	17.57	AC	40	Pipe Burst	0	1	0	7	115,732.00	243,326.53	RE	38.60315543	3.411635	Local	9.672484872	10000	10000	10000	N/A	6000	17.285
1224	499.9489082	6	11	11.07	AC	40	Pipe Burst	0	1	0	6	127,239.14	267,520.30	RL	27.92471764	0.954307	Local	3.721650169	10000	10000	10000	N/A	5000	11.035
1225	504.233957	6	11	12.79	AC	40	Pipe Burst	0	1	0	8	131,149.72	275,742.28	RL	29.00989744	0	Local	3.006047706	10000	10000	10000	N/A	5000	11.895
340	510.6601141	6	11	12	AC	41	Pipe Burst	0	1	0	1	120,515.27	253,383.36	RL	31.33006575	3.462419	Local	8.031491359	10000	10000	10000	N/A	5000	11.5
344	317.6565847	6	13	10.67	AC	41	Pipe Burst	0	1	0	1	81,002.02	170,306.76	RL	41.41202974	0	Local	13.05878646	238.9477749	238.5364548	10000	N/A	5000	11.835
1210	502.5026266	6	11	12.99	AC	41	Pipe Burst	0	1	0	3	123,281.81	259,200.00	RL	38.53579477	6.018763	Local	11.84378594	10000	10000	10000	N/A	5000	11.995
164	299.6452778	6	9	11.42	AC	44	Pipe Burst	1	0	0	5	79,174.62	166,464.64	RE	37.30406262	0	Local	5.987535698	10000	10000	10000	N/A	5000	10.21
1316	246.6255846	6	17	26.44	AC	44	Pipe Burst	0	1	0	1	65,907.94	138,571.44	RL	76.53836872	17.00889	Major	30.63528895	10000	10000	10000	N/A	8000	21.72
1341	283.9622658	6	27	25.94	AC	44	Pipe Burst	0	0	2	5	82,841.98	174,175.27	RL	101.1707496	14.73133	Major	29.68566672	10000	10000	10000	N/A	8000	26.47
891	26.53065617	6	8	14.08	AC	46	Pipe Burst	1	0	0	4	24,137.76	50,749.65	RL	26.1935693	1.115129	Local	8.633404013	10000	10000	10000	N/A	5000	11.04
541	12.30366389	6	8	13.69	AC	47	Pipe Burst	1	0	0	5	18,114.53	38,085.80	RL	28.70585568	28.75863	Local	8.838610455	146.3910804	121.8913188	10000	N/A	5000	10.845
465	171.7398876	6	8	13.4	AC	48	Pipe Burst	1	0	0	1	48,994.73	103,011.41	RL	41.03151802	1.425493	Local	11.11666723	10000	10000	10000	N/A	5000	10.7
466	304.5393036	6	13	12.76	AC	48	Pipe Burst	0	1	0	0	84,214.60	177,061.20	RL	40.36215154	0	Local	5.209239397	195.568256	195.4898308	10000	N/A	5000	12.88
470	281.390186	6	12	17.55	AC	48	Pipe Burst	0	1	0	2	74,795.41	157,257.36	RL	43.6907834	3.324364	Local	4.853996632	35.36031791	24.34820988	10000	N/A	5000	14.775
475	191.8781031	6	11	10.53	AC	48	Pipe Burst	0	1	0	1	54,274.10	114,111.29	RL	42.5999267	0	Local	4.646736668	26.27404862	26.23095322	10000	N/A	5000	10.765
12	288.1996451	6	20	7.2	AC	100	Pipe Burst	0	1	0	5	80,742.42	169,760.95	RL	36.41166701	2.945113	Local	8.675841983	10000	10000	10000	N/A	5000	13.6
35	49.3223952	6	10	11.46	AC	100	Pipe Burst	0	1	0	0	22,481.01	47,266.32	RL	35.44400871	3.139452	Local	7.688870523	147.1242363	147.124126	10000	N/A	5000	10.73
318	465.9414562	6	8	21.01	AC	100	Pipe Burst	1	0	0	2	110,012.56	231,301.41	RE	42.55650667	0	Local	8.725352555	10000	10000	10000	N/A	5000	14.505
422	386.3019162	6	12	13.58	AC	100	Pipe Burst	0	1	0	1	95,589.16	200,976.20	RL	37.89091289	2.59509	Local	5.125408676	10000	10000	10000	N/A	5000	12.79
435	347.4096471	6	13	17.72	AC	100	Pipe Burst	0	1	0	1	87,324.55	183,599.87	RL	32.8187115	10000	N/A	10.57644783	10000	10000	10000	N/A	6000	15.36
449	372.1984303	6	10	14	AC	100	Pipe Burst	0	1	0	2	94,092.17	197,828.78	RL	38.53367311	0.812901	Local	8.489031647	10000	232.4180947	219.7652892	Permanent River	5000	12
482	397.8451753	6	10	10.46	AC	100	Pipe Burst	0	1	0	3	101,042.10	212,441.01	RL	27.97634723	0	Local	8.95114923	19.07372234	11.94308702	10000	N/A	5000	10.23
500	260.5729542	6	8	22.85	AC	100	Pipe Burst	1	0	0	1	69,371.75	145,854.11	RL	48.730199	1.321334	Local	12.60021435	10000	10000	10000	N/A	6000	15.425
595	168.2760737	6	13	10.24	AC	100	Pipe Burst	0	1	0	6	56,758.67	119,335.09	RL	28.70160301	5.312903	Local	6.12491628	26.54131274	23.14201409	173.1592258	Permanent River	5000	11.62
669	128.8069191	6	8	15.9	AC	100	Pipe Burst	1	0	0	3	39,871.47	83,829.77	RL	37.21592001	6.081267	Local	12.17461041	198.2792998	197.9218451	10000	N/A	5000	11.95
779	317.483466	6	13	19.11	AC	100	Pipe Burst	0	1	0	10	94,465.24	198,613.16	RL	33.67352995	3.444209	Local	7.419109965	10000	10000	10000	N/A	6000	16.055
837	116.4130097	6	8	15.64	AC	100	Pipe Burst	1	0	0	0	32,737.76	68,831.15	RL	40.04929229	0	Local	10.95549196	125.8816485	125.8816485	10000	N/A	5000	11.82
838	183.2030591	6	8	15.64	AC	100	Pipe Burst	1	0	0	1	46,930.65	98,671.69	RL	37.54758249	0	Local	7.944437871	20.39171491	20.31506097	10000	N/A	5000	11.82
873	98.81388444	6	11	12.15	VCP	100	Trench - In road	0	1	0	0	36,703.47	77,169.05	RL	41.59560182	8.142308	Local	14.5207651	102.0588382	98.42105008	10000	N/A	5000	11.575
877	405.0034062	6	12	11.28	VCP	100	Trench - In road	0	1	0	3	117,750.85	247,571.17	RL	41.06193237	7.313384	Local	15.23256905	243.1505382	243.1468533	10000	N/A	5000	11.64
878	107.5257091	6	8	12.54	VCP	100	Trench - In road	1	0	0	3	39,381.43	82,799.45	RL	39.50959395	0.770019	Local	12.13378186	10000	10000	10000	N/A	5000	10.27
914	307.0120485	6	13	14.31	AC	100	Pipe Burst	0	1	0	7	87,740.06	184,473.48	RL	30.26553073	6.799725	Local	11.16843234	10000	10000	10000	N/A	5000	13.655
921	366.4736174	6	13	11.1	VCP	100	Trench - In road	0	1	0	0	103,618.40	217,857.70	RL	41.95154126	3.03934	Local	9.223126687	10000	10000	10000	N/A	5000	12.05
922	362.4363846	6	11	11.45	VCP	100	Trench - In road	0	1	0	6	111,609.10	234,658.12	RL	39.78738171	0	Local	9.221982769	10000	10000	10000	N/A	5000	11.225
985	320.1805633	6	10	12.12	AC	100	Pipe Burst	0	1	0	1	89,035.37	187,203.17	RL	28.95913025	0	Local	10.88251233	10000	10000	10000	N/A	5000	11.06
987	149.7010736	6	16	15.21	AC	100	Pipe Burst	0	1	0	0	43,811.48	92,113.63	RL	37.77639783	0	Local	6.164770396	10000	10000	10000	N/A	6000	15.605
1117	399.3583454	6	15	18.39	AC	100	Pipe Burst	0	1	0	1	104,363.65	219,424.57	RL	37.65690796	0.895277	Local	8.562018642	158.2834848	158.2834848	10000	N/A	6000	16.695
1122	357.6789992	6	11	21.88	AC	100	Pipe Burst	0	1	0	5	95,506.79	200,803.02	RL	35.75058644	1.70045	Local	8.173021293	10000	10000	10000	N/A	6000	16.44
1249	271.1341589	6	8	15.88	AC	100	Pipe Burst	1	0	0	13	85,116.01	178,956.41	RL	31.05462283	10.09892	Local	7.249521011	10000	10000	213.4771263	Permanent River	5000	11.94
1390	52.72398348	6	7	13.85	AC	100	Pipe Burst	1	0	0	0	19,203.85	40,376.09	RL	41.38237699	3.072865	Local	2.555780554	10000	10000	10000	N/A	5000	10.425
1391	106.9164108	6	8	18.84	AC	100	Pipe Burst	1	0	0	1	32,219.74	67,742.00	RL	43.58628985	5.174453	Local	3.075810251	10000	10000	10000	N/A	5000	13.42
794	245.9854962	6	9	8.8	AC	31	Pipe Burst	1	0	0	7	70,771.92	148,797.96	RE	29.81743364	6.496864	Local	4.958364417	10000	10000	10000	N/A	4000	8.9
795	128.7050899	6	9	8.18	AC	31	Pipe Burst	1	0	0	5	42,849.83	90,091.77	RE	35.24342905	27.43812	Local	4.344150712	10000	10000	10000	N/A	4000	8.59
796	311.0976234	6	8	8.05	AC	31	Pipe Burst	1	0	0	1	75,608.24	158,966.34	RE	33.9728289	3.530317	Local	4.689089087	10000	10000	10000	N/A	4000	8.025
809	565.124561	6	11	19.29	AC	31	Pipe Burst	0	1	0	2	135,088.97	284,024.56	AE	26.9046167	0	Local	9.060410853	24.30439591	24.19440418	10000	N/A	6000	15.145
814	497.670052	6	11	10.36	AC	32	Pipe Burst	0	1	0	0	117,754.89	247,579.65	RE	52.0080944	3.439699	Local	8.281225085	156.0711105	156.1125268	10000	N/A	5000	10.68
817	68.78914841	6	15	14.91	AC	32	Pipe Burst	0	1	0	0	28,117.69	59,117.45	RE	50.79224932	0	Local	6.686038071	10000	10000	10000	N/A	5000	14.955
854	311.9020671	6	6	8.55	AC	32	Pipe Burst	1	0	0	5	81,779.19	171,940.75	RE	32.7410743	0.41163	Local	6.657717876	185.4699414	183.0753899	10000	N/A	4000	7.275
857	254.0590857	6	13	9.18	AC	34	Pipe Burst	0	1	0	4	71,987.56	151,353.84	AE	36.6843011	5.946059	Local	15.01469156	205.6187127	203.3433818	10000	N/A	5000	11.09
802	213.9459535	6	13	14.7	AC	34	Pipe Burst	0	1	0	2	60,463.52	127,124.54	RE	65.00569229	9.79052	Local	0.673375488	10000	10000	10000	N/A	5000	13.85
1052	8.956808403	6	19	16.1	AC	38	Pipe Burst	0	1	0	1	13,903.32	29,231.73	RL	58.84540513	0	Local	10.13206366	25.08900975	23.6591471	10000	N/A	6000	17.55
1334	297.0676708	6	8	4.67	AC	40	Pipe Burst	1	0	0	4	74,126.88	155,851.77	RE	33.82284648	6.124345	Local	8.143002304	10000	10000	10000	N/A	4000	6.335
1335	51.64282442	6	5	1.95	AC	40	Pipe Burst	1	0	0	2	18,974.10	39,893.05	RE	41.47679831	11.89548	Local	8.116007904	10000	10000	10000	N/A	3000	3.475
167	494.9550463	6	11	9.83	AC	41	Pipe Burst	0	1	0	1	117,177.95	246,366.63	RL	56.41037962	0	Local	7.61285941	11.0610152	9.628948312	10000	N/A	5000	10.415
169	291.7406231	6	8	8	AC	43	Pipe Burst	1	0	0	1	71,494.88	150,317.99	RL	38.69226923	14.38512	Local	10.99126825	10000	10000	10000	N/A	4000	8

UniqueID	Proximity to and Types of Roads CO1	Proximity to and Types of Roads CO2	Proximity to Environmentally Sensitive Areas CO1	Proximity to Environmentally Sensitive Areas CO2	Proximity to Environmentally Sensitive Areas CO3	Proximity to Environmentally Sensitive Areas CO4	Proximity to Buildings CO1	Proximity to Buildings CO2	Land Use CO3	Repair Costs CO2	Proximity to Other Utilities CO1	Proximity to Other Utilities CO2	Proximity to Other Utilities CO4	CO1 Health and Safety	CO2 Cost of Failure	CO3 SSOs	CO4 Environmental Impact	Dominant COF	Condition LOF	Core Risk	Mitigation Factor	Risk Zone	Priority	TBL COF	BRE	COF Driver
1022	1	1	1	1	1	1	3	2	2	1	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
540	1	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
549	1	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
206	1	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
542	1	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
543	1	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
100	1	1	1	1	1	1	3	2	2	1	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
201	1	1	1	1	1	1	3	2	2	1	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
321	1	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
460	1	1	1	1	1	1	3	2	2	1	2	1	2	3	2	2	2	3	4	12	1	3	2	7	28	Proximity to Buildings
484	1	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
489	1	1	1	1	1	1	3	2	2	1	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
491	1	1	1	1	1	1	3	2	2	2	1	1	2	3	2	2	2	3	4	12	1	3	2	7	28	Proximity to Buildings
537	1	1	1	1	1	1	3	2	2	1	1	1	2	3	2	2	2	3	4	12	1	3	2	7	28	Proximity to Buildings
574	1	1	1	1	1	1	3	2	2	2	2	1	2	3	2	2	2	3	4	12	1	3	2	7	28	Proximity to Buildings
579	1	1	1	1	1	1	3	2	2	1	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
580	1	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
590	1	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
591	1	1	1	1	1	1	3	2	2	1	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
621	1	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
770	1	1	1	1	1	1	3	2	2	1	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
775	1	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
789	1	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
797	1	1	1	1	1	1	3	2	2	2	1	1	2	3	2	2	2	3	4	12	1	3	2	7	28	Proximity to Buildings
828	1	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
880	1	1	1	1	1	1	3	2	2	1	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
1012	1	1	1	1	1	1	3	2	2	2	1	1	2	3	2	2	2	3	4	12	1	3	2	7	28	Proximity to Buildings
1015	1	1	1	1	1	1	3	2	2	1	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
1106	1	1	1	1	1	1	2	1	3	2	1	1	1	2	2	3	1	3	4	12	1	3	2	7	28	Land Use
1107	1	1	1	1	1	1	3	2	2	1	1	1	1	3	2	2	1	3	4	12	1	3	2	7	28	Proximity to Buildings
1135	1	1	1	1	1	1	3	2	2	2	1	1	2	3	2	2	2	3	4	12	1	3	2	7	28	Proximity to Buildings
1094	1	1	1	1	1	1	1	1	3	2	1	1	1	1	2	3	1	3	4	12	1	3	2	6	24	Land Use
306	1	1	1	1	1	1	1	1	3	2	1	1	1	1	2	3	1	3	4	12	1	3	2	6	24	Land Use
1307	1	1	1	1	1	1	1	1	3	2	1	1	1	1	2	3	1	3	4	12	1	3	2	6	24	Land Use
1308	1	1	1	1	1	1	1	1	3	2	1	1	1	1	2	3	1	3	4	12	1	3	2	6	24	Land Use
124	1	1	1	1	1	1	1	1	3	2	1	1	1	1	2	3	1	3	4	12	1	3	2	6	24	Land Use
1301	1	1	1	1	1	1	1	1	3	2	1	1	1	1	2	3	1	3	4	12	1	3	2	6	24	Land Use
1302	1	1	1	1	1	1	1	1	3	2	1	1	1	1	2	3	1	3	4	12	1	3	2	6	24	Land Use
899	1	1	1	1	1	1	2	1	3	1	1	1	2	2	1	3	2	3	4	12	1	3	2	6	24	Land Use
304	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	4	12	1	3	2	5	20	Land Use
305	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	4	12	1	3	2	5	20	Land Use
1309	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	4	12	1	3	2	5	20	Land Use
1299	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	4	12	1	3	2	5	20	Land Use
1300	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	4	12	1	3	2	5	20	Land Use
1303	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	4	12	1	3	2	5	20	Land Use
1304	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	4	12	1	3	2	5	20	Land Use
511	2	1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to and Types of Roads, Proximity to Buildings, Land Use, Repair Costs
512	2	1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to and Types of Roads, Proximity to Buildings, Land Use, Repair Costs
544	2	1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to and Types of Roads, Proximity to Buildings, Land Use, Repair Costs
547	2	1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to and Types of Roads, Proximity to Buildings, Land Use, Repair Costs
557	1	1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
791	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
816	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
819	1	1	1	1	1	1	2	1	2	2	1	1	2	2	2	2	2	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities
781	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
782	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
787	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
798	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
799	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
804	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
803	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
842	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
843	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
844	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
845	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
847	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
848	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
302	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
690	1	1	1	1	1	1	2	1	2	2	1	1	2	2	2	2	2	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities
720	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
765	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
762	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
763	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
764	1	1	1	1	1	1	2	1	2	2	1	1	2	2	2	2	2	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities
768	1	1	1	1	1	1	2	1	2	2	1	1	2	2	2	2	2	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities
1047	1	1	1	1	1	1	2	1	2	2	1	1	2	2	2	2	2	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities
1095	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
1136	1	1	1	1	1	1	2	1	2	2	1	1	2	2	2	2	2	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities
963	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
1028	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
1040	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
1330	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
1374	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
991	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
995	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
996	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
1224	1	1	1	1	1	1	2	1	2	2	1	1	2	2	2	2	2	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities
1225	1	1	1	1	1	1	2	1	2	2	1	1	2	2	2	2	2	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities
340	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
344	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
1210	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
164	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
1316	2	1	1	1	1	1	1	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to and Types of Roads, Land Use, Repair Costs
1341	2	1	1	1	1	1	1	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to and Types of Roads, Land Use, Repair Costs
891	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
541	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
465	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
466	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
470	1	1	1	1	1	1	2	1	2	2	1	1	2	2	2	2	2	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities
475	1	1	1	1	1	1	2	1	2	2	1	1	2	2	2	2	2	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities
12	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
35	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
318	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
422	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
435	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
449	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
482	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
500	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
595	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
669	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
779	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
837	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
838	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
873	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
877	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
878	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
914	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
921	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
922	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
985	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
987	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
1117	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
1122	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
1249	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs
1390	1	1	1	1	1	1	2	1	2	2	1	1	2	2	2	2	2	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities
1391	1	1	1	1	1	1	2	1	2	2	1	1	2	2	2	2	2	2	4	8	1	2	3	6	24	Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities
794	1	1	1	1	1	1	2	1	2	1	1	1	2	2	1	2	2	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use, Proximity to Other Utilities
795	1	1	1	1	1	1	2	1	2	1	1	1	2	2	1	2	2	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use, Proximity to Other Utilities
796	1	1	1	1	1	1	2	1	2	1	1	1	2	2	1	2	2	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use, Proximity to Other Utilities
809	1	1	1	1	1	1	2	1	1	2	1	1	1	2	2	1	1	2	4	8	1	2	3	5	20	Proximity to Buildings, Repair Costs
814	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	4	8	1	2	3	5	20	Land Use, Repair Costs
817	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	4	8	1	2	3	5	20	Land Use, Repair Costs
854	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use
857	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	4	8	1	2	3	5	20	Land Use, Repair Costs
802	1	1	1	1	1	1	1	1	2	2	1	1	2	1	2	2	2	2	4	8	1	2	3	5	20	Land Use, Repair Costs, Proximity to Other Utilities
1052	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	4	8	1	2	3	5	20	Land Use, Repair Costs
1334	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use
1335	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use
167	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	4	8	1	2	3	5	20	Land Use, Repair Costs
169	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use

UniqueID	Length (ft)	Dia (in)	USMH depth (ft)	DSMH depth (ft)	Material	Ph 2 CIP Year	Replacement Method	Manholes (<10ft)	Manholes (10-20ft)	Manholes (>20ft)	Laterals	Matrl & Install Cost ($)	Const Cost ($)	Land Use Type	ProxTo Building (ft)	ProxTo Road (ft)	RoadType	ProxTo WaterMains (ft)	ProxTo StormWaterFeature (ft)	ProxTo StormWaterDitch (ft)	ProxToESA (ft)	Type of ESA	Repair Cost ($)	Depth (ft)	Proximity to and Types of Roads CO1	Proximity to and Types of Roads CO2	Proximity to Environmentally Sensitive Areas CO1	CO2	CO3	CO4	Proximity to Buildings CO1	CO2	Land Use CO3	Repair Costs CO2	Proximity to Other Utilities CO1	CO2	CO4	CO1 Health and Safety	CO2 Cost of Failure	CO3 SSOs	CO4 Environmental Impact	Dominant COF	Condition LOF	Core Risk	Mitigation Factor	Risk Zone	Priority	TBL COF	BRE	COF Driver
778	292.7086081	6	6	13	AC	100	Pipe Burst	1	0	0	3	74,700.58	157,057.97	RE	35.62756836	2.73163	Local	8.226467213	10000	10000	10000	N/A	4000	9.5	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use
784	114.2204402	6	8	13.37	AC	100	Pipe Burst	1	0	0	6	41,271.84	86,774.05	RE	62.53338513	1.697388	Local	3.503112607	15.05383089	13.32936573	10000	N/A	5000	10.685	1	1	1	1	1	1	1	1	2	2	1	1	2	1	2	2	2	2	4	8	1	2	3	5	20	Land Use, Repair Costs, Proximity to Other Utilities
785	18.48645799	6	14	13.49	AC	100	Pipe Burst	0	1	0	3	20,428.37	42,950.65	RE	74.67849949	0	Local	4.198941021	12.80906057	12.03937404	10000	N/A	5000	13.745	1	1	1	1	1	1	1	1	2	2	1	1	2	1	2	2	2	2	4	8	1	2	3	5	20	Land Use, Repair Costs, Proximity to Other Utilities
788	228.8757167	6	8	8.05	AC	100	Pipe Burst	1	0	0	5	64,136.09	134,846.13	RE	35.91006022	3.530317	Local	4.247462564	10000	10000	10000	N/A	4000	8.025	1	1	1	1	1	1	2	1	2	1	1	1	2	2	1	2	2	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use, Proximity to Other Utilities
820	44.82513156	6	15	12.77	AC	100	Pipe Burst	0	1	0	6	30,525.34	64,179.53	RE	86.14389092	6.687916	Local	8.604504353	10000	10000	10000	N/A	5000	13.885	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	4	8	1	2	3	5	20	Land Use, Repair Costs
821	44.2387441	6	15	12.77	AC	100	Pipe Burst	0	1	0	2	24,400.73	51,302.54	RE	105.4323046	57.51938	Local	81.37618275	10000	10000	10000	N/A	5000	13.885	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	4	8	1	2	3	5	20	Land Use, Repair Costs
822	58.53402263	6	15	12.77	AC	100	Pipe Burst	0	1	0	6	33,438.48	70,304.40	RE	88.24926709	10.25287	Local	24.25044657	10000	10000	10000	N/A	5000	13.885	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	4	8	1	2	3	5	20	Land Use, Repair Costs
823	297.544458	6	15	12.77	AC	100	Pipe Burst	0	1	0	3	79,728.20	167,628.53	RE	50.03191416	5.517918	Local	7.494925417	10000	10000	10000	N/A	5000	13.885	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	4	8	1	2	3	5	20	Land Use, Repair Costs
827	351.1190111	6	8	9.93	AC	100	Pipe Burst	1	0	0	0	82,612.79	173,693.39	RE	46.85088141	2.286833	Local	10.49324583	183.7376894	183.7493632	10000	N/A	4000	8.965	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use
874	112.9934556	6	8	11.15	VCP	100	Trench - In road	1	0	0	0	36,248.36	76,212.19	RL	41.35439313	10.45515	Local	13.26789098	194.2800776	194.2244476	10000	N/A	4000	9.575	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use
881	218.5809063	6	8	11.58	VCP	100	Trench - In road	1	0	0	3	67,145.23	141,172.84	RL	44.41986615	4.954365	Local	7.32863653	171.1682544	100.6510454	10000	N/A	4000	9.79	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use
884	223.3564001	6	8	9.95	VCP	100	Trench - In road	1	0	0	0	63,839.10	134,221.71	RL	41.9198204	0	Local	9.422353844	10000	10000	10000	N/A	4000	8.975	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use
885	293.4961636	6	10	8.5	VCP	100	Trench - In road	0	1	0	8	97,374.04	204,728.92	RL	44.48040003	0	Local	9.422353844	24.90357988	21.24520356	10000	N/A	4000	9.25	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use
1013	216.0651445	6	8	11.43	AC	100	Pipe Burst	1	0	0	2	56,913.84	119,661.36	RE	38.78490629	0	Local	9.324303091	10000	10000	10000	N/A	4000	9.715	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use
1014	138.8061972	6	8	6.01	AC	100	Pipe Burst	1	0	0	6	46,496.32	97,758.51	RE	30.34859322	0	Local	10.72912136	10000	10000	10000	N/A	4000	7.005	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use
1034	165.9081903	6	8	10.91	AC	100	Pipe Burst	1	0	0	4	49,255.49	103,559.67	RL	28.82443313	2.170301	Local	12.81625092	24.70365556	24.70301956	198.048635	Permanent River	4000	9.455	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	4	8	1	2	3	5	20	Proximity to Buildings, Land Use
749	144.3525083	8	13	9.89	AC	30	Pipe Burst	0	1	0	5	56,309.89	118,391.54	AE	168.6196712	10000	N/A	10000	10000	10000	113.498803	Permanent River	10000	11.445	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	1	2	4	8	1	2	3	4	16	Repair Costs
992	345.9122624	6	2	11.67	AC	40	Pipe Burst	1	0	0	4	87,506.36	183,982.11	RE	57.54103942	0	Local	8.116097904	10000	10000	10000	N/A	4000	6.835	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	4	8	1	2	3	4	16	Land Use
993	91.21112036	6	9	8	AC	40	Pipe Burst	1	0	0	3	31,882.36	67,032.67	RE	84.39093944	2.191001	Local	20.80743627	10000	10000	10000	N/A	4000	8.5	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	4	8	1	2	3	4	16	Land Use
600	313.3390137	6	10	9.06	AC	43	Pipe Burst	0	1	0	2	81,584.54	171,531.50	RL	64.44245328	0.307135	Local	7.071782514	22.14568348	22.14544331	10000	N/A	4000	9.53	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	4	8	1	2	3	4	16	Land Use
42	190.6431457	6	7	8.72	AC	44	Pipe Burst	1	0	0	2	51,511.67	108,303.28	RL	51.91464784	15.68396	Local	19.12761008	10000	10000	10000	N/A	4000	7.86	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	4	8	1	2	3	4	16	Land Use
172	284.5740635	6	8	10.37	AC	100	Pipe Burst	1	0	0	3	72,971.99	153,423.61	RL	71.10969752	0	Local	11.32552614	10000	10000	10000	N/A	4000	9.185	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	4	8	1	2	3	4	16	Land Use
369	500.3321335	6	10	9.86	AC	100	Pipe Burst	0	1	0	2	121,320.58	255,076.52	RL	59.26872691	1.145495	Local	11.34652971	10000	10000	10000	N/A	4000	9.93	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	4	8	1	2	3	4	16	Land Use
578	177.5410021	6	6	7	AC	100	Pipe Burst	1	0	0	2	48,727.46	102,449.49	RL	95.09499031	10000	N/A	138.9959768	10000	10000	10000	N/A	4000	6.5	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	4	8	1	2	3	4	16	Land Use
1186	494.5286597	6	8	2.66	AC	100	Pipe Burst	1	0	0	0	113,087.34	237,766.13	RL	51.38665092	7.706688	Local	15.46441869	10000	10000	139.4080344	Permanent River	4000	5.33	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	4	8	1	2	3	4	16	Land Use
1189	154.2470374	6	3	6	AC	100	Pipe Burst	1	0	0	2	43,777.50	92,042.18	RL	181.2666519	10000	N/A	10000	10000	10000	130.4261629	Permanent River	3000	4.5	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	4	8	1	2	3	4	16	Land Use
1204	325.2089835	6	8	10.8	AC	100	Pipe Burst	1	0	0	0	77,106.91	162,117.28	RL	59.31898722	11.24459	Local	31.04231264	10000	10000	10000	N/A	4000	9.4	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	4	8	1	2	3	4	16	Land Use
1207	294.7680932	6	8	4.75	AC	100	Pipe Burst	1	0	0	3	75,138.22	157,978.11	RL	76.12567768	0	Local	9.641665926	10000	10000	10000	N/A	4000	6.375	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	4	8	1	2	3	4	16	Land Use
1208	304.8140958	6	5	11.08	AC	100	Pipe Burst	1	0	0	2	75,773.00	159,312.72	RL	114.6047384	9.172542	Local	12.41953313	10000	10000	10000	N/A	4000	8.04	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	4	8	1	2	3	4	16	Land Use
695	403.3315233	15	9	24.2	AC	16	CIPP	1	0	0	2	36,813.22	77,399.79	AE	10000	10000	N/A	10000	10000	10000	47.35435552	Artificial Path	22500	16.6	1	1	5	4	5	5	2	2	1	3	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
696	329.4892628	15	18	8.81	AC	16	CIPP	0	1	0	1	34,587.31	72,719.83	AE	10000	10000	N/A	10000	10000	10000	47.35435552	Permanent River	18750	13.405	1	1	5	4	5	5	2	2	1	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
79	257.9282707	15	9	7.35	AC	17	CIPP	1	0	0	0	24,507.41	51,526.83	RL	117.060094	8.737387	Local	10000	10000	10000	64.46173506	Permanent River	15000	8.175	3	1	5	4	5	5	2	2	2	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
681	254.274576	15	8	8.69	AC	17	CIPP	1	0	0	0	24,273.57	51,035.19	RE	149.8398962	10.2273	Local	190.0180465	230.0615264	230.0615264	75.70596536	Permanent River	15000	8.345	3	1	5	4	5	5	2	2	2	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
682	252.0130339	15	18	22.61	AC	17	CIPP	0	1	0	0	28,128.83	59,140.87	AE	10000	10000	N/A	10000	10000	46.70488685	75.21354021	Permanent River	30000	20.305	1	1	5	4	5	5	2	2	1	3	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
698	138.4363378	15	8	8	AC	17	CIPP	1	0	0	8	255,859.93	537,945.49	RL	181.8561813	0	Local	10000	10000	10000	0	Permanent River	15000	8	3	1	5	4	5	5	2	2	2	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
704	504.825443	15	1	2.03	AC	17	CIPP	1	0	0	2	43,308.83	91,056.81	RL	99.87920969	0	Local	10000	10000	10000	41.70488767	Permanent River	11250	1.515	3	1	5	4	5	5	2	2	2	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
707	239.1090375	15	14	17.59	AC	17	CIPP	0	1	0	1	255,802.98	537,825.76	NR	10000	10000	N/A	10000	10000	10000	0	Permanent River	22500	15.795	1	1	5	4	5	5	2	2	4	3	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
562	211.7788614	15	19	11.28	AC	18	CIPP	0	1	0	0	252,553.85	530,994.46	RL	6.44828516	6.917028	Local	6.033189565	50.02444345	45.46973315	0	Permanent River	22500	15.14	3	1	5	4	5	5	4	3	2	3	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
563	97.70727917	15	22	18.83	AC	18	CIPP	0	0	1	2	24,253.27	50,992.49	RL	87.85129309	10000	N/A	230.7847009	231.0797443	231.0799266	69.81308506	Permanent River	30000	20.415	1	1	5	4	5	5	2	2	2	3	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
564	310.9860252	15	21	22.37	AC	18	CIPP	0	0	1	5	269,403.11	566,420.03	RL	178.7844884	10000	N/A	10000	10000	137.4069531	0	Permanent River	30000	21.685	1	1	5	4	5	5	2	2	2	3	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
565	188.9209249	15	21	21.37	AC	18	CIPP	0	0	1	6	263,090.94	553,148.70	RL	10000	10000	N/A	10000	10000	29.28829464	0	Permanent River	30000	21.185	1	1	5	4	5	5	2	2	2	3	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
566	476.2321675	15	19	20.56	AC	18	CIPP	0	1	0	0	269,478.86	566,579.30	RL	10000	10000	N/A	10000	10000	0	0	Permanent River	22500	19.78	1	1	5	4	5	5	2	2	2	3	3	3	4	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
567	307.2578336	15	19	18.95	AC	18	CIPP	0	1	0	0	31,664.50	66,574.61	RL	10000	10000	N/A	10000	10000	119.139079	34.54891159	Permanent River	22500	18.975	1	1	5	4	5	5	2	2	2	3	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
594	485.2136118	15	11	22.75	AC	18	CIPP	0	1	0	2	273,053.67	574,095.34	RL	36.78111518	0.549774	Local	5.384557648	17.7022749	0	0	Permanent River	22500	16.875	3	1	5	4	5	5	3	2	2	3	3	3	4	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
453	164.9009631	12	16	17.02	AC	19	CIPP	0	1	0	1	23,394.06	49,186.01	RL	10000	10000	N/A	10000	10000	40.21535436	22.75591822	Permanent River	12000	16.51	1	1	5	4	5	5	1	1	2	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
454	232.481263	12	17	18.04	AC	19	CIPP	0	1	0	1	254,448.88	534,978.76	RL	10000	10000	N/A	10000	10000	0	0	Permanent River	12000	17.52	1	1	5	4	5	5	1	1	2	2	3	3	4	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
455	85.06573474	12	18	18.12	AC	19	CIPP	0	1	0	9	30,603.94	64,344.79	RL	10000	10000	N/A	10000	10000	171.3268164	19.60033706	Permanent River	12000	18.06	1	1	5	4	5	5	1	1	2	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
456	324.0551742	12	18	20.5	AC	19	CIPP	0	1	0	9	44,943.31	94,493.31	RL	242.2014467	10000	N/A	10000	10000	246.1342707	56.80723508	Permanent River	12000	19.25	1	1	5	4	5	5	1	1	2	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
457	419.904607	12	20	21.22	AC	19	CIPP	0	1	0	14	58,194.28	122,353.47	RL	110.8811257	10000	N/A	10000	10000	10000	60.21360355	Permanent River	16000	20.61	1	1	5	4	5	5	1	1	2	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
458	356.7502421	12	21	10.09	AC	19	CIPP	0	0	1	2	39,405.01	82,849.04	RL	164.6090794	10000	N/A	10000	10000	10000	22.82340677	Permanent River	12000	15.545	1	1	5	4	5	5	1	1	2	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
569	255.3255309	12	18	17.46	AC	19	CIPP	0	1	0	2	30,319.53	63,746.82	RL	248.025643	10000	N/A	10000	10000	0	82.62714676	Permanent River	12000	17.73	1	1	5	4	5	5	1	1	2	2	3	3	4	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
570	192.053417	12	22	18.02	AC	19	CIPP	0	0	1	4	32,523.21	68,380.04	RL	136.4203311	10000	N/A	10000	10000	157.8471361	82.62714676	Permanent River	16000	20.01	1	1	5	4	5	5	1	1	2	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
572	301.6806656	12	10	21.58	AC	19	CIPP	0	1	0	2	260,100.84	546,862.02	RL	122.0040124	10000	N/A	10000	10000	10000	0	Permanent River	12000	15.79	1	1	5	4	5	5	1	1	2	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
1058	450.4866519	12	10	4.81	AC	22	CIPP	0	1	0	3	43,529.20	91,520.14	PF	248.8203362	10000	N/A	10000	230.2296544	230.2306751	84.03157454	Permanent River	8000	7.405	1	1	5	4	5	5	1	1	3	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
1059	236.8719914	12	5	2.3	AC	22	CIPP	1	0	0	2	25,212.32	53,008.90	PF	156.6202997	10000	N/A	208.0213911	104.6389647	52.40701986	18.37041837	Permanent River	6000	3.65	1	1	5	4	5	5	1	1	3	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
1060	294.1275668	12	2	5.5	AC	22	CIPP	1	0	0	1	27,147.65	57,077.94	PF	156.6202997	10000	N/A	131.2277564	109.3629949	22.12527533	18.37041837	Permanent River	6000	3.75	1	1	5	4	5	5	1	1	3	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
1061	238.4199296	12	4	8.7	AC	22	CIPP	1	0	0	1	23,805.20	50,050.42	RM	18.3812251	0	Local	0	147.872323	148.06174	9.585007167	Permanent River	8000	6.35	2	1	5	4	5	5	4	3	3	2	2	3	3	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
1062	441.6331343	12	2	4.24	AC	22	CIPP	1	0	0	3	265,997.99	559,260.77	RM	35.78331359	0	Local	236.9387948	247.0214383	247.0132646	0	Permanent River	6000	3.12	2	1	5	4	5	5	3	2	3	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
1063	471.0865774	12	7	2.36	AC	22	CIPP	1	0	0	2	39,265.19	82,555.07	RM	27.55664639	33.18576	Local	115.9790642	112.6232944	112.6232944	3.306824317	Permanent River	6000	4.68	1	1	5	4	5	5	3	2	3	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
1064	170.0386057	12	6	6.99	AC	22	CIPP	1	0	0	2	248,202.32	521,845.37	PF	33.43606974	0	Local	0	29.69436092	0	0	Permanent River	8000	6.495	2	1	5	4	5	5	3	2	3	2	3	3	4	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
1376	95.15834998	12	6	6.99	AC	22	CIPP	1	0	0	2	16,709.50	35,131.73	RM	28.10522511	4.172119	Local	100.1404545	81.5922002	19.32818418	40.68399276	Permanent River	8000	6.495	2	1	5	4	5	5	3	2	3	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
1175	225.9470796	15	8	8.79	AC	23	CIPP	1	0	0	0	22,460.61	47,223.44	CS	30.97530555	0	Local	0	14.28969074	0	56.79532236	Permanent River	15000	8.395	3	1	5	4	5	5	3	2	4	2	3	3	4	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
1192	255.3293698	15	8	17.06	AC	23	CIPP	1	0	0	3	28,841.08	60,638.37	CS	83.3685603	0	Local	46.04781852	14.60355299	0	31.56894226	Permanent River	18750	12.53	3	1	5	4	5	5	2	2	4	2	3	3	4	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
1193	299.2504609	15	17	8	AC	23	CIPP	0	1	0	6	267,152.03	561,687.14	CS	180.7164575	0	Local	10000	219.1656545	219.1656545	0	Permanent River	18750	12.5	3	1	5	4	5	5	2	2	4	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
1194	385.5332477	15	8	7.71	AC	23	CIPP	1	0	0	11	49,174.13	103,388.60	CS	216.1260566	10000	N/A	10000	10000	10000	85.12968493	Permanent River	15000	7.855	1	1	5	4	5	5	2	2	4	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
1195	126.3490582	15	8	11.03	AC	23	CIPP	1	0	0	2	19,086.34	40,129.03	CR	91.65704717	10000	N/A	10000	10000	10000	22.56595825	Permanent River	15000	9.515	1	1	5	4	5	5	2	2	4	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
1196	150.4735942	15	11	15.28	AC	23	CIPP	0	1	0	3	253,130.31	532,206.48	CR	56.24747001	10000	N/A	10000	10000	136.7689508	0	Permanent River	18750	13.14	1	1	5	4	5	5	2	2	4	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
1198	94.21937458	15	16	15.13	AC	23	CIPP	0	1	0	5	25,530.04	53,676.91	PF	119.4227857	10000	N/A	10000	10000	50.68114464	16.70681502	Permanent River	22500	15.565	1	1	5	4	5	5	2	2	3	3	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
1199	114.1137301	15	15	12.83	AC	23	CIPP	0	1	0	3	23,803.28	50,046.39	PF	162.6919813	10000	N/A	10000	10000	50.68114464	78.87053301	Permanent River	18750	13.915	1	1	5	4	5	5	2	2	3	2	1	1	1	5	4	5	5	5	3	15	1	4	Low	14	42	Proximity to Environmentally Sensitive Areas
863	314.3708645	24	23	19.29	AC	11	CIPP	0	0	1	6	114,664.56	241,082.23	RE	36.04532596	0	Local	9.060410853	18.51331089	0	10000	N/A	50000	21.145	4	2	1	1	1	1	3	3	2	4	3	3	4	4	4	2	4	4	3	12	1	4	Low	12	36	Proximity to and Types of Roads, Repair Costs, Proximity to Other Utilities
867	267.7363421	24	16	18.72	AC	11	CIPP	0	1	0	1	90,715.16	190,728.63	RE	26.19748921	0	Local	0	20.89733323	0	10000	N/A	37500	17.36	4	2	1	1	1	1	3	3	2	3	3	3	4	4	3	2	4	4	3	12	1	4	Low	11	33	Proximity to and Types of Roads, Proximity to Other Utilities
869	476.4723585	24	14	15.66	AC	11	CIPP	0	1	0	0	149,414.63	314,144.26	RE	37.52172403	0	Local	13.91806031	21.24194866	8.041436653	10000	N/A	31250	14.83	4	2	1	1	1	1	3	3	2	3	1	1	4	4	3	2	4	4	3	12	1	4	Low	11	33	Proximity to and Types of Roads, Proximity to Other Utilities
975	426.2610937	24	9	14.51	AC	11	CIPP	1	0	0	5	138,433.70	291,056.85	RE	46.17499875	1.285811	Local	0	19.0051514	0	10000	N/A	31250	11.755	4	2	1	1	1	1	3	3	2	3	3	3	4	4	3	2	4	4	3	12	1	4	Low	11	33	Proximity to and Types of Roads, Proximity to Other Utilities
858	159.6582779	24	22	8	AC	12	CIPP	0	0	1	1	62,545.45	131,501.80	AE	32.61147275	0	Local	10000	68.73474041	0	10000	N/A	37500	15	4	2	1	1	1	1	3	3	1	3	3	3	4	4	3	1	4	4	3	12	1	4	Low	11	33	Proximity to and Types of Roads, Proximity to Other Utilities
182	4245.771794	16	8	8	AC	13	CIPP	1	0	0	11	899,128.99	1,890,418.70	RE	16.02808736	0	Local	0	5.776118919	0	10000	N/A	15000	8	3	1	1	1	1	1	4	3	2	2	3	3	4	4	3	2	4	4	3	12	1	4	Low	11	33	Proximity to Buildings, Proximity to Other Utilities
451	455.4433004	10	12	14.03	AC	20	Pipe Burst	0	1	0	0	147,494.38	310,106.94	RL	34.2217089	0	Local	0	10000	10000	56.24105447	Permanent River	10000	13.015	2	1	4	3	4	4	3	2	2	2	2	3	3	4	3	4	4	4	3	12	1	4	Low	11	33	Proximity to Environmentally Sensitive Areas
452	409.3297703	10	15	15.5	AC	20	Pipe Burst	0	1	0	3	365,275.61	767,991.96	RL	57.29099972	4.179471	Local	10000	10000	204.0034739	0	Permanent River	12000	15.25	2	1	4	3	4	4	2	2	2	2	1	1	1	4	3	4	4	4	3	12	1	4	Low	11	33	Proximity to Environmentally Sensitive Areas
928	600.2255872	10	11	14.11	AC	21	Pipe Burst	0	1	0	0	417,567.11	877,934.85	RL	14.00375425	0	Local	0	10000	34.15421038	0	Permanent River	10000	12.555	2	1	4	3	4	4	4	3	2	2	2	3	3	4	3	4	4	4	3	12	1	4	Low	11	33	Proximity to Environmentally Sensitive Areas, Proximity to Buildings
1158	497.3029293	10	18	13.49	AC	21	Pipe Burst	0	1	0	6	395,947.62	832,479.87	CS	95.75323535	0	Local	42.38680289	6.145383169	0	0	Permanent River	12000	15.745	2	1	4	3	4	4	2	1	4	2	3	3	3	4	3	4	4	4	3	12	1	4	Low	11	33	Proximity to Environmentally Sensitive Areas, Land Use
1159	513.0953566	10	14	7.96	AC	21	Pipe Burst	0	1	0	4	397,645.87	836,050.44	RL	86.93901838	10000	N/A	184.1714228	10000	189.2665831	0	Permanent River	10000	10.98	1	1	4	3	4	4	2	1	2	2	1	1	1	4	3	4	4	4	3	12	1	4	Low	11	33	Proximity to Environmentally Sensitive Areas
1068	404.714329	12	8	8.67	AC	22	CIPP	1	0	0	0	32,282.86	67,874.71	RL	12.41358059	0	Local	10000	8.249920798	0	10000	N/A	8000	8.335	2	1	1	1	1	1	4	3	2	2	3	3	4	4	3	2	4	4	3	12	1	4	Low	11	33	Proximity to Buildings, Proximity to Other Utilities
1069	388.8618259	12	9	7.77	AC	22	CIPP	1	0	0	0	31,331.71	65,874.92	RL	18.86627619	0	Local	10000	11.42585321	0	10000	N/A	8000	8.385	2	1	1	1	1	1	4	3	2	2	3	3	4	4	3	2	4	4	3	12	1	4	Low	11	33	Proximity to Buildings, Proximity to Other Utilities
1071	300.7474723	12	14	9.01	AC	22	CIPP	0	1	0	5	37,544.85	78,938.04	CS	10.02797564	15.08361	Local	42.19685024	90.85522183	90.8151312	119.936459	Permanent River	10000	11.505	2	1	1	1	1	1	4	3	4	2	1	1	1	4	3	4	1	4	3	12	1	4	Low	11	33	Proximity to Buildings, Land Use
1229	273.7513054	12	9	14.32	AC	24	CIPP	1	0	0	1	25,925.08	54,507.48	RL	23.13550656	0	Local	0	0.74048279	0.74048279	10000	N/A	10000	11.66	2	1	1	1	1	1	4	3	2	2	2	3	4	4	3	2	4	4	3	12	1	4	Low	11	33	Proximity to Buildings, Proximity to Other Utilities
1178	473.1872496	10	13	14.87	AC	25	Pipe Burst	0	1	0	0	379,773.21	798,473.17	CS	23.6676491	0	Local	11.24457327	0.716278638	0	0	Permanent River	10000	13.935	2	1	4	3	4	4	4	3	4	2	3	3	3	4	3	4	4	4	3	12	1	4	Low	11	33	Proximity to Environmentally Sensitive Areas, Proximity to Buildings, Land Use
1179	273.5195851	10	12	12.45	AC	25	Pipe Burst	0	1	0	1	94,872.08	199,468.54	RL	67.54035009	0	Local	11.24457327	218.5608341	217.1691925	41.39931207	Permanent River	10000	12.225	2	1	4	3	4	4	2	2	2	2	1	1	1	4	3	4	4	4	3	12	1	4	Low	11	33	Proximity to Environmentally Sensitive Areas
1180	506.32195	10	13	11.8	AC	25	Pipe Burst	0	1	0	6	171,630.78	360,853.72	RL	102.8690777	27.2296	Major	12.0695836	10000	10000	45.3786834	Permanent River	10000	12.4	3	2	4	3	4	4	1	1	2	2	1	1	1	4	3	4	4	4	3	12	1	4	Low	11	33	Proximity to Environmentally Sensitive Areas
930	372.5748914	10	15	14.99	AC	26	Pipe Burst	0	1	0	8	134,841.03	283,503.27	RE	68.9220528	2.917283	Local	21.54546751	10000	10000	81.34781784	Permanent River	10000	14.995	2	1	4	3	4	4	2	2	2	2	1	1	1	4	3	4	4	4	3	12	1	4	Low	11	33	Proximity to Environmentally Sensitive Areas
931	310.6094743	10	15	15.37	AC	26	Pipe Burst	0	1	0	15	126,906.32	266,820.53	RE	59.0512372	10.54089	Local	19.20881055	10000	10000	62.44521935	Permanent River	12000	15.185	2	1	4	3	4	4	2	2	2	2	1	1	1	4	3	4	4	4	3	12	1	4	Low	11	33	Proximity to Environmentally Sensitive Areas
932	588.6700294	10	15	14.87	AC	26	Pipe Burst	0	1	0	2	190,129.33	399,746.92	CS	35.86051277	10.54089	Local	0	49.01856925	49.01856925	62.44521935	Permanent River	10000	14.935	2	1	4	3	4	4	3	2	4	2	2	3	3	4	3	4	4	4	3	12	1	4	Low	11	33	Proximity to Environmentally Sensitive Areas, Land Use
1169	316.1944504	10	15	7.56	AC	27	Pipe Burst	0	1	0	0	106,067.85	223,007.65	RL	49.60770252	0	Local	11.83035838	35.48557714	56.65664981	87.32867146	Permanent River	10000	11.28	2	1	4	3	4	4	3	2	2	2	1	1	1	4	3	4	4	4	3	12	1	4	Low	11	33	Proximity to Environmentally Sensitive Areas
864	449.007464	24	20	22.75	AC	11	CIPP	0	1	0	4	147,493.75	310,105.61	RE	43.28887916	0.054682	Local	10.47871098	10000	10000	10000	N/A	50000	21.375	4	2	1	1	1	1	3	3	2	4	1	1	1	4	4	2	1	4	3	12	1	4	Low	10	30	Proximity to and Types of Roads, Repair Costs
865	406.5534692	24	18	19.98	AC	11	CIPP	0	1	0	2	132,250.02	278,055.67	RE	42.66895316	0	Local	0	10000	10000	10000	N/A	37500	18.99	4	2	1	1	1	1	3	3	2	3	2	3	3	4	3	2	3	4	3	12	1	4	Low	10	30	Proximity to and Types of Roads
862	379.0861318	24	19	13.14	AC	12	CIPP	0	1	0	4	127,328.44	267,708.05	AE	49.39360465	0	Local	0	30.37106558	24.19440418	10000	N/A	37500	16.07	4	2	1	1	1	1	3	3	1	3	2	3	3	4	3	1	3	4	3	12	1	4	Low	10	30	Proximity to and Types of Roads
705	185.0589056	15	23	8	AC	17	CIPP	0	0	1	11	43,343.77	91,130.28	RE	71.28336448	0	Major	0	28.56652243	28.56652243	176.5134553	Permanent River	22500	15.5	4	3	1	1	1	1	2	2	2	3	2	3	3	4	3	2	3	4	3	12	1	4	Low	10	30	Proximity to and Types of Roads
568	101.2068697	15	17	18.63	AC	18	CIPP	0	1	0	0	18,477.24	38,848.40	RL	248.025643	10000	N/A	10000	10000	0	130.738476	Permanent River	22500	17.815	1	1	1	1	1	1	2	2	2	3	3	3	4	3	3	2	4	4	3	12	1	4	Low	10	30	Proximity to Other Utilities
1213	539.9513387	10	13	12.79	AC	24	Pipe Burst	0	1	0	1	174,135.52	366,119.94	RL	23.74083348	3.806691	Local	0	2.742021117	0	10000	N/A	10000	12.895	2	1	1	1	1	1	4	3	2	2	3	3	3	4	3	2	3	4	3	12	1	4	Low	10	30	Proximity to Buildings
1228	468.0162569	12	8	9.6	AC	24	CIPP	1	0	0	3	40,580.98	85,321.50	RL	33.20302384	0	Local	0	19.09579827	0	10000	N/A	8000	8.8	2	1	1	1	1	1	3	2	2	2	3	3	4	3	3	2	4	4	3	12	1	4	Low	10	30	Proximity to Other Utilities
1242	127.8341675	12	13	15.47	AC	24	CIPP	0	1	0	4	25,670.05	53,971.28	RL	43.92670999	0	Local	0	13.33937387	0	10000	N/A	10000	14.235	2	1	1	1	1	1	3	2	2	2	3	3	4	3	3	2	4	4	3	12	1	4	Low	10	30	Proximity to Other Utilities

UniqueID	Length (ft)	Dia (in)	USMH depth (ft)	DSMH depth (ft)	Material	Ph 2 CIP Year	Replacement Method	Manholes (<10ft)	Manholes (10-20ft)	Manholes (>20ft)	Laterals	Matrl & Install Cost ($)	Const Cost ($)	Land Use Type	ProxTo Building (ft)	ProxTo Road (ft)	RoadType	ProxTo WaterMains (ft)	ProxTo StormWaterFeature (ft)	ProxTo StormWaterDitch (ft)	ProxToESA (ft)	Type of ESA	Repair Cost ($)	Depth (ft)	Proximity to and Types of Roads CO1	Proximity to and Types of Roads CO2	Proximity to Environmentally Sensitive Areas CO1	Proximity to Environmentally Sensitive Areas CO2	Proximity to Environmentally Sensitive Areas CO3	Proximity to Environmentally Sensitive Areas CO4	Proximity to Buildings CO1	Proximity to Buildings CO2	Land Use CO3	Repair Costs CO2	Proximity to Other Utilities CO1	Proximity to Other Utilities CO2	Proximity to Other Utilities CO4	CO1 Health and Safety	CO2 Cost of Failure	CO3 SSOs	CO4 Environmental Impact	Dominant COF	Condition LOF	Core Risk	Mitigation Factor	Risk Zone	Priority	TBL COF	BRE	COF Driver
187	787.3150405	16	8	8	AC	15	CIPP	1	0	0	0	170,186.90	357,817.95	AE	10000	0	Major	10000	10000	10000	10000	N/A	15000	8	4	3	1	1	1	1	2	2	1	3	2	1	1	4	3	1	1	4	3	12	1	4	Low	8	24	Proximity to and Types of Roads
1161	25.2705572	10	17	18.61	AC	21	Pipe Burst	0	1	0	0	19,517.99	41,036.57	CS	124.613691	0	Local	20.15148416	12.06097032	8.447388727	10000	N/A	12000	17.805	2	1	1	1	1	1	1	1	4	2	1	1	1	2	2	4	1	4	3	12	1	4	Low	8	24	Land Use
296	215.9217604	10	4	4.24	AC	27	Pipe Burst	1	0	0	3	76,736.72	161,338.96	CS	89.41713911	30.43709	Local	48.77379875	169.7352353	169.2679681	10000	N/A	6000	4.12	1	1	1	1	1	1	2	1	4	1	2	1	1	2	1	4	1	4	3	12	1	4	Low	8	24	Land Use
1173	542.9010914	10	18	19.53	AC	27	Pipe Burst	0	1	0	0	173,513.07	364,811.24	RL	87.84317378	18.19186	Local	0	97.69597505	95.62716871	10000	N/A	12000	18.765	2	1	1	1	1	1	1	1	1	2	3	3	3	3	3	1	3	3	3	9	1	3	Low	8	24	Proximity to Other Utilities
81	157.8616434	6	8	8.79	DI	100	Trench - In road	1	0	0	0	274,465.41	577,063.53	CS	62.44071619	14.05002	Local	0	14.32332334	14.32332334	0	Permanent River	4000	8.395	1	1	4	3	4	4	1	1	4	1	1	1	1	4	3	4	4	4	2	8	1	4	Low	11	22	Proximity to Environmentally Sensitive Areas, Land Use
683	354.6820047	24	8	8	AC	12	CIPP	1	0	0	0	111,790.29	235,039.09	AE	42.86962633	44.5004	Local	10000	38.45271889	37.39324624	10000	N/A	25000	8	1	1	1	1	1	1	1	1	1	3	1	1	1	1	3	1	1	3	3	9	1	3	Low	7	21	Repair Costs
709	494.0372251	24	19	22.69	AC	12	CIPP	0	1	0	11	170,980.34	359,486.16	AE	86.24824681	39.78705	Local	10000	214.0406968	50.53202235	10000	N/A	50000	20.845	1	1	1	1	1	1	1	1	1	4	1	1	1	1	4	1	1	4	3	12	1	4	Low	7	21	Repair Costs
926	282.7355604	10	11	11.3	AC	21	Pipe Burst	0	1	0	0	96,113.83	202,079.33	RL	28.17821836	2.584502	Local	7.158492387	10000	36.63105842	10000	N/A	10000	11.15	2	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	3	9	1	3	Low	7	21	Proximity to Buildings
1057	142.0348891	12	10	10.13	AC	22	CIPP	0	1	0	2	23,522.09	49,455.20	RL	31.9467477	10000	N/A	10000	10000	10000	203.2459039	Permanent River	10000	10.065	2	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	3	9	1	3	Low	7	21	Proximity to Buildings
1214	282.0608452	10	12	13.34	AC	24	Pipe Burst	0	1	0	1	97,413.10	204,811.05	RL	33.89512345	0	Local	12.67814463	26.67583489	26.67694617	10000	N/A	10000	12.67	2	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	3	9	1	3	Low	7	21	Proximity to Buildings
1215	367.0921626	10	11	12	AC	24	Pipe Burst	0	1	0	2	124,209.92	261,151.35	RL	33.44089616	1.192651	Local	12.72134609	140.0766734	140.0942925	10000	N/A	10000	11.5	2	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	3	9	1	3	Low	7	21	Proximity to Buildings
1216	342.9469834	10	14	10.97	AC	24	Pipe Burst	0	1	0	0	114,026.73	239,741.19	RL	25.68462028	0	Local	8.583581275	205.408801	205.4112594	10000	N/A	10000	12.485	2	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	3	9	1	3	Low	7	21	Proximity to Buildings
1217	104.534091	10	11	13.66	AC	24	Pipe Burst	0	1	0	0	43,098.89	90,615.42	RL	26.14750968	0	Local	8.091954106	206.3259337	206.32869	10000	N/A	10000	12.33	2	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	3	9	1	3	Low	7	21	Proximity to Buildings
1219	201.709854	10	15	11.56	AC	24	Pipe Burst	0	1	0	10	87,008.68	182,935.75	RL	33.83875437	5.134731	Local	8.091954106	206.3259337	206.32869	10000	N/A	10000	13.28	2	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	3	9	1	3	Low	7	21	Proximity to Buildings
1227	492.3297376	12	14	8.61	AC	24	CIPP	0	1	0	3	46,039.78	96,798.65	RL	27.80412362	0	Local	9.248593083	158.5697701	158.5706373	10000	N/A	10000	11.305	2	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	3	9	1	3	Low	7	21	Proximity to Buildings
1238	223.6923179	12	13	11.71	AC	24	CIPP	0	1	0	0	25,421.54	53,448.79	RL	26.33005979	10000	N/A	119.0674322	200.0587409	10.84367266	10000	N/A	10000	12.355	2	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	3	9	1	3	Low	7	21	Proximity to Buildings
1170	534.1047766	10	7	12.12	AC	27	Pipe Burst	1	0	0	1	168,396.17	354,052.95	RL	29.00111468	0	Local	12.26882461	249.2450415	249.2555756	10000	N/A	8000	9.56	2	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	3	9	1	3	Low	7	21	Proximity to Buildings
153	92.73040492	10	18	18.42	AC	28	Pipe Burst	0	1	0	1	41,087.30	86,386.04	RL	31.78372998	6.063392	Local	10.60925294	151.855162	151.855162	10000	N/A	12000	18.21	2	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	3	9	1	3	Low	7	21	Proximity to Buildings
974	387.3133676	10	15	16.61	AC	28	Pipe Burst	0	1	0	4	133,225.73	280,107.09	PF	10000	0.513639	Local	10000	10000	10000	10000	N/A	12000	15.805	2	1	1	1	1	1	1	1	3	2	1	1	1	2	2	3	1	3	3	9	1	3	Low	7	21	Land Use
316	18.52334596	15	8	8	AC	100	CIPP	1	0	0	3	13,685.49	28,773.75	PF	10000	10000	N/A	18.71943572	10000	10000	123.4172866	Permanent River	15000	8	1	1	1	1	1	1	1	1	3	2	1	1	1	1	2	3	1	3	3	9	1	3	Low	7	21	Land Use
1266	54.28741145	12	15	14.73	AC	100	CIPP	0	1	0	0	15,257.24	32,078.36	RL	44.11819892	0	Local	8.942551169	80.81526543	17.60203076	10000	N/A	10000	14.865	2	1	1	1	1	1	3	2	2	2	1	1	1	3	2	2	1	3	3	9	1	3	Low	7	21	Proximity to Buildings
859	501.3059465	24	13	19.28	AC	12	CIPP	0	1	0	4	156,576.63	329,202.37	AE	77.48388733	10000	N/A	10000	10000	10000	10000	N/A	37500	16.14	1	1	1	1	1	1	1	1	2	3	1	1	1	1	3	2	1	3	3	9	1	3	Low	6	18	Repair Costs
860	515.1085083	24	13	13.18	AC	12	CIPP	0	1	0	4	166,557.29	350,186.71	AE	10000	10000	N/A	10000	10000	10000	10000	N/A	31250	13.09	1	1	1	1	1	1	1	1	2	3	1	1	1	1	3	2	1	3	3	9	1	3	Low	6	18	Repair Costs
861	493.4686493	24	13	13.66	AC	12	CIPP	0	1	0	2	157,316.36	330,757.64	AE	10000	10000	N/A	10000	10000	248.198371	10000	N/A	31250	13.33	1	1	1	1	1	1	1	1	2	3	1	1	1	1	3	2	1	3	3	9	1	3	Low	6	18	Repair Costs
693	468.7969611	15	26	13.92	AC	16	CIPP	0	0	1	4	51,003.01	107,233.82	AE	10000	10000	N/A	10000	10000	10000	10000	N/A	22500	19.96	1	1	1	1	1	1	1	1	2	3	1	1	1	1	3	2	1	3	3	9	1	3	Low	6	18	Repair Costs
694	278.9366064	15	24	25.97	AC	16	CIPP	0	0	1	8	44,851.94	94,301.21	AE	10000	10000	N/A	10000	10000	10000	181.6715468	Artificial Path	30000	24.985	1	1	1	1	1	1	1	1	2	3	1	1	1	1	3	2	1	3	3	9	1	3	Low	6	18	Repair Costs
697	266.1694358	15	20	17.26	AC	16	CIPP	0	1	0	5	36,534.84	76,814.51	AE	10000	10000	N/A	10000	10000	226.7954739	127.5335752	Permanent River	22500	18.63	1	1	1	1	1	1	1	1	2	3	1	1	1	1	3	2	1	3	3	9	1	3	Low	6	18	Repair Costs
700	266.9703862	15	14	19.96	AC	17	CIPP	0	1	0	4	35,086.10	73,768.54	AE	10000	10000	N/A	10000	10000	10000	229.9857454	Permanent River	22500	16.98	1	1	1	1	1	1	1	1	2	3	1	1	1	1	3	2	1	3	3	9	1	3	Low	6	18	Repair Costs
701	152.5113052	15	20	18.84	AC	17	CIPP	0	1	0	2	24,760.72	52,059.42	AE	10000	10000	N/A	10000	10000	10000	10000	N/A	22500	19.42	1	1	1	1	1	1	1	1	2	3	1	1	1	1	3	2	1	3	3	9	1	3	Low	6	18	Repair Costs
702	105.2918601	18	25	14.77	AC	17	CIPP	0	0	1	7	50,082.14	105,297.70	RR	10000	10000	N/A	10000	10000	10000	109.5706416	Permanent River	22500	19.885	1	1	1	1	1	1	1	1	2	3	1	1	1	1	3	2	1	3	3	9	1	3	Low	6	18	Repair Costs
706	274.5168509	15	19	13.95	AC	17	CIPP	0	1	0	2	32,569.08	68,476.49	AE	10000	10000	N/A	10000	10000	10000	10000	N/A	22500	16.475	1	1	1	1	1	1	1	1	2	3	1	1	1	1	3	2	1	3	3	9	1	3	Low	6	18	Repair Costs
1236	27.34758221	12	7	12.83	AC	24	CIPP	1	0	0	4	15,640.85	32,884.90	PF	131.9343259	10000	N/A	10000	205.4006	60.95936509	191.1840913	Permanent River	8000	9.915	1	1	1	1	1	1	1	1	3	2	1	1	1	1	2	3	1	3	3	9	1	3	Low	6	18	Land Use
871	114.3244909	10	16	15.07	AC	26	Pipe Burst	0	1	0	0	46,011.54	96,739.25	RE	67.12357328	0	Local	21.33558207	10000	10000	129.0192491	Permanent River	12000	15.535	2	1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	2	3	6	1	2	Low	6	18	Proximity to and Types of Roads, Proximity to Buildings, Land Use, Repair Costs
1174	514.0462045	10	20	12.52	AC	27	Pipe Burst	0	1	0	2	164,928.75	346,762.69	RL	69.55757645	2.809873	Local	15.63040641	10000	10000	10000	N/A	12000	16.26	2	1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	2	3	6	1	2	Low	6	18	Proximity to and Types of Roads, Proximity to Buildings, Land Use, Repair Costs
972	418.7357495	10	14	15.24	AC	28	Pipe Burst	0	1	0	2	139,573.89	293,454.09	PF	229.7000903	10000	N/A	10000	10000	205.8944648	10000	N/A	12000	14.62	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	3	6	1	2	Low	6	18	Land Use
186	2248.503378	12	8	8	AC	15	CIPP	1	0	0	0	142,910.20	300,468.70	AE	10000	3.065348	Local	10000	10000	10000	10000	N/A	8000	8	2	1	1	1	1	1	1	1	1	2	1	1	1	2	2	1	1	2	3	6	1	2	Low	5	15	Proximity to and Types of Roads, Repair Costs
708	248.9330449	15	14	9.17	AC	16	CIPP	0	1	0	2	27,931.71	58,726.43	AE	10000	10000	N/A	10000	10000	10000	10000	N/A	18750	11.585	1	1	1	1	1	1	2	2	1	2	1	1	1	2	2	1	1	2	3	6	1	2	Low	5	15	Proximity to Buildings, Repair Costs
744	499.8176511	15	9	11.21	AC	16	CIPP	1	0	0	3	44,488.33	93,536.71	RL	191.3787535	10000	N/A	10000	10000	10000	10000	N/A	18750	10.105	1	1	1	1	1	1	2	2	1	2	1	1	1	2	2	1	1	2	3	6	1	2	Low	5	15	Proximity to Buildings, Repair Costs
745	51.01516529	15	10	9.18	AC	16	CIPP	1	0	0	0	15,264.97	32,094.60	AE	145.3576951	10000	N/A	10000	209.4929232	209.4732923	10000	N/A	15000	9.59	1	1	1	1	1	1	2	2	1	2	1	1	1	2	2	1	1	2	3	6	1	2	Low	5	15	Proximity to Buildings, Repair Costs
746	409.8895154	15	11	9.83	AC	16	CIPP	0	1	0	8	50,232.93	105,614.73	AE	195.4371887	10000	N/A	10000	10000	10000	10000	N/A	18750	10.415	1	1	1	1	1	1	2	2	1	2	1	1	1	2	2	1	1	2	3	6	1	2	Low	5	15	Proximity to Buildings, Repair Costs
571	207.850147	12	21	21.88	AC	19	CIPP	0	0	1	4	33,471.01	70,372.80	RL	136.4203311	10000	N/A	10000	10000	200.2155602	108.0706622	Permanent River	16000	21.44	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	3	6	1	2	Low	5	15	Land Use, Repair Costs
1237	152.4935289	12	12	6.45	AC	24	CIPP	0	1	0	1	22,649.61	47,620.81	RL	131.934259	10000	N/A	10000	10000	10.84367266	212.9548156	Permanent River	8000	9.225	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	3	6	1	2	Low	5	15	Land Use, Repair Costs
703	59.78667324	16	2	8	DI	17	CIPP	1	0	0	6	29,316.05	61,637.00	RL	10000	22.44001	Local	10000	10000	10000	186.9895925	Permanent River	15000	5	3	1	1	1	1	1	1	1	1	2	1	1	1	3	2	1	1	3	2	6	1	2	Low	7	14	Proximity to and Types of Roads
184	62.24532593	12	8	8	AC	15	CIPP	1	0	0	6	11,734.72	24,672.25	AE	10000	10000	N/A	10000	10000	10000	10000	N/A	8000	8	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	1	2	3	6	1	2	Low	4	12	Repair Costs
185	64.73003256	12	8	8	AC	15	CIPP	1	0	0	0	11,883.80	24,985.69	AE	10000	10000	N/A	10000	10000	10000	10000	N/A	8000	8	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	1	2	3	6	1	2	Low	4	12	Repair Costs
88	58.16114329	6	8	4.18	PVC	100	Trench - Out road	1	0	0	0	20,493.01	43,086.56	RL	27.71447822	10000	N/A	147.3244047	82.31742769	81.03729117	28.25505467	Permanent River	4000	6.09	1	1	4	3	4	4	2	1	1	1	1	1	1	4	3	4	4	4	1	4	1	4	Low	11	11	Proximity to Environmentally Sensitive Areas
89	141.4513116	6	2	8	PVC	100	Trench - In road	1	0	0	2	46,362.83	97,477.85	RL	0.204300838	12.94949	Local	10.54973546	32.62445261	32.62992295	83.00769559	Permanent River	4000	5	1	1	4	3	4	4	4	3	2	1	1	1	1	4	3	4	4	4	1	4	1	4	Low	11	11	Proximity to Environmentally Sensitive Areas, Proximity to Buildings
231	87.67424627	6	5	10.66	PVC	100	Trench - In road	1	0	0	4	35,918.56	75,518.78	RL	0.415297436	16.65616	Local	29.51086905	14.70303803	13.96032622	65.44288887	Permanent River	4000	7.83	1	1	4	3	4	4	4	3	2	1	1	1	1	4	3	4	4	4	1	4	1	4	Low	11	11	Proximity to Environmentally Sensitive Areas, Proximity to Buildings
232	69.13993278	6	4	4.41	PVC	100	Trench - Out road	1	0	0	1	24,351.26	51,198.52	RL	16.55434043	10000	N/A	115.3905523	52.60108633	56.86709946	28.25505467	Permanent River	3000	4.205	1	1	4	3	4	4	1	1	1	1	1	1	1	4	3	4	4	4	1	4	1	4	Low	11	11	Proximity to Environmentally Sensitive Areas
335	160.1766163	6	6	5.89	PVC	100	Trench - In road	1	0	0	4	281,044.15	590,895.33	RL	56.38264762	0	Local	0	12.08253673	12.08253673	0	Permanent River	4000	5.945	1	1	4	3	4	4	1	1	1	1	1	1	1	4	3	4	4	4	1	4	1	4	Low	11	11	Proximity to Environmentally Sensitive Areas
440	246.5791498	8	15	15.5	PVC	100	Trench - Out road	0	1	0	0	302,913.32	636,875.25	RL	116.5057008	10000	N/A	10000	204.0034739	204.0034739	0	Permanent River	12000	15.25	1	1	4	3	4	4	1	1	1	2	1	1	1	4	3	4	4	4	1	4	1	4	Low	11	11	Proximity to Environmentally Sensitive Areas
1024	433.4459425	6	7	1.69	PVC	100	Trench - In road	1	0	0	13	135,861.49	285,648.77	RL	28.39641808	0	Local	0	14.93045598	0	96.0544487	Permanent River	3000	4.345	1	1	4	3	4	4	1	1	1	1	1	1	1	4	3	4	4	4	1	4	1	4	Low	11	11	Proximity to Environmentally Sensitive Areas
1025	140.246845	6	7	8.75	PVC	100	Trench - In road	1	0	0	1	49,061.71	103,152.25	PF	60.8087057	2.630538	Local	10.53982297	43.91910532	25.40531424	96.0544487	Permanent River	4000	7.875	1	1	4	3	4	4	1	1	1	1	1	1	1	4	3	4	4	4	1	4	1	4	Low	11	11	Proximity to Environmentally Sensitive Areas
1076	139.9998644	6	8	13.49	PVC	100	Trench - In road	1	0	0	6	278,999.97	586,597.43	CS	68.27704935	10.53282	Local	10.39470009	0.741688122	0	0	Permanent River	5000	10.745	1	1	4	3	4	4	1	1	4	2	1	1	1	4	3	4	4	4	1	4	1	4	Low	11	11	Proximity to Environmentally Sensitive Areas, Land Use
1177	57.52731647	6	13	12.35	PVC	100	Trench - In road	0	1	0	1	27,881.83	58,621.55	RL	49.68904185	0	Major	0	10000	10000	47.47947449	Permanent River	5000	12.675	1	1	4	3	4	4	1	1	1	2	1	1	1	4	3	4	4	4	1	4	1	4	Low	11	11	Proximity to Environmentally Sensitive Areas
1184	138.5213445	6	6	4.5	PVC	100	Trench - In road	1	0	0	2	45,630.34	95,937.78	RL	37.72115174	0	Local	10.15675303	17.57683376	17.57683376	57.88504046	Permanent River	4000	5.25	1	1	4	3	4	4	1	1	1	1	1	1	1	4	3	4	4	4	1	4	1	4	Low	11	11	Proximity to Environmentally Sensitive Areas
19	23.83989935	6	4	13.5	PVC	100	Trench - In road	1	0	0	1	15,459.97	32,504.60	RM	3.30155471	3.8325	Local	11.16398268	146.2829846	146.2795164	10000	N/A	4000	8.75	1	1	1	1	1	1	4	3	2	1	3	3	3	4	3	2	3	4	1	4	1	4	Low	10	10	Proximity to Buildings
45	397.0694551	6	17	14.22	PVC	100	Trench - In road	0	1	0	2	112,767.36	237,093.38	RL	0	0	Local	0	10000	10000	10000	N/A	6000	15.61	1	1	1	1	1	1	4	3	2	2	3	3	3	4	3	2	3	4	1	4	1	4	Low	10	10	Proximity to Buildings
97	132.9585933	6	10	8.67	PVC	100	Trench - Out road	0	1	0	2	43,559.51	91,583.86	RL	4.380675017	21.44668	Local	0	26.48399194	13.80087271	10000	N/A	4000	9.335	1	1	1	1	1	1	4	3	2	1	3	3	3	4	3	2	3	4	1	4	1	4	Low	10	10	Proximity to Buildings
111	136.050234	6	8	8.09	PVC	100	Trench - In road	1	0	0	2	45,012.56	94,638.90	RM	0	0	Local	0	204.4103031	204.4037736	10000	N/A	4000	8.045	1	1	1	1	1	1	4	3	2	1	3	3	3	4	3	2	3	4	1	4	1	4	Low	10	10	Proximity to Buildings
126	220.2757634	8	7	5.98	PVC	100	Trench - In road	1	0	0	5	81,582.73	171,527.69	CS	10000	0	Local	9.166935628	13.51428719	0	10000	N/A	8000	6.49	2	1	1	1	1	1	1	1	4	2	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
194	54.96686418	6	9	8.14	PVC	100	Trench - In road	1	0	0	2	24,741.72	52,019.46	RL	4.792376014	3.989516	Local	0	30.08897759	24.74160397	10000	N/A	4000	8.57	1	1	1	1	1	1	4	3	2	1	3	3	3	4	3	2	3	4	1	4	1	4	Low	10	10	Proximity to Buildings
248	259.0818385	6	8	15.2	PVC	100	Trench - In road	1	0	0	1	74,270.46	156,153.64	CS	51.69228475	0	Local	0	15.28856121	0	10000	N/A	5000	11.6	1	1	1	1	1	1	2	1	4	2	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
250	282.2263436	6	7	10.63	PVC	100	Trench - In road	1	0	0	2	81,556.59	171,472.72	CS	16.61554302	0	Local	0	221.7712645	153.5150882	10000	N/A	4000	8.815	1	1	1	1	1	1	3	2	4	1	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
252	219.9360586	6	13	19.88	PVC	100	Trench - In road	1	0	0	7	77,484.01	162,910.14	CS	48.92428417	0	Local	0	54.91710264	0	10000	N/A	6000	16.44	1	1	1	1	1	1	2	1	4	2	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
273	252.5401156	6	8	8.55	PVC	100	Trench - In road	1	0	0	3	75,635.03	159,022.65	CS	51.48226917	1.49737	Local	0	16.19857	0	10000	N/A	4000	8.275	1	1	1	1	1	1	2	1	4	1	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
309	86.92626607	6	4	10.92	PVC	100	Trench - In road	1	0	0	0	29,731.57	62,510.62	CS	113.1519651	0	Local	0	27.20056598	0	10000	N/A	4000	7.46	1	1	1	1	1	1	1	1	4	1	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
346	321.821261	6	8	17.15	PVC	100	Trench - In road	1	0	0	3	109,046.38	229,270.01	CS	37.80812917	0	Local	0	13.71699595	0	10000	N/A	10000	12.575	2	1	1	1	1	1	2	1	4	2	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
348	349.6750972	8	7	7.18	PVC	100	Trench - In road	1	0	0	4	118,902.53	249,992.57	CS	98.96230105	0	Local	6.62376833	22.46377276	0	10000	N/A	8000	7.09	2	1	1	1	1	1	1	1	4	2	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
362	163.3786724	6	11	11.11	PVC	100	Trench - In road	0	1	0	1	57,344.67	120,567.16	RL	2.328071975	0.588189	Local	11.03947692	8.791685232	0	10000	N/A	5000	11.055	1	1	1	1	1	1	4	3	2	2	1	1	1	4	3	2	1	4	1	4	1	4	Low	10	10	Proximity to Buildings
653	401.6688068	8	11	12.41	PVC	100	Trench - In road	0	1	0	7	143,000.64	300,658.85	CS	23.35686878	1.275842	Local	0	13.9753735	0	10000	N/A	10000	11.705	2	1	1	1	1	1	2	1	4	2	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
656	86.40382647	6	11	12.41	PVC	100	Trench - In road	0	1	0	0	33,600.96	70,646.01	CS	47.24172402	0	Local	6.454911996	42.9911928	0	10000	N/A	5000	11.705	1	1	1	1	1	1	2	1	4	2	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
660	201.4543497	6	7	8.76	PVC	100	Trench - In road	1	0	0	1	59,863.59	125,863.19	CS	51.9501045	2.911979	Local	10.17275968	18.67449034	0	10000	N/A	4000	7.88	1	1	1	1	1	1	1	1	4	1	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
662	403.8689712	6	7	11.8	PVC	100	Trench - In road	1	0	0	0	108,967.24	229,103.63	CS	38.80937818	2.899682	Local	0	17.93405989	0	10000	N/A	4000	9.4	1	1	1	1	1	1	2	1	4	1	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
888	487.3965828	6	10	12.32	PVC	100	Trench - In road	0	1	0	10	148,849.15	312,955.33	CS	40.14913335	0	Local	0	14.85004992	0	10000	N/A	5000	11.16	1	1	1	1	1	1	2	1	4	2	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
943	249.705516	6	14	15.4	PVC	100	Trench - Out road	0	1	0	0	68,636.74	144,308.76	RL	0	24.01401	Local	0	11.83489994	11.41033388	10000	N/A	5000	14.7	1	1	1	1	1	1	4	3	2	2	2	3	3	4	3	2	3	4	1	4	1	4	Low	10	10	Proximity to Buildings
1011	361.7274035	6	8	13.7	PVC	100	Trench - In road	1	0	0	6	107,431.85	225,875.47	RL	1.948846894	0	Local	0	12.91614356	12.91601229	10000	N/A	5000	10.85	1	1	1	1	1	1	4	3	2	2	2	3	3	4	3	2	3	4	1	4	1	4	Low	10	10	Proximity to Buildings
1079	461.760876	8	12	12.37	PVC	100	Trench - In road	0	1	0	8	162,528.26	341,715.67	CS	62.64233253	0	Local	12.1405393	13.23501577	0	10000	N/A	10000	12.185	2	1	1	1	1	1	1	1	4	2	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
1081	243.7006081	6	12	11.71	PVC	100	Trench - In road	0	1	0	0	72,925.15	153,325.13	CS	40.14913335	0	Local	0	18.60550905	0	10000	N/A	5000	11.855	1	1	1	1	1	1	2	1	4	2	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
1153	423.6934168	8	12	13.15	PVC	100	Trench - In road	0	1	0	0	139,108.03	292,474.62	CS	35.6808579	0	Local	10.77575875	14.74285192	0	10000	N/A	10000	12.575	2	1	1	1	1	1	2	2	4	2	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
1156	516.9956384	6	16	14.71	PVC	100	Trench - In road	0	1	0	0	141,248.91	296,975.83	CS	52.63419465	0	Local	10.81722718	14.76406575	0	10000	N/A	6000	15.355	1	1	1	1	1	1	1	1	4	2	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
1157	576.6396532	6	15	16.47	PVC	100	Trench - In road	0	1	0	2	159,159.91	334,633.72	CS	74.96817282	1.150305	Local	10.78510626	12.45749952	0	10000	N/A	6000	15.735	1	1	1	1	1	1	1	1	4	2	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
1329	356.255954	6	8	8	PVC	100	Trench - In road	1	0	0	6	106,063.99	222,999.54	RL	3.170338488	0	Local	0	236.2375377	236.2372479	10000	N/A	4000	8	1	1	1	1	1	1	4	3	2	1	2	3	3	4	3	2	3	4	1	4	1	4	Low	10	10	Proximity to Buildings
1332	308.4663619	6	8	11.88	PVC	100	Trench - In road	1	0	0	3	89,616.59	188,418.88	CS	25.54057537	0	Local	0	16.86090746	0	10000	N/A	4000	9.94	1	1	1	1	1	1	2	1	4	1	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
1388	66.2853146	6	8	16.44	PVC	100	Trench - In road	1	0	0	1	26,071.33	54,814.97	CS	54.41364162	0	Local	16.22879704	14.77437731	0	10000	N/A	5000	12.22	1	1	1	1	1	1	1	1	4	2	3	3	3	3	3	4	3	4	1	4	1	4	Low	10	10	Land Use
1410	90.19066197	6	8	6.3	PVC	100	Trench - In road	1	0	0	0	30,547.67	64,226.47	RM	1.311270763	0.106799	Local	16.85806254	103.9607322	87.25209495	10000	N/A	4000	7.15	1	1	1	1	1	1	4	3	3	1	1	1	1	4	3	3	1	4	1	4	1	4	Low	10	10	Proximity to Buildings
1	490.3221993	6	8	8	PVC	100	Trench - Out road	1	0	0	9	126,821.21	266,641.59	IG	10000	10000	N/A	0	10000	10000	10000	N/A	4000	8	1	1	1	1	1	1	1	1	4	1	2	3	3	2	3	4	3	4	1	4	1	4	Low	9	9	Land Use
2	490.559556	8	18.25	18.1	PVC	100	Trench - Out road	0	1	0	0	139,153.04	292,569.26	IG	135.5578806	62.27795	Major	57.18652395	10000	10000	10000	N/A	12000	18.175	3	1	1	1	1	1	1	1	4	2	1	1	1	3	2	4	1	4	1	4	1	4	Low	9	9	Land Use
3	498.4032542	8	18.08	17.94	PVC	100	Trench - In road	0	1	0	0	161,520.98	339,597.85	IG	135.585601	0	Local	0	10000	10000	10000	N/A	12000	18.01	2	1	1	1	1	1	1	1	4	2	2	3	3	2	3	4	3	4	1	4	1	4	Low	9	9	Land Use
4	501.3144716	8	17.92	17.77	PVC	100	Trench - Out road	0	1	0	0	141,940.71	298,430.34	IG	10000	61.53133	Major	78.38277481	10000	10000	10000	N/A	12000	17.845	3	1	1	1	1	1	1	1	4	2	1	1	1	3	2	4	1	4	1	4	1	4	Low	9	9	Land Use
5	501.0527601	8	17.75	17.6	PVC	100	Trench - Out road	0	1	0	0	141,872.88	298,287.72	IG	249.0611148	61.53133	Major	80.12810561	10000	10000	10000	N/A	12000	17.675	3	1	1	1	1	1	1	1	4	2	1	1	1	3	2	4	1	4	1	4	1	4	Low	9	9	Land Use
6	497.3341208	8	17.58	17.44	PVC	100	Trench - Out road	0	1	0	0	140,909.00	296,261.18	IG	249.0668355	61.6352	Major	84.31270355	10000	10000	10000	N/A	12000	17.51	3	1	1	1	1	1	1	1	4	2	1	1	1	3	2	4	1	4	1	4	1	4	Low	9	9	Land Use
7	496.1428183	8	17.25	11.25	PVC	100	Trench - Out road	0	1	0	0	140,600.22	295,611.96	IG	144.3312467	56.91776	Major	84.59347648	10000	10000	10000	N/A	10000	14.25	3	1	1	1	1	1	1	1	4	2	1	1	1	3	2	4	1	4	1	4	1	4	Low	9	9	Land Use
9	303.1833895	6	8	8	PVC	100	Trench - In road	1	0	0	8	95,795.85	201,410.77	RL	24.85875046	0	Local	7.111728739	13.13029861	0	10000	N/A	4000	8	1	1	1	1	1	1	3	2	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Proximity to Other Utilities
10	362.1931446	6	8	8	PVC	100	Trench - In road	1	0	0	11	115,048.29	241,889.02	RL	36.58330028	16.20196	Local	7.611902567	12.00049342	0	10000	N/A	4000	8	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
11	248.5820006	6	8	18.02	PVC	100	Trench - In road	1	0	0	1	71,645.50	150,634.66	RL	31.40421487	0	Local	9.185449581	5.708844317	0	10000	N/A	5000	13.01	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
16	80.08859243	6	7	13.5	PVC	100	Trench - In road	1	0	0	0	28,022.15	58,916.57	RM	8.894916979	3.636535	Local	0	151.6019466	151.5988823	10000	N/A	5000	10.25	1	1	1	1	1	1	3	2	3	2	2	3	3	3	3	3	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Land Use, Proximity to Other Utilities
20	201.5798131	6	5	4	PVC	100	Trench - In road	1	0	0	7	68,894.95	144,851.64	RM	8.012059971	0	Local	0	146.2829846	146.2795164	10000	N/A	3000	4.5	1	1	1	1	1	1	3	2	3	1	2	3	3	3	3	3	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Land Use, Proximity to Other Utilities
23	81.81636351	6	5	11.58	PVC	100	Trench - In road	1	0	0	1	29,954.09	62,978.48	RM	58.23491624	0	Local	6.069915948	31.60695106	0	10000	N/A	4000	8.29	1	1	1	1	1	1	1	1	3	1	3	3	3	3	3	3	3	3	1	3	1	3	Low	9	9	Land Use, Proximity to Other Utilities
26	169.6741067	6	8	5.68	PVC	100	Trench - In road	1	0	0	6	59,418.53	124,927.45	RL	26.86671203	0	Local	0	0.405996284	0	10000	N/A	4000	6.84	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
30	196.3380066	8	4	13.34	PVC	100	Trench - In road	1	0	0	1	68,401.40	143,813.95	RL	38.11363235	0	Local	9.999903581	12.97644614	0	10000	N/A	8000	8.67	2	1	1	1	1	1	2	2	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
31	16.99589562	6	8	8	PVC	100	Trench - In road	1	0	0	5	19,748.97	41,522.22	RL	99.49715652	7.054899	Local	8.288168561	27.87873721	0	10000	N/A	4000	8	1	1	1	1	1	1	1	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
39	44.47680832	8	6	11.51	PVC	100	Trench - In road	1	0	0	0	21,343.04	44,873.75	PF	137.8538782	9.093898	Major	0	10000	10000	10000	N/A	8000	8.755	3	1	1	1	1	1	1	1	3	2	2	3	3	3	3	3	3	3	1	3	1	3	Low	9	9	Proximity to and Types of Roads, Land Use, Proximity to Other Utilities
41	463.2645838	6	4	12.5	PVC	100	Trench - In road	1	0	0	11	140,316.15	295,014.70	RL	41.06988117	0	Local	9.434894537	25.4874025	0	10000	N/A	4000	8.25	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
51	270.4781179	6	5	10.77	PVC	100	Trench - In road	1	0	0	6	84,619.53	177,912.56	RL	38.49183774	0	Local	10.17895842	9.071923895	0	10000	N/A	4000	7.885	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
56	268.838428	6	12	10.73	PVC	100	Trench - In road	0	1	0	3	83,709.61	175,999.45	RL	39.13955144	0	Local	6.363395043	41.20018631	0	10000	N/A	5000	11.365	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
66	185.3440666	6	11	10.8	PVC	100	Trench - Out road	0	1	0	1	53,311.91	112,088.28	CS	14.89912534	46.40581	Local	4.76113386	25.54171284	25.29521497	10000	N/A	5000	10.9	1	1	1	1	1	1	3	2	4	2	1	1	2	3	2	4	2	4	1	4	1	4	Low	9	9	Land Use
67	103.7901345	6	11	10.64	PVC	100	Trench - Out road	0	1	0	2	37,294.12	78,410.89	CS	18.78366795	56.78816	Local	10.32132964	126.4155884	26.45817368	10000	N/A	5000	10.82	1	1	1	1	1	1	3	2	4	2	1	1	1	3	2	4	1	4	1	4	1	4	Low	9	9	Land Use
68	267.5339095	6	19	17.82	PVC	100	Trench - In road	0	1	0	1	80,383.48	169,006.26	RL	40.23503932	0	Local	0	12.69808163	0	10000	N/A	6000	18.41	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
70	153.6177715	6	8	4.42	PVC	100	Trench - In road	1	0	0	4	52,404.44	110,180.34	RL	42.29508014	0	Local	7.687811434	17.95873929	0	10000	N/A	4000	6.21	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
72	144.4752899	6	4	12.74	PVC	100	Trench - In road	1	0	0	1	45,618.82	95,913.57	RL	54.55105638	0	Local	0	9.536520069	0	10000	N/A	4000	8.37	1	1	1	1	1	1	1	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
75	213.2569815	6	9	3.29	PVC	100	Trench - In road	1	0	0	3	65,814.25	138,374.45	RL	27.20354556	0	Local	0	8.377887024	0	10000	N/A	4000	6.145	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
77	149.2278033	6	11	9.15	PVC	100	Trench - In road	0	1	0	5	56,806.95	119,436.61	RL	27.10672915	1.696166	Local	0	20.16350241	0	10000	N/A	5000	10.075	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
83	306.9658108	6	10	9.4	PVC	100	Trench - In road	0	1	0	4	94,741.45	199,193.90	RL	25.54251404	0	Local	0	10.26933614	0	10000	N/A	4000	9.7	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
84	360.3194973	6	11	12.01	PVC	100	Trench - In road	0	1	0	9	115,579.87	243,006.69	RL	34.39994703	0	Local	0	10.18092162	0	10000	N/A	5000	11.505	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
85	248.6706044	6	12	9.4	PVC	100	Trench - In road	0	1	0	3	78,667.65	165,398.74	RL	38.15063346	2.30209	Local	11.19890131	8.763121331	0	10000	N/A	5000	10.7	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
91	175.3006869	6	8	16.27	PVC	100	Trench - In road	1	0	0	1	53,325.17	112,116.17	RL	0.266613296	4.444887	Local	7.827315595	62.24316802	62.24316802	10000	N/A	5000	12.135	1	1	1	1	1	1	4	3	2	2	1	1	1	4	3	2	1	4	1	4	1	4	Low	9	9	Proximity to Buildings
93	172.6740125	6	8	33.8	PVC	100	Trench - In road	1	0	0	6	60,168.50	126,504.28	RL	37.26408991	0	Local	0	11.05079843	0	10000	N/A	8000	20.9	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
94	275.721988	6	8	12.9	PVC	100	Trench - In road	1	0	0	11	93,430.50	196,437.62	RL	39.91171883	0	Local	11.80873416	12.73804034	0	10000	N/A	5000	10.45	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
96	257.192073	6	13	10.72	PVC	100	Trench - In road	0	1	0	6	85,298.02	179,339.08	RL	28.43785973	0	Local	11.80873416	27.21483099	0	10000	N/A	5000	11.86	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
102	171.0848198	6	8	5	PVC	100	Trench - In road	1	0	0	3	55,271.20	116,207.71	RL	16.22845115	18.65216	Local	58.27460316	3.807316133	0	10000	N/A	4000	6.5	1	1	1	1	1	1	3	2	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Proximity to Other Utilities
103	39.21197934	6	5	13	PVC	100	Trench - Out road	1	0	0	0	16,422.73	34,528.80	RL	17.199746	66.13451	Local	82.07180606	2.783256119	0	10000	N/A	4000	9	1	1	1	1	1	1	3	2	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Proximity to Other Utilities
104	177.7426179	6	8	8	PVC	100	Trench - In road	1	0	0	5	59,935.65	126,014.71	RL	20.61874344	0	Local	0	37.02216703	8.829224782	10000	N/A	4000	8	1	1	1	1	1	1	3	2	2	1	2	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Proximity to Other Utilities
107	112.9919661	1.5	8	8.66	PVC	100	Trench - In road	1	0	0	1	37,747.99	79,365.15	RL	135.6443322	0	Local	11.0543029	16.00654177	0	10000	N/A	4000	8.33	1	1	1	1	1	1	1	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
108	283.9510312	1.5	8	8.66	PVC	100	Trench - In road	1	0	0	1	80,487.76	169,225.51	RL	33.00866686	0	Local	0	15.00670494	0	10000	N/A	4000	8.33	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
109	135.0588219	6	8	9.82	PVC	100	Trench - In road	1	0	0	1	43,264.71	90,964.04	RM	12.997962	1.173267	Local	0	21.92418079	15.27887652	10000	N/A	4000	8.91	1	1	1	1	1	1	3	2	3	1	2	3	3	3	3	3	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Land Use, Proximity to Other Utilities
110	98.12223698	6	8	8.13	PVC	100	Trench - In road	1	0	0	4	38,530.56	81,010.50	RM	18.30217818	0	Local	0	157.684508	157.6785864	10000	N/A	4000	8.065	1	1	1	1	1	1	3	2	3	1	2	3	3	3	3	3	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Land Use, Proximity to Other Utilities
116	225.9182702	6	8	8.27	PVC	100	Trench - In road	1	0	0	4	70,479.57	148,183.29	CS	49.17729197	15.71523	Local	0	10000	10000	10000	N/A	4000	8.135	1	1	1	1	1	1	2	1	4	1	2	3	3	2	3	4	3	4	1	4	1	4	Low	9	9	Land Use
117	81.7074724	6	11	15.56	PVC	100	Trench - In road	0	1	0	1	33,926.87	71,331.24	CS	42.32474114	0	Local	0	34.00889666	34.00973501	10000	N/A	5000	13.28	1	1	1	1	1	1	2	1	4	2	2	3	3	2	3	4	3	4	1	4	1	4	Low	9	9	Land Use
128	185.9530834	6	8	7.22	PVC	100	Trench - In road	1	0	0	2	57,488.27	120,869.09	RL	21.06982974	3.561432	Local	0	10000	10000	10000	N/A	4000	7.61	1	1	1	1	1	1	3	2	2	1	2	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Proximity to Other Utilities
133	282.9839047	6	8	8	PVC	100	Trench - Out road	1	0	0	6	77,784.94	163,542.84	CS	25.93246376	32.96466	Local	0	5.413159361	5.41512209	10000	N/A	4000	8	1	1	1	1	1	1	2	1	4	1	2	3	3	2	3	4	3	4	1	4	1	4	Low	9	9	Land Use
134	342.7243739	6	9	10.26	PVC	100	Trench - In road	1	0	0	10	108,681.09	228,502.00	RL	37.22904876	4.026802	Local	9.995102516	14.74438998	0	10000	N/A	4000	9.63	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
137	399.9355276	6	8	8	PVC	100	Trench - In road	1	0	0	1	109,483.88	230,189.86	RL	38.99656059	0	Local	9.344815014	15.50749563	0	10000	N/A	4000	8	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
139	231.5179544	6	8	8	PVC	100	Trench - In road	1	0	0	1	67,379.49	141,665.37	RL	36.66725635	0	Local	0	14.46886015	0	10000	N/A	4000	8	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
141	217.3363018	6	8	8	PVC	100	Trench - In road	1	0	0	7	72,834.08	153,133.64	RL	39.73526634	0	Local	9.886583871	13.74481748	0	10000	N/A	4000	8	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
143	257.4034949	6	7	6.05	PVC	100	Trench - In road	1	0	0	6	81,350.87	171,040.21	RL	49.49537653	0	Local	10.69223189	26.54704866	0	10000	N/A	4000	6.525	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
148	55.43906662	6	14	14.65	PVC	100	Trench - In road	0	1	0	0	25,859.77	54,370.16	RL	15.38935869	0	Local	0	13.0838309	7.50118122	10000	N/A	5000	14.325	1	1	1	1	1	1	3	2	2	2	2	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Proximity to Other Utilities
149	304.5628767	6	15	14.15	PVC	100	Trench - Out road	0	1	0	0	77,420.11	162,775.77	RL	0	37.87129	Local	7.231669917	11.29534917	11.29134741	10000	N/A	5000	14.575	1	1	1	1	1	1	4	3	2	2	1	1	1	4	3	2	1	4	1	4	1	4	Low	9	9	Proximity to Buildings
150	226.1140678	6	8	14.27	PVC	100	Trench - In road	1	0	0	6	73,528.52	154,593.71	RM	18.25076926	1.75124	Local	10.64685334	24.98250498	0	10000	N/A	5000	11.135	1	1	1	1	1	1	3	2	3	2	3	3	3	3	3	3	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Land Use, Proximity to Other Utilities
152	271.5763108	6	8	15.87	PVC	100	Trench - In road	1	0	0	4	81,894.08	172,182.30	RL	27.00492696	5.10591	Local	16.70375199	30.48393535	0	10000	N/A	5000	11.935	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
190	140.1601022	6	8	6.78	PVC	100	Trench - In road	1	0	0	2	46,040.03	96,799.15	RL	7.645263131	4.642707	Local	0	179.4143217	178.9910006	10000	N/A	4000	7.39	1	1	1	1	1	1	3	2	2	1	2	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Proximity to Other Utilities
191	357.6650144	6	6	8.21	PVC	100	Trench - In road	1	0	0	9	110,916.25	233,201.42	RL	39.182322	0	Local	5.912141045	11.53256927	0	10000	N/A	4000	7.105	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
196	149.2813264	6	8	10.2	PVC	100	Trench - In road	1	0	0	4	51,320.33	107,901.00	RL	21.23230153	4.461203	Local	14.8944831	11.52065557	0	10000	N/A	4000	9.1	1	1	1	1	1	1	3	2	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Proximity to Other Utilities
197	101.3243538	6	10	9.6	PVC	100	Trench - In road	0	1	0	1	38,831.09	81,642.36	RL	37.04382009	0	Local	9.112612	30.88484411	0	10000	N/A	4000	9.8	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
198	61.37555795	8	8	4.76	PVC	100	Trench - In road	1	0	0	1	27,912.67	58,686.38	MB	147.52559	0	Local	9.339206745	46.83708111	0	10000	N/A	8000	6.38	2	1	1	1	1	1	1	1	3	2	3	3	3	3	3	3	3	3	1	3	1	3	Low	9	9	Land Use, Proximity to Other Utilities
202	154.7784061	6	8	14.6	PVC	100	Trench - In road	1	0	0	4	52,694.60	110,790.40	RL	43.69574095	0	Local	13.18748964	15.00735808	0	10000	N/A	5000	11.3	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
209	421.0528227	6	13	10.21	PVC	100	Trench - In road	0	1	0	3	121,763.21	256,007.14	RL	38.17214478	1.976278	Local	0	15.88285816	0	10000	N/A	5000	11.605	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
213	134.0890818	6	9	11.35	PVC	100	Trench - In road	1	0	0	7	52,022.27	109,376.82	RL	44.15040007	0.013888	Local	9.330562159	45.5732023	0	10000	N/A	5000	10.175	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
223	1070.716134	2	14	8	PVC	100	Trench - In road	0	1	0	0	279,679.03	588,025.17	RL	17.72417917	0	Local	0	10000	10000	10000	N/A	5000	11	1	1	1	1	1	1	3	1	2	2	2	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Proximity to Other Utilities
224	77.2757453	6	4	8.28	PVC	100	Trench - In road	1	0	0	2	30,318.94	63,745.56	RL	4.620140377	4.141632	Local	7.669047959	33.66539487	12.57838242	230.1921543	Permanent River	4000	6.14	1	1	1	1	1	1	4	3	2	1	1	1	1	4	3	2	1	4	1	4	1	4	Low	9	9	Proximity to Buildings
226	137.6331769	6	6	11.06	PVC	100	Trench - In road	1	0	0	6	51,408.29	108,085.94	RM	35.95852483	0	Local	0	39.37013532	0	10000	N/A	4000	8.53	1	1	1	1	1	1	2	1	3	1	3	3	3	3	3	3	3	3	1	3	1	3	Low	9	9	Land Use, Proximity to Other Utilities

UniqueID	Length (ft)	Dia (in)	USMH depth (ft)	DSMH depth (ft)	Material	Ph 2 CIP Year	Replacement Method	Manholes (<10ft)	Manholes (10-20ft)	Manholes (>20ft)	Laterals	Matrl & Install Cost ($)	Const Cost ($)	Land Use Type	ProxTo Building (ft)	ProxTo Road (ft)	RoadType	ProxTo WaterMains (ft)	ProxTo StormWaterFeature (ft)	ProxTo StormWaterDitch (ft)	ProxToESA (ft)	Type of ESA	Repair Cost ($)	Depth (ft)
233	129.2451092	6	8	8	PVC	100	Trench - Out road	1	0	0	0	35,761.85	75,189.29	RM	24.03519363	47.7908	Local	0	16.12944927	16.12930525	10000	N/A	4000	8
235	31.73484628	6	9	9	PVC	100	Trench - In road	1	0	0	10	30,933.71	65,038.13	RM	9.950930647	0	Local	0	39.03477355	0	10000	N/A	4000	9
238	108.2978124	6	16	15.54	PVC	100	Trench - In road	0	1	0	1	40,574.45	85,307.79	RL	17.41174302	0	Local	0	14.76576423	0	10000	N/A	6000	15.77
239	111.7724142	6	15	14.71	PVC	100	Trench - Out road	0	1	0	0	36,008.71	75,708.32	RL	16.35947817	67.10434	Local	30.50506255	4.330043837	0	10000	N/A	5000	14.855
247	291.0002543	6	9	7.85	PVC	100	Trench - In road	1	0	0	2	83,750.06	176,084.51	CS	25.119201	10.99928	Local	0	10000	10000	10000	N/A	4000	8.425
253	137.9079253	6	8	10.24	PVC	100	Trench - In road	1	0	0	4	48,476.98	101,922.85	RL	41.86636687	0	Local	0	18.36391247	0	173.1592258	Permanent River	4000	9.12
254	230.4635671	6	8	19.28	PVC	100	Trench - In road	1	0	0	1	67,115.89	141,111.16	RL	35.59753291	0	Local	9.114003907	39.57625154	0	10000	N/A	5000	13.64
262	226.939866	6	14	11.21	PVC	100	Trench - In road	0	1	0	0	68,734.97	144,515.27	RM	24.47479889	7.212418	Local	10.00010252	13.49827697	0	10000	N/A	5000	12.605
263	127.4689402	6	8	9.87	PVC	100	Trench - In road	1	0	0	8	51,867.24	109,050.86	RM	60.13643547	3.583603	Local	9.664229237	39.38087499	0	10000	N/A	4000	8.935
264	253.3612404	6	10	9.44	PVC	100	Trench - In road	0	1	0	3	79,840.31	167,864.25	RM	41.55013814	0	Local	1.576175914	17.13514561	0	10000	N/A	4000	9.72
265	354.7212052	6	9	9.64	PVC	100	Trench - In road	1	0	0	7	107,180.30	225,346.58	RL	42.80117775	5.252238	Local	7.342880389	15.07947857	0	10000	N/A	4000	9.32
272	241.0147515	6	10	9.87	PVC	100	Trench - In road	0	1	0	0	72,253.69	151,913.38	RM	44.88313599	0	Local	0	18.08093793	0	10000	N/A	4000	9.935
275	323.4994318	6	9	9.04	PVC	100	Trench - In road	1	0	0	0	88,874.86	186,859.39	RL	33.64709649	0.891354	Local	0	16.67747014	0	10000	N/A	4000	9.02
277	131.6979364	6	12	10.74	PVC	100	Trench - In road	0	1	0	11	61,424.48	129,144.98	RM	8.751528149	2.946058	Local	0	213.533788	208.2000438	10000	N/A	5000	11.37
280	421.1751738	6	8	14.5	PVC	100	Trench - In road	1	0	0	2	116,293.79	244,507.70	RL	32.05424858	0	Local	8.361968103	9.199000754	0	10000	N/A	5000	11.25
281	240.841529	6	12	14.5	PVC	100	Trench - In road	0	1	0	0	72,210.38	151,822.33	RL	20.37831946	0	Local	0	9.444796237	0	10000	N/A	5000	13.25
282	152.883714	6	14	14.15	PVC	100	Trench - In road	0	1	0	0	50,220.93	105,589.50	RL	31.76878428	8.923076	Local	10.72301068	8.372355753	0	10000	N/A	5000	14.075
315	506.2038515	6	16	17.67	PVC	100	Trench - In road	0	1	0	2	141,550.96	297,610.90	RL	20.27338465	0	Local	0	9.205608723	0	10000	N/A	6000	16.835
320	138.0250955	6	8	13.87	PVC	100	Trench - In road	1	0	0	3	47,006.27	98,830.69	RL	18.58616225	0	Local	0	182.7141155	179.9705673	10000	N/A	5000	10.935
326	286.7831608	6	2	8.28	PVC	100	Trench - In road	1	0	0	4	85,695.79	180,175.40	RL	32.90789121	3.933798	Local	9.933865776	9.946392182	0	10000	N/A	4000	5.14
331	118.0970019	6	8	6.17	PVC	100	Trench - In road	1	0	0	0	37,524.25	78,894.74	RL	36.96076419	0	Local	0	14.91806362	0	101.4030345	Permanent River	4000	7.085
337	343.4750831	6	4	6.17	PVC	100	Trench - In road	1	0	0	0	93,868.77	197,359.09	RL	35.04735096	0	Local	12.26042676	22.7756984	0	101.4030345	Permanent River	4000	5.085
339	268.9203198	6	20	10.75	PVC	100	Trench - In road	0	1	0	2	82,230.08	172,888.74	RL	37.34235811	0	Local	7.449054254	14.61178935	0	10000	N/A	6000	15.375
345	121.9505091	8	7	7.36	PVC	100	Trench - In road	1	0	0	0	44,585.15	93,740.28	CS	48.5943723	0	Local	0	10.42016614	10.42129718	10000	N/A	8000	7.18
349	[illegible]																						8000	5.555
533	348.5811217	6	8	7.7	PVC	100	Trench - In road	1	0	0	2	98,145.28	206,350.45	RL	32.84126483	0	Local	0	14.26827919	0	10000	N/A	4000	7.85

UniqueID	Length (ft)	Dia (in)	USMH depth (ft)	DSMH depth (ft)	Material	Ph 2 CIP Year	Replacement Method	Manholes (<10ft)	Manholes (10-20ft)	Manholes (>20ft)	Laterals	Matrl & Install Cost ($)	Const Cost ($)	Land Use Type	ProxTo Building (ft)	ProxTo Road (ft)	RoadType	ProxTo WaterMains (ft)	ProxTo StormWaterFeature (ft)	ProxTo StormWaterDitch (ft)	ProxToESA (ft)	Type of ESA	Repair Cost ($)	Depth (ft)
1337	414.6153102	6	8	16.87	PVC	100	Trench - In road	1	0	0	6	120,653.83	253,674.67	RL	34.57077671	0	Local	9.568354155	22.83383565	0	10000	N/A	5000	12.435
1342	35.5999048	6	8	19.44	PVC	100	Trench - In road	1	0	0	2	19,899.98	41,839.70	RL	10.51359368	0	Local	5.537998142	77.75348589	0	10000	N/A	5000	13.72
1343	93.64575547	6	9	8.3	PVC	100	Trench - Out road	1	0	0	6	37,115.11	78,034.52	RM	7.582804803	23.9171	Local	38.95413823	9.94493649	0	10000	N/A	4000	8.65
1346	421.6211356	6	5	5.4	PVC	100	Trench - In road	1	0	0	2	116,405.28	244,742.11	RM	38.64028706	0	Local	0	73.38056932	0	10000	N/A	4000	5.2
1357	118.7419977	6	8	4.2	PVC	100	Trench - In road	1	0	0	3	42,185.50	88,695.01	RM	19.13251649	0	Local	0	85.25956629	31.23207425	10000	N/A	4000	6.1
1368	226.769354	2	8	18.27	PVC	100	Trench - Out road	1	0	0	0	56,710.06	119,232.90	IG	176.874129	70.50225	Major	0	10000	10000	10000	N/A	5000	13.135
1387	112.8929593	6	11	15.47	PVC	100	Trench - In road	0	1	0	3	44,723.24	94,030.61	RL	27.16528789	0	Local	5.245473298	38.43363587	0	10000	N/A	5000	13.235
1394	306.4047041	6	8	7.5	PVC	100	Trench - In road	1	0	0	3	89,101.18	187,335.22	RL	40.1213674	0	Local	0	14.36788546	0	10000	N/A	4000	7.75
1395	177.0852867	6	11	4.8	PVC	100	Trench - In road	0	1	0	0	56,271.32	118,310.45	RL	36.60568315	1.193655	Local	7.508634653	5.727764646	0	10000	N/A	4000	7.9
1396	357.1822971	6	21	10.88	PVC	100	Trench - In road	0	0	1	3	108,795.57	228,742.69	RL	41.41082551	0	Local	0	14.24363553	0	10000	N/A	6000	15.94
1398	109.3504776	6	19	21.3	PVC	100	Trench - In road	0	1	0	0	39,337.62	82,707.34	RL	47.26394135	0	Local	6.831424455	10.22196247	0	10000	N/A	8000	20.15
1402	308.5685347	6	8	8	PVC	100	Trench - In road	1	0	0	0	85,142.13	179,011.34	RL	41.96243012	0	Local	5.805737496	7.871685964	0	10000	N/A	4000	8
1403	177.7331412	6	27.08	8	PVC	100	Trench - In road	0	0	1	0	59,433.29	124,958.48	RL	23.08040134	0	Local	0	10000	10000	10000	N/A	6000	17.54
1404	147.4110805	6	8	9.56	PVC	100	Trench - In road	1	0	0	0	44,852.77	94,302.95	RL	36.2173092	0	Local	0	46.06799815	0	10000	N/A	4000	8.78
1406	380.9552952	6	7	7.7	PVC	100	Trench - In road	1	0	0	0	103,238.82	217,059.63	RM	44.21937158	0	Local	9.219759631	123.5776286	0	10000	N/A	4000	7.35
1407	204.9767267	6	10	6.8	PVC	100	Trench - In road	0	1	0	0	63,244.18	132,970.89	RM	22.32366525	0	Local	0	236.2634916	211.12759	10000	N/A	4000	8.4
1408	140.3858271	6	8	10.1	PVC	100	Trench - In road	1	0	0	0	43,096.46	90,610.30	RM	8.355886681	0	Local	0	175.0523429	175.0523429	10000	N/A	4000	9.05
8	342.4441777	8	17.25	7.95	PVC	100	Trench - Out road	0	1	0	0	100,761.53	211,851.12	PF	128.7533564	54.42418	Major	40.83736058	10000	10000	10000	N/A	10000	12.6
24	204.088511	6	4	5	PVC	100	Trench - In road	1	0	0	8	71,022.13	149,324.02	RM	38.72395796	0	Local	0	31.60695106	24.14750097	10000	N/A	3000	4.5
25	46.47498356	6	8	14.74	PVC	100	Trench - In road	1	0	0	0	19,618.75	41,248.41	RL	51.91979305	9.215399	Local	0	48.99906732	30.14490503	10000	N/A	5000	11.37
29	156.1696733	8	4	13.34	PVC	100	Trench - In road	1	0	0	0	54,850.90	115,324.02	RL	39.50146997	0	Local	0	24.9353157	24.90649298	10000	N/A	8000	8.67
36	499.3657977	8	11	17.15	PVC	100	Trench - Out road	0	1	0	0	141,435.61	297,368.38	PF	128.6368968	56.31464	Major	35.16077452	10000	10000	10000	N/A	10000	14.075
37	459.8301408	8	17	11.25	PVC	100	Trench - Out road	0	1	0	0	131,187.97	275,822.71	PF	129.4450708	57.06355	Major	30.52607384	10000	10000	10000	N/A	10000	14.125
38	319.5430622	8	8	7.95	PVC	100	Trench - Out road	1	0	0	0	90,825.56	190,960.74	PF	10000	51.97959	Major	26.5628313	10000	10000	10000	N/A	8000	7.975
40	354.9810746	8	8	6	PVC	100	Trench - Out road	1	0	0	0	100,011.09	210,273.33	PF	137.8538782	51.97959	Major	26.5628313	10000	10000	10000	N/A	8000	7
46	128.6003184	6	4	8.9	PVC	100	Trench - In road	1	0	0	0	40,150.08	84,415.54	RM	53.71096935	7.919919	Local	0	161.3068772	160.6310676	10000	N/A	4000	6.45
48	92.69711879	6	8	4.7	PVC	100	Trench - Out road	1	0	0	2	30,911.34	64,991.09	RM	14.63958781	10000	N/A	16.65249815	177.0200846	160.6310676	10000	N/A	4000	6.35
49	215.3998378	6	8	5.92	PVC	100	Trench - In road	1	0	0	6	70,849.96	148,962.04	RL	36.86584891	0	Local	0	43.0411142	6.697013553	10000	N/A	4000	6.96
53	267.7701327	6	9	8.76	PVC	100	Trench - In road	1	0	0	2	77,942.53	163,874.18	RL	35.86247928	2.740012	Local	0	26.94174837	14.79351668	10000	N/A	4000	8.88
101	77.07423282	6	9	9.27	PVC	100	Trench - In road	1	0	0	1	28,768.56	60,485.89	RL	40.63070515	0	Local	0	204.190263	204.190263	10000	N/A	4000	9.135
112	134.3168171	6	8	4.5	PVC	100	Trench - In road	1	0	0	1	43,079.20	90,574.03	RL	29.40438918	0	Local	0	10000	10000	10000	N/A	4000	6.25
119	60.50771332	6	5	7.14	DI	100	Trench - In road	1	0	0	1	24,626.93	51,778.12	RL	50.00167421	3.665673	Local	8.610474191	196.3400471	101.096029	10000	N/A	4000	6.07
129	316.0972233	8	12	8.87	PVC	100	Trench - In road	0	1	0	1	108,329.17	227,762.07	RL	63.45664892	0	Local	0	10000	10000	10000	N/A	10000	10.435
135	342.9166163	6	10	9.87	PVC	100	Trench - In road	0	1	0	6	106,729.15	224,398.05	RL	36.11293042	0	Local	0	13.7773212	13.7773212	10000	N/A	4000	9.935
136	188.7283031	6	10	11.59	PVC	100	Trench - In road	0	1	0	2	62,182.08	130,737.81	RL	27.19899501	0.285151	Local	0	105.7964198	105.7964198	10000	N/A	5000	10.795
140	278.1238445	6	8	8	PVC	100	Trench - In road	1	0	0	3	82,030.96	172,470.10	RL	40.66692847	0	Local	0	15.01951104	9.377307421	10000	N/A	4000	8
146	179.6168944	6	5	7.14	PVC	100	Trench - In road	1	0	0	3	57,404.22	120,692.38	RL	48.91459924	0	Local	0	39.87969935	25.2027746	10000	N/A	4000	6.07
147	264.0905634	6	8	7.53	PVC	100	Trench - In road	1	0	0	3	78,522.64	165,093.85	RL	38.0367425	2.104431	Local	0	20.53084046	14.71064193	10000	N/A	4000	7.765
156	224.5008174	6	8	16.46	PVC	100	Trench - In road	1	0	0	3	68,625.20	144,284.49	RL	47.4330936	0	Local	0	238.5629895	189.6241414	10000	N/A	5000	12.23
163	452.282566	6	8	16.97	PVC	100	Trench - In road	1	0	0	2	124,070.64	260,858.52	RL	31.52179995	0	Local	0	142.9366924	142.9456985	10000	N/A	5000	12.485
188	145.7113182	6	8	14.73	PVC	100	Trench - In road	1	0	0	2	47,427.83	99,717.01	RL	26.45864817	0	Local	0	134.3407364	17.75604691	10000	N/A	5000	11.365
199	27.07113036	8	9	8.61	PVC	100	Trench - In road	1	0	0	0	16,121.34	33,895.12	RL	40.21709907	0	Local	0	139.2010684	139.2022967	10000	N/A	8000	8.805
200	77.53882747	8	9	9.08	PVC	100	Trench - In road	1	0	0	0	31,261.65	65,727.62	RL	40.21709907	0	Local	0	139.2010684	139.2022967	10000	N/A	8000	9.04
220	287.4602954	6	12	12.72	PVC	100	Trench - In road	0	1	0	2	86,865.07	182,633.82	RE	68.38239767	0	Local	0	10000	10000	10000	N/A	5000	12.36
227	132.882202	6	3	8	PVC	100	Trench - In road	1	0	0	1	42,720.55	89,819.96	RE	60.5455898	0	Local	0	10000	10000	10000	N/A	4000	5.5
234	41.43502836	6	8	8.6	PVC	100	Trench - Out road	1	0	0	6	25,900.24	54,455.26	RM	9.950930647	30.36915	Local	18.30489243	16.12944927	14.86368311	10000	N/A	4000	8.3
237	296.7662543	6	8	13.36	PVC	100	Trench - In road	1	0	0	0	82,191.56	172,807.76	RL	31.11526177	0	Local	0	139.3060177	20.84935701	10000	N/A	5000	10.68
243	184.8410817	6	15	15.24	PVC	100	Trench - In road	0	1	0	2	61,210.27	128,694.59	RE	105.7412601	0	Local	0	10000	10000	10000	N/A	6000	15.12
249	75.75121714	6	10	10.63	PVC	100	Trench - In road	0	1	0	2	33,937.80	71,354.23	CS	36.41753958	1.690339	Local	45.35442863	187.7618354	153.5150882	10000	N/A	5000	10.315
251	270.6453508	6	11	12.98	PVC	100	Trench - In road	0	1	0	0	79,661.34	167,487.96	CS	30.2610085	0	Local	4.100401729	151.1703082	150.5791327	10000	N/A	5000	11.99
260	128.6154816	6	8	15.08	PVC	100	Trench - In road	1	0	0	6	49,153.87	103,346.01	RM	21.95058563	6.879144	Local	8.091336687	10000	127.1990557	10000	N/A	5000	11.54
267	408.487052	6	8	9.6	PVC	100	Trench - In road	1	0	0	0	110,121.76	231,531.01	RL	38.98307373	0	Local	0	16.95726968	14.03208205	10000	N/A	4000	8.8
269	107.4179483	6	10	10.09	PVC	100	Trench - In road	1	0	0	4	40,354.49	84,845.31	RL	47.44779493	0	Local	0	30.33756423	11.27571916	10000	N/A	5000	10.045
271	53.48130318	6	10	10.09	PVC	100	Trench - In road	1	0	0	4	31,370.33	65,956.11	RL	53.28653755	0	Local	0	14.83929413	14.83929413	10000	N/A	5000	10.045
293	315.3588236	6	3	6.16	PVC	100	Trench - In road	1	0	0	3	91,339.71	192,041.73	RL	59.7916149	0	Local	0	10000	10000	10000	N/A	3000	4.58
322	344.5754524	2	8	11.72	PVC	100	Trench - In road	1	0	0	3	98,643.86	207,398.72	RE	56.56226084	0	Local	0	10000	10000	10000	N/A	4000	9.86
324	226.9580167	2	8	2.73	PVC	100	Trench - In road	1	0	0	0	64,739.50	136,114.81	RL	31.23694474	0	Local	0	10000	10000	10000	N/A	4000	5.365
327	287.615139	6	5	6.12	PVC	100	Trench - In road	1	0	0	2	82,903.78	174,305.21	RL	38.75074723	1.77909	Local	0	28.29075865	28.29075865	10000	N/A	4000	5.56
347	306.0926785	8	7	6.71	PVC	100	Trench - In road	1	0	0	6	108,827.80	228,810.46	MB	44.47944647	0	Local	0	13.87695509	13.89301139	10000	N/A	8000	6.855
357	74.86782843	6	8	6.65	PVC	100	Trench - In road	1	0	0	4	32,716.96	68,787.40	RL	41.20190624	4.727464	Local	0	16.54387476	16.5637726	10000	N/A	4000	7.325
360	46.79925572	6	8	8.83	PVC	100	Trench - In road	1	0	0	4	25,699.81	54,033.86	RL	60.00559462	0	Local	0	14.1120579	5.259983202	10000	N/A	4000	8.415
365	34.35150321	6	8	8.66	PVC	100	Trench - In road	1	0	0	1	18,087.88	38,029.76	RL	110.8859285	2.398332	Local	0	10.75736621	8.915618958	10000	N/A	4000	8.33
372	249.7510423	8	20	17.55	PVC	100	Trench - In road	1	0	0	0	86,925.31	182,760.47	RL	35.33922106	0	Local	0	10000	10000	10000	N/A	12000	18.775
382	92.27649087	2	8	11.01	PVC	100	Trench - In road	1	0	0	3	35,569.12	74,784.08	RL	56.46885195	0	Local	0	10000	10000	10000	N/A	4000	9.505
389	200.0377715	8	17	12.91	PVC	100	Trench - In road	1	0	0	3	76,511.33	160,865.07	RE	18.90825704	0	Local	7.999810082	10000	10000	10000	N/A	10000	14.955
402	324.0974605	6	12	10.78	PVC	100	Trench - In road	0	1	0	4	99,024.37	208,198.73	RL	58.7748068	4.403751	Local	0	10000	10000	10000	N/A	5000	11.39
407	273.1049042	6	13	11.01	PVC	100	Trench - In road	0	1	0	1	81,776.23	171,934.52	RL	72.55079937	0	Local	0	10000	10000	10000	N/A	5000	12.005
416	102.2541389	6	8	13.93	PVC	100	Trench - In road	1	0	0	1	35,063.53	73,721.08	RL	38.99021443	4.446165	Local	0	16.08249809	14.47282947	10000	N/A	5000	10.965
419	380.1855542	6	11	3.99	PVC	100	Trench - In road	1	0	0	8	119,046.39	250,295.03	RL	41.69101532	0	Local	0	138.0770139	138.0796282	10000	N/A	4000	7.495
429	549.7199938	6	12	10.57	PVC	100	Trench - In road	0	1	0	3	153,930.00	323,637.82	RL	53.34305458	0	Local	0	10000	10000	10000	N/A	5000	11.285
430	203.0449377	6	14	11.82	PVC	100	Trench - In road	0	1	0	0	62,761.23	131,955.50	RL	53.46846904	0.076586	Local	0	10000	10000	10000	N/A	5000	12.91
431	471.9581167	6	14	8	PVC	100	Trench - In road	0	1	0	5	137,489.53	289,071.74	RL	41.62588902	0	Local	0	10000	10000	10000	N/A	5000	11
432	503.0703019	6	8	14.17	PVC	100	Trench - In road	1	0	0	2	136,767.58	287,553.83	RL	45.94377198	0	Local	0	10000	10000	10000	N/A	5000	11.085
441	578.7301102	8	17	15.09	PVC	100	Trench - In road	0	1	0	1	187,119.03	393,417.77	RE	23.278426	0	Local	116.4427111	10000	10000	10000	N/A	12000	16.045
442	180.9882077	8	16	16.57	PVC	100	Trench - In road	0	1	0	1	67,796.46	142,542.06	RL	151.72945	0	Local	0	10000	10000	10000	N/A	12000	16.285
444	456.3463046	8	13	13.51	PVC	100	Trench - In road	0	1	0	0	148,903.89	313,070.43	RL	15.77276318	0	Local	10.53089201	10000	10000	10000	N/A	10000	13.255
445	178.191229	8	14	12.44	PVC	100	Trench - In road	0	1	0	0	65,457.37	137,624.12	RL	40.10055846	0	Local	0	10000	10000	10000	N/A	10000	13.22
480	293.40766	6	9	11.45	PVC	100	Trench - In road	1	0	0	3	85,851.91	180,503.65	RL	34.58987324	0.513263	Local	0	18.8744182	18.34928869	10000	N/A	5000	10.225
481	67.51727791	6	8	19.58	PVC	100	Trench - In road	1	0	0	3	33,879.32	71,231.27	RL	49.4211878	0	Local	0	36.41460234	36.40898969	10000	N/A	5000	13.79
485	145.0024845	6	14	11.07	PVC	100	Trench - In road	0	1	0	12	66,250.62	139,291.93	RL	37.18197756	0	Local	0	237.1650393	210.6343089	10000	N/A	5000	12.535
488	124.4220036	6	8	13.37	PVC	100	Trench - In road	1	0	0	3	43,605.50	91,680.57	RL	33.40227189	0	Local	0	10000	10000	10000	N/A	5000	10.685
499	349.1661925	6	23	15.22	PVC	100	Trench - In road	0	0	1	8	114,291.55	240,297.98	RL	33.21197139	0	Local	0	10000	10000	10000	N/A	6000	19.11
506	322.4173061	6	11	12.86	PVC	100	Trench - In road	0	1	0	5	100,104.33	210,469.35	RL	28.88337317	0	Local	0	50.63763468	43.59159691	10000	N/A	5000	11.93
516	424.2193814	6	8	12.91	PVC	100	Trench - In road	1	0	0	12	132,054.85	277,645.31	RL	25.86984337	0	Local	0	10000	10000	10000	N/A	5000	10.455
523	491.1680045	6	11	11.98	PVC	100	Trench - In road	0	1	0	10	149,792.00	314,937.68	RL	45.26659207	0	Local	0	156.6989964	156.0854933	10000	N/A	5000	11.49
536	353.6708304	6	9	9.23	PVC	100	Trench - In road	1	0	0	6	105,417.71	221,640.73	RL	9.2354052	1.579622	Local	0	10000	10000	10000	N/A	4000	9.115
554	136.5247133	6	11	11.89	PVC	100	Trench - In road	0	1	0	4	46,131.18	96,990.80	CS	46.77019209	0	Major	9.590308875	10000	10000	10000	N/A	5000	11.445
561	359.2515924	6	8	15.08	PVC	100	Trench - In road	1	0	0	1	99,312.90	208,805.37	RM	30.32487519	0	Local	0	10000	195.6771352	10000	N/A	5000	11.54
584	155.3742922	6	16	17.3	PVC	100	Trench - In road	0	1	0	2	53,843.57	113,206.11	RL	51.20434202	0.420615	Local	0	44.19896465	44.18965109	10000	N/A	6000	16.65
585	412.9329809	6	8	17.11	PVC	100	Trench - In road	1	0	0	4	117,233.25	246,482.90	RL	49.77717087	0	Local	0	31.20947355	31.20947355	10000	N/A	5000	12.555
602	130.1606335	6	8	9.32	PVC	100	Trench - In road	1	0	0	5	48,040.16	101,004.43	RL	48.84254975	3.179221	Local	0	27.47480356	27.47480356	10000	N/A	4000	8.66
612	440.5380428	6	8	7.91	PVC	100	Trench - In road	1	0	0	7	128,634.51	270,456.06	RL	39.75711507	0	Local	0	52.40160183	23.17167445	10000	N/A	4000	7.955
626	284.3616618	6	8	8.37	PVC	100	Trench - In road	1	0	0	4	85,090.42	178,902.60	RL	41.88521806	0	Local	0	33.90514238	18.21287894	10000	N/A	4000	8.185
633	53.345359	6	14	13.13	PVC	100	Trench - In road	0	1	0	4	26,836.34	56,423.40	RL	32.43416482	8.365615	Local	0	48.19299071	39.28253784	10000	N/A	5000	13.565
641	103.349184	6	8	9.16	PVC	100	Trench - In road	1	0	0	3	39,837.30	83,757.91	RL	39.43185695	5.453591	Local	0	10000	10000	10000	N/A	4000	8.58
642	366.1087179	6	8	11.32	PVC	100	Trench - In road	1	0	0	4	101,027.18	212,409.64	RL	38.75729565	0	Local	0	32.97486795	30.76192056	10000	N/A	4000	9.66
644	256.9292258	6	8	7.73	PVC	100	Trench - In road	1	0	0	0	72,232.31	151,868.42	RL	41.2647027	0	Local	0	10000	10000	10000	N/A	4000	7.865
652	280.657908	6	11	9.83	PVC	100	Trench - In road	0	1	0	0	82,164.48	172,750.81	RL	38.84419806	4.53432	Local	0	24.80392767	23.61054061	10000	N/A	5000	10.415
655	74.73763549	6	10	11.2	PVC	100	Trench - Out road	1	0	0	6	37,053.64	77,905.29	CS	32.66183992	57.40369	Local	11.6434947	55.96101781	27.22753961	10000	N/A	5000	10.6
658	293.5138971	6	10	10.4	PVC	100	Trench - In road	1	0	0	0	86,878.47	182,661.99	RL	26.46579901	0.891354	Local	0	20.74858808	16.65311192	10000	N/A	5000	10.2
711	27.30535391	6	8	6.3	PVC	100	Trench - In road	1	0	0	4	20,826.34	43,787.38	RL	47.198825	1.755128	Local	0	10000	10000	10000	N/A	4000	7.15
713	268.14188	6	8	12.4	PVC	100	Trench - In road	1	0	0	3	79,535.47	167,223.33	RL	36.12608983	0	Local	0	78.84414896	78.84414896	10000	N/A	5000	10.2
717	168.5020333	6	8	8	PVC	100	Trench - In road	1	0	0	3	54,625.51	114,850.13	RL	32.17669148	1.592391	Local	0	10000	10000	10000	N/A	4000	8
728	122.1971831	6	13	16.55	PVC	100	Trench - In road	0	1	0	4	42,549.30	89,459.89	RL	39.67565899	4.39065	Local	0	51.27012068	48.50404654	10000	N/A	5000	14.775
731	319.1469721	6	18	14.46	PVC	100	Trench - In road	0	1	0	4	91,786.74	192,981.63	RL	39.32262434	0.104799	Local	0	33.90002295	24.98456195	10000	N/A	6000	16.23
735	20.18016706	6	23	23.7	PVC	100	Trench - In road	0	0	1	1	21,545.04	45,298.45	RL	64.01487324	7.635628	Local	0	10000	10000	10000	N/A	8000	23.35
736	475.754361	6	16	11.7	PVC	100	Trench - In road	0	1	0	1	130,938.59	275,298.39	RL	48.52145597	6.02372	Local	0	198.2792998	197.9218451	10000	N/A	5000	13.85
737	341.082698	6	12	7.55	PVC	100	Trench - In road	0	1	0	4	103,270.67	217,126.59	RL	47.80931347	0	Local	0	10000	10000	10000	N/A	4000	9.775
756	112.6031627	6	16	20.95	PVC	100	Trench - In road	0	1	0	4	46,150.79	97,032.04	RL	71.06212487	0	Local	0	10000	58.78012801	10000	N/A	6000	18.475
758	274.0828247	6	13	14.35	PVC	100	Trench - In road	0	1	0	4	86,520.71	181,909.78	RL	28.68876889	0	Local	0	10000	148.5475209	10000	N/A	5000	13.675
761	178.7797628	6	8	23	PVC	100	Trench - In road	1	0	0	3	57,194.94	120,252.36	RL	37.20774796	0	Local	0	10000	10000	10000	N/A	6000	15.5
772	405.9921899	6	18	15.96	PVC	100	Trench - In road	0	1	0	6	122,408.05	257,362.14	RL	41.26739818	0	Local	0	10000	10000	10000	N/A	6000	16.98
832	21.90478047	6	15	18.72	PVC	100	Trench - In road	0	1	0	1	18,976.20	39,897.45	RL	44.14602949	5.273667	Local	0	56.79016032	24.04470258	10000	N/A	6000	16.86
887	187.9947276	6	13	10.01	PVC	100	Trench - In road	0	1	0	4	64,998.68	136,659.73	CS	45.16629148	1.464295	Local	9.674306614	88.76639768	73.17940671	10000	N/A	5000	11.505
900	193.359141	6	8	11.56	PVC	100	Trench - In road	1	0	0	4	62,339.79	131,069.40	RL	43.53251283	0	Local	0	242.0989032	242.0989032	10000	N/A	4000	9.78
902	160.4920427	6	8	10.73	PVC	100	Trench - In road	1	0	0	3	52,623.01	110,639.88	RL	40.14786168	0	Local	0	25.41447152	25.11004451	10000	N/A	4000	9.365
917	290.5462011	6	8	11.72	PVC	100	Trench - In road	1	0	0	11	97,136.55	204,229.60	RL	37.65752897	3.541734	Local	0	10000	10000	10000	N/A	4000	9.86
938	341.1075943	6	8	14	PVC	100	Trench - In road	1	0	0	0	93,276.90	196,114.68	RL	32.07009619	0	Local	0	15.56219441	11.96809232	10000	N/A	5000	11
946	120.0244841	6	10	12.96	PVC	100	Trench - In road	1	0	0	4	48,006.12	100,932.87	RL	35.46949277	0.971434	Local	0	12.07422721	5.580838718	10000	N/A	5000	11.48
948	59.81312632	6	9	11.56	PVC	100	Trench - In road	1	0	0	3	34,953.28	73,489.27	RM	38.36143483	0	Local	0	16.44248066	7.468290388	10000	N/A	5000	10.28
953	424.4195769	6	12	14.08	PVC	100	Trench - In road	0	1	0	3	122,604.89	257,776.79	RL	32.12189944	0	Local	0	54.39518061	6.563496014	10000	N/A	5000	13.04
960	60.78247644	6	3	7.56	PVC	100	Trench - In road	1	0	0	3	29,195.62	61,383.79	RL	69.39283032	0	Local	0	10000	10000	10000	N/A	4000	5.28
966	292.4473228	6	8	6.12	PVC	100	Trench - In road	1	0	0	2	84,111.83	176,845.12	RL	38.74806892	1.139235	Local	0	10000	10000	10000	N/A	4000	7.06
970	435.6833227	6	12	18.94	PVC	100	Trench - In road	0	1	0	4	120,920.83	254,236.05	RL	41.82254679	1.553966	Local	0	10000	10000	10000	N/A	6000	15.47
989	207.4118171	6	19	10.63	PVC	100	Trench - In road	0	1	0	3	68,352.95	143,712.09	RE	66.9038528	0	Local	0	10000	10000	10000	N/A	5000	14.815
990	157.7480785	6	10	8	PVC	100	Trench - In road	1	0	0	3	55,937.02	117,607.58	RE	66.92218059	0	Local	0	10000	10000	10000	N/A	4000	9
1010	69.61750005	6	12	13.7	PVC	100	Trench - In road	0	1	0	1	36,904.38	77,591.45	RL	25.85211638	0	Local	0	19.40848232	18.15305553	10000	N/A	5000	12.85
1032	188.2225887	6	8	13.32	PVC	100	Trench - In road	1	0	0	1	61,055.65	128,369.50	RL	40.50072032	0	Local	0	44.05274208	20.36820223	10000	N/A	5000	10.66
1037	179.3155058	6	8	10.91	PVC	100	Trench - In road	1	0	0	3	54,328.88	114,226.46	RL	40.3150963	2.272123	Local	0	173.2549531	173.254915	10000	N/A	4000	9.455
1041	211.5962966	6	8	16.27	PVC	100	Trench - In road	1	0	0	0	60,899.07	128,040.30	RL	31.6165457	0	Local	0	62.24316802	62.24316802	10000	N/A	5000	12.135
1065	290.9205892	6	11	10.73	PVC	100	Trench - Out road	1	0	0	3	75,989.74	159,768.43	RM	31.9467477	34.82352	Local	0	31.89597469	31.90487867	10000	N/A	5000	10.865
1067	75.93601038	6	8	8.67	PVC	100	Trench - Out road	1	0	0	3	28,484.00	59,887.62	RM	44.03951269	5.398614	Local	0	10000	10000	10000	N/A	4000	8.335
1102	101.3755988	6	11	11.35	PVC	100	Trench - In road	0	1	0	3	37,343.90	78,515.55	RL	35.00549809	0.184438	Local	0	49.23979201	14.09650235	10000	N/A	5000	11.175
1103	152.2886011	6	12	14.2	PVC	100	Trench - In road	0	1	0	2	50,072.15	105,276.70	RL	36.57537013	0	Local	0	16.43568705	13.94130371	10000	N/A	5000	13.1
1116	400.9587823	6	8	15.87	PVC	100	Trench - In road	1	0	0	5	115,739.70	243,342.71	RL	27.48297428	0	Local	0	25.49403743	20.80570032	10000	N/A	5000	11.935
1132	244.3545573	6	8	16.82	PVC	100	Trench - In road	1	0	0	2	69,088.64	145,258.86	RM	8.294155766	1.838325	Local	10.29539651	15.62978075	15.62978075	10000	N/A	5000	12.41
1138	153.7295681	6	15	14.53	PVC	100	Trench - In road	0	1	0	4	45,021.11	94,656.89	RL	25.22850378	36.74484	Local	0	108.7556616	6.172316797	10000	N/A	5000	14.765
1142	223.3550412	8	18	21.31	PVC	100	Trench - In road	0	0	1	3	85,006.51	178,726.19	RL	39.92394871	0	Local	0	15.17174329	15.17174329	10000	N/A	12000	19.655
1149	82.01535844	6	16	18.22	PVC	100	Trench - In road	0	1	0	3	37,003.84	77,800.57	RL	53.54269544	0	Local	0	219.9264302	23.11637263	10000	N/A	6000	17.11
1162	211.2751963	6	8	8.22	PVC	100	Trench - In road	1	0	0	0	60,818.80	127,871.53	RM	61.36316693	0	Local	0	10000	10000	10000	N/A	4000	8.11
1165	247.4530107	6	8	8.22	PVC	100	Trench - In road	1	0	0	0	77,363.25	162,656.24	RM	31.36112928	0	Local	0	10000	10000	10000	N/A	4000	8.11
1222	248.0784313	8	7	10.19	PVC	100	Trench - In road	1	0	0	3	86,923.53	182,756.72	RL	23.13124	0	Local	9.703512849	4.008904411	6.13015618	10000	N/A	8000	8.595
1223	111.2556398	6	7	10.19	PVC	100	Trench - In road	1	0	0	1	41,813.91	87,913.75	RL	31.90628766	0	Local	0	168.01536	169.9748641	10000	N/A	4000	8.595
1244	243.7253845	6	14	17.22	PVC	100	Trench - In road	0	1	0	2	72,931.35	153,338.16	RL	32.82873229	0	Local	0	13.25724998	13.26054743	10000	N/A	6000	15.61
1247	261.4839056	6	15	13.87	PVC	100	Trench - In road	0	1	0	2	77,370.98	162,672.48	RL	47.56009958	0	Local	0	20.12257414	20.12257414	10000	N/A	5000	14.435
1248	222.0358916	6	15	8	PVC	100	Trench - In road	0	1	0	3	73,627.10	154,800.97	RM	31.05462283	0	Local	0	184.2859511	184.2859511	10000	N/A	5000	11.5
1257	405.2709089	6	7	8.56	PVC	100	Trench - In road	1	0	0	1	110,817.73	232,994.27	RL	43.65909594	6.081611	Local	0	138.051572	138.0885967	10000	N/A	4000	7.78
1264	180.1303979	6	9	9.23	PVC	100	Trench - In road	1	0	0	11	69,532.60	146,192.29	RL	45.49285811	8.956611	Local	0	10000	10000	10000	N/A	4000	9.115
1269	81.38599312	6	8	9.14	PVC	100	Trench - In road	1	0	0	3	29,846.50	62,752.26	RM	35.66470908	0	Local	0	34.70788009	32.73300994	10000	N/A	4000	8.57
1271	566.9790325	6	8	10.19	PVC	100	Trench - In road	1	0	0	4	152,744.76	321,145.85	RL	41.55998266	0	Local	0	45.25088317	33.09497443	10000	N/A	4000	9.095
1326	242.9171226	6	8	4.65	PVC	100	Trench - In road	1	0	0	4	74,729.28	157,118.31	RL	43.17133458	0	Local	0	22.49416842	22.49018773	10000	N/A	4000	6.325
1344	134.5281019	6	6	8.4	PVC	100	Trench - In road	1	0	0	4	38,396.64	80,728.93	RM	10.10789653	24.60197	Local	32.72652332	10.29197897	3.849637412	10000	N/A	4000	7.2
1348	231.1653435	6	8	7.1	PVC	100	Trench - In road	1	0	0	0	67,291.34	141,480.03	RM	8.319966882	0	Local	9.21975963	9.987547581	9.987547581	10000	N/A	4000	7.55
1350	229.8348626	6	6	6.7	PVC	100	Trench - In road	1	0	0	1	66,958.72	140,780.70	RM	32.33578013	0	Local	0	10000	215.3025765	10000	N/A	4000	6.35
1351	233.2439096	6	7	6.7	PVC	100	Trench - In road	1	0	0	0	66,310.98	139,418.83	RM	42.68879518	5.121349	Local	0	10000	215.3315324	10000	N/A	4000	6.85
1353	397.5047834	6	4	5.9	PVC	100	Trench - In road	1	0	0	0	107,376.20	225,758.45	RM	38.36693601	4.22801	Local	0	169.6579626	149.9737289	10000	N/A	3000	4.95

UniqueID	Proximity to and Types of Roads CO1	Proximity to and Types of Roads CO2	Proximity to Environmentally Sensitive Areas CO1	Proximity to Environmentally Sensitive Areas CO2	Proximity to Environmentally Sensitive Areas CO3	Proximity to Environmentally Sensitive Areas CO4	Proximity to Buildings CO1	Proximity to Buildings CO2	Land Use CO3	Repair Costs CO2	Proximity to Other Utilities CO1	Proximity to Other Utilities CO2	Proximity to Other Utilities CO4	CO1 Health and Safety	CO2 Cost of Failure	CO3 SSOs	CO4 Environmental Impact	Dominant COF	Condition LOF	Core Risk	Mitigation Factor	Risk Zone	Priority	TBL COF	BRE	COF Driver
1337	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
1342	1	1	1	1	1	1	3	2	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Proximity to Other Utilities
1343	1	1	1	1	1	1	3	2	3	1	3	3	3	3	3	3	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Land Use, Proximity to Other Utilities
1346	1	1	1	1	1	1	2	1	3	1	3	3	3	3	3	3	3	3	1	3	1	3	Low	9	9	Land Use, Proximity to Other Utilities
1357	1	1	1	1	1	1	3	2	3	1	2	3	3	3	3	3	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Land Use, Proximity to Other Utilities
1368	1	1	1	1	1	1	1	1	4	2	2	3	3	2	3	4	3	4	1	4	1	4	Low	9	9	Land Use
1387	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
1394	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
1395	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
1396	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
1398	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
1402	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
1403	1	1	1	1	1	1	3	2	2	2	2	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Proximity to Other Utilities
1404	1	1	1	1	1	1	2	1	2	1	3	3	3	3	3	2	3	3	1	3	1	3	Low	9	9	Proximity to Other Utilities
1406	1	1	1	1	1	1	2	1	3	1	3	3	3	3	3	3	3	3	1	3	1	3	Low	9	9	Land Use, Proximity to Other Utilities
1407	1	1	1	1	1	1	3	2	3	1	2	3	3	3	3	3	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Land Use, Proximity to Other Utilities
1408	1	1	1	1	1	1	3	2	3	1	2	3	3	3	3	3	3	3	1	3	1	3	Low	9	9	Proximity to Buildings, Land Use, Proximity to Other Utilities
8	3	1	1	1	1	1	1	1	3	2	1	1	1	3	2	3	1	3	1	3	1	3	Low	8	8	Proximity to and Types of Roads, Land Use
24	1	1	1	1	1	1	2	1	3	1	2	3	3	2	3	3	3	3	1	3	1	3	Low	8	8	Land Use, Proximity to Other Utilities
25	1	1	1	1	1	1	1	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
29	2	1	1	1	1	1	2	2	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
36	3	1	1	1	1	1	1	1	3	2	1	1	1	3	2	3	1	3	1	3	1	3	Low	8	8	Proximity to and Types of Roads, Land Use
37	3	1	1	1	1	1	1	1	3	2	1	1	1	3	2	3	1	3	1	3	1	3	Low	8	8	Proximity to and Types of Roads, Land Use
38	3	1	1	1	1	1	1	1	3	2	1	1	1	3	2	3	1	3	1	3	1	3	Low	8	8	Proximity to and Types of Roads, Land Use
40	3	1	1	1	1	1	1	1	3	2	1	1	1	3	2	3	1	3	1	3	1	3	Low	8	8	Proximity to and Types of Roads, Land Use
46	1	1	1	1	1	1	1	1	3	1	2	3	3	2	3	3	3	3	1	3	1	3	Low	8	8	Land Use, Proximity to Other Utilities
48	1	1	1	1	1	1	3	2	3	1	1	1	1	3	2	3	1	3	1	3	1	3	Low	8	8	Proximity to Buildings, Land Use
49	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
53	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
101	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
112	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
119	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	2	4	1	2	Low	4	8	Land Use
129	2	1	1	1	1	1	1	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
135	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
136	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
140	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
146	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
147	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
156	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
163	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
188	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
199	2	1	1	1	1	1	2	2	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
200	2	1	1	1	1	1	2	2	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
220	1	1	1	1	1	1	1	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
227	1	1	1	1	1	1	1	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
234	1	1	1	1	1	1	3	2	3	1	1	1	1	3	2	3	1	3	1	3	1	3	Low	8	8	Proximity to Buildings, Land Use
237	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
243	1	1	1	1	1	1	1	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
249	1	1	1	1	1	1	2	1	4	2	1	1	1	2	2	4	1	4	1	4	1	4	Low	8	8	Land Use
251	1	1	1	1	1	1	2	1	4	2	1	1	2	2	2	4	2	4	1	4	1	4	Low	8	8	Land Use
260	1	1	1	1	1	1	3	2	3	2	1	1	1	3	2	3	1	3	1	3	1	3	Low	8	8	Proximity to Buildings, Land Use
267	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
269	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
271	1	1	1	1	1	1	1	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
293	1	1	1	1	1	1	1	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
322	1	1	1	1	1	1	1	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
324	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
327	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
347	2	1	1	1	1	1	2	2	3	2	2	3	3	2	3	3	3	3	1	3	1	3	Low	8	8	Land Use, Proximity to Other Utilities
357	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
360	1	1	1	1	1	1	1	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
365	1	1	1	1	1	1	1	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
372	2	1	1	1	1	1	2	2	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
382	1	1	1	1	1	1	1	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
389	2	1	1	1	1	1	3	3	2	2	1	1	1	3	3	2	1	3	1	3	1	3	Low	8	8	Proximity to Buildings
402	1	1	1	1	1	1	1	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
407	1	1	1	1	1	1	1	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
416	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
419	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
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430	1	1	1	1	1	1	1	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
431	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
432	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
441	2	1	1	1	1	1	3	3	2	2	1	1	1	3	3	2	1	3	1	3	1	3	Low	8	8	Proximity to Buildings
442	2	1	1	1	1	1	1	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
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445	2	1	1	1	1	1	2	2	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
480	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
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499	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
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523	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
536	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
554	2	1	1	1	1	1	2	1	4	2	1	1	1	2	2	4	1	4	1	4	1	4	Low	8	8	Land Use
561	1	1	1	1	1	1	2	1	3	2	2	3	3	2	3	3	3	3	1	3	1	3	Low	8	8	Land Use, Proximity to Other Utilities
584	1	1	1	1	1	1	1	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
585	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
602	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
612	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
626	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
633	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
641	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
642	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
644	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
652	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
655	1	1	1	1	1	1	2	1	4	2	1	1	1	2	2	4	1	4	1	4	1	4	Low	8	8	Land Use
658	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
711	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
713	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
717	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
728	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
731	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
735	1	1	1	1	1	1	1	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
736	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
737	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
756	1	1	1	1	1	1	1	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
758	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
761	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
772	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
832	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
887	1	1	1	1	1	1	2	1	4	2	1	1	1	2	2	4	1	4	1	4	1	4	Low	8	8	Land Use
900	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
902	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
917	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
938	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
946	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
948	1	1	1	1	1	1	2	1	3	2	2	3	3	2	3	3	3	3	1	3	1	3	Low	8	8	Land Use, Proximity to Other Utilities
953	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
960	1	1	1	1	1	1	1	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
966	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
970	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
989	1	1	1	1	1	1	1	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
990	1	1	1	1	1	1	1	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1010	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1032	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1037	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1041	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1065	1	1	1	1	1	1	2	1	3	2	2	3	3	2	3	3	3	3	1	3	1	3	Low	8	8	Land Use, Proximity to Other Utilities
1067	1	1	1	1	1	1	2	1	3	1	2	3	3	2	3	3	3	3	1	3	1	3	Low	8	8	Land Use, Proximity to Other Utilities
1102	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1103	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1116	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1132	1	1	1	1	1	1	3	2	3	2	1	1	1	3	2	3	1	3	1	3	1	3	Low	8	8	Proximity to Buildings, Land Use
1138	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1142	2	1	1	1	1	1	2	2	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1149	1	1	1	1	1	1	1	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1162	1	1	1	1	1	1	1	1	3	1	2	3	3	2	3	3	3	3	1	3	1	3	Low	8	8	Land Use, Proximity to Other Utilities
1165	1	1	1	1	1	1	2	1	3	1	2	3	3	2	3	3	3	3	1	3	1	3	Low	8	8	Land Use, Proximity to Other Utilities
1222	2	1	1	1	1	1	3	3	2	2	2	1	2	3	3	2	2	3	1	3	1	3	Low	8	8	Proximity to Buildings
1223	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1244	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1247	1	1	1	1	1	1	2	1	2	2	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1248	1	1	1	1	1	1	2	1	3	2	2	3	3	2	3	3	3	3	1	3	1	3	Low	8	8	Land Use, Proximity to Other Utilities
1257	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1264	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1269	1	1	1	1	1	1	2	1	3	1	2	3	3	2	3	3	3	3	1	3	1	3	Low	8	8	Land Use, Proximity to Other Utilities
1271	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1326	1	1	1	1	1	1	2	1	2	1	2	3	3	2	3	2	3	3	1	3	1	3	Low	8	8	Proximity to Other Utilities
1344	1	1	1	1	1	1	3	2	3	1	2	1	2	3	2	3	2	3	1	3	1	3	Low	8	8	Proximity to Buildings, Land Use
1348	1	1	1	1	1	1	3	2	3	1	1	1	1	3	2	3	1	3	1	3	1	3	Low	8	8	Proximity to Buildings, Land Use
1350	1	1	1	1	1	1	2	1	3	1	2	3	3	2	3	3	3	3	1	3	1	3	Low	8	8	Land Use, Proximity to Other Utilities
1351	1	1	1	1	1	1	2	1	3	1	2	3	3	2	3	3	3	3	1	3	1	3	Low	8	8	Land Use, Proximity to Other Utilities
1353	1	1	1	1	1	1	2	1	3	1	2	3	3	2	3	3	3	3	1	3	1	3	Low	8	8	Land Use, Proximity to Other Utilities

UniqueID	Length (ft)	Dia (in)	USMH depth (ft)	DSMH depth (ft)	Material	Ph 2 CIP Year	Replacement Method	Manholes (<10ft)	Manholes (10-20ft)	Manholes (>20ft)	Laterals	Matl & Install Cost ($)	Const Cost ($)	Land Use Type	ProxTo Building (ft)	ProxTo Road (ft)	RoadType	ProxTo WaterMains (ft)	ProxTo StormWaterFeature (ft)	ProxTo StormWaterDitch (ft)	ProxToESA (ft)	Type of ESA	Repair Cost ($)	Depth (ft)	Proximity to and Types of Roads CO1	Proximity to and Types of Roads CO2	Proximity to Environmentally Sensitive Areas CO1	Proximity to Environmentally Sensitive Areas CO2	Proximity to Environmentally Sensitive Areas CO3	Proximity to Environmentally Sensitive Areas CO4	Proximity to Buildings CO1	Proximity to Buildings CO2	Land Use CO3	Repair Costs CO2	Proximity to Other Utilities CO1	Proximity to Other Utilities CO2	Proximity to Other Utilities CO4	CO1 Health and Safety	CO2 Cost of Failure	CO3 SSOs	CO4 Environmental Impact	Dominant COF	Condition LOF	Core Risk	Mitigation Factor	Risk Zone	Priority	TBL COF	BRE	COF Driver
1354	88.46440687	6	6	6.9	PVC	100	Trench - In road	1	0	0	0	30,116.10	63,319.10	RM	27.60239378	0	Local	0	159.2367965	159.2367965	10000	N/A	4000	6.45	1	1	1	1	1	1	3	2	3	1	1	2	3	3	2	3	3	3	1	3	1	3	Low	8	8	Land Use, Proximity to Other Utilities
1355	89.085766	6	8	6.5	PVC	100	Trench - Out road	1	0	0	7	33,135.62	69,667.65	RM	16.61286529	42.52175	Local	54.1101258	166.0350496	166.0350496	10000	N/A	4000	7.25	[illegible]																					3	Low	8	8	Land Use
1358	211.3452723	6	7	11	PVC	100	Trench - In road	1	0	0	7	71,336.32	149,984.61	RL	52.8307291	1.358172	Local	0	10000	10000	10000	N/A	4000	9	[illegible]																					3	Low	8	8	Proximity to Other Utilities
1360	376.9645557	6	6	9.15	PVC	100	Trench - In road	1	0	0	7	112,741.14	237,038.24	RL	40.53819074	1.492483	Local	0	10000	10000	10000	N/A	4000	7.575	[illegible]																					3	Low	8	8	Proximity to Other Utilities
1365	258.0165495	6	4	6.36	PVC	100	Trench - In road	1	0	0	4	74,004.14	155,593.70	RL	79.94391308	0	Local	0	10000	10000	10000	N/A	4000	5.18	[illegible]																					3	Low	8	8	Proximity to Other Utilities
1372	252.4198046	6	8	15.2	PVC	100	Trench - In road	1	0	0	4	77,104.95	162,113.16	CS	42.49785913	4.648511	Local	15.04361047	99.8673008	99.84500326	10000	N/A	5000	11.6	[illegible]																					4	Low	8	8	Land Use
1375	170.5852673	6	9	11.78	PVC	100	Trench - In road	1	0	0	2	53,646.32	112,791.38	RM	37.54335533	11.56025	Local	0	31.89597469	31.90487867	10000	N/A	5000	10.39	[illegible]																					3	Low	8	8	Land Use, Proximity to Other Utilities
1386	215.1661893	6	8	4.08	PVC	100	Trench - In road	1	0	0	9	75,291.55	158,300.48	RE	64.04260217	0	Local	0	10000	10000	10000	N/A	4000	6.04	[illegible]																					3	Low	8	8	Proximity to Other Utilities
1409	282.4388251	6	6	8.7	PVC	100	Trench - In road	1	0	0	0	78,609.71	165,276.91	RM	7.338684399	1.532116	Local	16.47235956	112.7053881	87.49216321	10000	N/A	4000	7.35	[illegible]																					3	Low	8	8	Proximity to Buildings, Land Use
1411	56.00232911	6	8	8.7	PVC	100	Trench - In road	1	0	0	0	22,000.58	46,256.22	RM	8.355886681	1.672396	Local	16.26148396	173.2796716	173.2796716	10000	N/A	4000	8.35	[illegible]																					3	Low	8	8	Proximity to Buildings, Land Use
1414	131.8854496	6	6	6.7	PVC	100	Trench - In road	1	0	0	0	40,971.36	86,142.29	RM	44.79180197	0	Local	0	227.9143836	227.9143836	10000	N/A	4000	6.35	[illegible]																					3	Low	8	8	Land Use, Proximity to Other Utilities
1418	81.45221353	6	10.92	6.2	PVC	100	Trench - In road	1	0	0	0	32,363.05	68,043.32	RM	35.62992799	0	Local	0	143.5950735	143.5950735	10000	N/A	4000	8.56	[illegible]																					3	Low	8	8	Land Use, Proximity to Other Utilities
14	275.1113283	6	6	4.5	PVC	100	Trench - In road	1	0	0	4	82,777.83	174,040.39	RL	13.93123235	2.441316	Local	11.32603062	10000	10000	10000	N/A	4000	5.25	[illegible]																					3	Low	7	7	Proximity to Buildings
27	164.9395107	6	8	3.99	PVC	100	Trench - In road	1	0	0	0	55,234.88	116,131.33	RL	18.45552046	0	Local	4.596924797	18.03401261	18.02528829	10000	N/A	4000	5.995	[illegible]																					3	Low	7	7	Proximity to Buildings
50	112.7432173	6	11	14.27	PVC	100	Trench - In road	0	1	0	0	40,185.80	84,490.65	RL	18.65506919	9.756865	Local	10.62025481	13.33300015	1.301454738	10000	N/A	5000	12.635	[illegible]																					3	Low	7	7	Proximity to Buildings
64	229.6463876	6	9	12.47	PVC	100	Trench - Out road	1	0	0	4	58,828.04	123,685.96	CS	67.06599677	20.50922	Local	51.92111473	79.99676151	79.99676151	10000	N/A	5000	10.735	[illegible]																					4	Low	7	7	Land Use
98	19.40815544	6	11	8.67	PVC	100	Trench - In road	0	1	0	2	16,852.04	35,431.41	RL	24.67227572	3.139452	Local	7.688870523	129.4324925	129.4311379	10000	N/A	4000	9.835	[illegible]																					3	Low	7	7	Proximity to Buildings
115	66.04331492	6	8	7.75	PVC	100	Trench - In road	1	0	0	2	27,510.83	57,841.52	CS	41.2176844	15.10899	Local	20.11187589	10000	10000	10000	N/A	4000	7.875	[illegible]																					4	Low	7	7	Land Use
118	209.9396512	6	8	10.65	PVC	100	Trench - Out road	1	0	0	4	59,095.04	124,247.32	CS	28.09432093	24.0132	Local	14.70854189	68.55602883	68.55467787	10000	N/A	4000	9.325	[illegible]																					4	Low	7	7	Land Use
123	285.6681628	6	6	11.76	PVC	100	Trench - In road	1	0	0	6	88,417.04	185,896.83	RL	19.86081603	3.94594	Local	8.866317133	105.2688297	91.47243292	10000	N/A	4000	8.88	[illegible]																					3	Low	7	7	Proximity to Buildings
189	39.83974327	6	8	6.78	PVC	100	Trench - In road	1	0	0	1	19,459.94	40,914.52	RL	6.103713354	0	Local	10.50220789	183.7401607	178.5751507	10000	N/A	4000	7.39	[illegible]																					3	Low	7	7	Proximity to Buildings
214	232.5823559	6	8	13.89	PVC	100	Trench - In road	1	0	0	10	81,145.59	170,608.60	RM	39.09688102	1.549894	Local	8.717481178	10000	10000	10000	N/A	5000	10.945	[illegible]																					3	Low	7	7	Land Use
240	31.88143758	6	15	14.82	PVC	100	Trench - Out road	0	1	0	3	23,348.13	49,089.45	RL	17.75805596	36.7484	Local	16.32860149	94.429193	0.322375573	10000	N/A	5000	14.91	[illegible]																					3	Low	7	7	Proximity to Buildings
255	374.5251451	6	8	9.88	PVC	100	Trench - In road	1	0	0	4	94,448.00	198,576.92	RL	9.74882672	30.93823	Local	43.87689777	107.8578324	107.8735424	10000	N/A	5000	8.94	[illegible]																					3	Low	7	7	Proximity to Buildings
256	35.12141891	6	9	13.9	PVC	100	Trench - Out road	1	0	0	0	15,544.08	32,681.43	RL	12.02797869	30.93823	Local	43.87689777	111.294459	111.3049192	10000	N/A	5000	11.45	[illegible]																					3	Low	7	7	Proximity to Buildings
258	93.38408548	6	17	13.9	PVC	100	Trench - Out road	0	1	0	3	36,558.90	76,865.09	RL	11.48107258	31.79927	Local	44.42503519	145.4411292	145.4530264	10000	N/A	6000	15.45	[illegible]																					3	Low	7	7	Proximity to Buildings
259	32.57223469	6	14	13.99	PVC	100	Trench - Out road	0	1	0	0	20,143.06	42,350.78	RL	12.02797869	0	Local	12.34955494	145.4411292	145.4530264	10000	N/A	5000	13.995	[illegible]																					3	Low	7	7	Proximity to Buildings
261	120.4840286	6	11	12.75	PVC	100	Trench - In road	0	1	0	1	43,621.01	91,713.17	RM	31.0600757	9.740652	Local	8.83057236	7.657263197	36.42146693	10000	N/A	5000	11.875	[illegible]																					3	Low	7	7	Land Use
270	69.76360525	6	10	10.09	PVC	100	Trench - In road	0	1	0	2	32,440.90	68,207.00	RM	49.4279306	7.080101	Local	9.60960822	18.85132006	14.87675498	10000	N/A	5000	10.045	[illegible]																					3	Low	7	7	Land Use
274	57.73714993	6	9	8.58	PVC	100	Trench - In road	1	0	0	8	34,434.29	72,398.09	CS	42.2715846	0	Local	10.4542182	13.98642681	2.92436872	10000	N/A	4000	8.79	[illegible]																					4	Low	7	7	Land Use
278	118.6054911	6	12	10.74	PVC	100	Trench - In road	1	0	0	12	59,651.37	125,417.01	RM	47.88845417	0	Local	21.67560021	10000	10000	10000	N/A	5000	11.37	[illegible]																					3	Low	7	7	Land Use
308	191.6426206	6	8	3.99	PVC	100	Trench - Out road	1	0	0	14	70,164.83	147,521.57	CS	47.3075541	38.68282	Local	19.35442411	7.039416402	6.010073716	10000	N/A	4000	5.995	[illegible]																					4	Low	7	7	Land Use
336	432.3819452	6	8	8.28	PVC	100	Trench - In road	1	0	0	3	120,595.49	253,552.01	RL	12.54585341	4.141632	Local	7.669047959	32.52248718	12.57838242	206.963737	Permanent River	4000	8.14	[illegible]																					3	Low	7	7	Proximity to Buildings
353	101.3654553	7	5	4.48	PVC	100	Trench - In road	1	0	0	0	38,409.64	80,756.26	MB	57.49344109	0	Local	10.16185769	55.64775981	8.013810569	10000	N/A	6000	4.74	[illegible]																					3	Low	7	7	Land Use
363	93.83037707	6	11	14.68	PVC	100	Trench - Out road	0	1	0	1	32,154.76	67,605.39	RL	23.81138921	10000	N/A	171.7637909	6.297096301	5.728226985	10000	N/A	5000	12.84	[illegible]																					3	Low	7	7	Proximity to Buildings
364	200.3726711	6	15	7.79	PVC	100	Trench - Out road	0	1	0	0	55,040.05	115,721.70	RL	13.29402453	29.90067	Local	16.5226274	3.505686928	3.505360851	10000	N/A	5000	11.395	[illegible]																					3	Low	7	7	Proximity to Buildings
371	196.7626431	6	8	11.01	PVC	100	Trench - In road	1	0	0	1	58,690.66	123,397.11	RL	23.08040134	3.953468	Local	13.97946603	10000	10000	10000	N/A	4000	9.505	[illegible]																					3	Low	7	7	Proximity to Buildings
383	167.5244042	6	8	11.01	PVC	100	Trench - In road	1	0	0	3	54,381.10	114,336.26	RL	13.61320206	0.321194	Local	13.00296009	10000	10000	10000	N/A	4000	9.505	[illegible]																					3	Low	7	7	Proximity to Buildings
384	222.6016522	6	8	8	PVC	100	Trench - In road	1	0	0	4	69,650.41	146,439.99	RL	11.5216186	7.294818	Local	13.97924096	10000	10000	10000	N/A	4000	8	[illegible]																					3	Low	7	7	Proximity to Buildings
433	821.1731365	2	8	14.23	PVC	100	Trench - In road	1	0	0	4	214,793.28	451,602.88	RL	22.48310754	1.388416	Local	7.684203072	10000	10000	10000	N/A	5000	11.115	[illegible]																					3	Low	7	7	Proximity to Buildings
439	144.6224103	6	8	1.13	PVC	100	Trench - In road	1	0	0	2	47,155.60	99,144.65	RL	15.74481525	8.441832	Local	2.312106765	10000	10000	10000	N/A	3000	4.565	[illegible]																					3	Low	7	7	Proximity to Buildings
498	318.8104068	6	10	12.02	PVC	100	Trench - Out road	0	1	0	3	96,202.60	202,265.97	RL	24.92845572	0	Local	11.76868626	101.4059252	10000	10000	N/A	5000	11.01	[illegible]																					3	Low	7	7	Proximity to Buildings
560	211.4929128	6	15	12.75	PVC	100	Trench - In road	0	1	0	1	66,373.23	139,549.71	RM	25.76665758	6.976438	Local	8.091336687	109.6537978	44.63133287	10000	N/A	5000	13.875	[illegible]																					3	Low	7	7	Land Use
628	131.2532699	6	11	15.35	PVC	100	Trench - In road	0	1	0	5	52,313.32	109,988.75	RL	5.345760275	5.90951	Local	5.189778259	137.8966439	136.9628366	10000	N/A	5000	13.175	[illegible]																					3	Low	7	7	Proximity to Buildings
674	402.8311482	6	8	9	PVC	100	Trench - In road	1	0	0	0	108,707.79	228,558.12	CS	41.46403783	10.05203	Local	9.253617761	91.63047379	91.62934494	10000	N/A	4000	8.5	[illegible]																					4	Low	7	7	Land Use
937	57.52048353	6	8	13.89	PVC	100	Trench - In road	1	0	0	1	23,880.12	50,207.95	RM	47.37813905	0.804604	Local	8.842693881	10000	10000	10000	N/A	5000	10.945	[illegible]																					3	Low	7	7	Land Use
971	532.9932315	6	8	15.67	PVC	100	Trench - In road	1	0	0	0	141,248.31	296,974.57	RE	16.4526238	0	Local	8.765614577	10000	10000	10000	N/A	5000	11.835	[illegible]																					3	Low	7	7	Proximity to Buildings
1030	109.1143584	6	8	8.41	PVC	100	Trench - In road	1	0	0	0	35,278.59	74,173.23	RL	22.97504643	3.453499	Local	9.51980971	110.0832009	110.0832009	10000	N/A	4000	8.205	[illegible]																					3	Low	7	7	Proximity to Buildings
1077	33.41845852	6	8	13.49	PVC	100	Trench - In road	1	0	0	5	23,854.61	50,154.33	CS	95.75323535	0	Local	15.46173145	89.96504626	89.91807249	118.851724	Permanent River	5000	10.745	[illegible]																					4	Low	7	7	Land Use
1108	202.0740233	6	8	13.89	PVC	100	Trench - In road	1	0	0	1	60,018.51	126,188.91	RM	29.81869662	0	Local	10.72469352	10000	10000	10000	N/A	5000	10.945	[illegible]																					3	Low	7	7	Land Use
1148	426.1663179	6	8	16.42	PVC	100	Trench - In road	1	0	0	10	129,541.58	272,361.17	RL	23.75589477	0	Local	5.547144489	212.8242492	104.6978777	10000	N/A	5000	12.21	[illegible]																					3	Low	7	7	Proximity to Buildings
1155	168.8818041	6	8	16.44	PVC	100	Trench - In road	1	0	0	1	51,720.45	108,742.25	CS	53.19824854	0	Local	15.02614557	26.13922784	14.98009211	10000	N/A	5000	12.22	[illegible]																					4	Low	7	7	Land Use
1164	374.8189215	6	9	11.78	PVC	100	Trench - In road	1	0	0	2	104,704.73	220,141.70	RM	37.5195673	6.648674	Local	7.420506315	181.6287171	181.6382245	10000	N/A	5000	10.39	[illegible]																					3	Low	7	7	Land Use
1183	153.9753864	6	5	11.69	PVC	100	Trench - In road	1	0	0	3	50,993.85	107,214.56	RL	21.52180323	0	Local	10.15675303	62.0379609	28.81131489	176.9562605	Permanent River	4000	8.345	[illegible]																					3	Low	7	7	Proximity to Buildings
1200	305.4646574	8	7	9.86	PVC	100	Trench - In road	1	0	0	0	99,639.40	209,491.83	MB	44.26801172	11.38065	Local	7.199170767	20.03371873	11.60225963	10000	N/A	8000	8.43	[illegible]																					3	Low	7	7	Land Use
1243	162.0231125	6	18	15.47	PVC	100	Trench - In road	0	1	0	9	66,005.78	138,777.15	RL	6.064430634	0	Local	5.422124722	39.29099723	29.52434888	10000	N/A	6000	16.735	[illegible]																					3	Low	7	7	Proximity to Buildings
1245	297.3932827	6	8	14.52	PVC	100	Trench - In road	1	0	0	4	82,348.32	173,137.34	RM	30.13696784	0	Local	4.480091744	158.5357497	158.5357497	10000	N/A	5000	11.26	[illegible]																					3	Low	7	7	Land Use
1338	253.3398868	6	15	16.63	PVC	100	Trench - In road	0	1	0	0	75,334.97	158,391.78	RE	21.78800867	0	Local	9.413768274	10000	10000	10000	N/A	6000	15.815	[illegible]																					3	Low	7	7	Proximity to Buildings
17	242.1802618	6	8	7.25	PVC	100	Trench - In road	1	0	0	3	73,045.07	153,577.25	RM	33.20533332	0	Local	10.1630382	231.5809597	231.5779597	10000	N/A	4000	7.625	[illegible]																					3	Low	6	6	Land Use
18	54.84860135	6	8	4.75	PVC	100	Trench - In road	1	0	0	1	23,121.15	48,612.22	RM	35.38075832	10.63337	Local	11.60096143	249.222053	249.1865965	10000	N/A	4000	6.375	[illegible]																					3	Low	6	6	Land Use
21	47.43965266	6	8	4.1	PVC	100	Trench - In road	1	0	0	1	21,359.91	44,909.22	RM	38.03557385	15.63134	Local	9.207161237	138.2013785	138.2014426	10000	N/A	4000	6.05	[illegible]																					3	Low	6	6	Land Use
22	30.34041262	6	8	4.1	PVC	100	Trench - In road	1	0	0	1	17,085.10	35,921.43	RM	36.47063384	13.27736	Local	9.742845141	180.411887	180.4116497	10000	N/A	4000	6.05	[illegible]																					3	Low	6	6	Land Use
28	142.045059	8	4	13.34	PVC	100	Trench - In road	1	0	0	0	50,613.51	106,414.91	RL	56.21645468	10.10553	Local	10.85030758	25.72381319	25.71987635	10000	N/A	8000	8.67	[illegible]																					2	Low	6	6	Proximity to and Types of Roads, Land Use, Repair Costs
43	416.3843563	8	18	17.55	PVC	100	Trench - In road	0	1	0	3	141,415.31	297,326.68	RL	40.11545251	0	Local	8.104473655	203.5521928	23.11637263	10000	N/A	12000	17.775	[illegible]																					2	Low	6	6	Proximity to and Types of Roads, Proximity to Buildings, Land Use, Repair Costs
44	204.8846926	8	14	18.22	PVC	100	Trench - In road	0	1	0	0	73,465.41	154,461.02	RL	42.28228235	0	Local	8.151761996	142.4156756	20.84935701	10000	N/A	12000	16.11	[illegible]																					2	Low	6	6	Proximity to and Types of Roads, Land Use, Repair Costs
47	84.62146149	6	8	4.7	PVC	100	Trench - Out road	1	0	0	4	32,176.69	67,651.49	RM	36.205486	10000	N/A	16.35642616	106.5076246	76.00988825	10000	N/A	4000	6.35	[illegible]																					3	Low	6	6	Land Use
63	87.70535893	6	8	8.4	PVC	100	Trench - Out road	1	0	0	1	28,339.11	59,582.98	CS	76.83948434	50.97594	Local	118.010134	47.62361097	47.61883189	10000	N/A	4000	8.2	[illegible]																					4	Low	6	6	Land Use
65	144.8620701	6	9	10.69	PVC	100	Trench - Out road	1	0	0	1	39,116.37	82,242.17	CS	122.4393506	46.40581	Local	4.76113386	47.80703513	25.29521497	10000	N/A	4000	9.845	[illegible]																					4	Low	6	6	Land Use
69	237.0138304	6	12	19.28	PVC	100	Trench - In road	0	1	0	1	72,753.46	152,964.14	RL	32.4377664	5.35594	Local	8.318787064	12.82685284	2.353827409	10000	N/A	6000	15.64	[illegible]																					2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities
90	76.17069774	6	8	12.01	PVC	100	Trench - In road	1	0	0	2	30,042.67	63,164.72	RL	39.63594501	1.491032	Local	11.63668339	30.43592866	30.4377526	10000	N/A	5000	10.005	[illegible]																					2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
105	459.0568515	6	16	12.42	PVC	100	Trench - In road	0	1	0	9	140,264.21	294,905.51	RL	32.83374862	5.259244	Local	15.43284671	10000	10000	10000	N/A	5000	14.21	[illegible]																					2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
127	139.1427535	6	8	15.2	PVC	100	Trench - In road	1	0	0	3	47,285.69	99,418.16	RL	31.64473712	5.52487	Local	9.048749319	23.87789108	23.4321842	10000	N/A	5000	11.6	[illegible]																					2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
130	292.2859482	8	11	11.5	PVC	100	Trench - In road	1	0	0	5	107,185.78	225,358.11	RL	68.43711667	0	Local	8.185063206	10000	10000	10000	N/A	10000	11.25	[illegible]																					2	Low	6	6	Proximity to and Types of Roads, Land Use, Repair Costs
131	289.7766219	8	10	11.01	PVC	100	Trench - In road	1	0	0	3	98,932.99	208,006.60	RL	56.46885195	0.321194	Local	13.00296009	10000	10000	10000	N/A	10000	10.505	[illegible]																					2	Low	6	6	Proximity to and Types of Roads, Land Use, Repair Costs
132	279.9516447	8	11	19.26	PVC	100	Trench - In road	0	1	0	1	97,485.49	204,963.25	RL	54.79483248	0	Local	12.9599221	10000	10000	10000	N/A	12000	15.13	[illegible]																					2	Low	6	6	Proximity to and Types of Roads, Land Use, Repair Costs
157	326.4707784	6	16	10.44	PVC	100	Trench - In road	1	0	0	5	98,117.69	206,292.45	RL	42.09946671	0	Local	11.57924944	5.585951098	5.552640391	10000	N/A	5000	13.22	[illegible]																					2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
158	295.8001826	6	12	26	PVC	100	Trench - In road	0	1	0	5	93,450.05	196,478.72	RL	47.27046033	2.755985	Local	9.761105709	10000	10000	10000	N/A	6000	19	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
160	251.8600055	6	18	8	PVC	100	Trench - In road	0	1	0	3	79,465.00	167,075.17	RL	41.1660887	0	Local	10.87102904	44.81617236	44.49539815	10000	N/A	5000	13	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
176	22.46518637	6	15	15.54	PVC	100	Trench - In road	0	1	0	2	20,616.30	43,345.76	RL	48.80984822	4.998774	Local	10.81873237	43.23807075	32.79057224	10000	N/A	6000	15.27	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
177	164.7573487	6	9	15.56	PVC	100	Trench - In road	1	0	0	2	52,189.34	109,728.08	RL	46.71438316	10.42009	Local	10.25405499	47.70685556	47.70888028	10000	N/A	5000	12.28	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
205	301.5107325	6	6	14	PVC	100	Trench - In road	1	0	0	5	90,877.68	191,070.33	RL	37.17427204	0	Local	9.277929587	10000	10000	10000	N/A	5000	10	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
210	103.1835092	6	10	12.96	PVC	100	Trench - In road	0	1	0	4	43,795.88	92,080.83	RL	48.37692319	6.269307	Local	14.3940289	24.04762438	20.63492637	10000	N/A	5000	11.48	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
211	54.74126741	6	8	20.36	PVC	100	Trench - In road	1	0	0	7	32,185.32	67,669.63	RL	38.65741024	11.70821	Local	7.449054254	25.54687811	23.30914529	10000	N/A	5000	14.18	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
216	256.2364742	6	8	12.53	PVC	100	Trench - In road	1	0	0	4	78,059.12	164,119.30	RL	38.3241432	5.605116	Local	9.316485159	230.1559592	224.3959697	10000	N/A	5000	10.265	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
225	16.0002096	6	8	11.06	PVC	100	Trench - In road	1	0	0	1	13,500.05	28,383.86	RM	35.95852483	14.9301	Local	7.439799531	35.90859285	31.52681877	10000	N/A	4000	9.53	1		1	1	1	1	1	2	1	3	1	1	1	1	2	1	3	1	3	1	3	1	3	Low	6	6	Land Use
236	268.307317	6	8	16.35	PVC	100	Trench - In road	1	0	0	0	75,076.83	157,849.03	RL	32.48858511	2.698426	Local	11.14686859	12.56730768	12.17645487	10000	N/A	5000	12.175	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
257	341.758512	6	8	16.99	PVC	100	Trench - In road	1	0	0	0	93,439.63	196,456.82	RL	33.75605752	1.687923	Local	2.300655103	236.042493	236.0584217	10000	N/A	5000	12.495	1		1	1	1	1	1	2	1	2	2	1	1	2	2	2	2	2	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities
268	27.0295368	6	8	14.74	PVC	100	Trench - In road	1	0	0	1	16,257.38	34,181.15	RL	38.98307373	3.11148	Local	9.602698968	23.46276506	23.46468463	10000	N/A	5000	11.37	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
279	371.2289913	6	11	12.4	PVC	100	Trench - In road	0	1	0	8	116,807.25	245,587.24	RL	29.63675979	5.607735	Local	8.767933083	109.0447713	109.0447713	10000	N/A	5000	11.7	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
285	264.6423318	6	8	14.11	PVC	100	Trench - In road	1	0	0	5	81,660.58	171,691.38	RL	45.25408929	7.041466	Local	13.49027028	10000	10000	10000	N/A	5000	11.055	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
314	374.0682259	2	8	16.69	PVC	100	Trench - In road	1	0	0	3	106,017.06	222,900.86	RL	41.52539534	0.384594	Local	8.863913677	10000	10000	10000	N/A	5000	12.345	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
330	128.5389467	6	8	12.19	PVC	100	Trench - In road	1	0	0	0	40,134.74	84,383.28	PF	10000	0	Local	18.97582474	10000	10000	10000	N/A	5000	10.095	1		1	1	1	1	1	1	1	3	2	1	1	1	1	2	3	1	3	1	3	1	3	Low	6	6	Land Use
338	65.18150072	6	8	20.36	PVC	100	Trench - In road	1	0	0	2	27,295.38	57,388.53	RL	39.13855069	6.081611	Local	10.62944623	77.51556723	76.04810945	10000	N/A	5000	14.18	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
354	376.9036813	6	11	17.15	PVC	100	Trench - In road	0	1	0	1	107,725.92	226,493.75	PF	10000	0	Local	25.23677759	10000	10000	10000	N/A	5000	14.075	1		1	1	1	1	1	1	1	3	2	1	1	1	1	2	3	1	3	1	3	1	3	Low	6	6	Land Use
386	345.3441179	8	8	10.57	PVC	100	Trench - In road	1	0	0	3	116,103.24	244,107.05	RL	63.52996261	1.71721	Local	13.83356179	10000	10000	10000	N/A	8000	9.285	2		1	1	1	1	1	1	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to and Types of Roads, Land Use, Repair Costs
387	178.9173486	8	8	9.79	PVC	100	Trench - Out road	1	0	0	6	63,375.38	133,246.73	RL	29.08355436	62.94287	Local	8.00874601	10000	10000	10000	N/A	8000	8.895	1		1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
388	53.82184462	8	10	11.31	PVC	100	Trench - In road	0	1	0	4	34,146.55	71,793.13	RL	112.6392165	9.883399	Local	8.00874601	10000	10000	10000	N/A	10000	10.655	2		1	1	1	1	1	1	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to and Types of Roads, Land Use, Repair Costs
398	309.4839218	6	16	12.91	PVC	100	Trench - In road	0	1	0	4	95,370.98	200,517.49	RE	34.26045445	0	Local	6.945784398	10000	10000	10000	N/A	5000	14.455	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
408	213.5640533	6	11	13.48	PVC	100	Trench - In road	0	1	0	2	68,391.01	143,792.11	RL	30.3022864	0	Local	8.263702313	10000	10000	10000	N/A	5000	12.24	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
413	252.4715721	6	10	13.93	PVC	100	Trench - In road	0	1	0	3	79,617.89	167,396.62	RL	37.99915948	0	Local	7.463407333	78.45238734	24.05592339	10000	N/A	5000	11.965	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
414	185.4077105	6	8	13.86	PVC	100	Trench - In road	1	0	0	5	61,851.93	130,043.68	RL	37.8471733	0	Local	10.45864812	24.53939559	17.35526249	10000	N/A	5000	10.93	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
428	234.5517427	6	11	12.44	PVC	100	Trench - In road	0	1	0	0	70,637.94	148,516.26	RL	33.48074479	5.087937	Local	8.360136244	10000	10000	10000	N/A	5000	11.72	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
438	151.1531757	6	13	14.8	PVC	100	Trench - Out road	0	1	0	11	60,967.70	128,184.59	RL	30.64764452	10000	N/A	2.312106765	10000	10000	10000	N/A	5000	13.9	1		1	1	1	1	1	2	1	2	2	1	1	2	2	2	2	2	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities
443	228.2756347	8	14	15.5	PVC	100	Trench - In road	0	1	0	0	80,482.69	169,214.86	RL	41.07099473	12.80698	Local	5.024967246	10000	10000	10000	N/A	10000	14.75	2		1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to and Types of Roads, Proximity to Buildings, Land Use, Repair Costs
462	238.1341496	6	8	12.18	PVC	100	Trench - In road	1	0	0	6	76,533.54	160,911.76	RL	48.31776427	1.991768	Local	5.230970256	10000	10000	139.2646624	Permanent River	5000	10.09	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
478	161.1801443	6	8	13.99	PVC	100	Trench - In road	1	0	0	3	52,795.04	111,001.56	RL	44.58874567	0.762882	Local	9.977564533	155.4205644	155.4277191	10000	N/A	5000	10.995	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
479	166.940709	6	14	9.58	PVC	100	Trench - In road	0	1	0	5	61,235.18	128,746.96	RL	44.58874567	0.513263	Local	10.39600806	56.94658655	42.24845584	10000	N/A	5000	11.79	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
486	111.7813907	6	11	11.45	PVC	100	Trench - In road	0	1	0	3	44,445.35	93,446.34	RL	37.11543806	3.898221	Local	10.90401851	127.8966079	123.1345059	10000	N/A	5000	11.225	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
490	136.5873527	6	8	13.37	PVC	100	Trench - In road	1	0	0	5	49,646.84	104,382.48	RL	34.79740508	0	Local	10.18272704	10000	10000	10000	N/A	5000	10.685	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
492	226.632266	6	8	12.2	PVC	100	Trench - In road	1	0	0	3	69,158.07	145,404.83	RL	28.89532166	7.244494	Local	5.787632317	10000	10000	10000	N/A	5000	10.1	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
502	298.7552881	6	23	14.39	PVC	100	Trench - In road	0	0	1	4	95,688.82	201,185.75	RL	38.28734184	1.321334	Local	12.60021435	10000	10000	10000	N/A	6000	18.695	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
503	332.0494464	6	14	23.89	PVC	100	Trench - In road	0	1	0	13	114,512.36	240,762.24	RL	25.35670019	0.280362	Local	8.916563991	10000	10000	10000	N/A	6000	18.945	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
531	316.5365517	6	11	9.55	PVC	100	Trench - In road	0	1	0	1	92,634.14	194,763.27	RL	36.61879553	0	Local	6.627456022	148.5206041	148.515408	10000	N/A	5000	10.275	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
598	102.9380064	6	17	14.39	PVC	100	Trench - In road	0	1	0	12	55,734.50	117,181.79	RL	47.69023718	0	Local	5.068438868	9.15413743	9.161769388	164.5342102	Permanent River	6000	15.695	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
601	319.6910395	6	8	13.5	PVC	100	Trench - In road	1	0	0	0	87,922.76	184,857.60	RL	46.16214789	0	Local	9.50240451	171.8796459	171.8940289	10000	N/A	5000	10.75	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
607	263.6328799	6	9	14.85	PVC	100	Trench - In road	1	0	0	10	88,908.22	186,929.53	RL	38.90109063	3.099194	Local	9.748370532	155.2517374	155.2497801	10000	N/A	5000	11.925	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
649	189.0548212	6	11	13.42	PVC	100	Trench - In road	0	1	0	2	62,263.71	130,909.44	RL	31.28895087	0.73591	Local	7.89233085	25.40705641	7.39242569	10000	N/A	5000	12.21	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
659	68.52657946	6	7	7.24	PVC	100	Trench - In road	1	0	0	2	28,131.64	59,146.78	CS	51.84689205	4.677755	Local	10.33795503	24.43627732	21.62308556	10000	N/A	4000	7.12	1		1	1	1	1	1	1	1	4	1	1	1	1	1	1	4	1	4	1	4	1	4	Low	6	6	Land Use
661	79.34467001	6	9	9.38	PVC	100	Trench - In road	1	0	0	0	27,836.17	58,525.54	CS	85.90206426	0	Local	10.17275968	168.9189676	168.9189676	10000	N/A	4000	9.19	1		1	1	1	1	1	1	1	4	1	1	1	1	1	1	4	1	4	1	4	1	4	Low	6	6	Land Use
675	266.6780482	6	15	15.2	PVC	100	Trench - In road	0	1	0	0	78,669.51	165,402.65	RL	43.97161321	0	Local	10.82422851	32.16581804	32.16782029	10000	N/A	6000	15.1	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
686	25.05218906	6	14	14	PVC	100	Trench - In road	0	1	0	0	18,263.05	38,398.06	RL	40.14508288	4.777969	Local	8.071314135	10000	10000	10000	N/A	5000	14	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
712	108.6591952	6	12	14	PVC	100	Trench - In road	0	1	0	3	43,664.80	91,805.24	RL	40.14508288	4.777969	Local	8.071314135	10000	10000	10000	N/A	5000	13	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
718	197.708163	6	8	15.25	PVC	100	Trench - In road	1	0	0	2	60,427.04	127,047.85	RL	35.00582031	0	Local	9.418173617	10000	10000	10000	N/A	5000	11.625	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
723	353.9528526	6	9	12.12	PVC	100	Trench - In road	1	0	0	0	96,488.21	202,866.47	RL	39.5479033	0	Local	10.62458478	10000	10000	10000	N/A	5000	10.56	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
724	401.7272344	6	12	15.58	PVC	100	Trench - In road	0	1	0	0	112,431.81	236,387.88	RL	35.08526821	0	Local	8.569282458	80.37230359	79.42666328	10000	N/A	5000	13.79	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
727	133.4277145	6	8	13.75	PVC	100	Trench - In road	1	0	0	0	41,356.93	86,952.94	RL	41.8290942	5.434012	Local	9.566391526	142.7758715	142.7758715	10000	N/A	5000	10.875	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
730	308.5354912	6	12	14.46	PVC	100	Trench - In road	0	1	0	1	90,633.87	190,557.72	RL	39.32262434	1.607746	Local	10.03960722	10000	10000	10000	N/A	5000	13.23	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
755	600.2798225	6	21	15.9	PVC	100	Trench - In road	0	0	1	5	172,569.96	362,828.33	RL	30.81926059	8.653532	Local	4.336565847	14.80923719	4.598571711	10000	N/A	6000	18.45	1		1	1	1	1	1	2	1	2	2	2	1	2	2	2	2	2	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities
759	499.9844918	6	14	13.35	PVC	100	Trench - In road	0	1	0	5	144,496.12	303,803.10	RL	28.5324274	3.111275	Local	6.817502255	10000	10000	10000	N/A	5000	13.675	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
889	292.6882001	6	8	14.08	PVC	100	Trench - In road	1	0	0	5	88,672.05	186,432.99	RL	39.96664998	0	Local	8.510480499	122.9530655	122.8645478	10000	N/A	5000	11.04	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
908	281.6719234	6	11	11.85	PVC	100	Trench - In road	0	1	0	4	88,417.98	185,898.80	RL	45.93108094	0	Local	9.131903473	31.52000347	10.31111463	10000	N/A	5000	11.425	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
910	436.0017969	6	13	11.56	PVC	100	Trench - In road	0	1	0	8	133,000.45	279,633.44	RL	31.75429655	1.111633	Local	10.16667089	8.97667087	8.138418186	10000	N/A	5000	12.28	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
915	348.5555292	6	14	11.39	PVC	100	Trench - In road	0	1	0	1	100,638.88	211,593.25	RL	42.28477417	4.289977	Local	7.900903646	230.2112996	228.0539389	10000	N/A	5000	12.695	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
916	343.7373026	6	11	11.72	PVC	100	Trench - In road	0	1	0	12	115,934.33	243,751.92	RL	40.27600094	3.992661	Local	7.835875788	10000	10000	10000	N/A	5000	11.36	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
918	128.4223191	6	12	11.5	PVC	100	Trench - In road	0	1	0	0	44,105.58	92,731.98	RL	40.27600094	0	Local	7.68310842	10000	10000	10000	N/A	5000	11.75	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
924	263.804396	6	14	14.56	PVC	100	Trench - In road	0	1	0	2	80,951.10	170,199.69	RL	43.7870895	2.241557	Local	6.494830165	10000	10000	10000	N/A	5000	14.28	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
933	237.5406034	6	8	18.31	PVC	100	Trench - In road	1	0	0	2	70,385.15	147,984.78	RL	33.05857196	6.063392	Local	10.60925294	241.3646818	241.3646818	10000	N/A	5000	13.155	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
939	344.4190225	6	9	15.4	PVC	100	Trench - In road	1	0	0	12	112,104.76	235,700.25	RL	31.49556122	5.79672	Local	7.231669917	23.60296138	11.41033388	10000	N/A	5000	12.2	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
941	189.3778435	6	13	17.7	PVC	100	Trench - In road	0	1	0	2	62,344.46	131,079.23	RL	32.72366181	8.550721	Local	15.93344181	14.69310333	9.735002688	159.4180697	Permanent River	6000	15.35	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
942	217.3566039	6	18	14.65	PVC	100	Trench - In road	0	1	0	3	70,839.15	148,939.31	RL	33.05070317	0	Local	7.194645515	7.009804786	7.008826308	10000	N/A	6000	16.325	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
952	363.5468485	6	12	10.15	PVC	100	Trench - In road	0	1	0	0	102,886.71	216,319.31	RL	30.72714759	2.67446	Local	11.63101087	29.21431231	29.21926626	10000	N/A	5000	11.075	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
954	70.74031568	6	14	15.02	PVC	100	Trench - In road	0	1	0	3	34,185.08	71,874.13	RL	39.47468357	0	Local	8.004807993	5.862581998	5.862784707	10000	N/A	5000	14.51	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
956	217.4319575	6	8	19.58	PVC	100	Trench - In road	1	0	0	10	77,357.99	162,645.17	RL	38.69767537	4.172683	Local	11.9658939	38.44669948	35.5432303	10000	N/A	5000	13.79	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1026	224.3500922	6	9	13.32	PVC	100	Trench - In road	1	0	0	6	73,087.52	153,666.52	RL	40.70110908	0	Local	10.66754858	44.05274208	20.36820223	163.3929309	Permanent River	5000	11.16	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1043	225.6557408	6	8	14.06	PVC	100	Trench - In road	1	0	0	2	67,413.94	141,737.80	RL	40.00323438	5.293837	Local	11.11177928	7.233637529	7.233637529	10000	N/A	5000	11.03	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1054	399.7641554	6	13	17	PVC	100	Trench - In road	0	1	0	1	113,441.04	238,509.78	RL	38.36722692	6.269307	Local	14.3940289	48.23774398	48.11400348	10000	N/A	6000	15	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1072	242.5578487	6	8	8.97	PVC	100	Trench - In road	1	0	0	2	71,639.46	150,621.97	CS	72.19232003	8.59271	Local	18.35199368	10000	10000	10000	N/A	4000	8.485	1		1	1	1	1	1	1	1	4	1	1	1	1	1	1	4	1	4	1	4	1	4	Low	6	6	Land Use
1074	34.28790064	6	8	8.91	PVC	100	Trench - In road	1	0	0	4	22,571.98	47,457.58	CS	75.67739266	0	Local	18.35199368	10000	10000	10000	N/A	4000	8.455	1		1	1	1	1	1	1	1	4	1	1	1	1	1	1	4	1	4	1	4	1	4	Low	6	6	Land Use
1127	319.2222289	6	8	19.83	PVC	100	Trench - In road	1	0	0	0	87,805.56	184,611.18	RL	36.82219632	0	Local	12.61872777	222.4395882	222.4395882	10000	N/A	5000	13.915	1		1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs

UniqueID	Length (ft)	Dia (in)	USMH depth (ft)	DSMH depth (ft)	Material	Ph 2 CIP Year	Replacement Method	Manholes (<10ft)	Manholes (10-20ft)	Manholes (>20ft)	Laterals	Matrl & Install Cost ($)	Const Cost ($)	Land Use Type	ProxTo Building (ft)	ProxTo Road (ft)	RoadType	ProxTo WaterMains (ft)	ProxTo StormWaterFeature (ft)	ProxTo StormWaterDitch (ft)	ProxToESA (ft)	Type of ESA	Repair Cost ($)	Depth (ft)	Proximity to and Types of Roads CO1	CO2	Proximity to Environmentally Sensitive Areas CO1	CO2	CO3	CO4	Proximity to Buildings CO1	CO2	Land Use CO3	Repair Costs CO2	Proximity to Other Utilities CO1	CO2	CO4	CO1 Health and Safety	CO2 Cost of Failure	CO3 SSOs	CO4 Environmental Impact	Dominant COF	Condition LOF	Core Risk	Mitigation Factor	Risk Zone	Priority	TBL COF	BRE	COF Driver
1128	533.4830802	6	8	16.48	PVC	100	Trench - In road	1	0	0	2	144,370.77	303,539.54	RL	38.88032848	0	Local	6.049697979	107.6733077	36.47060663	10000	N/A	5000	12.24	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1139	115.2397067	6	8	14.82	PVC	100	Trench - In road	1	0	0	0	36,809.93	77,392.87	RL	25.22850378	1.704166	Local	11.49073828	108.7556616	28.54015821	10000	N/A	5000	11.41	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1143	91.79576579	8	23	17.67	PVC	100	Trench - In road	0	0	1	1	44,038.73	92,591.43	RL	30.42646491	0.992025	Local	10.61051688	15.69600496	15.18377577	10000	N/A	16000	20.335	2	1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to and Types of Roads, Proximity to Buildings, Land Use, Repair Costs
1144	321.977285	8	18	22.97	PVC	100	Trench - In road	0	1	0	8	120,593.19	253,547.17	RL	40.97239306	0.992025	Local	9.851013272	19.77797902	14.87947644	10000	N/A	16000	20.485	2	1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to and Types of Roads, Proximity to Buildings, Land Use, Repair Costs
1147	409.6054313	8	17	15.42	PVC	100	Trench - In road	0	1	0	9	148,381.63	311,972.38	RL	38.78389955	0	Local	9.084263623	193.7223525	25.7594304	10000	N/A	12000	16.21	2	1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to and Types of Roads, Proximity to Buildings, Land Use, Repair Costs
1151	350.6851715	8	16	14.11	PVC	100	Trench - In road	0	1	0	1	118,705.55	249,578.42	RL	35.84848738	0	Local	11.2394035	18.90849273	18.81170207	10000	N/A	12000	15.055	2	1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to and Types of Roads, Proximity to Buildings, Land Use, Repair Costs
1152	388.4715727	8	13	16.38	PVC	100	Trench - In road	0	1	0	1	130,041.47	273,412.19	RL	36.60436304	1.620396	Local	10.77575875	19.73609103	19.73609103	10000	N/A	10000	14.69	2	1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to and Types of Roads, Proximity to Buildings, Land Use, Repair Costs
1163	218.2228183	6	8	8	PVC	100	Trench - In road	1	0	0	7	73,055.70	153,599.62	RM	48.2565455	0	Local	11.24632069	10000	10000	10000	N/A	4000	8	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	1	3	1	3	Low	6	6	Land Use
1166	215.9726086	6	5	8	PVC	100	Trench - In road	1	0	0	0	61,993.15	130,340.60	RM	39.56226414	0	Local	8.930122575	10000	10000	10000	N/A	4000	6.5	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	1	3	1	3	Low	6	6	Land Use
1246	299.8752453	6	14	13.86	PVC	100	Trench - In road	0	1	0	4	92,968.81	195,466.93	RL	39.67114911	0	Local	9.663228132	184.5054012	184.5054012	10000	N/A	5000	13.93	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1252	457.2078339	6	12	12.27	PVC	100	Trench - In road	0	1	0	0	126,301.96	265,549.87	RL	32.69879945	0	Local	5.868687854	177.8988324	177.8257647	10000	N/A	5000	12.135	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1260	207.4793	6	11	16.13	PVC	100	Trench - In road	0	1	0	9	77,369.82	162,670.06	RL	45.75682655	8.8695	Local	8.405007483	27.18990542	14.60740184	10000	N/A	5000	13.565	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1280	409.6235682	6	8	21.75	PVC	100	Trench - In road	1	0	0	0	110,405.89	232,128.39	RL	28.61702844	0	Local	7.530743043	34.13217956	15.22358404	10000	N/A	5000	14.875	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1282	246.2811232	6	8	12.98	PVC	100	Trench - In road	1	0	0	0	69,570.28	146,271.52	RL	37.30123395	0	Local	10.59234968	138.2424239	14.67096798	10000	N/A	5000	10.49	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1285	345.7510548	6	10	11.15	PVC	100	Trench - In road	0	1	0	0	98,437.76	206,965.40	RL	34.9086903	0.614027	Local	7.511735242	10000	10000	10000	N/A	5000	10.575	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1291	94.13386617	6	8	12.53	PVC	100	Trench - In road	1	0	0	0	31,533.47	66,299.11	RL	38.96475114	7.954779	Local	8.8002012	136.8618809	133.4924808	10000	N/A	5000	10.265	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1317	51.78035174	6	7	26.44	PVC	100	Trench - In road	1	0	0	0	20,945.09	44,037.05	RL	107.5183685	17.00856	Major	30.63496088	10000	10000	10000	N/A	6000	16.72	2	1	1	1	1	1	1	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to and Types of Roads, Land Use, Repair Costs
1345	41.9075648	6	6	6.2	PVC	100	Trench - In road	1	0	0	0	18,476.89	38,847.66	RM	29.36586672	16.86583	Local	7.70735895	106.4014243	3.826956179	10000	N/A	4000	6.1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	1	3	1	3	Low	6	6	Land Use
1347	107.272172	6	7	5.75	PVC	100	Trench - Out road	1	0	0	4	37,042.06	77,880.94	RM	28.98297331	35.40427	Local	15.80437222	69.35840601	1.783103932	10000	N/A	4000	6.375	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	1	3	1	3	Low	6	6	Land Use
1349	216.1625482	6	7	5.4	PVC	100	Trench - In road	1	0	0	5	69,540.64	146,209.19	RM	43.73274495	0	Local	7.789826267	120.7018266	3.826510909	10000	N/A	4000	6.2	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	1	3	1	3	Low	6	6	Land Use
1352	109.9110523	6	8	6.85	PVC	100	Trench - In road	1	0	0	2	38,477.76	80,899.50	RM	41.99506239	17.4909	Local	8.780359189	234.3273692	234.3273692	10000	N/A	4000	7.425	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	1	3	1	3	Low	6	6	Land Use
1356	180.7548818	6	7	4.2	PVC	100	Trench - In road	1	0	0	3	57,688.72	121,290.53	RM	27.60239378	4.22801	Local	7.910878473	151.4246351	149.9737289	10000	N/A	4000	5.6	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	1	3	1	3	Low	6	6	Land Use
1367	423.663566	6	8	8	PVC	100	Trench - Out road	1	0	0	2	102,002.93	214,461.17	IG	10000	10000	N/A	8.980923009	10000	10000	10000	N/A	4000	8	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	4	1	4	1	4	1	4	Low	6	6	Land Use
1371	369.7715982	2	8	8	PVC	100	Trench - Out road	1	0	0	2	90,426.94	190,122.64	IG	10000	10000	N/A	7.750326893	10000	10000	10000	N/A	4000	8	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	4	1	4	1	4	1	4	Low	6	6	Land Use
1379	385.4159577	6	8	17.01	PVC	100	Trench - In road	1	0	0	1	105,853.99	222,558.01	RE	46.2560617	8.693685	Local	17.08534636	10000	10000	10000	N/A	5000	12.505	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1381	293.2702374	6	17	16.35	PVC	100	Trench - In road	0	1	0	4	91,317.56	191,995.17	RE	40.28490618	10.21311	Local	17.97682368	10000	10000	10000	N/A	6000	16.675	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1400	396.5139899	6	8	18.52	PVC	100	Trench - In road	1	0	0	0	107,128.50	225,237.67	RE	45.57623897	0	Local	7.150100539	47.73277117	47.57476881	10000	N/A	5000	13.26	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1405	168.3897277	6	8	16.53	PVC	100	Trench - In road	1	0	0	0	50,097.43	105,329.85	RE	44.95706118	0	Local	8.659454012	10000	10000	10000	N/A	5000	12.265	1	1	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	1	2	1	2	Low	6	6	Proximity to Buildings, Land Use, Repair Costs
1415	505.495778	6	7	7.3	PVC	100	Trench - In road	1	0	0	0	134,373.94	282,521.22	RM	44.02517761	0	Local	10.7591217	153.4200046	132.6761717	10000	N/A	4000	7.15	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	1	3	1	3	Low	6	6	Land Use
1416	129.1869998	6	7	7.7	PVC	100	Trench - In road	1	0	0	0	40,296.75	84,723.92	RM	32.07389359	0	Local	8.283231179	130.1883994	26.51290616	10000	N/A	4000	7.35	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	1	3	1	3	Low	6	6	Land Use
1417	126.6018725	6	8	10.88	PVC	100	Trench - Out road	1	0	0	0	35,194.08	73,995.56	RM	35.6394131	10000	N/A	9.495462743	107.9880531	101.4342902	10000	N/A	4000	9.44	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	1	3	1	3	Low	6	6	Land Use
1035	110.6351079	6	8	10.91	PVC	38	Trench - In road	1	0	0	0	35,658.78	74,972.58	RL	38.59599342	5.376675	Local	18.32702596	237.0878723	237.0882916	10000	N/A	4000	9.455	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
13	494.6255217	6	8	6	PVC	100	Trench - In road	1	0	0	9	145,156.38	305,191.29	RL	43.24229237	2.441316	Local	11.16771616	10000	10000	10000	N/A	4000	7	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
15	133.6054478	6	4	7.2	PVC	100	Trench - In road	1	0	0	0	41,401.36	87,046.36	RL	27.89945322	2.945113	Local	8.675841983	10000	10000	10000	N/A	4000	5.6	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
52	63.71379112	6	9	8.93	PVC	100	Trench - In road	1	0	0	1	25,428.45	53,463.31	RL	37.15461851	11.60093	Local	9.872040346	57.4298267	14.60635253	10000	N/A	4000	8.965	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
54	261.2020053	6	8	8.4	PVC	100	Trench - In road	1	0	0	6	82,300.50	173,036.80	RL	39.38680155	3.575	Local	9.889265646	24.79565136	17.83591244	10000	N/A	4000	8.2	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
55	217.3793794	6	8	9.31	PVC	100	Trench - In road	1	0	0	6	71,344.84	150,002.54	RL	42.87376361	0	Local	9.559063828	68.11712541	66.84153905	10000	N/A	4000	8.655	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
73	143.79263	6	8	11.15	PVC	100	Trench - In road	1	0	0	4	49,948.16	105,016.00	RL	38.85801185	2.391942	Local	8.085829206	235.7464759	235.7455505	10000	N/A	4000	9.575	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
74	161.1415391	6	4	9.27	PVC	100	Trench - In road	1	0	0	1	49,785.38	104,673.77	RL	39.99503346	11.11393	Local	20.09762182	206.092045	206.092045	10000	N/A	4000	6.635	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
82	164.6509816	6	9	2.7	PVC	100	Trench - In road	1	0	0	5	56,662.75	119,133.42	RL	40.80500383	5.293993	Local	10.54973546	33.37245889	33.37758836	140.3927369	Permanent River	4000	5.85	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
86	112.0438421	6	8	10.76	PVC	100	Trench - In road	1	0	0	4	42,010.96	88,328.04	RL	36.47613577	11.65808	Local	9.574593019	96.47216816	96.47577788	10000	N/A	4000	9.38	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
95	191.3759375	6	7	10.72	PVC	100	Trench - In road	1	0	0	5	63,343.98	133,180.73	RL	31.362792	0	Local	16.29151297	23.17873276	13.80087271	10000	N/A	4000	8.86	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
113	244.3234522	6	8	4.5	PVC	100	Trench - In road	1	0	0	7	79,580.86	167,318.76	RL	42.32037475	3.567823	Local	10.31464062	10000	10000	10000	N/A	4000	6.25	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
120	92.81661314	6	8	11.84	PVC	100	Trench - In road	1	0	0	1	32,704.15	68,760.48	RL	35.44958207	8.630849	Local	16.56852802	16.52706421	10.66447148	10000	N/A	4000	9.92	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
138	335.3967338	6	8	8	PVC	100	Trench - In road	1	0	0	3	96,349.18	202,574.16	RL	43.07229775	0	Local	8.484910631	103.8907726	103.8976727	10000	N/A	4000	8	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
142	74.84185654	6	3	8	PVC	100	Trench - In road	1	0	0	1	28,210.46	59,312.50	RE	28.82320853	0	Local	5.533684905	10000	10000	10000	N/A	4000	5.5	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
144	238.6974954	6	17	21.98	PVC	100	Trench - In road	0	1	0	5	79,174.37	166,464.12	RE	67.54138337	7.561321	Local	14.89632462	10000	10000	10000	N/A	6000	19.49	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
145	208.3541219	6	19	18.99	PVC	100	Trench - In road	0	1	0	3	68,588.53	144,207.39	RE	83.43774291	0	Local	19.90670259	10000	10000	10000	N/A	6000	18.995	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
159	244.462395	6	26	16.97	PVC	100	Trench - In road	0	0	1	3	80,615.60	169,494.30	RL	51.57767798	3.813472	Local	9.761105709	142.9366924	142.9456985	10000	N/A	8000	21.485	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
178	422.936783	6	7	4.5	PVC	100	Trench - In road	1	0	0	3	118,234.20	248,587.40	RL	49.20190639	3.078282	Local	8.411399826	10000	10000	10000	N/A	4000	5.75	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
192	122.5100627	6	8	6.22	PVC	100	Trench - In road	1	0	0	4	44,627.52	93,829.35	RL	39.6581062	1.035551	Local	6.156367534	31.67838795	7.033418584	10000	N/A	4000	7.11	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
193	136.2941472	6	9	7.39	PVC	100	Trench - In road	1	0	0	1	43,573.54	91,613.36	RL	39.97398504	0	Local	7.430278876	34.70788009	34.14283553	10000	N/A	4000	8.195	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
195	394.7763663	6	7	8.05	PVC	100	Trench - In road	1	0	0	6	115,694.09	243,246.83	RL	31.63172781	4.461203	Local	9.567920435	44.17228715	41.87353381	10000	N/A	4000	7.525	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
203	263.8502984	6	8	5.28	PVC	100	Trench - In road	1	0	0	3	78,462.57	164,967.56	RL	33.24271725	4.185282	Local	237.4450946	10000	10000	10000	N/A	4000	6.64	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
212	157.4752155	6	8	7.66	PVC	100	Trench - In road	1	0	0	4	53,368.80	112,207.91	RL	38.91672681	0.315218	Local	9.273813359	10000	10000	10000	N/A	4000	7.83	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
219	311.7521223	6	12	16.12	PVC	100	Trench - In road	0	1	0	1	91,438.03	192,248.46	RL	72.17910629	0	Local	9.273849032	10000	10000	10000	N/A	5000	14.06	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
229	65.76277059	6	22	22.21	PVC	100	Trench - In road	0	0	1	0	31,440.69	66,104.06	RE	101.8585953	13.049	Local	14.51722812	10000	10000	10000	N/A	8000	22.105	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
230	270.8415813	6	23	14.78	PVC	100	Trench - In road	0	0	1	0	82,710.40	173,898.61	RE	80.70338482	15.68203	Local	10.76290305	10000	10000	10000	N/A	6000	18.89	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
241	118.796988	6	19	18.99	PVC	100	Trench - In road	0	1	0	2	44,699.25	93,980.17	RE	91.53210402	4.248863	Local	14.56784281	10000	10000	10000	N/A	6000	18.995	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
242	190.1179352	6	19	18.99	PVC	100	Trench - In road	0	1	0	4	65,529.48	137,775.74	RE	83.51014765	8.006144	Local	15.11023328	10000	10000	10000	N/A	6000	18.995	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
244	126.2292993	6	16	19.55	PVC	100	Trench - In road	0	1	0	2	46,557.32	97,886.78	RE	80.00124319	2.932259	Local	19.91479631	10000	10000	10000	N/A	6000	17.775	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
245	170.3661558	6	16	19.55	PVC	100	Trench - In road	0	1	0	2	57,591.54	121,086.21	RE	52.68071198	0	Local	18.82992904	10000	10000	10000	N/A	6000	17.775	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
246	159.3248893	6	16	19.55	PVC	100	Trench - In road	0	1	0	3	56,331.22	118,436.39	RE	50.59665173	1.207016	Local	19.99738476	10000	10000	10000	N/A	6000	17.775	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
266	63.97721406	6	8	8.58	PVC	100	Trench - In road	1	0	0	2	31,994.30	67,268.02	RL	42.81351818	2.52574	Local	7.785366922	27.07979562	22.72082776	10000	N/A	4000	8.29	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
276	451.8995958	6	8	11.59	PVC	100	Trench - In road	1	0	0	0	120,974.90	254,349.73	RL	38.3822604	4.131772	Local	1.279938251	215.6610879	208.4369945	10000	N/A	4000	9.795	1	1	1	1	1	1	2	1	2	1	1	1	2	2	1	2	2	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use, Proximity to Other Utilities
283	27.69842491	6	15	9.47	PVC	100	Trench - In road	1	0	0	1	20,424.61	42,942.73	RL	50.87856377	0	Local	5.080421623	30.76238274	11.25942996	10000	N/A	5000	12.235	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
292	214.9999352	6	8	2.26	PVC	100	Trench - In road	1	0	0	7	72,249.98	151,905.59	RL	25.47585138	0	Local	11.37232348	10000	10000	10000	N/A	3000	4.13	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
299	207.8619679	6	8	8	PVC	100	Trench - In road	1	0	0	0	59,965.49	126,077.45	RL	25.66791373	0.411057	Local	172.1870135	10000	10000	10000	N/A	4000	8	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
319	232.3840435	2	8	5.14	PVC	100	Trench - In road	1	0	0	6	75,096.01	157,889.36	RL	49.41506938	3.532648	Local	8.973485071	28.32616193	24.17323395	10000	N/A	4000	6.57	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
325	24.38242819	6	8	8.28	PVC	100	Trench - In road	1	0	0	1	18,595.61	39,097.26	RL	40.35999584	6.389314	Local	12.08979659	9.138385591	9.138371341	10000	N/A	4000	8.14	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
332	144.653935	6	8	8.26	PVC	100	Trench - In road	1	0	0	7	54,663.45	114,929.97	RL	30.2848685	3.75881	Local	17.46610282	10000	235.4275221	10000	N/A	4000	8.13	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
333	212.8325833	6	8	7.47	PVC	100	Trench - In road	1	0	0	5	68,708.15	144,458.88	RL	32.14928618	0	Local	13.1735685	144.0860792	144.083952	242.0796534	Permanent River	4000	7.735	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
334	144.5985987	6	8	6.17	PVC	100	Trench - In road	1	0	0	0	44,149.65	92,824.64	RL	33.04286034	4.086736	Local	14.89274401	34.98332853	30.59693582	101.4030345	Permanent River	4000	7.085	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
361	102.6184106	6	8	11.11	PVC	100	Trench - In road	1	0	0	2	35,154.60	73,912.55	RL	41.18813072	0.547537	Local	9.749206658	13.98597729	5.259983202	10000	N/A	4000	9.555	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
373	103.6577375	2	8	8	PVC	100	Trench - Out road	1	0	0	0	30,265.68	63,633.60	RE	37.49915001	41.96776	Local	7.617453989	10000	10000	10000	N/A	4000	8	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
378	250.4666199	2	8	11.01	PVC	100	Trench - In road	1	0	0	3	75,116.65	157,932.77	RE	25.08672165	3.899146	Local	12.56835411	10000	10000	10000	N/A	4000	9.505	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
381	58.2676953	2	8	11.01	PVC	100	Trench - In road	1	0	0	2	25,566.92	53,754.46	RL	49.69208033	3.920487	Local	5.543472377	10000	10000	10000	N/A	4000	9.505	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
395	245.7281614	6	10	13.58	PVC	100	Trench - In road	0	1	0	3	77,932.04	163,852.11	RL	85.92953723	6.216979	Local	4.582698716	10000	10000	10000	N/A	5000	11.79	1	1	1	1	1	1	1	1	2	2	1	1	2	1	2	2	2	2	1	2	1	2	Low	5	5	Land Use, Repair Costs, Proximity to Other Utilities
396	382.2007031	6	15	10.9	PVC	100	Trench - In road	0	1	0	4	113,550.18	238,739.24	RE	56.37511115	0	Local	5.564620338	10000	10000	10000	N/A	5000	12.95	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
397	320.058714	6	13	15.33	PVC	100	Trench - In road	0	1	0	4	98,014.68	206,075.86	RE	79.20181661	0	Local	5.618770544	10000	10000	10000	N/A	5000	14.165	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
404	131.9774405	6	14	12.29	PVC	100	Trench - In road	0	1	0	3	46,494.36	97,754.39	RL	78.65895479	0	Local	7.123142197	10000	10000	10000	N/A	5000	13.145	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
405	319.1740145	6	14	14.14	PVC	100	Trench - In road	0	1	0	4	97,793.50	205,610.84	RL	75.07196457	2.828213	Local	7.123142197	10000	10000	10000	N/A	5000	14.07	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
406	325.076048	6	11	13.83	PVC	100	Trench - In road	0	1	0	3	97,769.01	205,559.35	RL	70.12181322	0	Local	3.584124196	10000	10000	10000	N/A	5000	12.415	1	1	1	1	1	1	1	1	2	2	1	1	2	1	2	2	2	2	1	2	1	2	Low	5	5	Land Use, Repair Costs, Proximity to Other Utilities
417	51.24130687	2	8	8	PVC	100	Trench - In road	1	0	0	2	23,810.33	50,061.21	RL	29.29892498	5.290918	Local	31.58584005	56.39038334	55.84030078	10000	N/A	4000	8	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
418	128.5344327	6	8	10.43	PVC	100	Trench - In road	1	0	0	3	44,633.61	93,842.16	RL	29.56947978	4.189123	Local	18.70241394	107.5800735	106.9266428	10000	N/A	4000	9.215	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
437	62.87185093	6	15	15.5	PVC	100	Trench - Out road	0	1	0	3	37,504.87	78,854.00	RL	106.2637608	54.01986	Local	1.969609154	10000	10000	10000	N/A	6000	15.25	1	1	1	1	1	1	1	1	2	2	1	1	2	1	2	2	2	2	1	2	1	2	Low	5	5	Land Use, Repair Costs, Proximity to Other Utilities
496	295.6632185	6	5	12.02	PVC	100	Trench - In road	1	0	0	6	90,951.60	191,150.48	RL	28.66495113	1.243358	Local	15.38602796	10000	10000	10000	N/A	4000	8.51	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
505	303.4818447	6	8	11.85	PVC	100	Trench - Out road	1	0	0	3	77,687.90	163,338.81	RL	45.30945208	33.68095	Local	4.086671153	19.72832305	4.959162999	10000	N/A	4000	9.925	1	1	1	1	1	1	2	1	2	1	1	1	2	2	1	2	2	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use, Proximity to Other Utilities
518	348.8725426	6	14	11.82	PVC	100	Trench - In road	0	1	0	2	102,218.74	214,913.63	RL	50.54279943	0.280362	Local	10.14353033	10000	10000	10000	N/A	5000	12.91	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
522	376.7232067	6	8	11.35	PVC	100	Trench - In road	1	0	0	4	108,180.80	227,450.14	RL	25.89115595	0	Local	9.605187347	10000	10000	10000	N/A	4000	9.675	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
530	121.3584743	6	7	9.55	PVC	100	Trench - In road	1	0	0	5	45,839.62	96,377.80	RL	48.00350687	0	Local	11.28929453	32.88496728	32.87688026	10000	N/A	4000	8.275	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
532	176.0393442	6	8	10.25	PVC	100	Trench - In road	1	0	0	8	64,009.84	134,580.68	RL	33.21766648	7.812496	Local	8.160867449	10000	245.654764	10000	N/A	4000	9.125	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
535	309.1737163	6	9	7.7	PVC	100	Trench - In road	1	0	0	4	91,293.43	191,944.43	RL	39.53558843	3.389592	Local	14.9254225	15.02251779	8.528961109	10000	N/A	4000	8.35	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
583	172.4451272	6	8	6.92	PVC	100	Trench - In road	1	0	0	9	64,611.28	135,845.22	RL	42.04146178	3.624445	Local	7.205152748	10000	10000	10000	N/A	4000	7.46	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
605	211.024479	6	8	8.37	PVC	100	Trench - In road	1	0	0	6	69,756.12	146,662.24	RL	34.56148091	0	Local	7.922792895	35.02294304	4.338370087	10000	N/A	4000	8.185	1	1	1	1	1	1	2	1	2	1	2	1	2	2	1	2	2	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use, Proximity to Other Utilities
616	338.0036544	6	8	11.84	PVC	100	Trench - In road	1	0	0	12	110,500.91	232,328.17	RL	39.98270027	0	Local	9.380140104	10000	10000	10000	N/A	4000	9.92	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
617	100.9259033	6	8	11.84	PVC	100	Trench - In road	1	0	0	4	39,231.48	82,484.18	RL	34.89141953	5.070231	Local	8.353387446	10000	10000	10000	N/A	4000	9.92	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
639	445.1932683	6	8	9.86	PVC	100	Trench - In road	1	0	0	2	122,298.32	257,132.21	RL	28.2151388	0	Local	9.371585227	184.1183996	184.1201841	10000	N/A	4000	8.93	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
640	228.2650918	6	8	9.16	PVC	100	Trench - In road	1	0	0	1	66,566.27	139,955.59	RL	42.7648597	0	Local	9.268535769	10000	10000	10000	N/A	4000	8.58	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
643	128.6861467	6	8	7.73	PVC	100	Trench - In road	1	0	0	0	40,171.54	84,460.66	RL	38.31281275	0	Local	9.798861563	10000	10000	10000	N/A	4000	7.865	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
647	86.004268	6	8	11.32	PVC	100	Trench - In road	1	0	0	2	32,501.07	68,333.49	RL	35.16338765	0	Local	9.367209109	32.97486795	30.76192056	10000	N/A	4000	9.66	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
687	219.2274869	6	14	22.69	PVC	100	Trench - Out road	0	1	0	0	59,090.06	124,236.86	RL	58.89310338	27.81486	Local	13.38142602	10000	10000	10000	N/A	6000	18.345	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
722	67.88144056	6	8	9.53	PVC	100	Trench - In road	1	0	0	0	24,970.36	52,500.18	RL	39.5479033	0	Local	10.10536418	10000	10000	10000	N/A	4000	8.765	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
726	393.3867222	6	8	8	PVC	100	Trench - In road	1	0	0	0	106,346.68	223,593.90	RL	40.85664027	0	Local	9.566391526	142.7758715	142.7758715	10000	N/A	4000	8	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
738	190.8471601	6	7	7.22	PVC	100	Trench - In road	1	0	0	11	72,211.79	151,825.29	RL	47.42491326	1.622214	Local	9.62184714	10000	10000	10000	N/A	4000	7.11	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
757	88.48344448	6	14	16.99	PVC	100	Trench - Out road	0	1	0	3	35,506.24	74,651.88	RL	127.6833033	59.64467	Local	66.55583089	10000	113.0519035	10000	N/A	6000	15.495	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
771	356.666482	6	8	11.43	PVC	100	Trench - In road	1	0	0	0	97,166.62	204,292.82	RL	40.18849973	3.663295	Local	4.826439	10000	10000	10000	N/A	4000	9.715	1	1	1	1	1	1	2	1	2	1	1	1	2	2	1	2	2	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use, Proximity to Other Utilities
850	244.7832975	6	8	7.14	PVC	100	Trench - In road	1	0	0	2	72,195.82	151,791.72	RE	39.96023107	0	Local	9.895767214	19.45725053	19.45725053	167.703074	Artificial Path	4000	7.57	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
890	126.5867127	6	8	8	PVC	100	Trench - In road	1	0	0	3	44,146.68	92,818.39	RL	41.38096991	0	Local	8.633404013	10000	10000	10000	N/A	4000	8	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
904	153.7452083	6	9	3.72	PVC	100	Trench - In road	1	0	0	2	49,436.30	103,939.83	RL	40.54368631	6.736615	Local	9.901275794	25.26724688	5.872965061	10000	N/A	4000	6.36	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
919	154.3183947	6	8	11.5	PVC	100	Trench - In road	1	0	0	5	54,079.60	113,702.36	RL	35.51095695	0	Local	8.260867224	135.9074206	135.9074206	10000	N/A	4000	9.75	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
944	336.1319042	6	8	10.66	PVC	100	Trench - In road	1	0	0	2	95,032.98	199,806.83	RL	31.76295906	2.521559	Local	5.587670802	15.38873299	13.96032622	149.1951702	Permanent River	4000	9.33	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
961	289.6578816	6	8	3.7	PVC	100	Trench - In road	1	0	0	6	89,414.47	187,993.92	RL	31.08980316	0	Local	14.00387212	10000	10000	10000	N/A	4000	5.85	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
967	323.0282859	6	8	7.9	PVC	100	Trench - In road	1	0	0	3	93,257.07	196,072.99	RL	41.86483042	0	Local	10.31662699	10000	10000	10000	N/A	4000	7.95	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
969	308.0460544	6	8	12	PVC	100	Trench - In road	1	0	0	0	85,011.51	178,736.71	RL	52.07644294	4.298255	Local	8.672385075	10000	10000	10000	N/A	5000	10	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
1018	110.3823222	6	8	8	PVC	100	Trench - In road	1	0	0	5	43,095.58	90,608.46	RL	41.80880449	0	Local	10.27990891	16.36160445	9.624816867	10000	N/A	4000	8	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1023	49.85608265	6	8	1.69	PVC	100	Trench - In road	1	0	0	2	23,464.02	49,333.10	RL	41.59587156	1.085814	Local	10.90133099	96.10956872	96.10956872	10000	N/A	3000	4.845	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1036	308.6110963	6	8	10.91	PVC	100	Trench - In road	1	0	0	0	85,152.77	179,033.71	RL	38.54288403	0	Local	14.84312132	155.9550572	153.1709174	110.2225703	Permanent River	4000	9.455	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1097	185.8925563	6	11	8	PVC	100	Trench - In road	0	1	0	1	59,973.14	126,093.52	RL	33.00775478	0	Local	10.90164396	13.9528249	13.94130371	10000	N/A	4000	9.5	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1185	299.9932913	6	8	8.49	PVC	100	Trench - In road	1	0	0	1	84,498.32	177,657.72	RL	33.58915214	2.319663	Local	20.55001906	124.6533649	118.3951597	10000	N/A	4000	8.245	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1233	204.3913849	6	8	9.62	PVC	100	Trench - In road	1	0	0	5	66,597.85	140,021.97	RL	39.28518733	4.266994	Local	9.725155562	66.01248465	66.01051375	10000	N/A	4000	8.81	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1234	57.00303941	6	8	9.62	PVC	100	Trench - In road	1	0	0	3	26,750.76	56,243.47	RL	46.02355913	0	Local	7.572274516	26.55479463	26.55630095	10000	N/A	4000	8.81	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1253	465.722743	6	8	7.66	PVC	100	Trench - In road	1	0	0	0	124,430.69	261,615.52	RL	26.43713501	0.965641	Local	9.273813359	10000	10000	228.1725037	Permanent River	4000	7.83	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1255	178.4509238	6	8	9.76	PVC	100	Trench - In road	1	0	0	6	61,612.73	129,540.77	RL	38.46704246	4.481767	Local	9.836277716	48.72358185	48.72024058	10000	N/A	4000	8.88	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1258	187.3491822	6	8	7.63	PVC	100	Trench - In road	1	0	0	10	69,837.30	146,832.91	RL	33.82579268	0	Local	11.11255821	10000	10000	10000	N/A	4000	7.815	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1262	23.96504873	6	8	9.47	PVC	100	Trench - In road	1	0	0	12	31,991.26	67,261.63	RL	46.19472614	0	Local	9.273813359	10000	10000	10000	N/A	4000	8.735	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1263	144.7629099	6	8	9.47	PVC	100	Trench - In road	1	0	0	5	51,690.73	108,679.75	RL	45.01707743	9.352171	Local	9.447788578	10000	10000	10000	N/A	4000	8.735	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1268	142.3380657	6	8	9.57	PVC	100	Trench - In road	1	0	0	0	43,584.52	91,636.45	RL	40.46320291	0	Local	5.401562361	124.0859039	35.88555059	10000	N/A	4000	8.785	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1270	176.091085	6	8	8.31	PVC	100	Trench - In road	1	0	0	9	65,522.77	137,761.63	RL	36.7225586	0	Local	7.853998897	107.8020929	106.6044494	10000	N/A	4000	8.155	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1272	68.32229417	6	8	9.63	PVC	100	Trench - In road	1	0	0	17	50,580.57	106,345.66	RL	36.9990225	0.729139	Local	7.022665949	25.28795776	11.48619634	10000	N/A	4000	8.815	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1284	303.3726697	6	11	7.4	PVC	100	Trench - In road	0	1	0	0	87,843.17	184,690.26	RL	38.41929772	5.182201	Local	8.320418295	14.79081767	3.329208437	10000	N/A	4000	9.2	1	1	1	1	1	1	2	1	2	1	2	1	2	2	1	2	2	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use, Proximity to Other Utilities
1286	352.9658984	6	8	10.49	PVC	100	Trench - In road	1	0	0	0	96,241.47	202,347.70	RL	37.0306507	1.247041	Local	6.724334904	10000	10000	10000	N/A	4000	9.245	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1289	62.78100773	6	8	10.19	PVC	100	Trench - In road	1	0	0	0	23,695.25	49,819.27	RL	38.37827371	5.320155	Local	10.26536802	19.26153284	19.26004676	10000	N/A	4000	9.095	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1293	79.50697525	6	8	7.54	PVC	100	Trench - In road	1	0	0	9	41,376.74	86,994.60	RL	35.43220694	1.676529	Local	10.82024585	187.3818543	148.0407144	10000	N/A	4000	7.77	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1294	439.3571537	6	8	9.01	PVC	100	Trench - In road	1	0	0	3	122,339.29	257,218.35	RL	40.72329497	2.008482	Local	13.09801944	150.8513979	143.52352	10000	N/A	4000	8.505	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1315	209.4557897	6	8	7.9	PVC	100	Trench - In road	1	0	0	7	70,863.95	148,991.45	RL	33.48773741	0	Local	4.946103302	38.30118594	38.22178282	196.633946	Permanent River	4000	7.95	1	1	1	1	1	1	2	1	2	1	1	1	2	2	1	2	2	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use, Proximity to Other Utilities
1318	192.1835174	6	8	7.84	PVC	100	Trench - Out road	1	0	0	1	50,781.02	106,767.09	RL	31.88557267	42.37093	Local	44.61355115	10000	10000	10000	N/A	4000	7.92	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1323	120.8435836	6	5	14.73	PVC	100	Trench - In road	1	0	0	7	48,710.90	102,414.66	RL	25.30902178	0	Local	8.264564976	10.94024304	5.812538431	10000	N/A	4000	9.865	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1328	328.5169548	2	8	6.72	PVC	100	Trench - In road	1	0	0	8	102,129.24	214,726.72	RL	33.770357	10.2693	Local	15.25775776	59.44510467	58.78476708	10000	N/A	4000	7.36	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1362	197.2190597	6	8	5.49	PVC	100	Trench - In road	1	0	0	4	63,304.76	133,098.27	RL	30.518266	1.900689	Local	11.23295536	10000	10000	10000	N/A	4000	6.745	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1364	195.5127043	6	6	4.71	PVC	100	Trench - In road	1	0	0	2	59,878.18	125,893.87	RL	31.12476933	0	Local	9.612414249	10000	10000	10000	N/A	4000	5.355	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1366	193.546434	6	8	4.5	PVC	100	Trench - In road	1	0	0	1	57,886.61	121,706.59	RL	43.80045228	1.211032	Local	1.437123119	10000	10000	10000	N/A	4000	6.25	1	1	1	1	1	1	2	1	2	1	1	1	2	2	1	2	2	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use, Proximity to Other Utilities
1370	191.3351208	6	8	5.9	PVC	100	Trench - In road	1	0	0	1	57,333.78	120,544.27	RL	33.27455848	0	Local	7.053732501	10000	10000	10000	N/A	4000	6.95	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1380	224.8954387	6	16	8.12	PVC	100	Trench - In road	0	1	0	4	74,223.86	156,055.66	RE	91.58364285	13.94992	Local	19.9789554	10000	10000	10000	N/A	5000	12.06	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
1382	198.5533628	6	3	2.32	PVC	100	Trench - In road	1	0	0	0	57,638.34	121,184.61	RE	28.82320853	0	Local	4.417750496	10000	10000	10000	N/A	3000	2.66	1	1	1	1	1	1	2	1	2	1	1	1	2	2	1	2	2	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use, Proximity to Other Utilities
1389	64.64887661	6	8	13.61	PVC	100	Trench - In road	1	0	0	2	27,162.22	57,108.57	RL	51.93983806	2.29846	Local	7.345076864	10000	10000	10000	N/A	5000	10.805	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	2	Low	5	5	Land Use, Repair Costs
1392	115.1853052	6	11	8.77	PVC	100	Trench - In road	0	1	0	16	64,796.33	136,234.28	RL	42.75212857	0	Local	8.660173904	210.0202321	210.0202321	10000	N/A	4000	9.885	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1393	40.01133289	6	8	10.43	PVC	100	Trench - In road	1	0	0	4	24,002.83	50,465.96	RL	43.02596292	2.713618	Local	18.30367598	235.503673	235.0145971	10000	N/A	4000	9.215	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	2	1	2	1	2	1	2	Low	5	5	Proximity to Buildings, Land Use
1412	158.09775	6	8	6.2	PVC	100	Trench - In road	1	0	0	0	47,524.44	99,920.13	RM	84.66415841	1.01517	Local	10.0608197	161.8990517	151.6716353	10000	N/A	4000	7.1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	1	3	1	3	Low	5	5	Land Use
1413	32.0826657	6	6	6.4	PVC	100	Trench - In road	1	0	0	0	16,020.67	33,683.45	RM	77.77024413	0.98857	Local	9.816607347	212.0373205	212.0373205	10000	N/A	4000	6.2	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	1	3	1	3	Low	5	5	Land Use
1419	59.75878317	6	8	8.2	PVC	100	Trench - Out road	1	0	0	0	20,836.19	43,808.08	RM	118.7405137	10000	N/A	9.967279414	10000	10000	10000	N/A	4000	8.1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	1	3	1	3	Low	5	5	Land Use

UniqueID	Length (ft)	Dia (in)	USMH depth (ft)	DSMH depth (ft)	Material	Ph 2 CIP Year	Replacement Method	Manholes (<10ft)	Manholes (10-20ft)	Manholes (>20ft)	Laterals	Matrl & Install Cost ($)	Const Cost ($)	Land Use Type	ProxTo Building (ft)	ProxTo Road (ft)	RoadType	ProxTo WaterMains (ft)	ProxTo StormWaterFeature (ft)	ProxTo StormWaterDitch (ft)	ProxToESA (ft)	Type of ESA	Repair Cost ($)	Depth (ft)
1420	176.1794787	6	8	7.7	PVC	100	Trench - Out road	1	0	0	0	45,843.35	96,385.65	RM	90.12995805	34.23878	Local	10.07669751	10000	10000	10000	N/A	4000	7.85
1421	26.48229543	6	8	6.7	PVC	100	Trench - In road	1	0	0	0	14,620.57	30,739.76	RM	65.60045701	7.893355	Local	11.57495155	10000	10000	10000	N/A	4000	7.35
71	64.09235453	6	8	4.42	PVC	100	Trench - In road	1	0	0	0	24,023.09	50,508.54	RL	97.30496652	5.137425	Local	10.93413807	25.62612466	18.62155815	10000	N/A	4000	6.21
87	168.8818594	6	8	10.72	PVC	100	Trench - In road	1	0	0	1	51,720.46	108,742.28	RL	50.18783697	6.827459	Local	10.16253604	51.22811132	50.28946449	10000	N/A	4000	9.36
161	176.6543899	6	8	7.77	PVC	100	Trench - In road	1	0	0	0	52,163.60	109,673.96	RL	64.4458939	11.71432	Local	13.07074004	244.9010807	171.3879205	10000	N/A	4000	7.885
222	259.7807906	2	8	8	PVC	100	Trench - In road	1	0	0	0	72,945.20	153,367.28	RL	79.35574584	0	Local	12.80220052	10000	10000	10000	N/A	4000	8
228	154.7212079	6	8	2.93	PVC	100	Trench - In road	1	0	0	3	51,180.30	107,606.58	RE	60.61267225	1.854168	Local	8.203756324	10000	10000	10000	N/A	4000	5.465
284	40.68927672	6	8	4.76	PVC	100	Trench - In road	1	0	0	4	24,172.32	50,822.30	RL	222.8201009	12.78264	Local	11.36984626	10000	10000	10000	N/A	4000	6.38
286	317.1788396	6	5	2.91	PVC	100	Trench - In road	1	0	0	2	90,294.71	189,844.63	RL	53.7164234	0	Local	7.383592132	10000	10000	10000	N/A	3000	3.955
291	316.9718093	6	3	14.11	PVC	100	Trench - In road	1	0	0	3	91,742.95	192,889.56	RL	53.7164234	5.55716	Local	13.21359156	10000	10000	10000	N/A	4000	8.555
294	83.93040484	6	2	1.63	PVC	100	Trench - In road	1	0	0	3	33,482.60	70,397.17	RL	145.2588691	2.112712	Local	11.5271862	10000	10000	10000	N/A	3000	1.815
295	133.1520594	6	1	1.13	PVC	100	Trench - In road	1	0	0	1	42,788.01	89,961.80	RL	77.97373337	0	Local	10.51096235	10000	10000	10000	N/A	3000	1.065
303	283.7599909	2	8	11.72	PVC	100	Trench - Out road	1	0	0	2	71,951.65	151,278.34	RE	61.42906107	10000	N/A	37.35803607	10000	10000	10000	N/A	4000	9.86
358	90.22331325	6	6	7.78	PVC	100	Trench - In road	1	0	0	12	48,555.83	102,088.63	RL	57.59196021	1.280736	Local	9.63392364	13.44392436	8.634030486	10000	N/A	4000	6.89
374	76.43468011	2	8	8	PVC	100	Trench - In road	1	0	0	4	33,108.67	69,610.98	RE	113.1307198	8.876149	Local	7.857137466	10000	10000	10000	N/A	4000	8
375	39.55096696	2	8	8	PVC	100	Trench - In road	1	0	0	3	22,387.74	47,070.23	RL	79.75056132	0.852649	Local	7.999810082	10000	10000	10000	N/A	4000	8
376	37.33322099	2	8	11.01	PVC	100	Trench - In road	1	0	0	3	21,833.31	45,904.52	RL	55.66974335	5.389957	Local	4.776220145	10000	10000	10000	N/A	4000	9.505
377	27.6608943	2	8	8	PVC	100	Trench - In road	1	0	0	0	14,915.22	31,359.26	RL	72.15551018	3.593314	Local	4.471917428	10000	10000	10000	N/A	4000	8
379	136.4381642	2	8	11.01	PVC	100	Trench - In road	1	0	0	1	43,609.54	91,689.06	RL	86.69285396	0	Local	4.050880694	10000	10000	10000	N/A	4000	9.505
380	18.79977486	2	8	11.01	PVC	100	Trench - In road	1	0	0	3	17,199.94	36,162.88	RE	52.51475891	3.933205	Local	10.36781306	10000	10000	10000	N/A	4000	9.505
385	246.8902913	6	8	8.87	PVC	100	Trench - In road	1	0	0	3	74,222.57	156,052.96	RL	63.52996261	1.71721	Local	13.83356179	10000	10000	10000	N/A	4000	8.435
390	209.939847	6	7	9.08	PVC	100	Trench - In road	1	0	0	3	64,984.96	136,630.88	RL	63.42448057	0	Local	5.462411498	10000	10000	10000	N/A	4000	8.04
520	401.8091943	6	6	10.2	PVC	100	Trench - In road	1	0	0	2	111,452.30	234,328.46	RA	31.28798941	6.551965	Local	8.638488037	10000	10000	10000	N/A	4000	8.1
739	126.7639643	6	8	7.63	PVC	100	Trench - In road	1	0	0	1	41,190.99	86,604.06	RL	56.71985397	3.561432	Local	10.13291362	10000	10000	10000	N/A	4000	7.815
1325	35.63376662	6	4	6.5	PVC	100	Trench - In road	1	0	0	0	16,908.44	35,550.00	RL	84.95982797	14.23238	Local	6.02925096	17.91539063	9.413948409	10000	N/A	4000	5.25
1327	102.5865588	6	8	4.65	PVC	100	Trench - In road	1	0	0	0	33,646.64	70,742.06	RL	61.99413937	14.23238	Local	7.345375342	37.7112727	30.92776215	10000	N/A	4000	6.325
1339	97.85490877	2	8	8	PVC	100	Trench - In road	1	0	0	2	35,463.73	74,562.49	RL	137.4277113	1.548584	Local	7.984347094	10000	10000	10000	N/A	4000	8
1340	241.0850957	2	8	8	PVC	100	Trench - In road	1	0	0	0	68,271.27	143,540.35	RL	75.52673199	0	Local	7.762345338	10000	10000	10000	N/A	4000	8
1359	235.2300927	6	9	7.5	PVC	100	Trench - In road	1	0	0	2	69,807.52	146,770.32	RL	55.38808326	0	Local	6.77687151	10000	10000	10000	N/A	4000	8.25
1361	201.9658201	6	6	5.7	PVC	100	Trench - In road	1	0	0	8	70,491.46	148,208.28	RL	141.7584224	1.210721	Local	10.86093605	10000	10000	10000	N/A	4000	5.85
1363	148.4500598	6	6	6.36	PVC	100	Trench - In road	1	0	0	7	55,612.51	116,925.31	RL	138.9968752	0	Local	9.800266451	10000	10000	10000	N/A	4000	6.18
1383	400.6434461	6	1	2.93	PVC	100	Trench - In road	1	0	0	10	123,160.86	258,945.71	RE	58.74517207	0.167269	Local	3.948800434	10000	10000	10000	N/A	3000	1.965
1384	395.8979691	6	4	8	PVC	100	Trench - In road	1	0	0	0	106,974.49	224,913.87	RE	56.61128113	0	Local	8.727304411	10000	10000	10000	N/A	4000	6
1385	187.9228167	6	4	3.49	PVC	100	Trench - In road	1	0	0	1	56,480.70	118,750.68	RE	92.11026723	1.26048	Local	8.754423901	10000	10000	10000	N/A	3000	3.745
1399	135.1689681	6	8	7.69	PVC	100	Trench - In road	1	0	0	0	41,792.24	87,868.19	RE	81.74088002	0.552688	Local	7.650157798	10000	10000	10000	N/A	4000	7.845
1401	321.2408675	6	14	3.15	PVC	100	Trench - In road	0	1	0	0	92,310.22	194,082.23	RL	58.09189094	0	Local	9.965925047	10000	10000	10000	N/A	4000	8.575
519	250.0345877	6	8	5.57	PVC	100	Trench - Out road	1	0	0	8	73,707.43	154,969.87	RA	94.55480032	10000	N/A	10000	10000	10000	10000	N/A	4000	6.785

UniqueID	Proximity to and Types of Roads		Proximity to Environmentally Sensitive Areas				Proximity to Buildings		Land Use	Repair Costs	Proximity to Other Utilities			CO1	CO2	CO3	CO4	Dominant	Condition	Core	Mitigation					
	CO1	CO2	CO1	CO2	CO3	CO4	CO1	CO2	CO3	CO2	CO1	CO2	CO4	Health and Safety	Cost of Failure	SSOs	Environmental Impact	COF	LOF	Risk	Factor	Risk Zone	Priority	TBL COF	BRE	COF Driver
1420	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	1	3	1	3	Low	5	5	Land Use
1421	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	3	1	3	1	3	1	3	Low	5	5	Land Use
71	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
87	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
161	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
222	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
228	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
284	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
286	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
291	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
294	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
295	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
303	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
358	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
374	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
375	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
376	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	2	2	2	1	2	1	2	Low	4	4	Land Use, Proximity to Other Utilities
377	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	2	2	2	1	2	1	2	Low	4	4	Land Use, Proximity to Other Utilities
379	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	2	2	2	1	2	1	2	Low	4	4	Land Use, Proximity to Other Utilities
380	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
385	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
390	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
520	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	2	1	2	1	2	Low	4	4	Proximity to Buildings
739	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
1325	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
1327	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
1339	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
1340	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
1359	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
1361	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
1363	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
1383	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	2	2	2	1	2	1	2	Low	4	4	Land Use, Proximity to Other Utilities
1384	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
1385	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
1399	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
1401	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	2	1	2	Low	4	4	Land Use
519	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Low	3	3	Proximity to and Types of Roads, Proximity to Environmentally Sensitive Areas, Proximity to Buildings, Land Use, Repair Costs, Proximity to Other Utilities

Appendix C – MCSD Water & Wastewater Rate Study (Willdan Financial Services, 2018)

McKINLEYVILLE COMMUNITY SERVICE DISTRICT

Water & Wastewater Rate Study

SEPTEMBER
2018

McKINLEYVILLE COMMUNITY SERVICES DISTRICT

WILLDAN

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Introduction

In 2018, McKinleyville Community Services District ("MCSD" or the "District") commissioned Willdan Financial Services ("Willdan") to perform a water and wastewater rate analysis and financial plan. This analysis provides financial recommendations that focus on two key objectives consisting of: 1) short and long-run financial health and stability for MCSD water and wastewater operations; and, 2) equitable cost-of-service rates that reflect the benefit provided while maintaining Proposition 218 compliance.

Based on the analyses performed for this study, MCSD's existing rates will not generate sufficient revenue to fund existing and projected expenditures (operations, maintenance, and capital) and reserve targets (e.g. the $1 million annual capital reserve transfer for each system). While MCSD currently maintains moderate reserve levels, the existing rates are not sustainable as both utilities are not generating sufficient revenues and are subsequently running net losses.

MCSD purchases its wholesale water supply from the Humboldt Bay Municipal Water MCSD, which diverts water from its million-gallon tank on Essex Hill, under the Mad River, to MCSD's Grant A. Ramey Pump Station at North Bank and Azalea Roads. Water is then pumped to storage tanks at McCluski Hill, Cochran Road and Norton Road; MCSD's six storage tanks have a combined capacity of 5.25 million gallons, approximately a 36-hour supply for its 6,705 customers.

All sewage for MCSD's customers is treated at the wastewater Management Facility at Hiller Park. MCSD maintains approximately 65 miles of wastewater mains. MCSD recycles treated wastewater for agricultural irrigation at the Fischer Irrigation Site and at Hiller Park. MCSD is committed to maintaining its sewage collection, treatment and disposal systems as a model for other communities.

This report details the methodology, approach, and results of this analysis. Based on discussion with MCSD staff, guidance and direction from the MCSD Board throughout the process, this report presents the recommended revenue adjustments and the corresponding rate impacts.

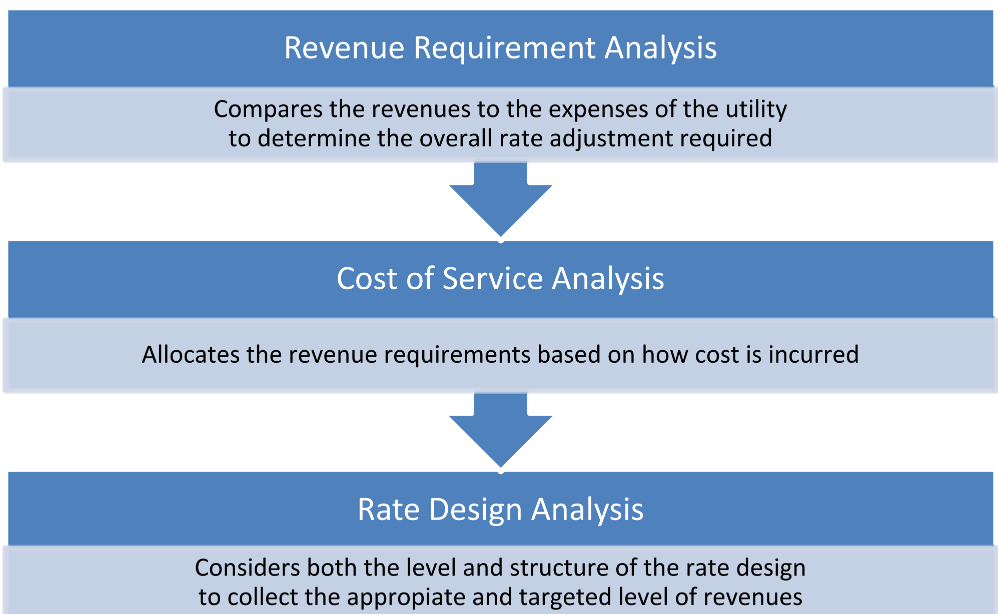
Overview of the Rate Setting Process

The scope of this study included the development of cost-based water and wastewater user charges through a comprehensive cost of service and rate design analysis. Utility rates must be set at a level where a utility's operating and capital expenses are met with the revenues received from customers. This is a significant point, as failure to achieve this level could lead to a situation where insufficient funds are available to adequately maintain the system. A comprehensive rate study typically consists of following three interrelated analyses.

I. ***Financial Planning/Revenue Requirement Analysis***: Creation of a five-year plan to support a financially prudent program of on-going maintenance and operating costs, capital improvement and replacement activities, debt financing, and retirement of any outstanding debt. In addition, the long-term plan should fund and maintain reserve balances to adequate levels based on industry standards and MCSD fiscal policies.

II. ***Cost of Service Analysis***: Identifies and apportions annual revenue requirements to customers based on their demand on the utility system.

III. ***Rate Design:*** Develops an equitable and proportionate fixed/variable schedule of rates to recover the costs of the utilities. This is also where other policy objectives can be achieved, such as discouraging wasteful water use. The policy objectives are harmonized with cost of service objectives to achieve the delicate balance of equity, financial stability and resource conservation goals.



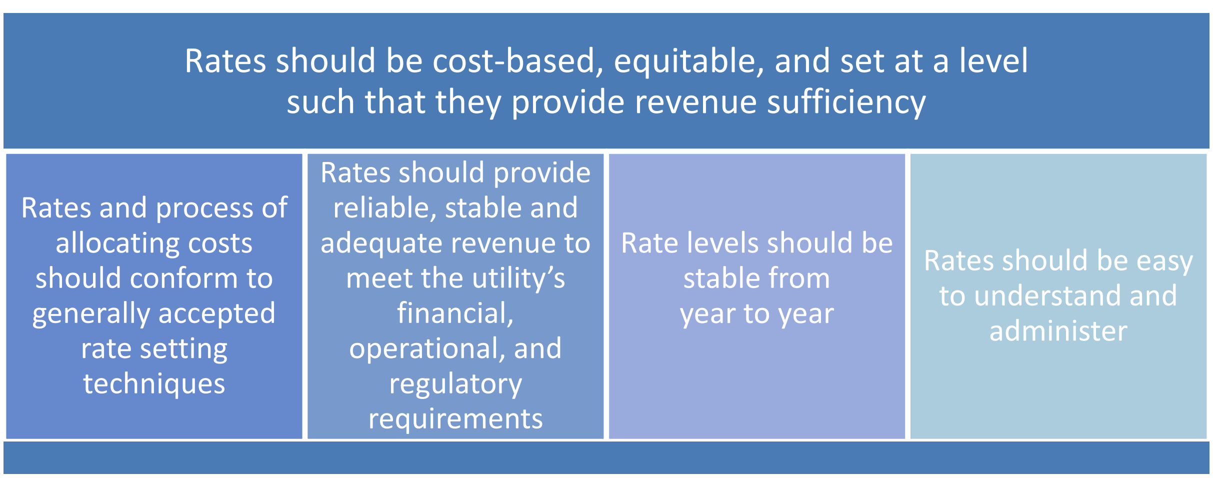
Rate Setting Principles

The primary objective when conducting this comprehensive rate and financial analysis was to determine the adequacy of the existing rates (pricing, structure, and revenue sufficiency) and provide the basis for any necessary adjustments to meet the MCSD's operating and capital needs and policy objectives. MCSD desires a rate structure that fully funds operations, maintenance, and capital costs while providing long term funding of reserves.

Financial Management, Policies and Rates

A financial plan revolves around the development of a proper long and short-term balance of revenues and expenditures. The following provides an outline of MCSD's financial targets and policies, and the financial foundation of the cost of service and rate analysis. Over the past years, many generally accepted principles or guidelines have been established to assist in developing utility rates. The purpose of this section of the report is to provide a general background of the methodology and guidelines used for setting cost-based utility rates, in order to provide a higher-level understanding of the rate setting approach detailed later in this report.

As a practical matter, there should be a general set of principles used to guide the development of water and wastewater rates. For water rates, the American Water Works Association (AWWA) establishes these principles in the M1 Manual – *Principles of Water Rates, Fees and Charges.* For wastewater rate setting, the Water Environment Federation (WEF) establishes similar guidelines. These guiding principles help to ensure there is a consistent global approach that is employed by all utilities in the development of their rates (water and water-related utilities, including wastewater and reclaimed water). Below is a summary listing the established guidelines, which public utilities should consider when setting their rates. These closely reflect MCSD's specified objectives.



These guidelines, along with the MCSD's objectives, have been utilized within this study as a framework to help develop utility rates that are cost-based and equitable.

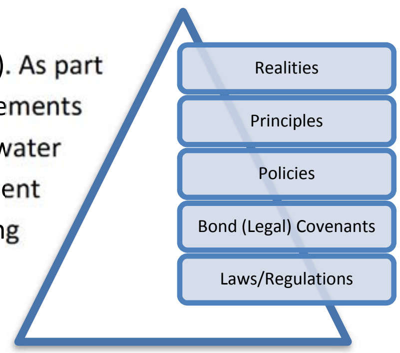
Overview of Rate Setting Environment, Objectives & Process

Rate analyses are typically performed every five years to ensure that revenues from rates are adequately funding utility operations, maintenance, and future capital needs. In California, rate analyses also require compliance with the cost-of-service principles imposed by Proposition 218 to ensure that rates correlate to how costs are incurred. Beyond the laws, regulations, and guiding principles, the rates ultimately need to be approved and implemented by the MCSD Board.

Considerations in Setting Revenue Requirements

There are a multitude of considerations, ranging from financial to political to legal, which must be analyzed or discussed during the revenue requirements process of a rate analysis. This section, along with the accompanying graphic, provides an overview of the considerations that are reviewed during this process.

Capital Budgeting and Financing



Capital needs are defined by MCSD's Capital Improvement Plan ("CIP"). As part of its budget and planning process, MCSD identifies capital improvements that are necessary for the continued delivery of clean, safe, drinking water and treatment of wastewater in accordance with increasingly stringent wastewater standards. The CIP is funded by a variety of sources including water and wastewater rates, connection (impact) fees, and capital reserves. Recent economic realities, including slower than anticipated growth and usage, have reduced funding and/or delayed funding of critical system improvements.

Capital Funding: Debt vs. PAYGO

The selection of the most appropriate funding strategy for capital projects is primarily a policy decision between use of cash ("Pay-as-you-go financing" aka PAYGO), the issuance of debt (bonding), or a combination thereof. PAYGO is the use or build-up of cash to fund capital improvements. With debt financing, capital improvements are paid for with borrowed funds (usually through the issuance of bonds) with the obligation of repayment, typically with interest, in future years. Each funding mechanism has a different impact on water rates in the short and long run, different net present values, risks, and legal obligations. Due to the borrowing costs associated with debt, cash funding can be cheaper; however, debt typically ensures greater generational equity for larger and longer lasting capital projects.

Willdan's review of MCSD's CIP revealed that the utility system does not have sufficient funds on hand to meet its planned capital investments without an increase to rates.

Our recommendation, which is consistent with the MCSD funding policy of MCSD, is that MCSD continues to balance the use of all financing options by using debt in the near-term to mitigate the impact on rates, and cash funding in the long-term for ongoing replacement projects.

Revenue Requirements

The method used by most public utilities to establish their revenue requirements is called the "cash basis" approach of setting rates. As the name implies, a public utility combines its cash expenditures over a period to determine their required revenues from rates and other forms of income. Figure 1-1 below presents the "cash basis" methodology.

Figure 1: Overview of the "Cash Basis" Design

+ Operation and Maintenance Expenses
+ Debt Service (Principal and Interest)
+ Capital Additions Funded with Rate Revenue
= Total Revenue Requirements

Based on the revenue requirement analysis, the utility can determine the level of revenues needed to meet the overall expenditures.

MCSD Expenditures – Water & Wastewater

To achieve long-term financial health, a utility's revenues must be sufficient to meet total expenditures or cash-flow obligations. This "required revenue" includes all incurred costs related to operation and maintenance, capital improvement programs, and principal and interest payments on existing or anticipated debt.

As demonstrated in Figure 2, Water & Wastewater Fund expenditures were categorized into five major classifications: (1) Operation; (2) Purchased Water; (3) Salaries & Benefits; (4) Debt Service; (5) Capital Projects (PAYGO). The pie chart below demonstrates the relative size of the various expense categories for the study test year of FY 2019.

Figure 2: Water & Wastewater Fund - Cost Distribution by Expenditure Classification

Through the study period, debt service (principal and interest) represents a large percentage of the total expenditures (21%). Revenues must be targeted to ensure MCSD meets its debt service coverage requirements of 1.25 times on its existing and future debt service.

In addition, in an effort to establish a reserve fund specifically for funding ongoing renewal and replacement (R&R) projects, MCSD has set a goal to reserve transfer of $1 million per year for each utility system. This reserve will be utilized to support PAGO funded capital as well as long-term Repair and Replacement (R&R).

Financial Planning

In the development of the revenue requirements, certain assumptions are utilized to project future expenditures, growth in customers and consumption, and necessary revenue adjustments. MCSD's budget documents are used as the baseline and are then projected over a five-year planning period to account for assumed changes in costs from year to year, as well as adjustments to debt service payments.

Reasonable growth assumptions and prudent financial planning are fundamental in rates that will generate adequate rate revenue to meet the needs of the system. The developed financial model considers the MCSD's existing debt service coverage ratio and operating cash balances (cash on hand). In addition, as part of the financial planning, municipal bond financing is incorporated into the model to fund necessary capital improvements. As debt is redeemed, additional bonds may be utilized to fund additional capital improvements required due to aging infrastructure.

Rate Setting Principles Summary

In meeting the objectives of MCSD, the rate design must also conform to the State Constitution and the State's Water Code. More specifically, Proposition 218 requires that property related fees and charges, such as water and wastewater rates, not exceed the reasonable cost of providing the service associated with the fee or charge and shall also not exceed the proportional cost of the service attributable to the parcel that is subject to the fee or charge.

In conjunction with Proposition 218, Article X (2) of the State Constitution institutes the need to preserve the State's water supplies and discourage the wasteful or unreasonable use of water by encouraging conservation. Article X (2) is broad in its declarations; however, the Water Code provides guidance to its application for developing water rates. Section 106 declares that the highest use of water is for domestic purposes, and irrigation is secondary. In connection with meeting the objectives of Article X, Water Code Sections 370 (AB2882) and 375 authorize a water purveyor to utilize its water rate design to incentivize the efficient use of water; or stated differently, to encourage conservation.

Although incentives to conserve water could be provided by implementing a higher rate for water as consumption increases, a nexus between rates and cost incurred to provide water at those rates must be developed to achieve compliance with Proposition 218. Therefore, in our analysis, when developing a tiered rate structure, we analyzed the consumption and peaking characteristics of each defined tier to determine the proportional share of cost incurred by each tier. The cost is then divided by consumption to derive a rate per unit of water for each tier. Doing so synchronizes the objectives of Article X (2) and Article XIIID (6) in developing a cost of service tiered rate structure.

Besides ensuring compliance with State law, another key principle for a comprehensive rate study is found in economic theory, which suggests that the price of a commodity must roughly equal its cost or value if equity among customers is to be maintained – i.e. cost-based. For example, capacity-related costs are usually incurred by a water utility to meet peak use requirements. Consequently, the customers causing peak demands should pay for the demand-related facilities in proportion to their contribution to maximum demands.

Through refinement of costing and pricing techniques, consumers of a product are given a more accurate price point, representative of what the commodity costs to produce and deliver, to meet their needs, in this case, for water use. The above fundamentals have considerable foundation in economic literature and correlate to the cost of service principles of Proposition 218. This “price-equals-cost” theory provides the basis for much of the subsequent analysis and comment. This theory is particularly important as the proposed rate structure has been developed to encourage the efficient use of water while maintaining economic and cost of service principles.

Rate Design

The final element, the rate design process, applies the results from the revenue requirements to develop rates that achieve the general guidelines, policies and objectives of MCSD, and compliance with the provisions of law. These objectives are achieved through the development of cost-based rates but may also account for adjustments to expenditures or the level of cash reserves to balance rate shock, continuity of past rate philosophy, conservation objectives, ease of administration, and legal requirements. This section of the report incorporates the general principles, techniques, and economic theory used to set utility rates. These principles, techniques, and economic theory were the starting point for this rate study and the groundwork used to meet MCSD’s key objectives in analyzing and redesigning their utility rates.

This rate study is performed to allocate the costs of providing service to users with rates that are equitable and in compliance with Proposition 218 requirements. The total cost of serving MCSD customers is determined by distributing each of the utility cost components based upon the service demands placed on the MCSD by its customers. Therefore, a cost of service rate study enables a utility to adopt rates based on the costs incurred to serve its customers and corresponding accounts. The purposes of this cost of service study include defining the proportional allocation of the costs of service to users and deriving unit costs to support the development of rates.

Water Rate Analysis

Water Consumption and User Characteristics

Willdan examined multiple years of historical billing data to identify various customer classes and applicable growth trends within each class. Based on the data, MCSD currently provides water to approximately 7,140 customer accounts. The billing data was used to determine seasonal demand patterns and overall consumption characteristics. The consumption analysis revealed that MCSD customers have a lower than average use of water, when compared to similar California agencies, which is likely due to its coastal climate.

Existing Water Revenues

The water utility derives revenue from a variety of sources. Annually, MCSD expects nearly 92% of the Water Fund's revenue to be generated from rate revenues (monthly user rates). In Fiscal Year 2017-2018, MCSD generated nearly $3.3 million in operating rate revenue, compared with $280 thousand in non-operating revenue, such as miscellaneous service charges, interest income and capacity fees.

Existing Water Expenditures

To achieve long-term financial health, a utility's revenues must be sufficient to meet total expenditures or cash obligations. All incurred costs related to operation and maintenance, debt service, and capital costs must be funded. MSCD estimates approximately $3.8 million in total system expenditures.

Figures 3 provides the Baseline Scenario for the Water Funds. This represents current and projected financial conditions of the water utility excluding any rate/revenue adjustments over the next 5 years. As the figure illustrates, existing revenue levels are not sufficient to meet the projected expenditures.

Figure 3: Water Fund - Baseline Financial Scenario

Description	Existing Rates	Projected For Fiscal Year Ending June 30:				
		2019	2020	2021	2022	2023
Revenues:						
User Rate Revenues	$ 3,301,951	$ 3,309,788	$ 3,388,683	$ 3,474,574	$ 3,562,649	$ 3,654,076
Other Revenues	280,758	280,758	294,493	308,856	324,077	339,989
Total Revenues	$ 3,582,709	$ 3,590,546	$ 3,683,176	$ 3,783,430	$ 3,886,726	$ 3,994,065
Percentage Rate Adjustment		0.00%	0.00%	0.00%	0.00%	0.00%
System Expenditures:						
O&M Costs	$ 2,459,940	$ 2,459,940	$ 2,577,596	$ 2,693,922	$ 2,821,799	$ 2,957,276
Debt Service (P&I)	263,724	263,724	486,928	686,122	740,245	812,927
R&R Transfer	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Total Operating & Non-Operating	$ 3,723,664	$ 3,723,664	$ 4,064,524	$ 4,380,044	$ 4,562,043	$ 4,770,203
Revenue Excess (Deficiency)	**$ (140,955)**	**$ (133,118)**	**$ (381,348)**	**$ (596,614)**	**$ (675,317)**	**$ (776,138)**
Debt Service Coverage	**4.26**	**4.29**	**2.27**	**1.59**	**1.44**	**1.28**

Projected Operating Results

Given the existing financial condition of the utility, without near term revenue adjustments, MCSD's water fund will not be able to meet its targeted objectives without rate adjustments. As such, Willdan worked with MCSD staff for the development of a financial plan and rate structure that provides gradual adjustment to provide continued financial stability throughout the study period. Numerous financial scenarios were analyzed and presented over the course of the study. The results and recommendations provided in the analysis were presented in August 2018 and account holders were subsequently mailed a Proposition 218 Noticed in September. The recommended financial scenario was developed and analyzed to achieve a positive net income within the five-year study period and to maintain compliance with the MCSD's Debt Coverage Ratio.

Figure 4 provides a summary of the projected operating results for the water system and the corresponding impact of the proposed rate adjustments.

Figure 4: Water - Projected Operating Results

Description	Projected For Fiscal Year Ending June 30:				
	2019	2020	2021	2022	2023
Revenues:					
User Rate Revenues	$ 3,394,078	$ 3,650,743	$ 3,917,744	$ 4,190,549	$ 4,434,226
Other Revenues	295,758	310,243	325,393	341,442	358,222
Total Revenues	$ 3,689,836	$ 3,960,986	$ 4,243,137	$ 4,531,990	$ 4,792,447
Percentage Rate Adjustment	**7.00%**	**7.00%**	**6.00%**	**6.00%**	**3.00%**
System Expenditures:					
O&M Costs	$ 2,459,940	$ 2,577,596	$ 2,693,922	$ 2,821,799	$ 2,957,276
Debt Service (P&I)	263,724	486,928	686,122	740,245	812,927
R&R Transfer	960,000	890,000	860,000	960,000	1,000,000
Total Operating & Non-Operating	$ 3,683,664	$ 3,954,524	$ 4,240,044	$ 4,522,043	$ 4,770,203
Revenue Excess (Deficiency)	**$ 6,172**	**$ 6,462**	**$ 3,094**	**$ 9,947**	**$ 22,244**
Debt Service Coverage	**4.66**	**2.84**	**2.26**	**2.31**	**2.26**

Cost of Service Analysis

Following the consumption and revenue requirement analysis, the next stage was to distribute costs (revenue requirements) to functional components, and ultimately, to customers. The cost of service analysis is a systematic process by which revenue requirements are allocated by function to generate a classification of equitable costs in proportion to the service received by each account. The cost of services analysis combines the Water Consumption and Usage Characteristics analysis with the Revenue Requirements and expenditure analyses. This section of the report discusses the methodology of allocating expenditures to the functional cost components.

Cost Allocation by Function

To equitably allocate the cost to customers in proportion to their usage and peaking demands, costs first need to be allocated to functional cost components. The cost of service allocation completed in this study is established on the base-extra capacity method endorsed by the American Water Works Association (AWWA). Under the base-extra capacity method, revenue requirements are allocated based on the demand placed on the water system. Allocations to functional cost components are established on average day (base) usage, maximum day (peak) usage, meters and services, and billing and collection. Use of this methodology results in an AWWA-accepted cost distribution to customers and a means of calculating and designing rates to proportionately recover those costs.

A water system COS analysis is a detailed study that allocates the Revenue Requirements of the system to individual customer classes. This process involves four basic steps as follows:

- ***Revenue Requirement*** - The revenue requirement determines the costs to be supported by monthly user rates. The amount is developed based on a projection of expenses for FY 2019 (the Test Year) as developed by utility staff. Sources for the financial projections include the currently budgeted expenditures for operations and capital improvements. Projections for customer growth, operation and maintenance costs, and capital paid from current earnings are based on information provided by MCSD.

- ***Cost Functionalization*** - The cost functionalization process categorizes the revenue requirement by basic utility function and service. In this analysis, the water costs separated into Supply/Treatment, Transmission, Distribution, Administration and Customer functions.

- ***Classification*** - Once functionalized, the costs are classified into the fundamental cost categories that directly influence the nature and type of cost. For MCSD, costs are classified into based demand-related (fixed costs), systemwide max-day, distribution specific max-day and customer-related costs.

- ***Allocation*** - Based on these cost classifications, costs are then allocated to the individual customer classes based on their usage characteristics. For example, since the max-day costs are variable in nature, they are allocated to the various customer classes based on billable flows.

Current Budget and Revenue

The determination of the monthly user rates and charges to be applied to water customers is based upon the estimated revenue requirements of the system. Revenue requirements consist of the operating, maintenance, debt service, capital and other monetary expenditures necessary to provide, maintain and perpetuate quality services to meet the goals and objectives of the utility system.

Methodology

The rate analysis performed herein utilizes the projected water system budget for fiscal year 2018/19 (the "Water Budget" for fiscal year ending June 30, 2019) as the basis for developing the revenue requirements to be recovered from user rates. The Water Budget, as prepared by MCSD, has certain expenditures that are allocated between identifiable functional components, as well as expenditures that are associated with the combined system operations. In developing the rate analysis, certain adjustments are made such that the expenditures are categorized into either Operating and Maintenance (O&M) expenses or Non-Operating expenses (e.g. debt service, capital reserves, general fund transfer, etc.).

Classification of Costs

The allocation of functionalized water system costs to service characteristics follows the base-extra capacity cost allocation method included in AWWA Manual M-1. Applying this methodology, costs are classified into the following categories:

> ***Base*** capital costs and O&M expenses associated with service to customers under average demand conditions. This category does not include any costs attributable to variations in water use resulting from peaks in demand. Base costs tend to vary directly with the total quantity of water used.
>
> ***Max Day*** (Extra Capacity) costs attributable to facilities that are designed to meet peaking requirements. These costs include capital and operating costs for additional plant and system capacity beyond that required for average usage. For the purpose of this analysis, the max/extra capacity costs are further separated into systemwide facilities and distribution facilities. Such a separation is done to provide a basis to exclude the allocation of distribution costs from wholesale customers that operate their own distribution facilities for their customers.
>
> ***Humboldt Bay Municipal Water MCSD*** costs which are attributable to the direct and indirect costs of purchased water.
>
> ***Customer Service*** costs include those related to the maintenance and servicing of customer accounts, and meter service related costs. Customer account costs are uniform to all customers and include such costs as meter reading, billing, accounting, and administration. Meter service costs include maintenance and capital costs associated with meters and services related costs.

Figure 5 shows a summary distribution of the utility's expenditures for the test year of the study period. To generate this data, MCSD's budget was analyzed line-item by line-item and expenditures were distributed based on a variety of demand factors: average day (base), maximum day (peak) usage, meters and services, and customer accounts.

Figure 5: Distribution of Expenditure by Function

Description	Costs 2019	Projected Revenues	Difference $ Amount	Difference Percent
Total Cost of Service:				
Base	$ 926,235			
Max Day/Extra Capacity	672,263			
Sub-Total Non Customer	$ 1,598,498			
Customer	981,499			
Total	$ 2,579,997			
EXISTING RATES				
Customer Class:				
Residential	$ 1,776,493	$ 1,641,030	$ (135,463)	-8%
Multifamily	495,357	537,280	41,923	8%
Nonresidential	308,148	245,200	(62,948)	-20%
Total	$ 2,579,998	$ 2,423,510	$ (156,488)	-6%
PROPOSED RATES				
Customer Class:				
Residential	$ 1,773,678	$ 1,699,940	$ (73,738)	-4%
Multifamily	493,410	556,050	62,640	13%
Nonresidential	312,909	257,650	(55,259)	-18%
Total	$ 2,579,997	$ 2,513,640	$ (66,357)	-3%

Once the system cost causation analysis is complete, the next step is to design the most equitable and appropriate rate structure to recover those revenues.

Rate Design Analysis

In an effort to meet the objectives of establishing rates that are administratively efficient, equitable and based upon the cost of service provided, the analysis developed herein includes a review of the existing rate structure. In reviewing the rate structure, primary consideration is given to the overall equity of the rate structure as it applies to various customers and customer classes. Consideration is also given to administrative efficiency, water conservation goals, the comparativeness of the rate structure with other regional utility systems, as well as common industry standards for water utility rates. Upon review, certain rate structure modifications are proposed. A general description of the proposed rate structure revisions is provided in the following discussions.

Criteria and Considerations

In determining the appropriate rate level and structure, Willdan, in conjunction with MCSD staff, analyzed various generated financial scenarios concerning the proposed adjustments and the implications attributed to those decisions.

A simplified list of some of the rate design considerations that were reviewed is listed:

- Clear and understandable
- Easily administered
- Cost of service principles
- Revenue stability
- Prudent financial planning
- Capital Funding Options
- Equity
- Comply with legal and regulatory requirements

Every consideration has merit and plays an important role in a comprehensive rate study. When developing MCSD's proposed rates, all the criteria were taken into consideration, in addition to the objective of minimizing rate shock. Determining the appropriate balance is crucial, as some of the criteria sometimes conflict with one another, i.e. the conservation measures and cost-based. In designing rates, there will always be a goal of achieving balance between the various objectives as well as policy decisions made by the MCSD Board.

Existing Rate Structure

The existing rate structure has a two-tier rate structure for residential and non-residential customers. The structure is comprised of the following cost components.

Base Charge: Charge is per month and is based on the size of water meter. This component of the water rate reflects the cost of metering support, customer service, and maintaining the account.

Commodity Charge: Charge is $1.47 for the first 800 cubic feet (CF) used per month; $3.66 for anything over 800 CF. This supports the variable cost of the system that brings the water to homes or businesses.

Humboldt Bay Pass-through: The pass-through rate recovers cost increases outside the control of MCSD, such as increased cost of purchased water, pursuant to Government Code Section 53756. The current pass-through rate is $1.40 per 100 CF.

Proposed Rate Structure

Since the existing rates are not expected to generate adequate revenue to support the MCSDs expenditure needs, Willdan recommends certain modifications to the existing rates and rate structure. Below are the proposed components of the recommended rate structure.

Base Charge: Although MCSD applies a practice of incrementing the base monthly charges for larger connections, the incrementing equivalency factors are not consistent with industry standards. As such, it is proposed that MCSD revise the current methodology related to the equivalency factors for the various meter sizes. The proposed methodology for incrementing the monthly availability charge is based upon standardized meter/capacity criteria established by the American Water Works Association (AWWA) relative to the size of the water meter. The AWWA equivalent meter capacity criteria are commonly used to establish a standard unit of measure for customers referred to as an Equivalent Residential Unit (ERU). Based upon the established standards, an ERU is equal to one single-family residential connection with a 5/8x3/4-inch water meter. The applicable ERU factors for larger water meters are based upon the incremental increase in potential capacity of those meters as compared to the standard meter size. These factors are derived from actual flow testing results as performed and defined by the AWWA, and commonly utilized by the water and wastewater utility industry. In fact, many state public service commissions have adopted the AWWA meter equivalency basis as the required structure for rate-making by the private utility systems within their regulatory jurisdiction. Similar to the current practice utilized by MCSD, the AWWA equivalency factors can be applied to the monthly base charge for a 5/8x3/4-inch meter in order to calculate the applicable base charges for each meter size.

Commodity Charge: Charge is applied to all units of water used per month and split between two tiers. Starting in January 2019, all users will be charge $1.57 cents for the first 800 CF and $3.93 for anything over 800 CF.

Humboldt Bay Pass-through: The pass-through rate will be adjusted annually to reflect and recover cost increases outside the control of MCSD, such as increased cost of purchased water, pursuant to Government Code Section 53756. This will ensure appropriate cost recovery without the possibility of overcharging customers for assumed increases. The water adjustment charge will be calculated as necessary to reflect cost increases implemented by HBMWD. The pass-through rate starting in January 2019 will be $1.58 per 100 CF.

Recommended Water Charges

The proposed revenue adjustments as a percentage do not equal or necessary correlate to an equivalent percentage increase to rates or monthly bills. The results of the cost-of-service analysis and rate redesign will affect users differently, based on meter size and water consumed.

Base Charge

In accordance with the existing rate structure, the base charges are applied by the size of the water meter for residential and nonresidential customers. For multi-family customers, the base charges are billed by the number of dwelling units. Figure 6 provides a breakdown of the projected water customer accounts/units by customer class.

Figure 6: Total Water Accounts/Units

Description	Estimated 2018	Projected For Fiscal Year Ending June 30:				
		2019	2020	2021	2022	2023
WATER SYSTEM						
Accounts - Inside:						
Residential	4,860	4,872	4,884	4,897	4,910	4,924
Multi-Family	1,965	1,971	1,977	1,983	1,989	1,998
Nonresidential	295	295	295	295	295	295
Subtotal	7,120	7,138	7,156	7,175	7,194	7,217
Accounts - Outside:						
Residential	6	6	6	6	6	6
Multi-Family	0	0	0	0	0	0
Nonresidential	20	20	20	20	20	20
Subtotal	26	26	26	26	26	26
Accounts - Combined:						
Residential	4,866	4,878	4,890	4,903	4,916	4,930
Multi-Family	1,965	1,971	1,977	1,983	1,989	1,998
Nonresidential	315	315	315	315	315	315
Total	7,146	7,164	7,182	7,201	7,220	7,243

The projected base charge revenue related is approximately $1.4 million dollars for fiscal year 2019. Figure 7 provides the projected base charge revenue by customer class for the projection period.

Figure 7: Projected Base Charge Revenue

Description	Proposed Rates	Projected For Fiscal Year Ending June 30:			
	2019	2020	2021	2022	2023
WATER REVENUES					
Monthly Base Charges - Inside:					
Residential	$ 951,760	$ 1,024,280	$ 1,097,410	$ 1,170,670	$ 1,230,520
Multi-Family	376,790	404,380	431,910	459,220	481,800
Nonresidential	84,040	96,600	109,970	124,150	137,330
Total	$ 1,412,590	$ 1,525,260	$ 1,639,290	$ 1,754,040	$ 1,849,650
Monthly Base Charges - Outside:					
Residential	$ 1,580	$ 1,750	$ 1,930	$ 2,100	$ 2,260
Multi-Family	0	0	0	0	0
Nonresidential	9,910	11,370	12,930	14,570	16,090
Total	$ 11,490	$ 13,120	$ 14,860	$ 16,670	$ 18,350
Monthly Base Charges - Combined:					
Residential	$ 953,340	$ 1,026,030	$ 1,099,340	$ 1,172,770	$ 1,232,780
Multi-Family	376,790	404,380	431,910	459,220	481,800
Nonresidential	93,950	107,970	122,900	138,720	153,420
Total	$ 1,424,080	$ 1,538,380	$ 1,654,150	$ 1,770,710	$ 1,868,000

Rates related to Meters and Services are distributed on an equivalent meter factor, as endorsed by the AWWA. Larger meters place a higher demand on the utility due to a higher capacity and total flow rate, which in turn cause higher maintenance costs.

Estimated revenue related to the volumetric charges is approximately around $1.9 million dollars for fiscal year ending 2019. Figure 8, highlights volumetric, pass-through and bulk water rate revenue through 2024.

Figure 8: Projected Volumetric Revenues

Description	Proposed Rates 2019	Projected For Fiscal Year Ending June 30: 2020	2021	2022	2023
WATER REVENUES					
Volumetric Rates - Inside:					
Residential	$ 742,100	$ 810,770	$ 881,330	$ 954,880	$ 1,020,640
Multi-Family	179,260	192,220	205,170	218,220	229,270
Nonresidential	155,160	166,180	176,840	187,690	196,490
Pass-through Charge	855,990	902,960	957,010	1,012,640	1,070,290
Bulk Water	17,528	19,103	20,914	22,859	24,946
Total	$ 1,950,038	$ 2,091,233	$ 2,241,264	$ 2,396,289	$ 2,541,636
Volumetric Rates - Outside:					
Residential	$ 4,500	$ 4,820	$ 5,130	$ 5,440	$ 5,700
Multi-Family	0	0	0	0	0
Nonresidential	8,540	9,140	9,720	10,320	10,800
Pass-through Charge	6,920	7,170	7,480	7,790	8,090
Total	$ 19,960	$ 21,130	$ 22,330	$ 23,550	$ 24,590
Total Volumetric Combined:					
Residential	$ 746,600	$ 815,590	$ 886,460	$ 960,320	$ 1,026,340
Multi-Family	179,260	192,220	205,170	218,220	229,270
Nonresidential	163,700	175,320	186,560	198,010	207,290
Pass-through Charge	862,910	910,130	964,490	1,020,430	1,078,380
Bulk Water	17,528	19,103	20,914	22,859	24,946
Total	$ 1,969,998	$ 2,112,363	$ 2,263,594	$ 2,419,839	$ 2,566,226

Figure 9 provides the proposed base charges, volumetric rates and pass-through rate. The pass through will be adjusted as necessary to reflect the adjustments in the wholesale water charges established by HBWMD. This mechanism enables MCSD to only pass-through the actual costs of purchased water; while providing an increase in financial stability and certainty to MCSD.

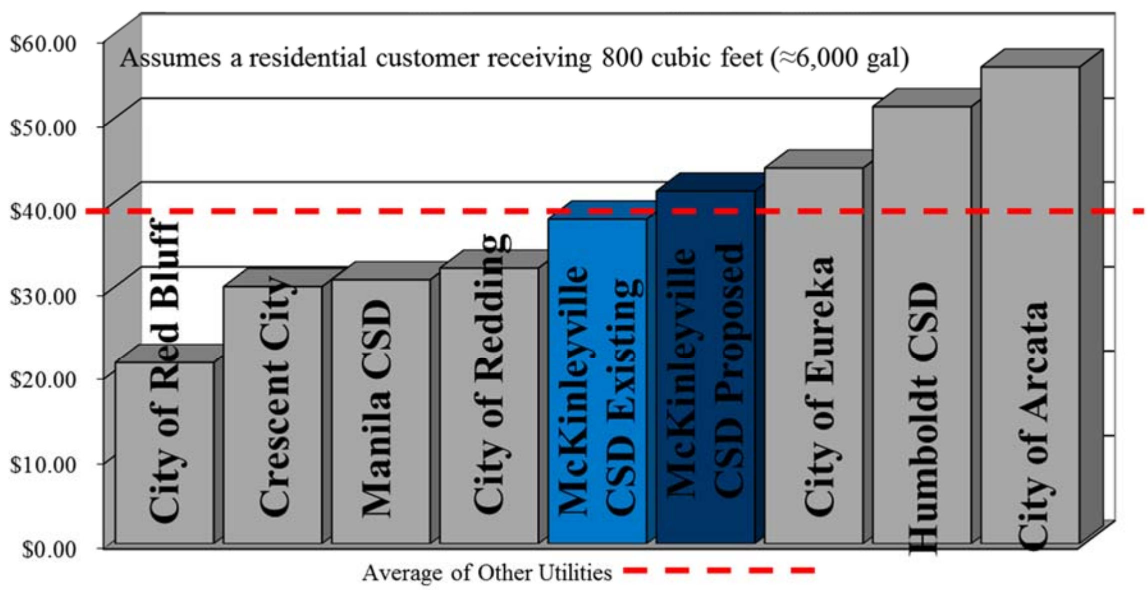
Figure 9: Proposed Rates

TABLE 1 PROPOSED RATES - WATER					
Description	**Year 2019**	**Year 2020**	**Year 2021**	**Year 2022**	**Year 2023**
Monthly Base Charge:					
5/8 Inch	$ 16.47	$ 17.62	$ 18.68	$ 19.80	$ 20.39
3/4 Inch	$ 22.23	$ 24.49	$ 26.71	$ 29.11	$ 30.59
1.0 Inch	$ 33.60	$ 38.06	$ 42.59	$ 47.52	$ 50.98
1.5 Inch	$ 62.09	$ 71.89	$ 82.01	$ 93.06	$ 101.95
2.0 Inch	$ 96.35	$ 112.59	$ 129.45	$ 147.91	$ 163.12
3.0 Inch	$ 179.52	$ 214.61	$ 251.43	$ 291.85	$ 326.24
4.0 Inch	$ 290.53	$ 343.59	$ 399.00	$ 459.76	$ 509.75
6.0 Inch	$ 575.46	$ 682.07	$ 793.53	$ 915.75	$ 1,019.50
8.0 Inch	$ 917.71	$ 1,088.92	$ 1,268.00	$ 1,464.41	$ 1,631.20
Volumetric Per 100 CF:					
Block 1 - 0 to 8 CCF	$ 1.57	$ 1.68	$ 1.78	$ 1.89	$ 1.95
Block 2 - All Over 8 CCF	$ 3.93	$ 4.20	$ 4.45	$ 4.73	$ 4.88
Pass-through Charge (P/HCF)	$ 1.58	$ 1.64	$ 1.71	$ 1.78	$ 1.85

Rate Comparison

While the cost structure and facilities vary greatly between water utilities, rate comparisons provide stakeholders a barometer of its rates in relation to surrounding communities. For increased application, the figure below compares agencies where HBMWD is the wholesale service provider. Figure 10 provides the estimated monthly bill for a typical residential customer (800 CF). As the figure demonstrates, holding rates level, the Proposed FY 2018-19 rates will still be among the average in the region.

Figure 10: Single Family Regional Rate Comparison (800 Cubic Feet)



Wastewater Rate Analysis

The wastewater utility is in a similar financial position when compared to the water fund. Although starting with higher reserves, the Wastewater Fund is facing significant future capital expenditures and increased costs related to operations and a need to repair and replace aging infrastructure. This section of the report outlines the details of the analysis and the approach to developing the recommendations.

Wastewater Discharge and User Characteristics

As wastewater usage (discharge) is not metered, an examination of seasonal water consumption plays a critical role in ensuring equitable and revenue sufficient rates. Willdan examined multiple years of historical billing data to identify various customer classes and applicable growth trends within each class. Furthermore, billing data was analyzed to determine seasonal demand patterns and overall consumption characteristics. These discharge assumptions were cross-analyzed against treatment plant information (gallons treated) to confirm the appropriateness of the user discharge analysis.

Customer Statistics

During the Fiscal Year 2017, an analysis of the wastewater data identified service to an estimated 6,253 accounts across 26 different customer land use classifications and discharging an estimated 429,000 CF of wastewater. A projection of customers and flows is necessary in the development of rates.

Existing Wastewater Revenues

Like water, the Wastewater Fund receives a majority of its revenues from rates. In Fiscal Year ending 2017, the Wastewater Fund yielded $3.3 million in operating rate revenue, compared with $196 thousand in non-operating revenue.

Existing Wastewater Expenditures

To achieve long-term financial health, a utility's revenues must be sufficient to meet total expenditures or cash obligations. This "required revenue" includes all incurred costs related to operation and maintenance, debt service, and capital costs. MSCD estimates approximately $3.8 million in total system expenditures.

Figures 12 demonstrates the Baseline Scenario for the Wastewater Fund. This represents current and projected financial conditions of the water utility <u>excluding any revenue adjustment (increases) over the next 5 years</u>.

Figure 12: Wastewater Fund - Baseline Financial Scenario

Description	Existing Rates	Projected For Fiscal Year Ending June 30:				
		2019	2020	2021	2022	2023
Revenues:						
User Rate Revenues	$ 3,303,500	$ 3,303,390	$ 3,348,770	$ 3,394,720	$ 3,443,480	$ 3,492,970
Other Revenues	181,164	181,164	187,686	194,443	201,443	208,695
Total Revenues	$ 3,484,664	$ 3,484,554	$ 3,536,456	$ 3,589,163	$ 3,644,923	$ 3,701,665
Percentage Rate Adjustment		**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
System Expenditures:						
O&M Costs	$ 1,858,870	$ 1,858,870	$ 1,935,682	$ 2,009,794	$ 2,087,439	$ 2,171,401
Debt Service (P&I)	947,439	947,439	1,233,749	1,266,129	1,262,129	1,256,023
R&R Transfer	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Total Operating & Non-Operating	$ 3,806,309	$ 3,806,309	$ 4,169,431	$ 4,275,923	$ 4,349,568	$ 4,427,424
Revenue Excess (Deficiency)	**$ (321,645)**	**$ (321,755)**	**$ (632,975)**	**$ (686,761)**	**$ (704,645)**	**$ (725,760)**
Debt Service Coverage	**1.72**	**1.72**	**1.30**	**1.25**	**1.23**	**1.22**

Projected Operating Results

Given the existing financial condition of the utility, without near term revenue adjustments, MCSD's water fund will not be able to meet its targeted objectives without increases in the future. As such, Willdan worked with MCSD staff to seek input for the development a financial plan and rate structure that provides gradual adjustment to provide continued financial stability throughout the study period. Numerous financial scenarios were analyzed and presented over the course of the study. The results and recommendations provided in the analysis were presented in August 2018 and stakeholders were subsequently mailed a Proposition 218 Noticed in September. The recommended financial scenario was structured and analyzed to achieve a positive net income within the five-year study period and to maintain be incompliance with the MCSD's Debt Coverage Ratio.

Figure 13 provides a summary of the projected operating results for the wastewater system and the corresponding impact of the proposed rate adjustments.

Figure 13: Wastewater - Projected Operating Results

Description	Existing Rates	Projected For Fiscal Year Ending June 30:				
		2019	2020	2021	2022	2023
Revenues:						
User Rate Revenues	$ 3,303,500	$ 3,419,690	$ 3,835,860	$ 4,004,460	$ 4,181,750	$ 4,371,210
Other Revenues	196,164	196,164	203,226	210,542	218,122	225,974
Total Revenues	$ 3,499,664	$ 3,615,854	$ 4,039,086	$ 4,215,002	$ 4,399,872	$ 4,597,184
Percentage Rate Adjustment		**7.00%**	**7.00%**	**3.00%**	**3.00%**	**3.00%**
System Expenditures:						
O&M Costs	$ 1,858,870	$ 1,858,870	$ 1,935,682	$ 2,009,794	$ 2,087,439	$ 2,171,401
Debt Service (P&I)	947,439	947,439	1,233,749	1,266,129	1,262,129	1,256,023
R&R Transfer	800,000	800,000	860,000	930,000	1,000,000	1,000,000
Total Operating & Non-Operating	$ 3,606,309	$ 3,606,309	$ 4,029,431	$ 4,205,923	$ 4,349,568	$ 4,427,424
Revenue Excess (Deficiency)	**$ (106,645)**	**$ 9,545**	**$ 9,655**	**$ 9,079**	**$ 50,304**	**$ 169,760**
Debt Service Coverage	**1.73**	**1.85**	**1.70**	**1.74**	**1.83**	**1.93**

*Note revenue projections may slightly increase assuming the "Brewery" land use class is implemented.

Cost of Service Analysis

Following the discharge and revenue requirement analysis, the next stage is to distribute costs (revenue requirements) to functional components, and ultimately, to each customer class. The cost of service analysis is a systematic process by which revenue requirements are allocated by function to generate a classification of equitable costs in proportion to the service received for each user class.

This section of the report discusses the allocation of operating and capital costs to the applicable Flow, parameters, the determination of unit rates, and the calculation of user class cost responsibility. Similar to water, a wastewater system COS analysis is a detailed study that allocates the Revenue Requirements of the system to individual customer classes. This process involves three basic steps as follows:

- ***Revenue Requirement*** - The revenue requirement determines the costs to be supported by monthly user rates. The amount is developed based on a projection of expenses for FY 2019 (the Test Year). Sources for the financial projections include the currently budgeted expenditures for operations and capital improvements. Projections for customer growth, operation and maintenance costs, and capital paid from current earnings are based on information provided by MCSD.

- ***Cost Functionalization*** - The cost functionalization process categorizes the revenue requirement by basic utility function and service. In this analysis, the wastewater costs separated into Treatment, Collection, Administration and Customer functions.

- ***Allocation*** - Based on these cost functionalization, costs are then allocated to the individual customer classes based on their usage characteristics.

Current Budget and Revenue

The determination of the monthly user rates and charges to be applied to wastewater customers is based upon the estimated revenue requirements of the system. Revenue requirements consist of the operating, maintenance, debt service, capital and other monetary expenditures necessary to provide, maintain and perpetuate quality services to meet the goals and objectives of the utility system.

Methodology

The rate analysis performed herein utilizes the projected wastewater system budget for fiscal year 2018/19 (the "Wastewater Budget" for fiscal year ending June 30, 2019) as the basis for developing the revenue requirements to be recovered from user rates. The Wastewater Budget, as prepared by MCSD, has certain expenditures that are allocated between identifiable functional components, as well as expenditures that are associated with the combined system operations. In developing the rate analysis, certain adjustments are made such that the expenditures are categorized into either Operating and Maintenance (O&M) expenses or Non-Operating expenses (e.g. debt service, capital reserves, general fund transfer, etc.).

Cost Allocation by Function

The cost of service allocation conducted in this study is established on the flow and strength characteristics method, which is endorsed by the Water Environmental Federation (WEF). Under this method, revenue requirements are allocated to the different user classes proportionate to their use of the wastewater system. Allocations are based on customers and flow volume, and components of treatment, collection, administration and customer costs. Use of this methodology results in a generally accepted cost distribution among customer classes and a means of calculating and designing rates to proportionately recover those costs.

Figure 14 presents the allocated costs by function and customer class. This analysis is important in order to determine an equitable means of allocating costs to utility demand.

Figure 14: Distribution of Expenditure by Function

Description	Costs 2019	Projected Revenues	Difference	
			$ Amount	Percent
Total Cost of Service:				
Treatment	$ 1,151,281			
Collection	825,547			
Sub-Total Non Customer	$ 1,976,828			
Customer	1,613,318			
Total	$ 3,590,146			
PROPOSED RATES				
Customer Class:				
2 sewer Units/Commercial	$ 2,663	$ 2,810	$ 147	5.52%
Apartment/Multi Unit (Each)	804,258	816,700	12,442	1.55%
Bakery	3,157	2,030	(1,127)	-35.70%
Barber/Beauty Shop	3,034	3,020	(14)	-0.46%
Car Wash	3,883	3,100	(783)	-20.16%
Church & Residence	894	950	56	6.26%
Churches	11,581	9,820	(1,761)	-15.21%
Coast Guard Station/Airport	40,169	25,150	(15,019)	-37.39%
Dialysis Clinic	9,997	6,050	(3,947)	-39.48%
Fire Station/School	9,791	7,380	(2,411)	-24.62%
Gas Stations (No Market)	4,084	4,090	6	0.15%
Laundromats	15,241	10,220	(5,021)	-32.94%
Market	43,986	26,620	(17,366)	-39.48%
Metered Septage Vault	20,190	12,880	(7,310)	-36.21%
Moblie Homes (Each)	19,360	18,400	(960)	-4.96%
Motels/Hotels	30,626	18,790	(11,836)	-38.65%
Office Building/Post Office	42,059	46,900	4,841	11.51%
Restaurant/Tavern	135,590	82,540	(53,050)	-39.13%
Retail/Banks/Theater/Other	43,436	34,920	(8,516)	-19.61%
Round Table/Market	5,276	3,540	(1,736)	-32.90%
Sewer Only Accounts	11,182	15,560	4,378	39.15%
Sewer Units - Commercial	819	900	81	9.89%
Single Family Residential	2,322,809	2,261,240	(61,569)	-2.65%
Two Sewer Units/Business	4,947	5,000	53	1.07%
Two Sewer Units/Daycare	1,115	1,080	(35)	-3.14%
Total	$ 3,590,147	$ 3,419,690	$ (170,457)	-4.75%

The separation of costs into these functional components provides the means for further allocation to the customer classes based upon their respective demand of each function. The resulting distribution percentages are utilized to allocate annual required revenue to each customer class based on the class' respective demand on the system

Once the system cost causation analysis is complete, the next step is to design an equitable rate structure to recover the revenues.

Rate Design Analysis

The final step of the rate study is the design of the wastewater rates to collect the desired level of revenue determined in the revenue requirement analysis. During this analysis, consideration is given to the levels of the rates. This section reviews the proposed wastewater rate design for the MCSD.

Criteria and Considerations

In determining the appropriate rate level and structure, Willdan, in conjunction with MCSD staff, analyzed various generated financial scenarios concerning the proposed adjustments and the implications attributed to those decisions.

Listed below is a simplified list of the design considerations that were reviewed:

- Consideration of the customer's ability to pay
- Clear and understandable rates
- Easily administered
- Outdoor water usage
- Revenue stability
- Efficient allocation of resources
- Capital Funding Options
- Equity
- Comply with legal and regulatory requirements

When developing the proposed rates all of the criteria were taken into consideration. Determining the appropriate balance is crucial, as some of the criteria occasionally conflict with one another, i.e. the customer's ability to pay and cost-based rates. In designing rates, there will always be concessions between the various objectives; however, the proposed rates meet all of the leading objectives of MCSD as discussed with staff and the Board.

Existing Rate Structure

The existing rate structure is a three-tiered rate structure for residential and two-tier rate structure for non-residential classes, both of which, also includes a base monthly rate. The structure is comprised of the following cost components.

> ***Base Charge*** is per month and is of the same for each customer class regardless of connection size. This component of the wastewater rate reflects a portion of operations, customer service, and maintaining the accounts.

Commodity Charge This charge reflects the cost of service related to the projected discharge and discharge characteristics for all remaining classes.

Proposed Rate Structure

Willdan recommends that some components of the rate structure be modified to reflect the current analysis and allocation of the costs incurred. Below are the proposed components of the recommended rate structure – while each customer class' rate(s) is comprised of these charges, the specific rates may differ based on land use category.

Base Charge: A fixed and uniform rate, applied per month, regardless of customer class or connection size. This component of the wastewater rate reflects a portion of operations, customer service, and maintaining the account.

Commodity Charge: Charge has been updated to reflect the cost of service related to discharge strengths based on land use category. The proposed rate for the Single Family Residential land use class is $2.55 per 100 CF. The rates for all other identified land use categories are based on loading standards developed by the California State Water Resources Control Board.

Recommended Wastewater Charges

The proposed revenue adjustments as a percentage do not equal or necessarily correlate to an equivalent percentage increase to rates or monthly bills. The results of the cost-of-service analysis and rate redesign will affect users differently, at both the customer class and account level.

Base Charge

In accordance with the existing rate structure, the base charges are the same for all land use classes. Figure 15 provides a breakdown of the projected wastewater customer accounts by land use category.

Figure 15: Total Wastewater Accounts

Description	Estimated 2018	Projected For Fiscal Year Ending June 30:				
		2019	2020	2021	2022	2023
WASTEWATER SYSTEM						
Accounts:						
2 sewer Units/Commercial	6	6	6	6	6	6
Apartment/Multi Unit (Each)	1,652	1,672	1,692	1,712	1,736	1,760
Bakery	1	1	1	1	1	1
Barber/Beauty Shop	6	6	6	6	6	6
Car Wash	3	3	3	3	3	3
Church & Residence	2	2	2	2	2	2
Churches	14	14	14	14	14	14
Coast Guard Station/Airport	4	4	4	4	4	4
Dialysis Clinic	1	1	1	1	1	1
Fire Station/School	7	7	7	7	7	7
Gas Stations (No Market)	8	8	8	8	8	8
Laundromats	5	5	5	5	5	5
Market	3	3	3	3	3	3
Metered Septage Vault	1	1	1	1	1	1
Moblie Homes (Each)	34	34	34	34	34	34
Motels/Hotels	2	2	2	2	2	2
Office Building/Post Office	108	108	108	108	108	108
Restaurant/Tavern	20	20	20	20	20	20
Retail/Banks/Theater/Other	43	43	43	43	43	43
Round Table/Market	2	2	2	2	2	2
Sewer Only Accounts	44	44	44	44	44	44
Sewer Units - Commercial	2	2	2	2	2	2
Single Family Residential	4,273	4,348	4,424	4,501	4,580	4,660
Two Sewer Units/Business	10	10	10	10	10	10
Two Sewer Units/Daycare	2	2	2	2	2	2
Subtotal	6,253	6,348	6,444	6,541	6,644	6,748

The projected base charge revenue related is approximately $2.2 million dollars for fiscal year 2019. Figure 16, provides the projected base charge revenue for the projection period.

Figure 16: Projected Wastewater Base Charge Revenue

Description	Proposed Rates 2019	Projected For Fiscal Year Ending June 30: 2020	2021	2022	2023
WASTEWATER REVENUES					
Monthly Base Charges:					
2 sewer Units/Commercial	$ 2,120	$ 2,350	$ 2,420	$ 2,490	$ 2,570
Apartment/Multi Unit (Each)	591,390	661,910	689,870	720,580	752,510
Bakery	350	390	400	420	430
Barber/Beauty Shop	2,120	2,350	2,420	2,490	2,570
Car Wash	1,060	1,170	1,210	1,250	1,280
Church & Residence	710	780	810	830	860
Churches	4,950	5,480	5,640	5,810	5,990
Coast Guard Station/Airport	1,410	1,560	1,610	1,660	1,710
Dialysis Clinic	350	390	400	420	430
Fire Station/School	2,480	2,740	2,820	2,910	2,990
Gas Stations (No Market)	2,830	3,130	3,220	3,320	3,420
Laundromats	1,770	1,960	2,010	2,080	2,140
Market	1,060	1,170	1,210	1,250	1,280
Metered Septage Vault	350	390	400	420	430
Moblie Homes (Each)	12,030	13,300	13,700	14,110	14,540
Motels/Hotels	710	780	810	830	860
Office Building/Post Office	38,200	42,250	43,520	44,830	46,180
Restaurant/Tavern	7,070	7,820	8,060	8,300	8,550
Retail/Banks/Theater/Other	15,210	16,820	17,330	17,850	18,390
Round Table/Market	710	780	810	830	860
Sewer Only Accounts	15,560	17,210	17,730	18,260	18,810
Sewer Units - Commercial	710	780	810	830	860
Single Family Residential	1,537,890	1,730,670	1,813,720	1,901,070	1,992,430
Two Sewer Units/Business	3,540	3,910	4,030	4,150	4,280
Two Sewer Units/Daycare	710	780	810	830	860
Total	$ 2,245,290	$ 2,520,870	$ 2,635,770	$ 2,757,820	$ 2,885,230

*Note projected revenues do not account for the proposed “Brewery” land use class. Additional revenue for the “Brewery” class will be minimal.

The projected revenue from volumetric rates is approximately $1.1 million dollars for fiscal year 2019. Figure 17, provides the projected wastewater volumetric rate revenue for the projection period.

Figure 17: Projected Wastewater Volumetric Rate Revenues

Description	Proposed Rates 2019	Projected For Fiscal Year Ending June 30: 2020	2021	2022	2023
WASTEWATER REVENUES					
Volumetric Rates:					
2 sewer Units/Commercial	$ 690	$ 730	$ 730	$ 730	$ 730
Apartment/Multi Unit (Each)	225,310	249,640	257,030	264,990	273,860
Bakery	1,680	2,020	2,190	2,360	2,550
Barber/Beauty Shop	900	980	1,000	1,020	1,050
Car Wash	2,040	1,630	1,230	800	360
Church & Residence	240	230	210	180	160
Churches	4,870	5,060	4,980	4,880	4,800
Coast Guard Station/Airport	23,740	24,690	24,290	23,820	23,430
Dialysis Clinic	5,700	6,690	7,170	7,610	7,990
Fire Station/School	4,900	4,950	4,770	4,580	4,510
Gas Stations (No Market)	1,260	1,240	1,170	1,100	1,030
Laundromats	8,450	8,840	8,700	8,550	8,430
Market	25,560	28,640	29,710	30,720	31,670
Metered Septage Vault	12,530	11,590	10,360	9,050	8,320
Moblie Homes (Each)	6,370	7,050	7,260	7,460	7,700
Motels/Hotels	18,080	20,020	20,790	21,600	22,560
Office Building/Post Office	8,700	9,500	9,710	9,880	10,190
Restaurant/Tavern	75,470	90,650	98,340	106,190	114,570
Retail/Banks/Theater/Other	19,710	20,500	20,170	19,780	19,450
Round Table/Market	2,830	3,140	3,230	3,320	3,420
Sewer Only Accounts	0	0	0	0	0
Sewer Units - Commercial	190	190	180	170	160
Single Family Residential	723,350	815,110	853,600	893,310	937,220
Two Sewer Units/Business	1,460	1,520	1,490	1,460	1,440
Two Sewer Units/Daycare	370	380	380	370	380
Total	$ 1,174,400	$ 1,314,990	$ 1,368,690	$ 1,423,930	$ 1,485,980

*Note projected revenues do not account for the proposed “Brewery” land use class. Additional revenue for the “Brewery” class will be minimal.

Figure 18 provides the proposed base charges, volumetric rates based on land use class for the wastewater system.

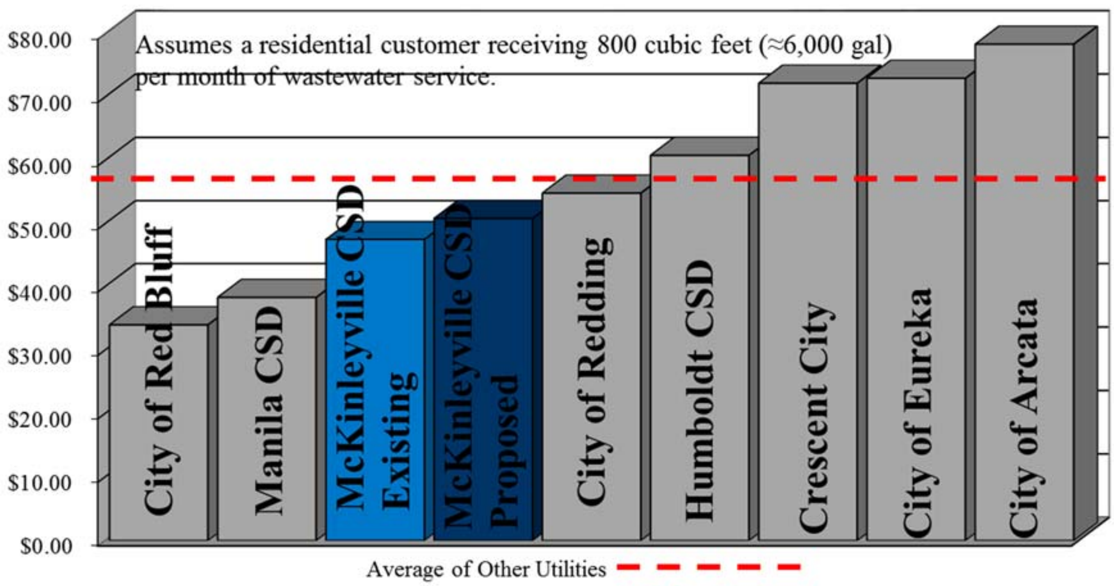
Figure 18: Proposed Wastewater Rates

TABLE 2 PROPOSED RATES - WASTEWATER										
Description		**FY 2019**		**FY 2020**		**FY 2021**		**FY 2022**		**FY 2023**
Monthly Base Charge:										
All Customers	$	30.47	$	32.60	$	33.58	$	34.59	$	35.63
Volumetric Per 100 CF:										
2 sewer Units/Commercial	$	3.06	$	3.14	$	3.09	$	3.03	$	2.98
Apartment/Multi Unit (Each)	$	2.55	$	2.73	$	2.81	$	2.89	$	2.98
Bakery	$	10.43	$	11.79	$	12.79	$	13.81	$	14.90
Barber/Beauty Shop	$	2.63	$	2.78	$	2.84	$	2.89	$	2.98
Car Wash	$	1.58	$	1.34	$	1.01	$	0.66	$	0.30
Church & Residence	$	4.39	$	4.20	$	3.82	$	3.41	$	2.98
Churches	$	3.06	$	3.14	$	3.09	$	3.03	$	2.98
Coast Guard Station/Airport	$	3.06	$	3.14	$	3.09	$	3.03	$	2.98
Coming Attractions	$	2.63	$	2.78	$	2.84	$	2.89	$	2.98
Dialysis Clinic	$	2.98	$	3.28	$	3.46	$	3.61	$	3.73
Fire Station/School	$	2.12	$	2.13	$	2.05	$	1.97	$	1.94
Gas Stations (No Market)	$	3.29	$	3.25	$	3.06	$	2.86	$	2.68
Laundromats	$	2.32	$	2.38	$	2.33	$	2.28	$	2.24
Market	$	10.00	$	10.78	$	11.18	$	11.56	$	11.92
Metered Septage Vault	$	4.39	$	4.15	$	3.71	$	3.24	$	2.98
Moblie Homes (Each)	$	2.55	$	2.73	$	2.81	$	2.89	$	2.98
Motels/Hotels	$	6.96	$	7.29	$	7.33	$	7.37	$	7.45
Office Building/Post Office	$	2.63	$	2.78	$	2.84	$	2.89	$	2.98
Restaurant/Tavern	$	10.43	$	11.79	$	12.79	$	13.81	$	14.90
Retail/Banks/Theater/Other	$	3.06	$	3.14	$	3.09	$	3.03	$	2.98
Round Table/Market	$	8.52	$	9.12	$	9.39	$	9.65	$	9.95
Sewer Only Accounts	$	0.00	$	0.00	$	0.00	$	0.00	$	0.00
Sewer Units - Commercial	$	3.29	$	3.25	$	3.06	$	2.86	$	2.68
Single Family Residential	$	2.55	$	2.73	$	2.81	$	2.89	$	2.98
Two Sewer Units/Business	$	3.06	$	3.14	$	3.09	$	3.03	$	2.98
Two Sewer Units/Daycare	$	2.96	$	3.03	$	2.98	$	2.92	$	2.98
Brewery	$	5.10	$	10.92	$	16.86	$	23.12	$	29.80

Rate Comparison

While the cost structure and facilities vary greatly between wastewater utilities, rate comparisons provide stakeholders a barometer of the MCSD rates in relation to surrounding or similar communities. Figure 19 provides the estimated monthly bill for a typical single-family customer (800 CF).

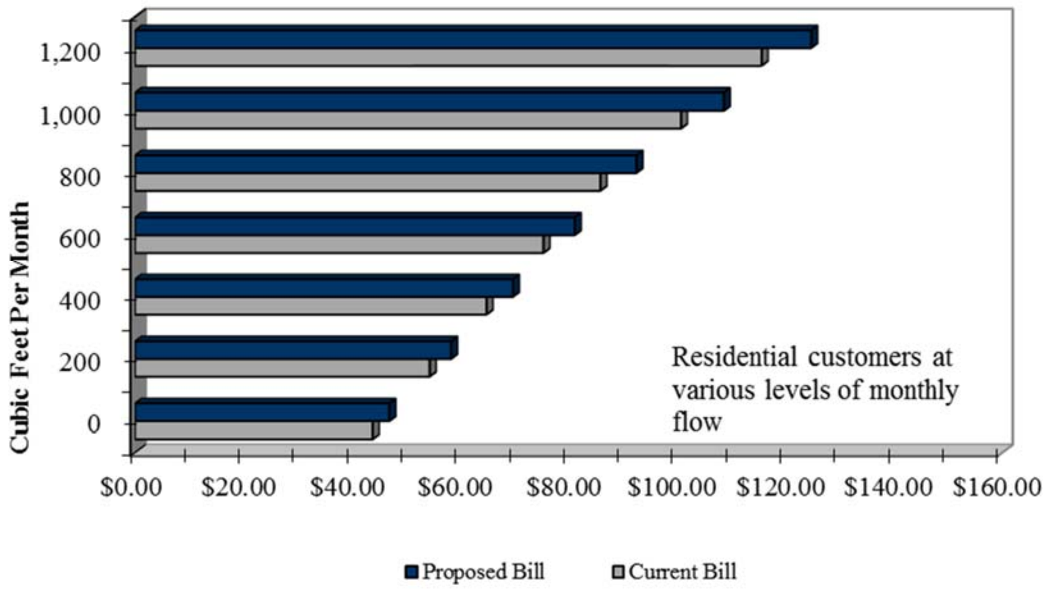
Figure 19: Single-Family Regional Wastewater Rate Comparison



Customer Impacts

The proposed rates will provide MCSD with the necessary revenue to provide continue quality service without a significant impact on the average ratepayer. The figure below provides a combined water and wastewater sample bill for a variety of single-family consumption levels.

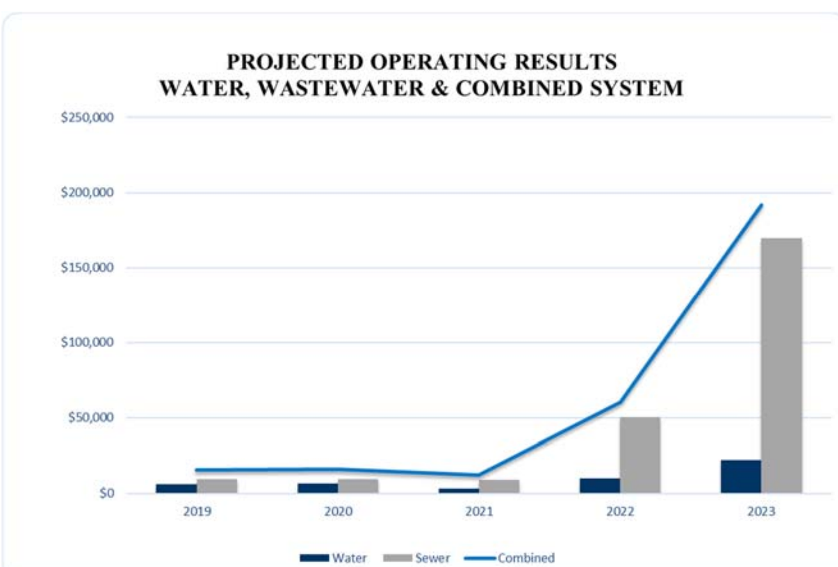
Figure 20: Single-Family Monthly Bill Comparison



Operating Results

The projection of the combined operating results for both water & wastewater trend positive from the base year 2019 through the analysis year of 2023. Figure 21 provides a graphical illustration of the projected operating results and trends for both enterprises, as well as for the combined enterprise system.

Figure 21: Projected Operating Results



Conclusions and Recommendations

Conclusions

- Projected operating revenues and operating expenses for the forecast period are developed by, and/or in consultation with, MCSD staff, and are based upon applicable assumptions;
- The projected CIP costs have been developed by MCSD staff to address the water and wastewater system renewal and replacement needs;
- Willdan is of the opinion that the financial projections presented here demonstrate the Utility's ability to meet its obligations with regard to:
  - Operating expenses;
  - Non-operating expenses (including debt service);
  - Capital project costs; and
  - Key financial policies, including debt service coverage and maintenance of at least 6 months of operating fund reserve balances.
- The proposed rates presented here are in conformance with industry standard rate-making practices, Proposition 218 and/or MCSD's rate policies with respect to:
  - The equitable recovery of costs through its water and wastewater rates;
  - Setting rates based upon the proportionate cost of providing utility services; and
  - Generating sufficient revenue to fully recover system expenditure and reserve requirements.

Recommendations

- It is recommended that MCSD implement the proposed rates presented in this Report for FY 2018-19 through FY 2022-23.
- It is recommended that MCSD update the Revenue Sufficiency Analysis portion of this study each year to ensure projected revenues are sufficient to fund projected expenses going forward as assumptions made during this analysis may change and have a material impact upon the analysis.