ASSET MANAGEMENT PLAN

Hull POTW

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COMMITMENT & INTEGRITY DRIVE RESULTS

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Town of Hull, MA
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EXECUTIVE SUMMARY

The Town of Hull (Town) is a peninsula community of about 10,000 permanent residents, and 15,000 seasonal residents, located between Hingham Bay and Massachusetts Bay on the South Shore of Massachusetts. The Town's sewer system is comprised of approximately 42 miles of separated gravity sewers, seven sanitary wastewater pumping stations, and over 175 publicly-owned grinder pumps within the low-pressure sewer system, which send flow to the Town's Water Pollution Control Facility (WPCF). The WPCF discharges treated effluent to Massachusetts Bay, regulated under a National Pollutant Discharge Elimination System (NPDES) permit. The WPCF also receives flow from the neighboring towns of Cohasset and Hingham, through a sewer utility Inter-Municipal Agreement (IMA).

Due to Town's unique geography, the collection system resembles a "fish skeleton" instead of a typical "tree" configuration. The back bone of the system is the interceptor, which ranges in size from 30" to 36" and is constructed of reinforced concrete. The main gravity interceptor was installed in late 1970's, and 42% of the interceptor has been rehabilitated with a cured-in-place liner. Most areas of the collection system consist of vitrified clay and asbestos cement pipe, with some older areas of original brick infrastructure (late 1800's) and newer areas of PVC (installed in the 1980's and 90's).

The WPCF was constructed in the late 1970's and received a partial upgrade in 2002. Due to the plant's location, it is extremely vulnerable to coastal flooding, and several storms have impacted operations over the WPCF's lifetime. While partial modifications have been made to alleviate the hazards posed during flooding events (post-Blizzard of 1978 and post- "No Name Storm" of 1991), the most recent devastating facility loss in February 2013 caused over $6 million dollars in repairs, with minimal changes to existing WPCF layout. In 2016, the Town released its Coastal Climate Change Vulnerability Assessment and Adaptation Study, and the WPCF received the highest consequence of failure score, signifying immediate long-term capital planning needs to be prepared.

On May 1, 2015, Woodard & Curran (W&C) entered a 10-year contract to operate and maintain the treatment and collection system for the Town Sewer Department. As part of ongoing contract operations work, Woodard & Curran has prepared several versions of recommended capital repairs and improvements to the collection system and pump stations, as well as treatment plant equipment and unit process upgrade recommendations.

One year later, on May 1, 2016, the Town entered an Administrative Order on Consent (AOC) with U.S. Environmental Protection Agency (EPA) and MassDEP to address ongoing critical asset repairs and address Sanitary Sewer Overflows (SSO's) within the collection system. The AOC (Docket No. CWA-01-AO-16-09) requires several immediate deliverables, including a Collection Management, Operation and Maintenance (CMOM) Program Manual and Action Plan for the collection system and WPCF.

On February 14, 2017, the Town retained Woodard & Curran (W&C) to execute a Change Order to the Operations and Maintenance contract to provide engineering and support services. The key purpose of this change order was to develop an innovative plan for providing overall engineering and O&M support for many interrelated wastewater utility asset management needs. The key areas covered in this change order include the following:

- Asset Management and Fiscal Sustainability Plan – this Plan
- AOC Deliverable Support
- Resiliency Needs Incorporation
- Critical Asset Repair/Replacement Prioritization
- Ongoing Annual Asset Management Repair and Replacement
- Stormwater Compliance Support

- Community/Stakeholder Support

As reviewed in Section 1, this Asset Management Plan is provided as the deliverable per the "Water Infrastructure Assessment and Planning Grant - Round 3, BRP-2017-02," as approved by MassDEP. Deliverables for this project consist of:

- Written report to provide methodologies, assumptions and data sources for the initial Risk Analysis, and guidance for tools provided to implement comprehensive, proactive approach to infrastructure funding.
- Introduction and Access to Software Tools:
    - Utility Cloud© web-based software
    - Info Master© Innovyze® desktop-based software
    - Google Sheets™ web-based database
    - Funding Tool, Microsoft Excel-based model provided

It the intent of this report to serve as "step one" for the Town's implementation process. Understanding that asset management is a cyclical process, the continued integration of performance, redundancy, and resiliency data for each individual asset is mandatory. By constantly improving the basis of asset information, the more accurate the planning tools will become over time. Based upon the sheer size of needed improvements, the Town must make informed decisions and this plan provides asset, capital planning and funding tools to demonstrate consequences to the Town and its rate payers.

Based on initial risk analysis, and understanding the initial draft of risk-based capital project planning, the following table shows an example of the proposed investment schedule over the course of the next ten years.

Capital Planning Year	Fiscal Year Financed	Improvement Type	Estimated Cost
1	2019	SSES, I/I Study, Critical Collection Rehab. and WPCF Replacements	$8,500,000
2	2020	SSES, WPCF/PS Resiliency and Process Improvements, Ph. 1	$18,350,000
3	2021	WPCF/Pump Station Improvements, Ph. 2	$2,050,000
4	2022	Collection Rehabilitation, Ph. 1 and WPCF/PS Improvements, Ph. 3	$2,150,000
5	2023	WPCF/PS Improvements, Ph. 4	$1,900,000
6-10	2024-2029	I/I Study Update, Collection Rehab Ph. 2 & 3, PS Ph. 5	$6,030,000
		Total	**$38,980,000**

It is expected that this list may change as more information becomes available throughout future iterations of this project. As the Town still needs to finalize the scope of capital upgrades, and determine the funding strategy which best suits their needs and their rate payers, the following recommendations are made as immediate next steps:

- Using Utility Cloud© for vertical assets, and NASSCO-Compliant CCTV providers for horizontal assets, move towards 100% current condition assessment of all POTW systems including:
    - Assessing remaining 40% of WPCF assets
    - Mapping remaining 15% of collection system assets, and
    - Collecting condition assessments on remaining 85% of collection system assets
    - Collecting 100% condition assessment of older force mains

- Collecting additional performance assessments on each pump station

- Determine next steps for setting a resiliency design standard for future upgrades
  - Assess WPCF structural feasibility of adaption measures for the control building
  - Assess WPCF electrical system and backup power systems relocation feasibility
  - Determine appropriate design flood elevations to mitigate risk to at each pump station and at the WPCF (based on electrical and structural feasibility assessments)
- Revise risk analysis to reprioritize priority assets
  - Determine scope of Facilities Plan to set long-term phased projects for inclusion on State Revolving Fund (SRF) Intended Use Plan (IUP)

While the Town is not currently on the CWSRF Intended Use Plan, they intend to apply for SRF funding for the projects identified through this program. Once the SRF application is completed, then a public meeting detailing the asset management plan and initial SRF project work would be presented to the public.

1 INTRODUCTION

On February 14, 2017, the Town of Hull retained Woodard & Curran (W&C) to execute a Change Order to the Operations and Maintenance contract to provide engineering and support services, including preparation of the Asset Management and Fiscal Sustainability Plan deliverables, as approved by MassDEP, as a part of the Asset Management Grant Program. This report fulfills the requirements of the application scope and includes additional Fiscal Planning tools. The table below compares the Application Scope of Work (listed 1 – 6 at left) with the Table of Contents of this report (right column) for quick comparison.

Table 1-1: Application and Executed Scopes of Work

Application Scope of Work (by others)	Executed Scope of Work (this Report)
1. Asset Inventory	Section 2: Asset Inventory
2. Condition Assessment (Asset Evaluation)	Section 3: Risk Management Analysis
3. Identification and priority of Criticality Assets	
4. Development of Priority List of Assets	
5. Development of Secondary List of Assets	
6. Cost & Funding Plan	Section 4: Funding and Capital Improvement Planning
N/A	Section 4.2 Rate Planning Tool and Long Term Funding Plan
Report, AM software development & GIS mapping	Section 5: Implementation Recommendations
N/A	Section 5.3 Energy and Conservation Evaluation
N/A	Appendix E: Software Evaluation
N/A	Appendix F: CREAT Evaluation

As a part of Section 3, preliminary coastal adaptation options for the wastewater treatment facility, pump stations, and the collection system were considered as a part of criticality analysis to incorporate resiliency into planning considerations. The EPA CREAT report (Appendix F), along with the 2016 Town of Hull Vulnerability Assessment, were used to provide capital planning estimates which are incorporated in Section 4. Also in Section 4, WPCF preliminary process alternatives were evaluated to help determine future capital plans, and a comprehensive Rate Evaluation tool demonstrated various rate impacts for a 10-year life cycle period. These Financial Sustainability Planning tools comply with MassDEP's State Revolving Fund (SRF) cost effectiveness and affordability criteria, as the Town is planning to submit a Project Evaluation Form (PEF) later this year for funding consideration. In Section 5, initial results of an energy efficiency self-assessment show future steps to be considered for long-term efficiency improvements to the facility, and for inclusion in SRF planning documents.

2 ASSET INVENTORY

The Town of Hull's Publicly Owned Treatment Works (POTW) is comprised of separated gravity sewers, pump stations, force main, grinder pumps/low-pressure networks to transport approximately 1.7 MG (2017 current average daily wastewater flow) to its Water Pollution Control Facility (WPCF). The WPCF provides treatment of municipal wastewater through screening, grit removal, primary treatment, secondary treatment, sludge thickening and trucking to regional incinerator for disposal, and disinfection. Numerous town assets have been previously inventoried and documented as geographic information system (GIS) files, or as assets in the computerized maintenance management system (CMMS). The existing inventories served as the starting point for this evaluation.

The Based on the current GIS, the Town's collection system consists of about 42 miles of separated sanitary sewer pipe. In addition to pipes, there are also approximately 994 manholes and seven pump stations in the system. The Town also owns and maintains approximately 175 grinder pumps and a low-pressure sewer system that services the southern portion of the Town. The gravity collection is separated into 12 sewersheds, subdivided sewered areas that each drain to a single point in the collection system. These sewersheds were studied to quantify I/I in the late 1990s and will be refined as the Town's GIS continues to improve with field data collection efforts.

The WPCF receives all flow from the Town of Hull, as well as flow from Hingham and Cohasset communities. The original WPCF was constructed in 1978 with some upgrades/repairs made in 2002 and 2013. Based on the CMMS database, the WPCF is comprised of over 390 assets for its various processes. In general, it was noted that the existing inventory focused primarily on items which required frequent maintenance, like mechanical systems, and not long term assets, like structural components. As a part of capital planning and budgeting, all assets need to be considered for its eventual end of life.

2.1 WPCF

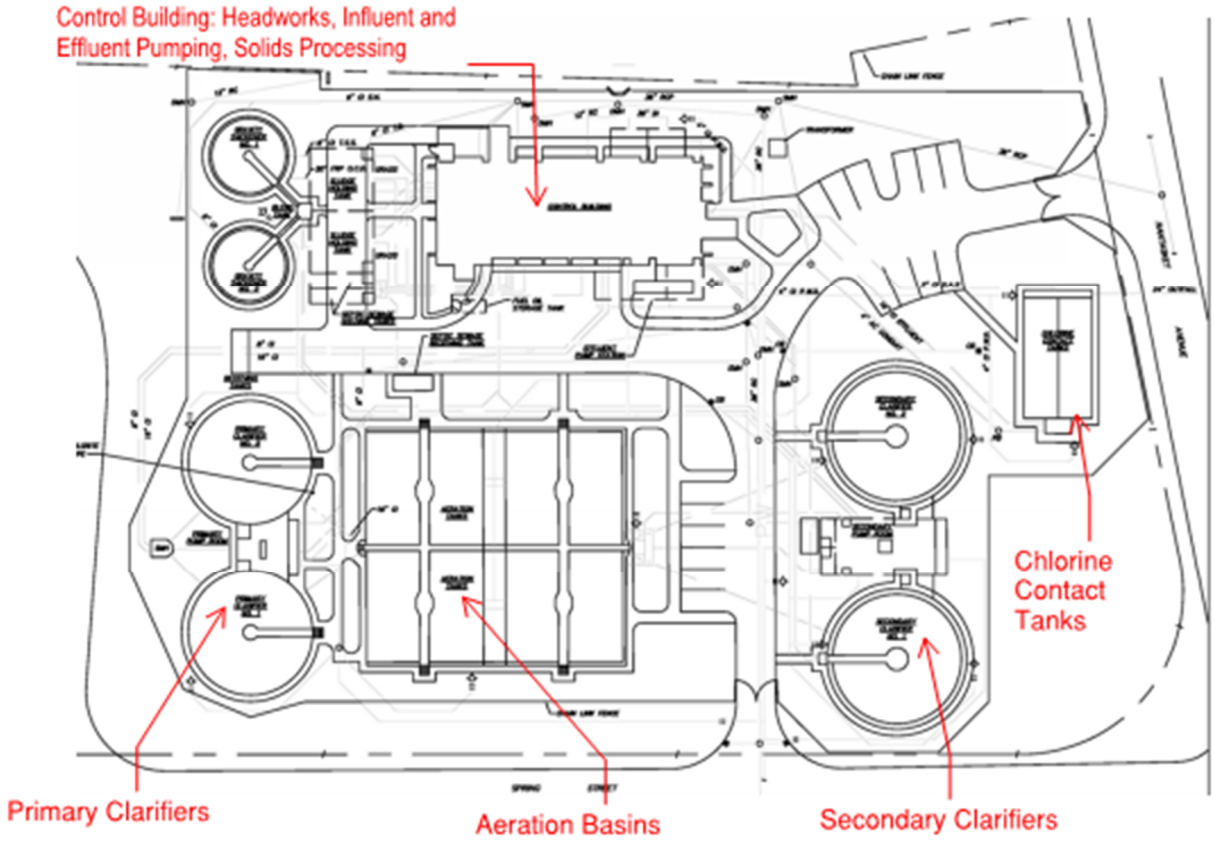
Under the Operations and Maintenance Contract, W&C maintains a WPCF asset inventory in a Computerized Maintenance Management Software (CMMS), SEMS Technologies. The most recent major repair and capital improvement spreadsheet, prepared as a part of the W&C Contract Operations work, was reviewed and combined with the data from the 2014 Tighe & Bond condition assessment spreadsheet and audit forms.

The corrected inventory was imported by SEMS asset number and Parent Category (see descriptions in Figure 2-1), and the following headings were assigned:

- **Utility Cloud ID**: this is the unique identifier assigned by the Utility Cloud software program; for tracking work order tasks and assignments.
- **Asset Description**: this provides the most detail about each individual asset, and is the system descriptor (e.g. "Primary Pump 1" or "Effluent Discharge Check Valve") which typically matches labels and/or equipment tags.
- **Asset ID:** the subset identifier of the Utility Cloud ID, which only counts items contained within the Utility Cloud WPCF group.
- **Category:** the general group or discipline for which the asset is identified as part of: Control, Electrical, HVAC, Lighting, Mechanical, Piping, Pumping, Safety, and Structural**.**
- **Location:** physical location of the asset within the building, process or site.
- **Type:** the subset identifier of the Parent Group, this field indicates which specific process it impacts through its operation (i.e. Primary Sludge Pumps are responsible for Sludge Handling, the type of process it supports)

The remaining headings capture the condition and likelihood of failure ratings, which will be described in Section 3.1. At the time of this report, over 390 assets have been inventoried within the WPCF, and they are included in Appendix B.

Figure 2-1: WPCF Layout and Major Asset Categories



WPCF Parent Groups
30 - WW Treatment Plant - General
31 - WW Headworks
32 - WW Influent Process
33 - WW Primary Treatment
34 - WW Secondary Treatment
36 - WW Effluent Process
37 - WW Odor Control
38 - WW Disinfection
39 - WW Sludge Treatment

As part of ongoing and future asset management efforts, we plan to continue to inventory assets within the WPCF to a greater level of detail. For the current analysis, we included the building as a single asset. In the future, we will add individual rooms/areas to the asset list, such as:

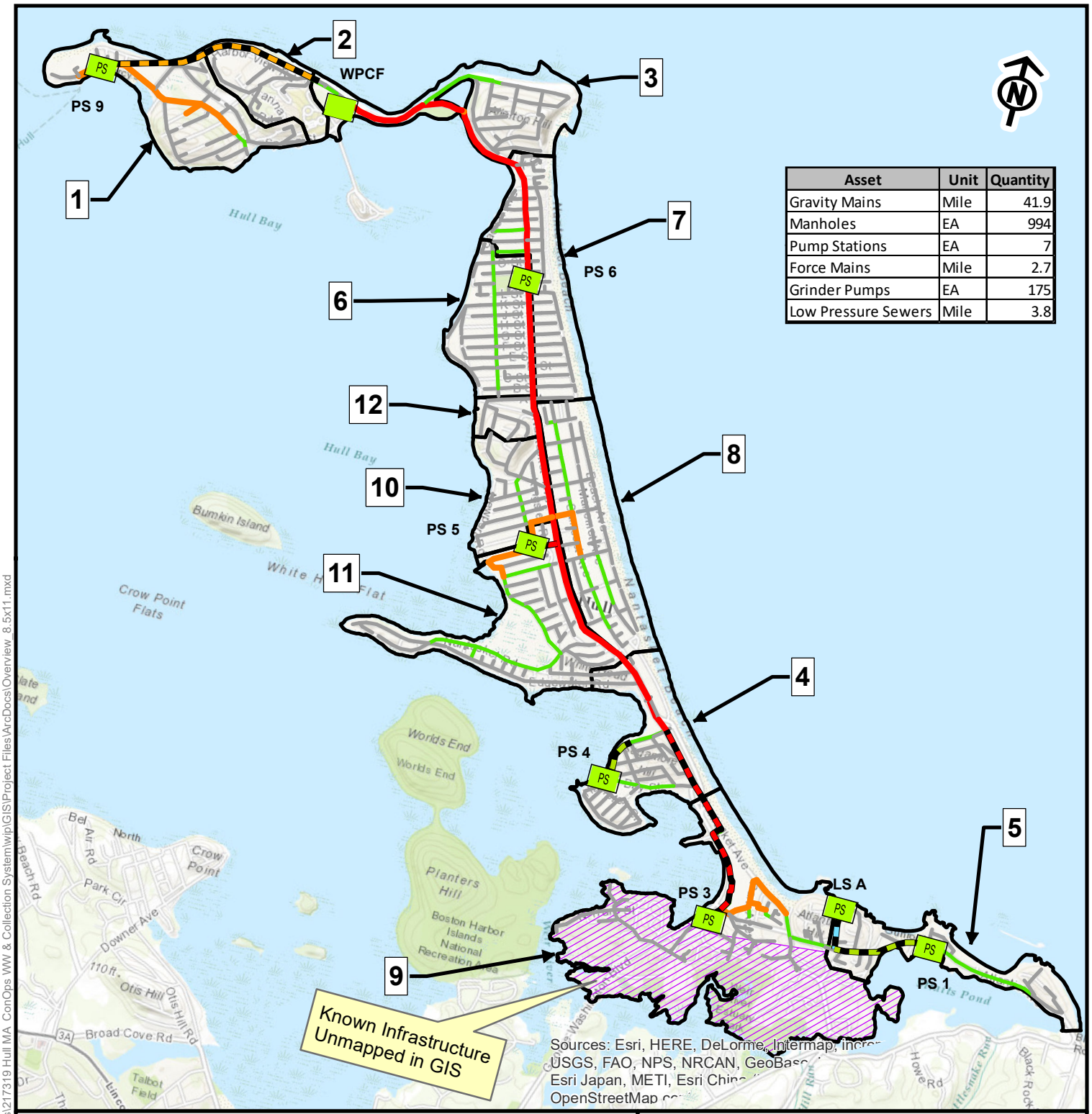
- Offices
- Bathrooms and Locker Rooms
- Kitchen/Break Room
- Storage Rooms and Closets
- Garage Areas
- Stairways and Hallways
- Remote Pump Rooms within the Plant

All the above-mentioned areas will need upgrades and major repairs that need to be included in an overall facility asset management plan.

2.2 Collection System

An accurate database of collection system assets is a foundational element of effective wastewater system management. Asset data plays an essential role in Capacity, Management, Operation and Maintenance (CMOM), capital improvement planning, and compliance programs. The Town's collection system assets include gravity and low pressure sanitary sewer pipes, manholes, pump stations, with associated force mains, and grinder pumps, which work together to convey wastewater to the Hull WPCF. W&C quantified and evaluated these assets by researching historical plans and maps provided by the Town's Sewer Department, as well as collecting asset information through daily WPCF Operations.

One of the focuses of recent activities was to conduct a condition assessment of the interceptor sewer since it is one of the most vulnerable assets in the system due to the amount of flow that it transports and the high probability of deterioration from hydrogen sulfide corrosion. W&C utilized the Town's existing GIS as a repository for basic asset data (e.g. location, size, material, etc.) on most of the Town's collection system assets. Approximately 85% of the entire collection system has been inventoried using GIS, and the remaining assets will be added into the GIS system over the next several years. Elevation data (manhole rim and inverts, pipe invert in/out) data has not been digitized by the Town into GIS, but is maintained in the Town's record drawings. The Town has recently purchased an Arrow Gold GPS unit that will allow the Town to collect and verify field measured GPS and elevation data directly into their GIS database. Figure 2-2 shows the extent of the Town's collection system as maintained in their GIS database. The Town's GIS maintains both geographic and attribute data for its sewer pipes, manholes, force mains, and pump stations. A detailed breakdown of each collection system asset class is described in the sections below.



Asset	Unit	Quantity
Gravity Mains	Mile	41.9
Manholes	EA	994
Pump Stations	EA	7
Force Mains	Mile	2.7
Grinder Pumps	EA	175
Low Pressure Sewers	Mile	3.8

Legend

PS Pump Station

Sewershed

Force Main (Diam)	Gravity Main (Diam)
4-6	5-8
8	10-14
10-12	16-24
14	30-36

Sewer Collection System Overview

Town of Hull, MA

Figure 2-2

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2.2.1 Gravity Sewer Pipes and Manholes

The Town's gravity sewer collection system is designed to be a separated sanitary sewer system. Although connections between the stormwater drainage system and sanitary system are suspected to exist, direct and indirect connections are evident via increases in flow in the sanitary system during wet weather. Portions of the Town have been evaluated for infiltration and inflow response (I/I), however, the last comprehensive plan was completed over 15 years ago. The Town will begin to implement a CMOM Corrective Action Plan during the summer of 2017 which is a strategic document that will focus on improving acknowledged deficiencies in the capacity, management, operation, and maintenance of the collection system.

The gravity collection system is comprised of pipes and manholes of varying installation age, material, and diameters. The overall layout of the collection system can be seen on Figure 2-2. Ultimately, sewer flow is collected by smaller diameter sewer pipes and transported to the Town's 30-36-inch reinforced concrete interceptor. The interceptor, originally installed in the mid-1970s was partially rehabilitated by the Town in 2006 and 2011 by installing cured-in-place pipe lining in areas at the time that showed severe deterioration. Table 2-2, and Figures 2-3 through 2-5 summarize the Town's gravity sewer pipe and manholes material and diameter.

Table 2-2: Gravity Collection System by Sewershed

Sewershed	Sewer Pipe (LF)	Manhole Count
1	18,666	82
2	6,100	33
3	20,127	82
4	24,364	101
5	12,473	61
6	26,723	92
7	18,340	95
8	23,304	102
9	21,565	106
10	12,799	59
11	31,968	151
12	4,579	28
Total	221,007	994

Figure 2-3: Gravity Sewer Length by Diameter

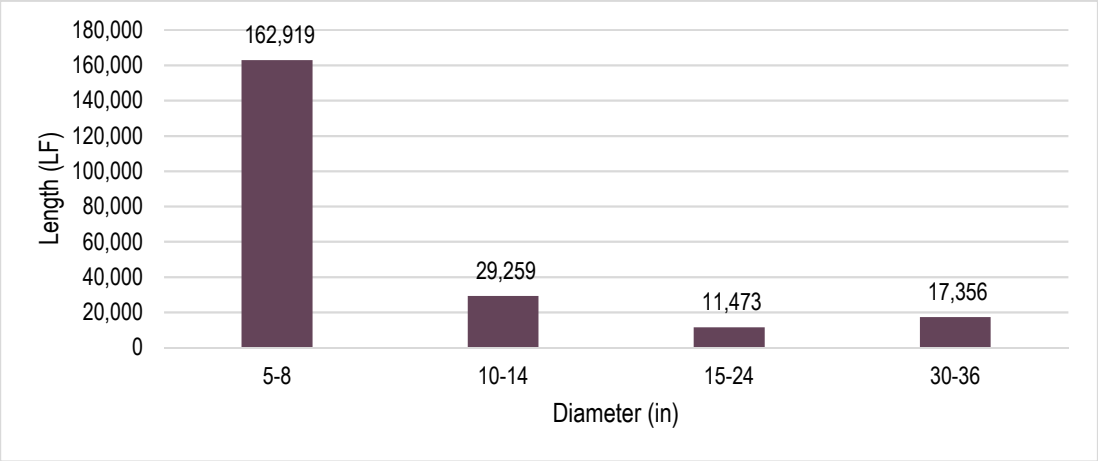
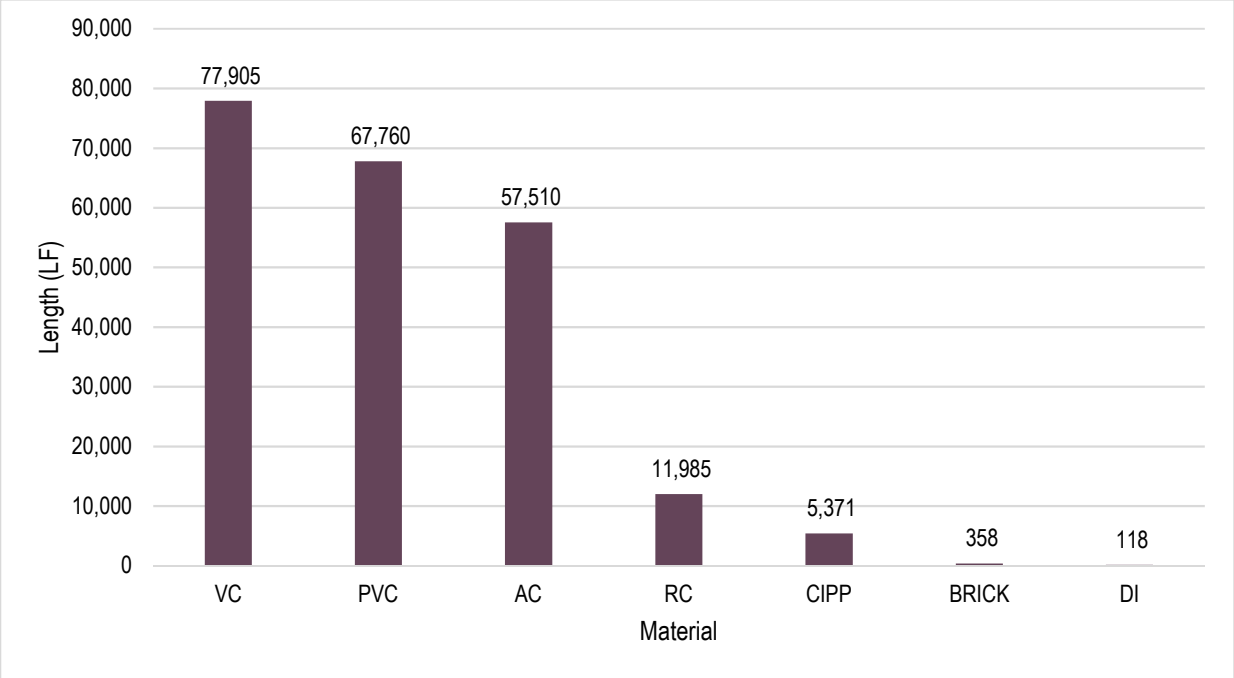
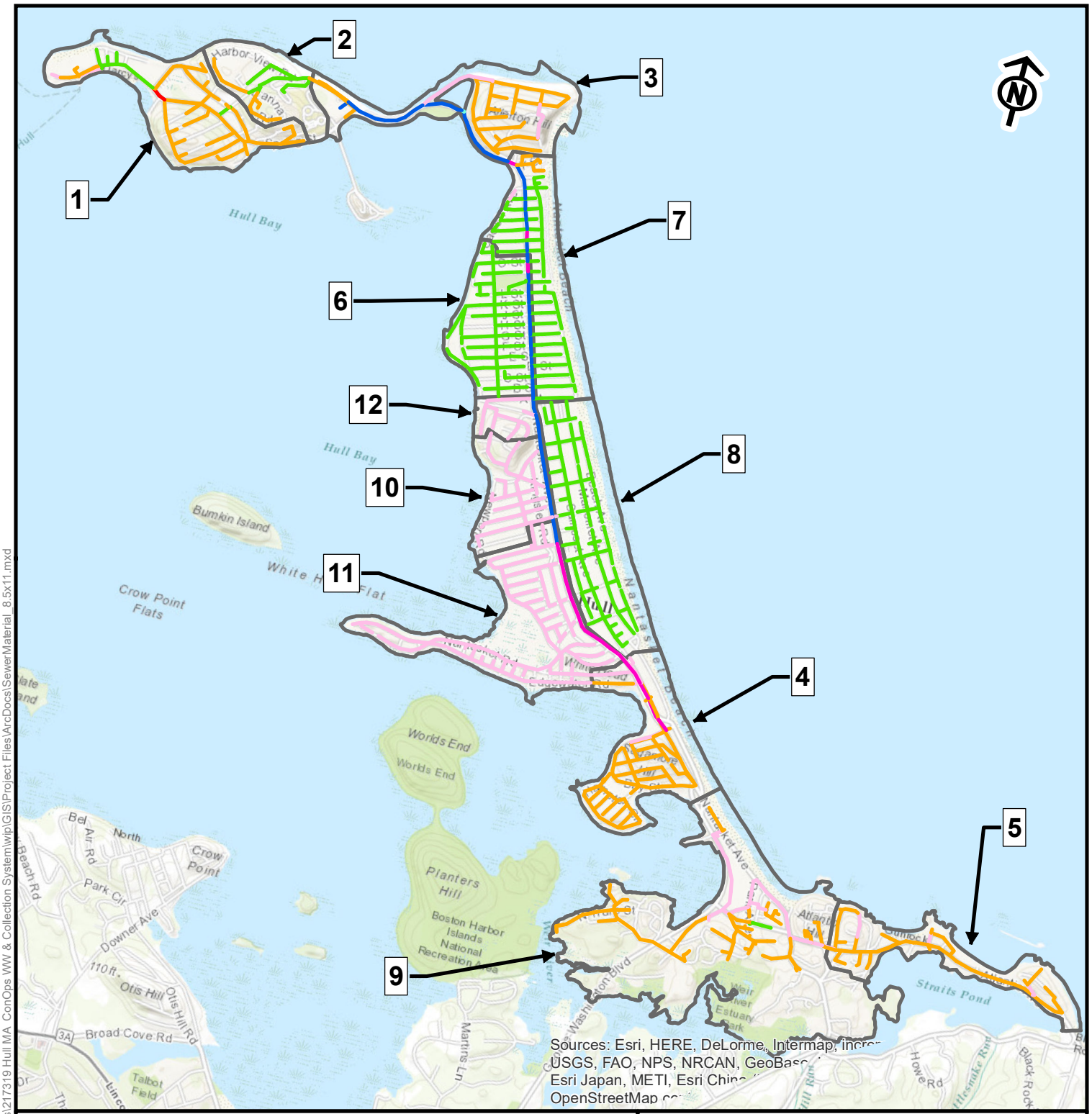


Figure 2-4: Gravity Sewer Length by Material





Legend

Sewershed

Gravity Main

- AC
- BRICK
- CIPP
- DI
- PVC
- RC
- VC

Sewer Collection System Overview
Sewer Main Material
Town of Hull, MA

Figure 2-5

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2.2.2 Pump Stations

Within the Hull POTW, there are seven sanitary sewer pump stations. The SEMS database provided a complete asset inventory for the Town's pump stations, but lacked ancillary data (such as asset nameplate information, performance testing and/or consistent component consequence assessments). See Table 2-3 for a summary of the station design information.

Table 2-3: Pump Station Inventory

Asset	Location	Generator	Design Capacity (gpm)	Approx. Age (years)
Station A	Valley Beach Rd.	No*	200	40
Station 1	Atlantic Ave.	Yes	450	40
Station 3	George Washington Blvd.	Yes	1700	40
Station 4	Marginal Rd.	Yes	800	40
Station 5	Draper Ave.	Yes	1600	40
Station 6	L St. Playground	Yes	670	27
Station 9	Main St. High School	Yes	650	40
*Transfer Switch, portable generator connection and portable generator are available.				

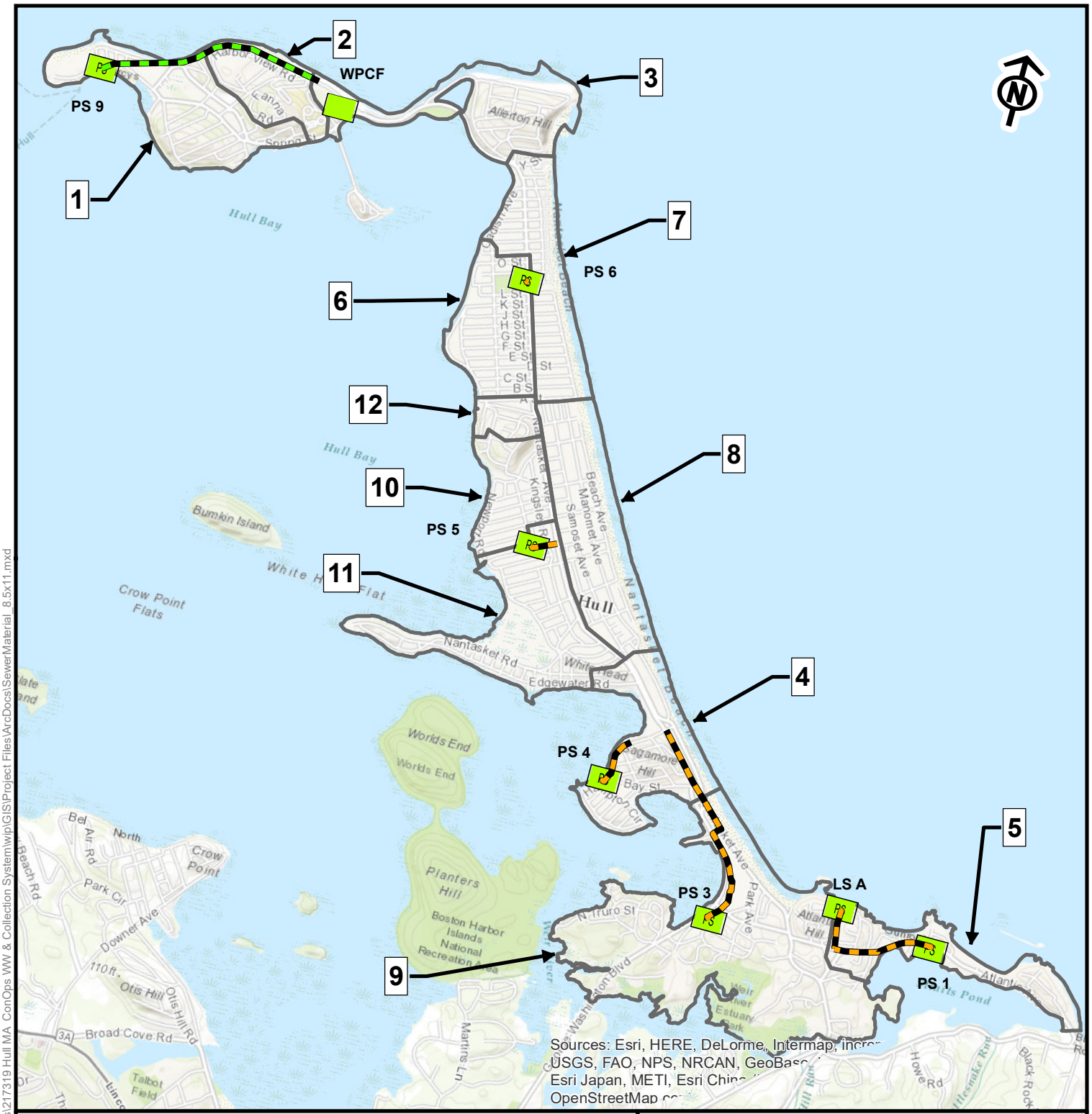
The data was imported into Utility Cloud© for integration and comparison among other assets. Based on the asset inventory from SEMS, most pump stations had a comparable number of assets. Examples of the assets which most stations had inventoried include:

- Pumps
- Wet Well
- Back-up Power (Generator)
- Motor Control Center/Power Supply
- Building
- Wet Well Aeration Equipment
- HVAC
- Instrumentation and Controls
- Force mains

The force mains carry the wastewater from each pump station to a discharge point in the gravity network. In general, all force mains are of original installation and consist of ductile iron, except for the force main for P.S.9 which was replaced in 2011 with 10-inch HDPE. Table 2-4 the force mains by pump station and Figure 2-6 shows the location of the pump stations and their force mains.

Table 2-4: Force Main by Pump Station

Pump Station	Diameter (in)	Material	Length
LS A	4	DI	871
PS 1	8	DI	2,138
PS 3	14	DI	4,763
PS 4	8	DI	1,136
PS 5	14	DI	584
PS 6	6	DI	78
PS 9	10	HDPE	4,863



Legend

Force Main

- DI
- HDPE
- PS Pump Station
- Sewershed

Sewer Collection System Overview
Sewer Force Main Material
Town of Hull, MA

Figure 2-6

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2.2.3 Grinder Pumps

The town owns and operates 175 grinder pumps in the southern portion of the town as evidence in Figure 2-2. There are approximately 25 privately owned grinder pumps. These grinder pumps connect to a low-pressure force main that is approximately 20,000 LF in length.

3 RISK ASSESSMENT

This section of the report introduces the concept of risk analysis to prioritize the Town's POTW, including the WPCF, gravity collection system, pump stations, force mains, and grinder pumps. Using a standardized risk assessment process detailed below, this analysis will guide the Town towards an effective and informed maintenance and capital improvement strategy. There are two critical components of risk analysis and each rely on data to calculate risk associated with an asset.

Risk = Likelihood of Failure x Consequence of Failure

The two components of risk, as defined by the National Association of Sewer Service Companies (NASSCO), are as follows:

- **Likelihood of Failure (LOF):** A numerical representation that denotes the probability of failure based upon an asset's physical condition. LOF is scored using a numerical range from 1-5, where a score of 5 indicates that the asset very likely to fail or has very significant defects. For example, the LOF for an asset may be known via inspection or may be estimated based on engineering judgment (e.g. it is estimated that a vitrified clay pipe may be more *likely to fail* than a polyvinyl chloride pipe).

  LOF scoring is used for the following actions:

  - Assess structural or operational condition of an asset.
  - Prioritize assets for rehabilitation or replacement.

- **Consequence of Failure (COF):** A numerical representation that is the combination of direct and indirect impact on the vicinity and the community due to potential asset failure. COF is scored using a numerical range from 1-5, where a score of 5 indicates that the failure of an asset has an extreme consequence of failure. Assets which have the high COF scores can be considered *the most critical* components of the Town's sewer system. For example, a 36-inch interceptor sewer located on a busy roadway near the ocean may have a greater economic, social, and environmental impact than a smaller diameter sewer on a side street.

  COF scoring is used for the following actions:

  - Prioritize assets for inspection and maintenance to develop predictive maintenance procedures.
  - Prioritize assets for rehabilitation or replacement.

For the Pump Stations and WPCF, the criteria are slightly more specific, but the definition of risk in general, as stated above, is consistent across all three asset categories: Collection System, Pump Stations and WPCF.

3.1 WPCF LOF & COF Scoring

For the WPCF basis of LOF and COF Scoring is based on the 2006 USEPA GHD Asset Management Workbook, with citation as follows: "*The workbook is copyrighted by GHD. It is intended for the use of and licensed for use by utility staff and public officials. Feel free to modify it to fit your organization, but please assure proper citation."* The spreadsheet was partially modified by Tighe & Bond to expand the asset class expected service life table. There were several criteria which were assessed as a part of comprehensive asset LOF and COF scoring, such as current known condition information, residual useful life, performance, reliability, and importance to treatment process.

3.1.1 WPCF LOF Scoring

The LOF analysis looked at the different failure modes of the WPCF equipment, and the potential paths to reach ultimate failure. The different failure modes used for the LOF analysis included failure by end of residual useful life based on actual age and condition assessment, failure by lack of performance (aka undersized), or failure due to reliability.

Since an asset could fail by any of these failure modes, the worst resulting failure mode is used as the assets LOF. Each of the failure modes are compared by converting the results to a percentage. That percentage represents the certainty that the asset will fail. Below is a description of the data considered and mathematical method of how each failure mode assessment reaches the LOF percent.

Residual Useful Life (age and condition) Assessment

The residual useful life analysis is a traditional method for equipment replacement. Assets are categorized by asset class which is then referenced to assign a standard expected life for the asset.

Table 3-1: Expected Service Life

Class	Asset Type	Standard Expected Life (yrs.)
1	Civil	40
2	Pressure Pipework	40
3	Sewers	100
4	Pumps	20
5	Valves	30
6	Motors	35
7	Electrical	35
8	Controls	25
9	Building Assets	60
10	Land	300
11	Equipment (40 years)	40
12	Equipment (20 years)	20
13	Equipment (10 years)	10

A condition rating is assigned to provide equipment specific adjustment to the standard expected life rating. For example, if an asset requires frequent maintenance, but is still meeting performance requirements, then it would require a condition rating of 4. If performance begins to drop, or a major part needs to be replaced, then it moves up to a condition rating of 5 or higher. See Table 3-2 below for a description of each condition assessment rating.

Table 3-2: Condition Assessment Rating

Condition Rating	Description	Maintenance Level
1	New or Excellent Condition	Normal PM
2	Very Good Condition with minor signs of wear	
3	Good Condition with Minor Defects Only	Normal PM, Minor CM
4	Fair to Good Condition	

5	Fair Condition/Moderate Deterioration	Normal PM, Major CM
6	Moderate to Significant Deterioration	
7	Significant Deterioration	Major repair, rehabilitate
8	Very Poor Condition	
9	Imminent Failure	Rehab unlikely
10	Unserviceable/ Failed	Replace

Based on the installation date of the equipment, the actual age is calculated. The standard remaining life (Expected - Actual) is then calculated and adjusted based on a table of correction factors.

$$Remaining\ Life = Asset\ Type\ Expected\ Life - Age$$

$$Residual\ Useful\ Life = Remaining\ Life * Condition\ Factor$$

If the equipment is beyond the standard expected life, meaning it has a negative remaining life, a different table of condition adjustment factors is used.

Table 3-3: Remaining Life Condition Adjustment Factors

Positive		***Negative***	
Condition	**Factor**	**Condition**	**Factor**
1	1.5	1	0.9
2	1.4	2	0.8
3	1.3	3	0.7
4	1.2	4	0.6
5	1.05	5	0.5
6	0.87	6	0.4
7	0.68	7	0.3
8	0.47	8	0.2
9	0.25	9	0.1
10	0	10	0

The result provides a residual useful life based on the actual age, and a condition assessment. The residual useful life is converted into a percentage of asset consumed by comparing the residual useful life with the standard expected life for that type asset.

$$\%\ LoF = \left\{1 - \frac{Residual\ Useful\ Life}{Asset\ Type\ Expected\ Life}\right\} * 100\%$$

Performance Assessment

This LOF factor provides the Town the ability to identify equipment that is underperforming and prioritize it quickly. For each asset, the following performance assessment criteria were applied (Table 3-4), but for items where the status is unknown, the value was left blank.

Table 3-4: Performance Assessment

Performance Rating	Description	Performance LOF
1	Exceeds / Meets all Performance Targets	0%
2	Minor Performance Deficiencies	5%
3	Considerable Performance Deficiencies	20%
4	Major Performance Deficiencies	50%
5	Does not meet any Performance Targets	100%

Reliability Assessment

Like the performance assessment, the reliability assessment allows assets to be prioritized before the end of its useful life. The table below presents the numerical values and resulting LOF values used in the assessment.

Table 3-5: Reliability Ratings

Reliability Rating	Description	Failure Timing	Reliability LOF
1	As Specified by Manufacturer	Never	0%
2	Random Breakdown	Every 20 Years	5%
3	Occasional Breakdown	Every 5 Years	20%
4	Periodic Breakdown	Every 2 Years	50%
5	Continuous Breakdown	= 1 year	100%

LOF Results

LOF is the asset's highest percentage likelihood of failure of the three failure modes.

3.1.2 WPCF COF Scoring

The consequence of failure of an asset is one of the most important factors for asset management. As such for the WPCF, a 1 to 10 scale factor was assigned several reference values to assist evaluators such as the description of the consequence, the percentage of the total system affected, and the level of failure which would occur. Using these values, a consequence of failure for each asset was derived.

Table 3-6: Consequence of Failure Scoring

COF Rating	Consequence	Description	% Affected	Level
1	No Consequence	easily resolved, no impact	0-25%	Asset (component)
2	Minor	low mech. Low permit	25-50%	Asset (primary)
3	Low	med. Mech. Minor permit	0-25%	Asset (major)
4	Low-Avg	major mech. Moderate permit	25-50%	Unit process Minor
5	Average	major mech likely permit	50-100%	Unit process Major
6	Average	Minor System Failure	20-40%	Total System
7	Avg-High	Minor - Medium System Failure	40-60%	Total System
8	High	high alert major process failure	60-80%	Total System
9	Major	emergency status	80-90%	Total System
10	Catastrophic	Total	90-100%	Total System

3.2 WPCF Risk Assessment

WPCF data from the 2014 Tighe & Bond asset spreadsheet was reviewed and correlated/combined with the W&C CMMS SEMS asset database. The risk analysis was then updated and updated data inputted into the required fields for each asset into the above format. The updated risk analysis was based on the most recent W&C capital repair/recommendation plan, condition information available from open work orders, and other condition assessment information and reports (structural reports, pump efficiency testing reports, etc.). Each asset which had COF and LOF was evaluated for the above criteria, and those values have been assigned to the assets which make up the system. The numerical values used to perform WPCF risk assessment were normalized to a 1-5 scale to align the WPCF results with the other POTW sector assessments, as described later in Section 3.5. The details of how the WPCF risk assessment database list of assets was bundled into various capital projects is described in section 4.1.

The five WPCF assets with normalized risk percentages of 100% were as follows:

1. Main Switchboard
2. Influent Forcemain (16") *
3. Influent Wet Well #2**
4. Godwin Portable Pump
5. HVAC System

*The 8" forcemain was 6th on the WPCF Risk list, with a score of 98%. ** Influent wet well #1 was 7th on the WPCF Risk List, with a score of 98%.

All the WPCF assets with risk assessment scores were included in the total Priority Asset List found in Section 3.5 and Appendix C.

For as many assets as possible, LOF and COF values were populated and estimates for rehabilitation or replacement were added. At the time of this report, approximately 70% of the 398 WPCF assets inventoried have LOF and COF ratings, with approximately 120 remaining to be assessed over the course of the next planning year. The assets within the more critical systems and processes were evaluated first, as described in section 4.1.

3.3 Collection System LOF & COF Scoring

The Town's collection system poses unique operational and economic challenges. The analysis below will guide decision makers to make informed decisions that maintain the function of the collection system cost effectively. For each asset class below, a detailed description of the risk components, COF and LOF, will be provided. At the end of the section priority list of assets that will be tabulated.

Collection system assets were evaluated for LOF using approaches specific to each asset class. These approaches are described in the following sections and are scored with values that range from 1-5, where a score of 5 indicates that the asset has at least one very significant defect.

Table 3-7: LOF Scoring

LOF Score	Condition Assessment
1	Asset has negligible defects
2	Asset has low priority defects
3	Asset has medium priority defects
4	Asset has high priority defects
5	Asset has extreme priority defects

Collection system assets were evaluated for COF using the criteria outlined below.

Pipeline Diameter/Flow:

This category accounts for the effect of pipe diameter on the Consequences of Failure. Pipes in Hull's wastewater collection system range from under 5 inches to 36-inches in diameter. Larger pipes and attached manholes would be more disruptive and expensive to replace or repair. Larger diameter pipes also carry higher flow rates, resulting in greater consequences to property, public health, as well as higher economic cost of repair.

Street Classification:

This category accounts for the impacts of asset failures to traffic flow, accessibility for construction, and safety. For example, if a pipe or manhole failed under a major arterial street, traffic delays and diversions would likely affect more people than if a pipe failed on a residential street. A sinkhole caused by a collapse would affect more people in a major street than in a minor one. This category is based on street classification from MassDOT's road GIS layer. Assets located in "cross-country" areas are considered to have a medium consequence of failure because it is likely that accessibility is compromised, thus delaying response efforts.

Serves Critical Users:

This category helps prioritize assets that serve critical users including: schools, health care facilities, tourist attractions (beaches, Nantasket Beach Resort), and public safety (fire and police stations). The failure of an asset serving these users or nearby to these users, such as an overflow onto their property or a sewer collapse limiting access, could prevent them from functioning.

Schools and tourist attractions are considered critical users because the impacts of a failure could affect many people or cause loss of revenue. Health care facilities, fire, and police stations are considered highly critical because impacts could reduce their ability to protect public health and safety. Parcels containing critical users were determined from GIS data sources, including parcel data and Mass GIS layers. The nearby collection system serving that parcel were considered to have a high or severe Consequence of Failure.

Proximity to Water Resource:

This category accounts for the impacts to water resources due to sewage spills and repair activities resulting from an asset failure. Originally, water resources were identified using the MassDEP Wetlands. However, Hull is a coastal resource area and thus this was not a significant differentiating factor and therefore not utilized

Finally, with aid from the Town, a water resource database was developed and used as a consequence of failure factor. For example, a sewer failure located on Fitzpatrick Way may cause sanitary sewer overflow directly into the surrounding bay resulting in social impacts (i.e. negative news coverage), environmental impacts (i.e. sanitary sewer overflow to the ocean), and economic impacts (i.e. fines and difficulty of construction near the bay).

Proximity to Drinking Water (Not Applicable to Hull):

This category accounts for the impacts to surface drinking water supply resulting from an asset failure. Drinking water sources were identified using the MassDEP Surface Water Supply Protection Zones dataset. This dataset delineates the zones surrounding surface water supplies that are covered by legislation.

However, Hull does not have any sewers near protected surface water protection zones and therefore a geospatial analysis was not completed for this factor. Spatial analysis for failure near water mains was not performed for this iteration of the asset management report, however could be integrated in the future if/when water main sizes and locations are shown on the geospatial mapping.

Table 3-8 defines relative scoring numbers for estimated environmental, social, and economic consequences of failure. The scoring is based on Woodard & Curran's understanding of the Town's collection system and the estimated potential impacts associated with collection system failure. Table 3-9 summarizes the COF scoring used to evaluate the Town's collection system assets. An asset's total consequence of failure is equal to the summation of its individual score in each category.

Table 3-8: COF Scoring by Impact

COF Score	Societal/Environmental Impacts
1	No risk of injury; in-house work item; minor/no environmental damage; $1K-20K or less total financial impact
2	Low risk of injury, no service, reputation, or media impacts, minor environmental damage; $20K-50K total financial impact
3	Medium risk of injury, minor service & reputation impacts, no media, possible environmental damage, $50K-250K total financial impact
4	Significant risk of injury; reputation impact and local media attention; intermittent services; localized environmental damage & fines, $250K-$750K total financial impact
5	Significant risk of serious injury or death, major reputation impact and media coverage; complete disruption of services; significant environmental damage & fines; $750K or greater total financial impact

Table 3-9: COF Scoring by Criteria

Criteria	COF Score				
	5	4	3	2	1
Critical Users	Health Care Facilities, Schools, Hotels	Fire/Police Department	Recreation Area	-	Residential/Other
Location of Pipe	Major Road – Numbered Highways	Major Road – Collectors	Cross Country (Pipes and Manholes)	Minor Street	Maintained Easement
Gravity Sewer Diameter/Flow	24-36"	14-18"	10-12"	-	<=8"
Force Main Diameter/Flow	14"	10"	8"	4-6"	-
Proximity to Critical Water Resource	-	Adjacent to Resource	-	-	Not Adjacent to Water Resource

3.3.1 Gravity Sewer Pipe

The results of the LOF and COF scoring is summarized below.

3.3.1.1 Gravity Sewer LOF

LOF for gravity sewer pipe was determined using a multi-parameter process that considers both recent NASSCO Pipeline Assessment Certification Program (PACP) inspection data and the material of the pipe. More specifically, pipe LOF was determined by utilizing the peak defect score of early 2017 CCTV inspection of the interceptor and portions of the collection system (3% of the gravity pipe) or if recent inspection was not completed for the pipe section the likelihood of failure was estimated using pipe material and estimated date of installation. LOF scoring by material is an estimate based upon knowledge of the system by Town staff and collection system operators. As CCTV inspection progresses in the Town, a larger percentage of the gravity pipe's LOF will be determined from CCTV inspection data. This will provide a better understanding of the condition of the collection system.

Table 3-3 summarizes the Spring 2017 CCTV inspection data by pipe length. CCTV inspection was completed in the Gunrock/Atlantic Avenue area, along sections of the Town's reinforced concrete interceptor, Main Street, and Nantasket Road. Appendix A includes a figure that summarizes the Spring 2017 CCTV inspection that shows the locations and peak defect scores located by Wind River Environmental.

Table 3-10: Gravity Pipe Inspected Spring 2017 Peak Defect Score by Length

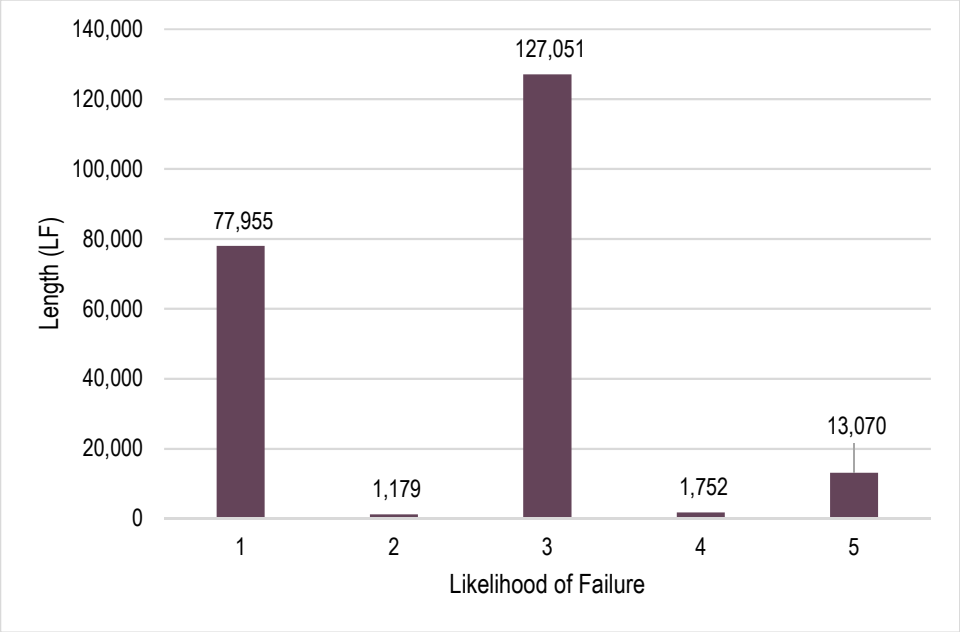
LOF Score	Pipe Length
1	4,613
2	1,657
3	1,175
4	2,125
5	3,611

Table 3-11: Gravity Pipe LOF Score by Material

Material	LOF Score
RC	5
DI	4
VC	3
AC	3
BRICK	2
CIPP	1
PVC	1

Figure 3-1 describes the LOF distribution of the Town's gravity sewer pipe. Notice that the distribution shows much of the collection system as scoring 3, this is because much of the Town's collection system is comprised of VC and AC sewer pipe and is estimated to not have significant defects that will lead to failure. See Appendix A for the locations and peak defect scores for individual pipes inspected in the Spring of 2017.

Figure 3-1: Gravity Sewer Pipe LOF Score by Length



3.3.1.2 Gravity Sewer Pipe COF

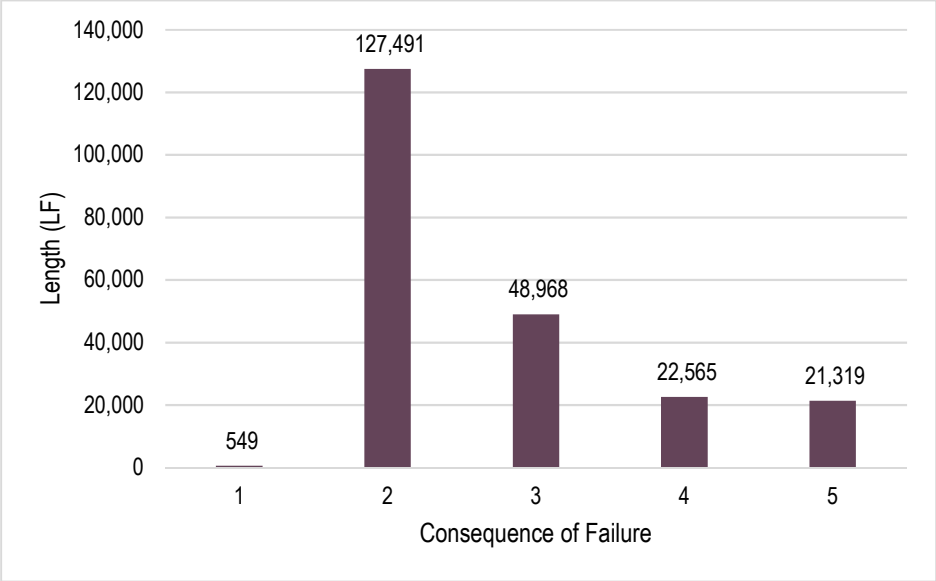
The Town owns approximately 42 miles of gravity sewer pipe that transports a current (2017) average daily flow of 1.7 MGD to the Hull WPCF. To assess the criticality of any pipe, the consequence of failure analysis above was calculated for each type of pipe. The results of this analysis are summarized below. Ultimately, this analysis identifies that the Town's 30-36-inch diameter interceptor sewer pipe has the highest consequence of failure. Particularly, failure of the 36-inch interceptor along Fitzpatrick Way poses an extreme consequence of failure due to the amount of wastewater flow it transports and proximity to both the Town's shoreline and along a highly traveled roadway. Failure of this asset would be costly to repair via emergency excavation and would likely produce a large SSO volume directly into the bay. In contrast, smaller diameter pipes (i.e. serve less residents and transport less flow) on a side street (easier emergency excavation, less traffic disturbance, little or no environmental impact) scores lower in the consequence of failure analysis. Below is list of the Town's gravity sewer with an extreme or severe consequence of failure:

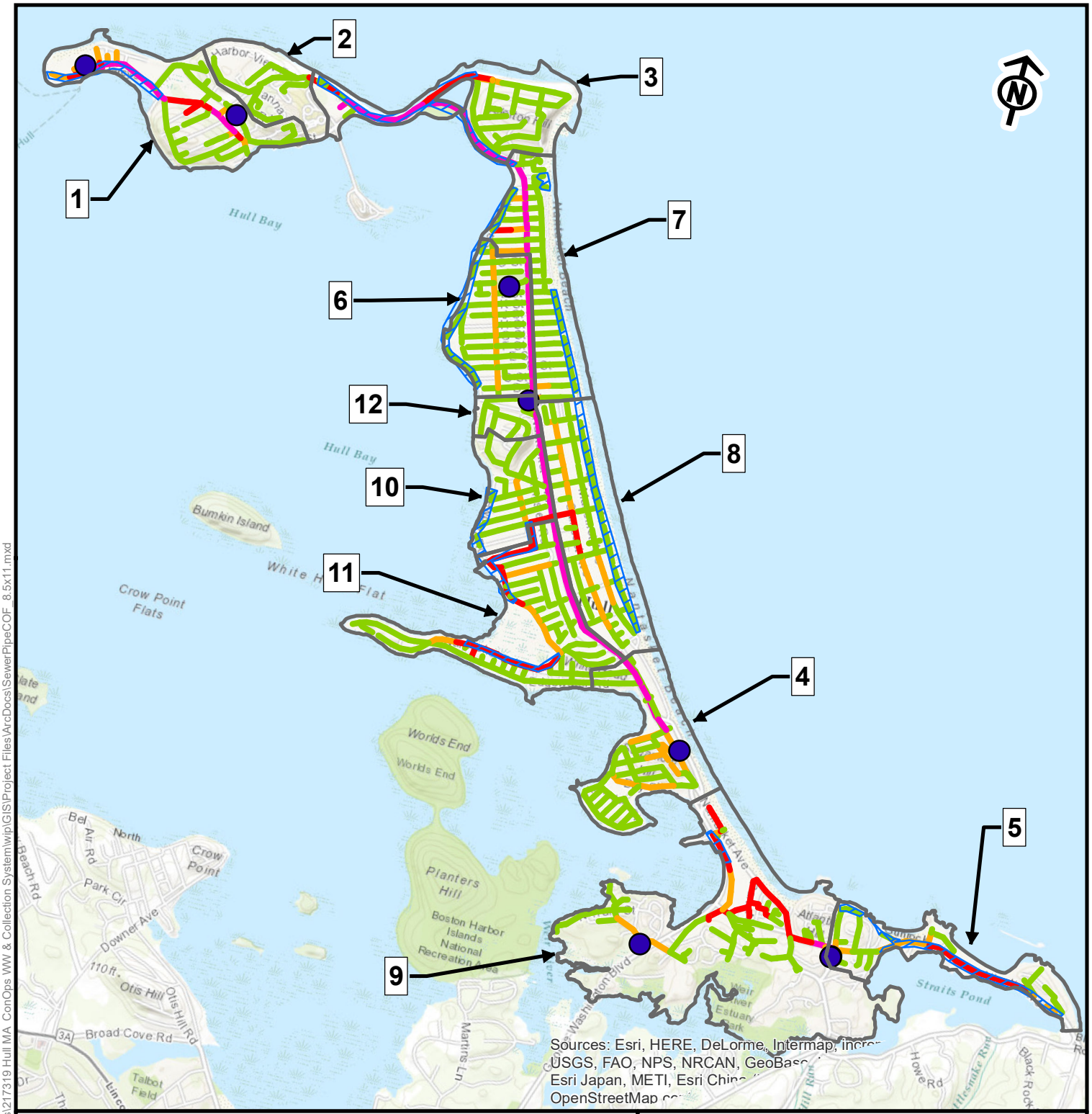
- 30-36-inch reinforced concrete & CIPP Interceptor along Nantasket Avenue and Fitzpatrick Way
- 18-24-inch reinforced concrete lagoon crossing located off Fitzpatrick Way
- Nantasket Avenue at Packard Avenue Siphon
- 18-24-inch PVC sewer pipe on Main Street near Hull High School
- 16-inch asbestos cement sewer pipe located along Draper Avenue near the Town's shoreline.
- 14-16-inch asbestos cement sewer pipe located along Nantasket Avenue and downstream of the Hull Fire Department and the Police Fire Department at Town Hall.
- 15-inch brick sewer on Main Street near the Hull Fire Department in the Village.

It is recommended that the Town prioritize inspection of these assets and all assets with a consequence of failure score greater than or equal to three, this is approximately 70,000 LF. A defined maintenance and inspection program of the Town's critical gravity sewer pipes will identify condition of these assets and allow for the Town to perform

rehabilitation/replacement before pipe failure occurs leading to emergency excavation. A breakdown of the Town's gravity sewer pipe COF distribution is summarized in Figure 3-2 and shown graphically in Figure 3-3.

Figure 3-2: Gravity Sewer Pipe COF Distribution





Legend

- Sewershed
- CriticalFacilities
- Shoreline

Gravity Main Consequence of Failure

- 1
- 2
- 3
- 4
- 5

Sewer Collection System Overview
Gravity Sewer Pipe COF
Town of Hull, MA

Figure 3-3

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SCALE: 1 " = 2,920 '	DOC: SewerPipeCOF_8.5x11.mxd
DATE: JUNE 2017	PROJECT #: 0217319.02
DRAWN BY: PJL	SOURCE: Town of Hull, ESRI

Figure Exported: 6/12/2017 By: plyons Using: \\wc\shared\Projects\217319 Hull MA ConOps WW & Collection System\wip\GIS\Project Files\ArcDocs\SewerPipeCOF_8.5x11.mxd

3.3.2 Sewer Manholes

The results of the LOF and COF scoring is summarized below.

3.3.2.1 Sewer Manhole LOF

LOF for sewer manholes was determined using a multi-parameter process that considers both recent manhole inspection data and the material of downstream pipe. More specifically, manhole LOF was determined by utilizing the manhole inspections in the Spring of 2017 (focusing in the locations where CCTV was also completed) or if recent inspection was not completed for the manhole the likelihood of failure was estimated using the "worst case" pipe material as described in Table 3-3 (i.e. if a pipe was connected to both reinforced concrete pipe and CIPP rehabilitation, the manhole was given a LOF score associated with the reinforced concrete pipe.)

LOF scoring by material is an estimate based upon knowledge of the system by Town staff and collection system operators. As manhole inspection progresses in the Town, a larger percentage of the sewer manhole's LOF will be determined from manhole inspection data. This will provide a better understanding of the manhole conditions throughout the system.

Table 3-12 summarizes the LOF scoring determined by W&C staff while performing NASSCO Level 1 Manhole Assessment and Certification Program (MACP) manhole inspections. Table 3-13 also summarizes the LOF score relative to manhole type and connecting sewer material. Figure 3-4 summarizes the Town's gravity sewer manholes by LOF score.

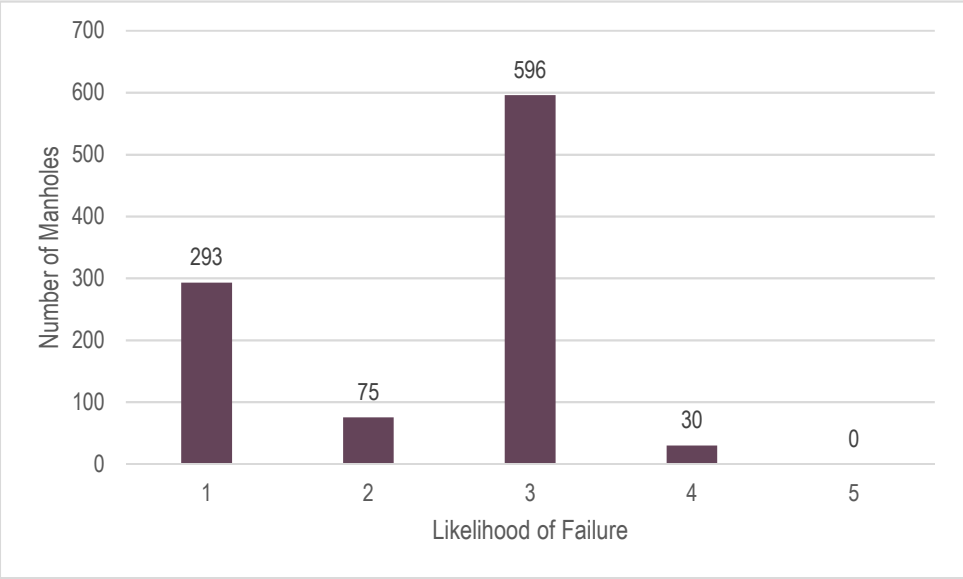
Table 3-12: MH LOF Determined by Field Inspection

Spring 2017 LOF	MH Count
1	6
2	76
3	32
4	9
5	0
Total:	123

Table 3-13: MH LOF Criteria and Distribution

US/DS Pipe Material	MH LOF Score	MH Count
AC	3	277
Brick	2	2
CIPP	1	9
DI	4	0
PVC	1	284
RC	4	56
VC	3	364
Null (Unknown in GIS)	4	2
	Total:	994

Figure 3-4: Gravity Sewer MH LOF Distribution



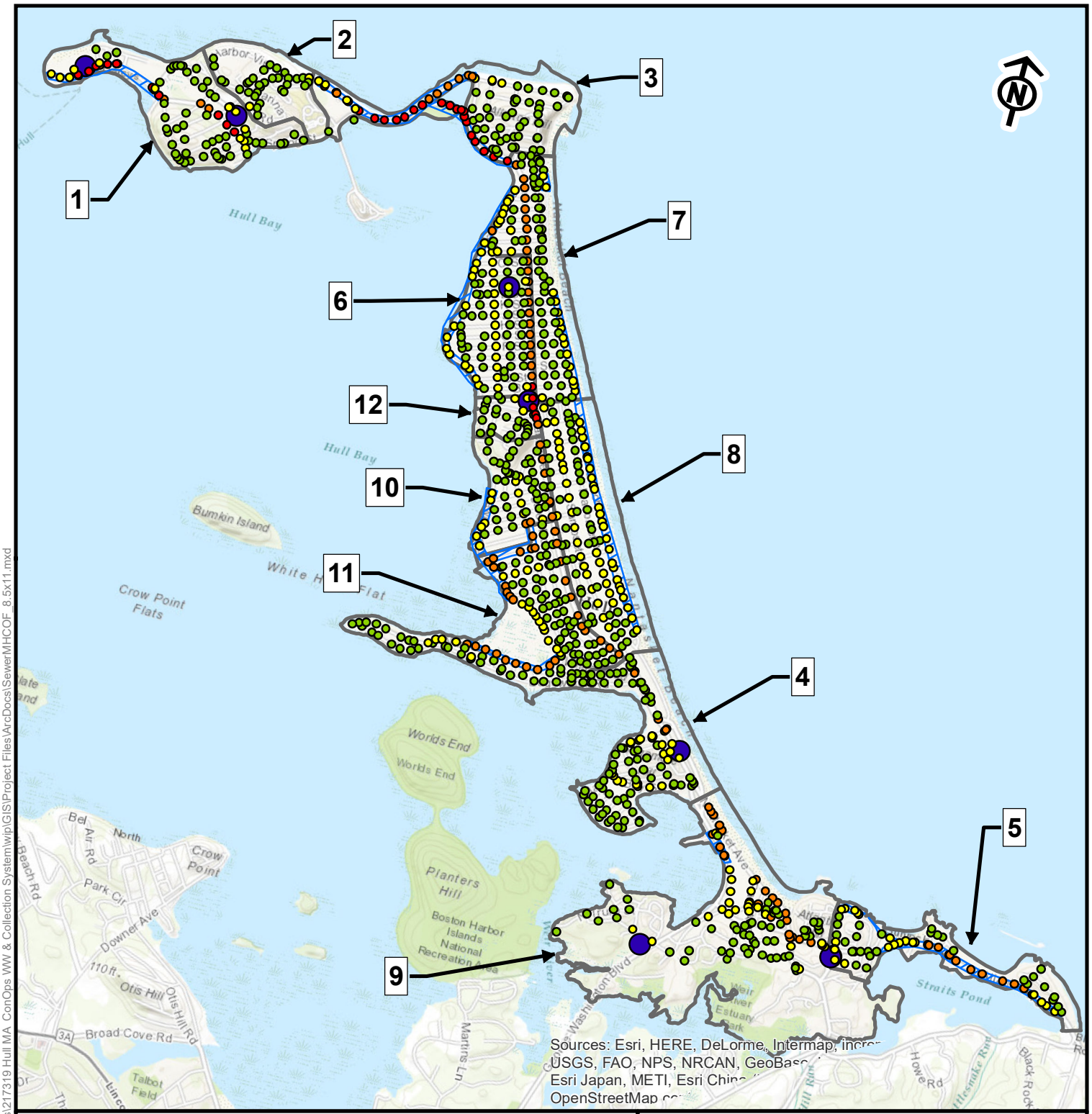
The Town has recently completed a MH inspection program targeted at the 30-36" reinforced concrete interceptor and these scores are incorporated into the LOF analysis. A figure showing the Town's manhole inspection completed in the Spring of 2017 is included in Appendix A.

3.3.2.2 Sewer Manhole COF

The Town's existing GIS database contains 994 sanitary sewer manholes. As future collection system investigation continues, the Town's GIS will become more complete and will update their asset management plan will be updated. These sanitary sewer manholes operate as access points for inspection and maintenance of the collection system's gravity sewers. Sewer manhole COF follows a similar spatial distribution as the Town's gravity sewer pipes as the same geoprocessing methods were utilized. Below is a list of the Town's critical manholes with an extreme or severe consequence of failure:

- Manholes located along the 30-36-inch reinforced concrete & CIPP Interceptor along Nantasket Avenue and Fitzpatrick Way
- Manholes located along the 18-24-inch PVC sewer pipe on Main Street near Hull High School
- 14-16-inch asbestos cement sewer pipe located along Atlantic Avenue, and downstream of Town Hall, where there is a Police and Fire Department.

Figure 3-5 summarizes the Town's gravity sewer manhole COF distribution and shown graphically in Figure 3-6.



Legend

- Sewershed
- CriticalFacilities
- Shoreline

Manhole Consequence of Failure

- 1
- 2
- 3
- 4
- 5

Sewer Collection System Overview
Gravity Sewer Manhole COF
Town of Hull, MA

Figure 3-5

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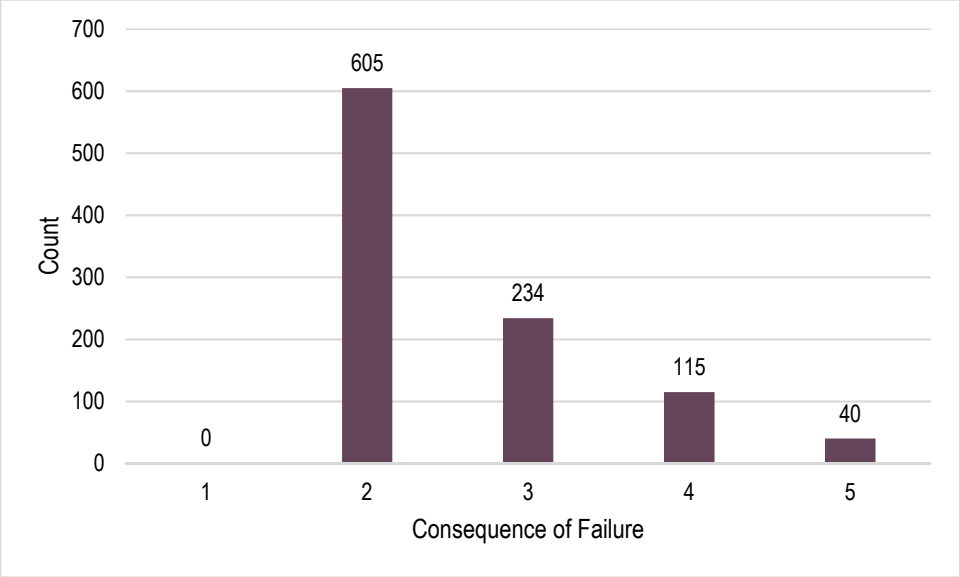
SCALE: 1 " = 2,920 '	DOC: SewerMHCOF_8.5x11.mxd
DATE: JUNE 2017	PROJECT #: 0217319.02
DRAWN BY: PJL	SOURCE: Town of Hull, ESRI

Figure Exported: 6/12/2017 By: plyons Using: \\wc\shared\Projects\217319 Hull MA ConOps WW & Collection System\wip\GIS\Project Files\ArcDocs\SewerMHCOF_8.5x11.mxd

Figure 3-6: Gravity Sewer Manhole COF Scoring



3.3.3 Force Main

The results of the LOF and COF scoring are summarized below.

3.3.3.1 Force Main LOF

Hull has approximately 2.7 miles of force main. The Town has not adopted a preventative maintenance inspection for any of the force mains and thus no CCTV or other inspection method could be utilized for LOF scoring. To generate LOF scoring for Hull's seven force mains, recent performance (structural failure, SSOs, prescribed maintenance schedule) was evaluated distribute LOF scoring. Table 3-14 summarize the LOF scoring for each individual force main.

Table 3-14: Force Main LOF Scoring

Force Main	Diameter (in.)	Material	Length (lf)	LOF Score
PS 3	14	DI	4,763	5
LS A	4	DI	871	4
PS 4	8	DI	1,136	3
PS 1	8	DI	2,138	3
PS 6	6	DI	78	2
PS 5	14	DI	584	2
PS 9	10	HDPE	4,863	1

It is estimated and presumed that the 14-inch diameter force main from PS 3 is in poor condition and will need to be rehabilitated/replaced soon based on a previous sectional liner installed at the force main discharge location and the recent pinhole leak observed on the pump discharge piping. PS 4 has also experienced several breaks over the years, and frequent maintenance has been incorporated based on its structural history. The PS 9 force main was recently replaced with 10-inch HDPE in 2011.

3.3.3.2 Force Main COF

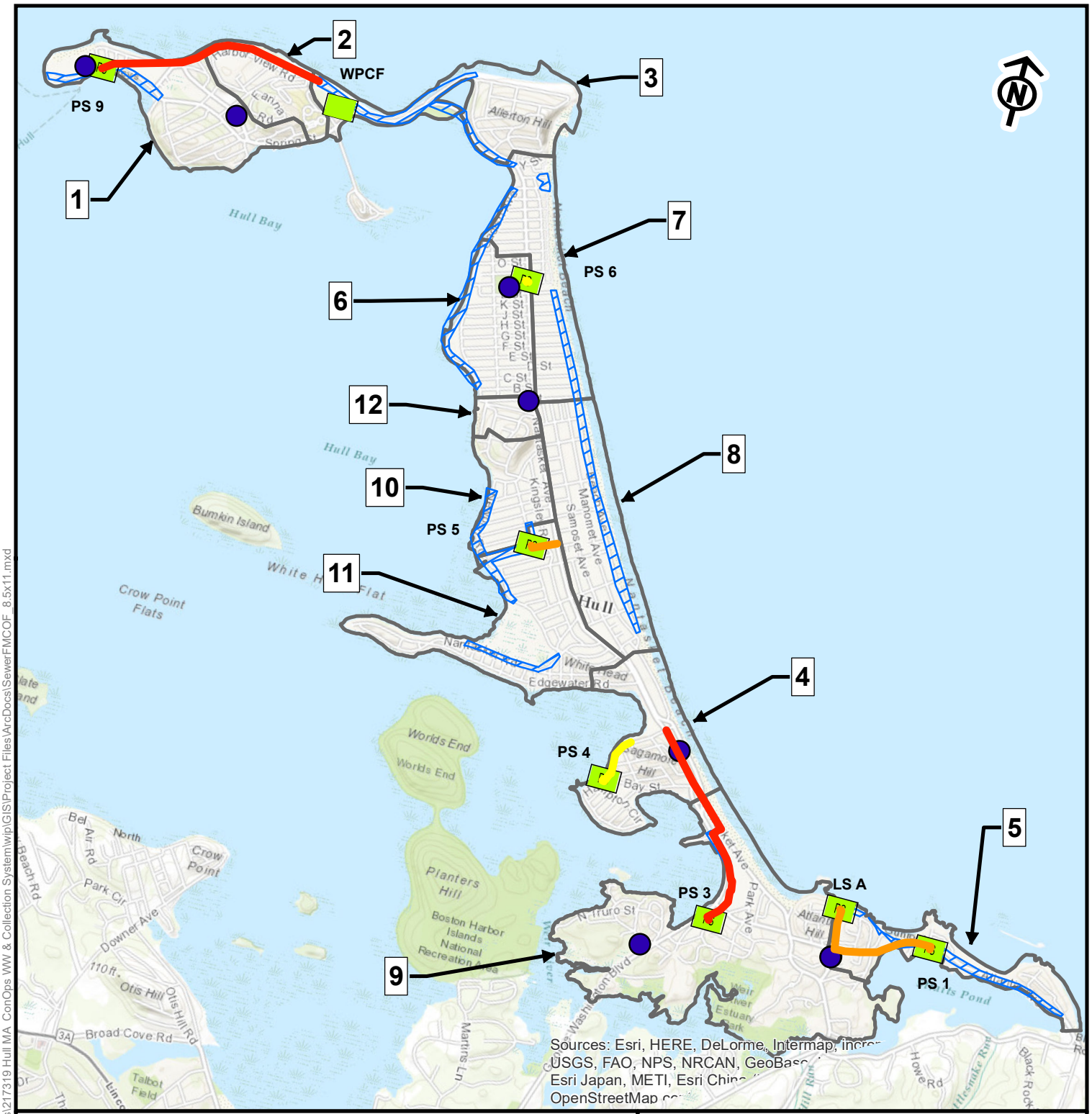
The Town owns seven pump stations that utilize almost three miles of pressurized sewer main. In general, failure of a force main causes moderate to extreme damage due to the potential consequences of failure (large volumes of SSO, PS damage, high sewage bypass costs, environmental impacts, residential and business disruption, public lack of confidence and credibility, etc.). Below is a brief description of the Town's most critical sewer force mains with severe to extreme consequences of failure:

- 14-inch ductile iron force main from PS 3 along George Washington Boulevard and Nantasket Avenue is critical due to the amount of flow it transports and its location on a highly traveled roadway.
- 8-inch force main from PS 1 along Atlantic Avenue is critical due to its location near the shoreline, its proximity to the Hull Police and Fire Department and its location on a highly traveled roadway.
- 4-inch force main from LS A along Valley Beach Road is critical due to its location near the shoreline, its proximity to the Hull Police and Fire Department.
- 6-inch force main from PS 6 onto Nantasket Avenue from the L Street field is critical due to the amount of flow it transports and its proximity to a highly traveled roadway and recreational field.
- 10-inch HDPE force main from PS 9 between the High School, Harborview Road area, and the WPCF is critical due to the amount of flow it transports and its proximity to Hull High School, commuter boat parking, and the shoreline.

The force mains listed above represent the Town's most critical force mains and should be inspected on a regular basis to better understand structural integrity which will lead to rehabilitation/replacement prior to failure reducing emergency excavation costs and other economic, environmental, and social costs. Table 3-15 summarizes each sanitary sewer force main by COF. Figure 3-7 shows locations of the Town's force mains with associated consequences of failure.

Table 3-15: Force Main COF Scoring

Pump Station	Diameter (in.)	Material	Length (lf)	COF Score
PS 3	14	DI	4,763	5
LS A	4	DI	871	4
PS 4	8	DI	1,136	3
PS 1	8	DI	2,138	4
PS 6	6	DI	78	3
PS 5	14	DI	584	4
PS 9	10	HDPE	4,863	5



Legend

- Sewershed
- CriticalFacilities
- PS Pump Station
- Shoreline

Pressurized Main Consequence of Failure

- 1
- 2
- 3
- 4
- 5

Sewer Collection System Overview
Sewer Forcemain COF
Town of Hull, MA

Figure 3-7

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SCALE: 1 " = 2,920 '	DOC: SewerFMCOF_8.5x11.mxd
DATE: JUNE 2017	PROJECT #: 0217319.02
DRAWN BY: PJL	SOURCE: Town of Hull, ESRI

Figure Exported: 6/12/2017 By: plyons Using: \\wc\shared\Projects\217319 Hull MA ConOps WW & Collection System\wip\GIS\Project Files\ArcDocs\SewerFMCOF_8.5x11.mxd

3.3.4 Pump Stations

The risk assessment was performed based previous pump station condition assessment reports and on the operation staff's direct experience with the equipment. This assessment effort was an efficient method for providing a high-level condition and consequence assessment. The operations team's familiarity with the assets, and all the factors that weigh into such an analysis, naturally prioritizes assets in the current state. However, it is recommended that more specific performance, redundancy, maintenance and repair data be incorporated so that a more comprehensive failure mode analysis on the pump stations can be developed. The failure mode analysis assessment ensures proper long term prioritization of assets while utilizing operational activities and data. The risk analysis ranked all assets on a 1 (best condition, least consequence) to 5 (most likely to fail, highest consequence) LOF and COF score. The results of the Pump Station risk are summarized in the figures below.

Figure 3-8: Pump Station Assets by LOF

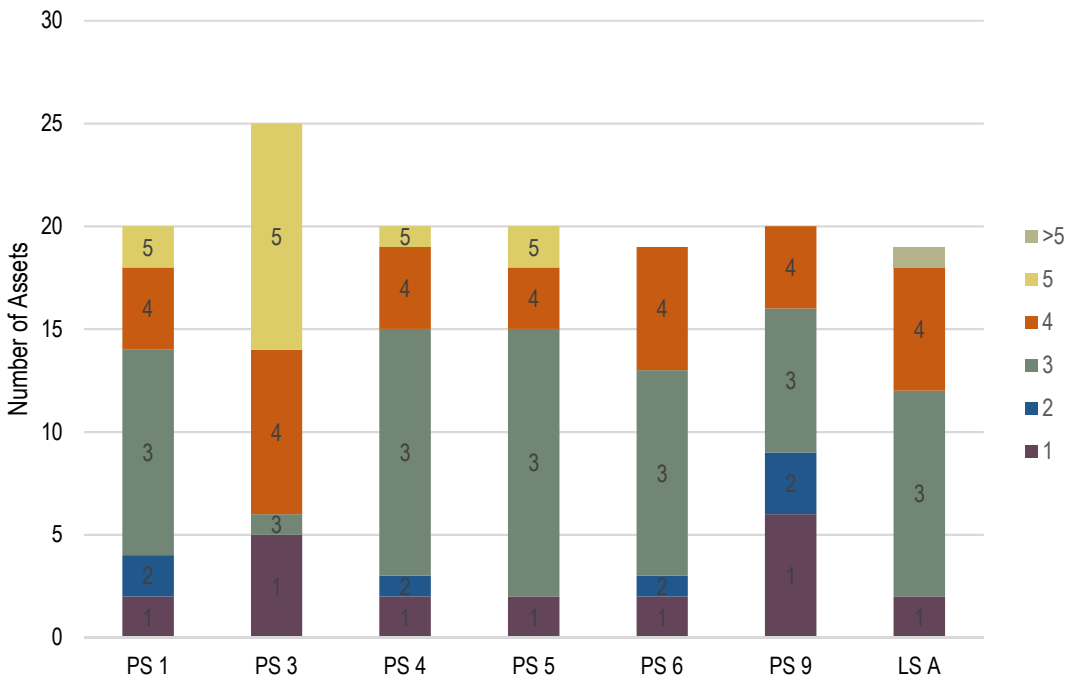


Figure 3-9: Pump Station Assets by COF

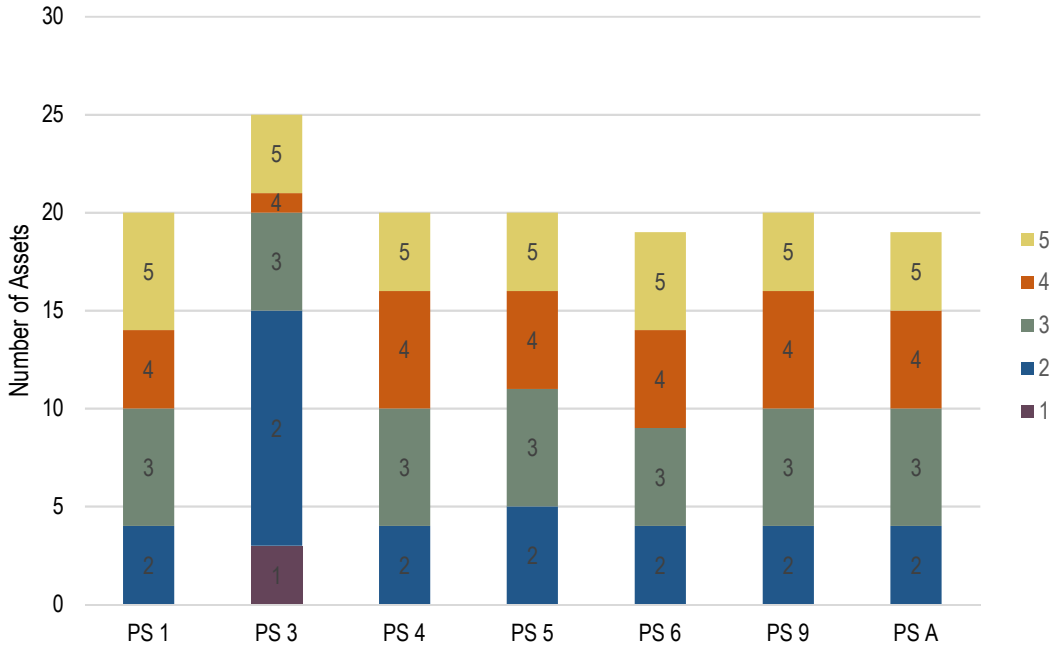
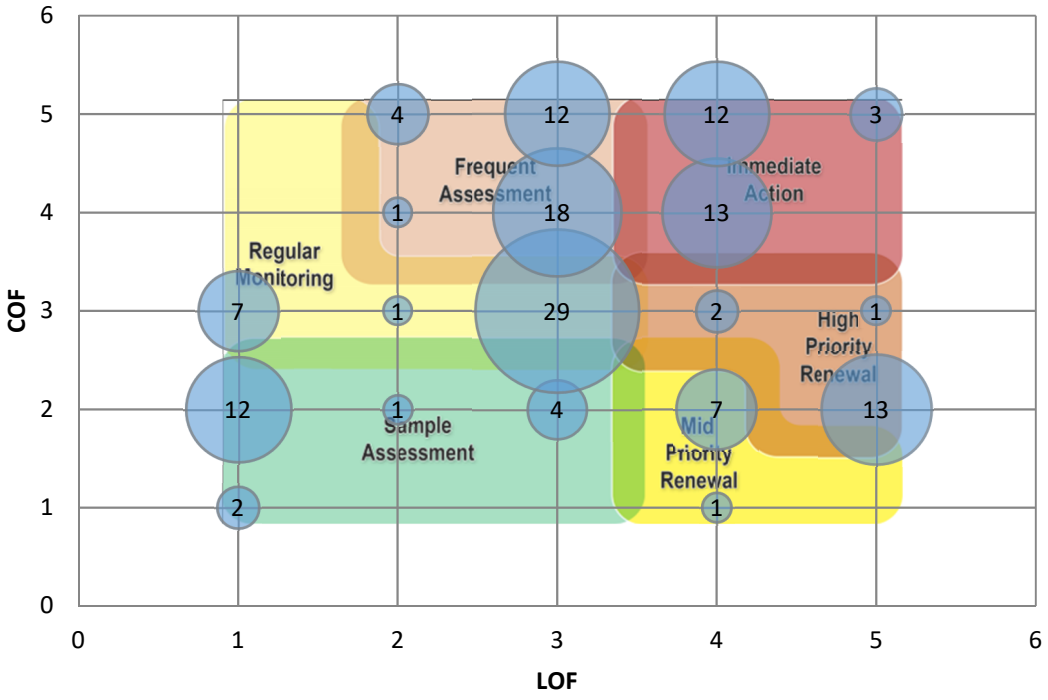


Figure 3-10: Count of Pump Station Assets by Risk Category



Per Figure 3-10, there are 28 assets which fall into the "Immediate Action" category, summarized in Table 3-16 below.

Table 3-16: High Risk Pump Station Assets

Asset Name	Station	LOF	COF	Rating
PS 1 Wet Well	PS 1	4	5	4-High
PS 1 Piping and Valves	PS 1	4	5	4-High
PS 1 SCADA Panel	PS 1	4	4	4-High
PS 1 Modem	PS 1	4	4	4-High
PS 3 Piping and Valves	PS 3	5	5	5-Extreme
PS 3	PS 3	5	5	5-Extreme
PS 3 Wet Well	PS 3	4	5	4-High
PS 3 Electrical MCC	PS 3	4	5	4-High
PS 3 Building	PS 3	4	4	4-High
PS 4 Wet Well	PS 4	4	5	4-High
PS 4 SCADA Panel	PS 4	4	4	4-High
PS 4 Modem	PS 4	4	4	4-High
PS 5 Wet Well	PS 5	4	5	4-High
PS 5 SCADA Panel	PS 5	4	4	4-High
PS 5 Modem	PS 5	4	4	4-High
PS 6 Wet Well	PS 6	4	5	4-High
PS 6 Electrical MCC	PS 6	4	5	4-High
PS 6 Building	PS 6	4	5	4-High
PS 6 SCADA Panel	PS 6	4	4	4-High
PS 6 Modem	PS 6	4	4	4-High
PS 9 Wet Well	PS 9	4	5	4-High
PS 9 SCADA Panel	PS 9	4	4	4-High
PS 9 Modem	PS 9	4	4	4-High
PS A Wet Well	PS A	4	5	5-High
PS A Electrical MCC	PS A	4	5	4-High
PS A Building	PS A	4	5	4-High
PS A SCADA Panel	PS A	4	4	4-High
PS A Modem	PS A	4	4	4-High

3.3.5 Grinder Pumps

The Town owns approximately 175 grinder pumps and four miles of low pressure sewer in Sewershed 9, as shown in Figure 2-1. Within the Town GIS, there is limited data on location, asset type and number of homes serviced by grinder pumps within the low-pressure sewer system. While paper records do exist, they have not been incorporated into the Town's GIS and therefore do not have consistent maintenance records. It is also suspected that some grinder pumps serve multiple users, but until accurate mapping can be completed or service is performed, locating these grinder pumps should be prioritized for inspection to minimize users affected by a failure. The pressure sewer manholes, cleanout valves, and air release valves need to be inventoried and have condition assessments completed.

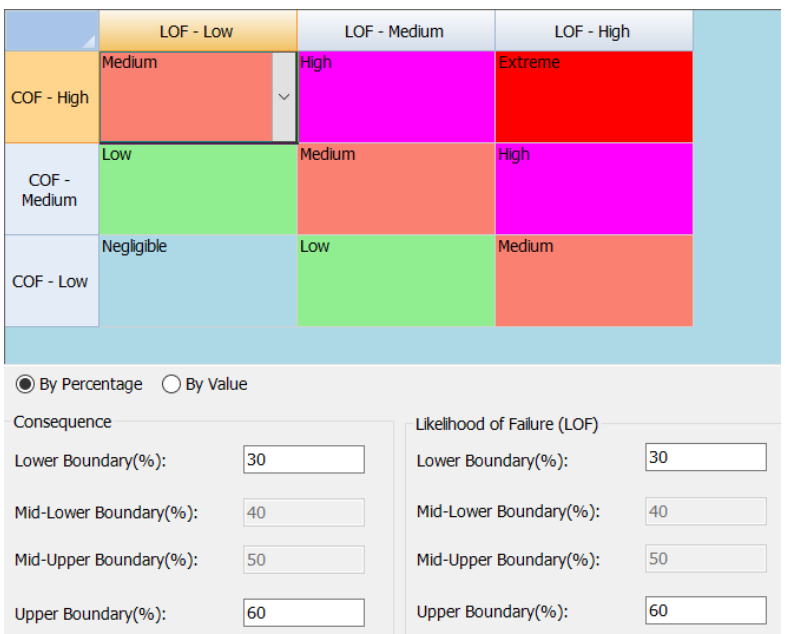
As the Town develops their inspection database and uses GPS units to find digitized locations of the grinder pumps and low pressure sewer, COF and LOF can be calculated more precisely. For the purposes of this assessment, all grinder pumps can be considered to have a consequence of failure of 2 or "low" due to a small quantity of users being affected during failure and that the little environmental and social costs are expected. Once grinder pumps are incorporated into the Town GIS, then the Utility Cloud© asset management system can assign formal inspection records to refine information presented in this report.

3.4 Collection System Risk Assessment

This section summarizes risk associated with each asset given the COF and LOF analysis completed above. Risk is a function of COF and LOF and will be used to develop specific rehabilitation projects and studies that aim to mitigate risk associated with known failure probabilities. Specific projects identified from this risk analysis are detailed in Section 5.

To determine an asset's risk category, the asset's COF and LOF score are plotted into a risk matrix where the x-axis is LOF scoring and the y-axis is COF scoring. The risk matrix is set up in a 3x3 configuration such that the low, medium, and high LOF and COF values are defined by normalized boundaries at 0-30 percentile, 30-60 percentile and 60-100 percentile. These boundaries were used for risk assessment of gravity main, manholes, and force mains. Grinder pumps were not analyzed using this method as the exact location and functionality is should be better understood before this analysis is performed. Pump stations were not included using this analysis as W&C performed the COF and LOF analysis on the individual parts of the pump station, rather than the pump station as a whole. The 3x3 risk assessment matrix is calculated as follows:

Figure 3-11: Risk Assessment Matrix



These boundaries set up distinct risk levels where an extreme risk is posed by any asset that is both very likely to fail and has a very high consequence of failure, for example segments of the Town's reinforced concrete interceptor.

An important note to the collection system risk analysis is that condition of the collection system has been estimated from record drawing data via pipe material (i.e. assumed LOF scoring) and field inspection of assets. As field inspections are completed for assets, they will be incorporated into the asset's LOF and score and the risk assessment

will be updated. It would be prudent for the Town to consider rehabilitation for areas that have utilized field inspection (e.g. in the form of CCTV inspection of MH inspection). For portions of the collection that have not been recently inspected, and therefore have been given an estimated LOF score, W&C recommends inspection based on COF scoring. Using this method, the Town would inspect collection system assets starting at "extreme" consequence of failure and working towards "medium". Assets with a COF score of less than "medium" may be only inspected if failures occur (e.g. customer complaints, sinkholes, SSOs) or the DPW budget allows. With the assumptions about pipe material in mind, Table 3-17 and Figure 3-12 through Figure 3-15 summarize the Town's collection system risk assessment.

Table 3-17: Collection System Risk Assessment Summary

Risk Category	Gravity Main Length (miles)	Count of Manholes	Force Main Length
1: Negligible	6.1	162	0.0
2: Low	21.1	136	0.0
3: Medium	8.8	387	1.1
4: High	3.3	204	0.5
5: Extreme	2.5	105	1.1
Total	41.8	994	2.7

Figure 3-12: Gravity Sewer Pipe Risk by Length

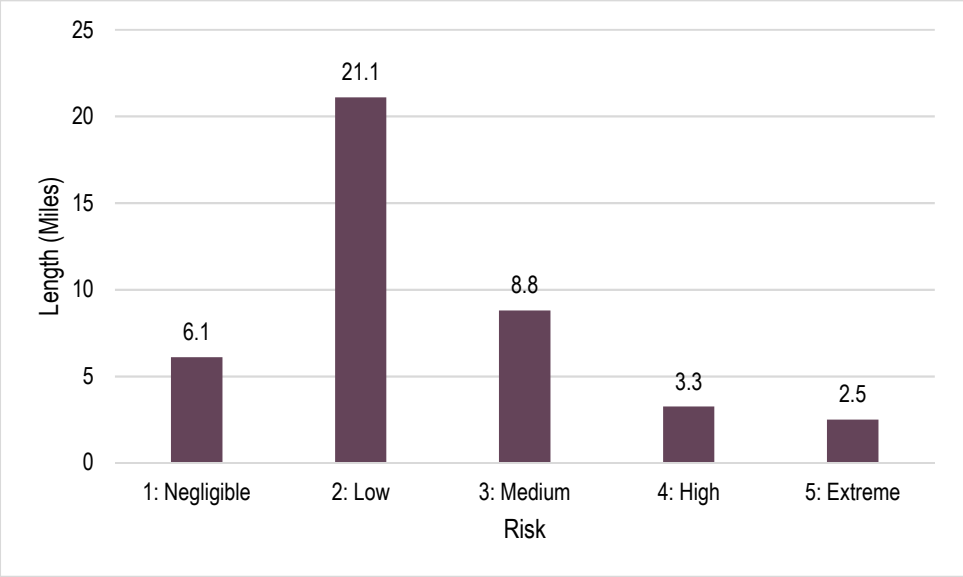


Figure 3-13: Gravity Manhole Risk by Count

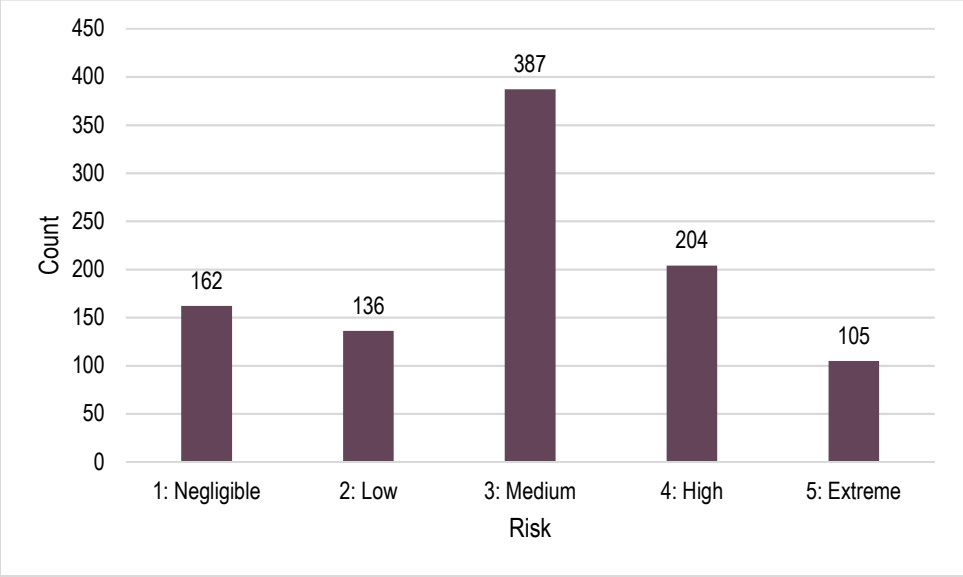


Figure 3-14: Force Main Risk by Length

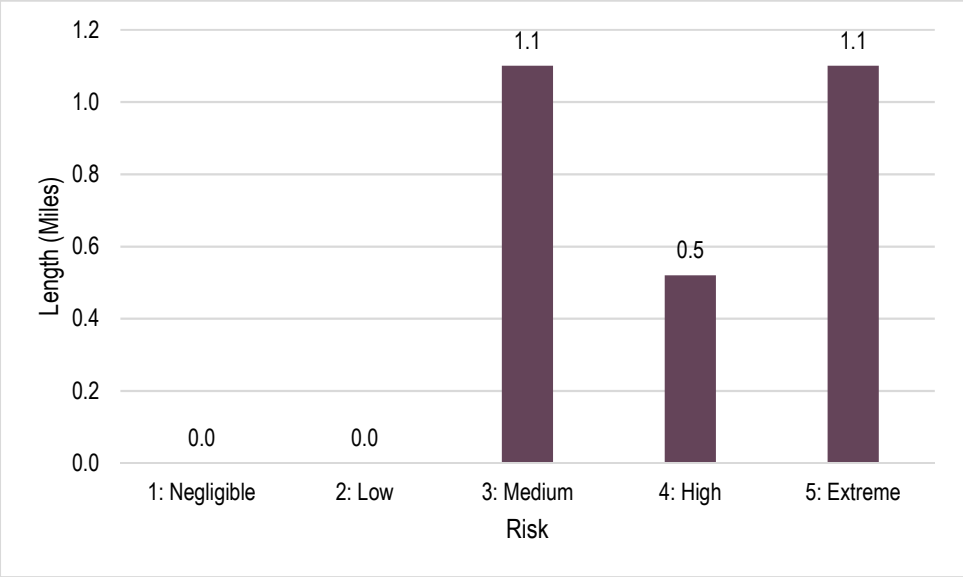
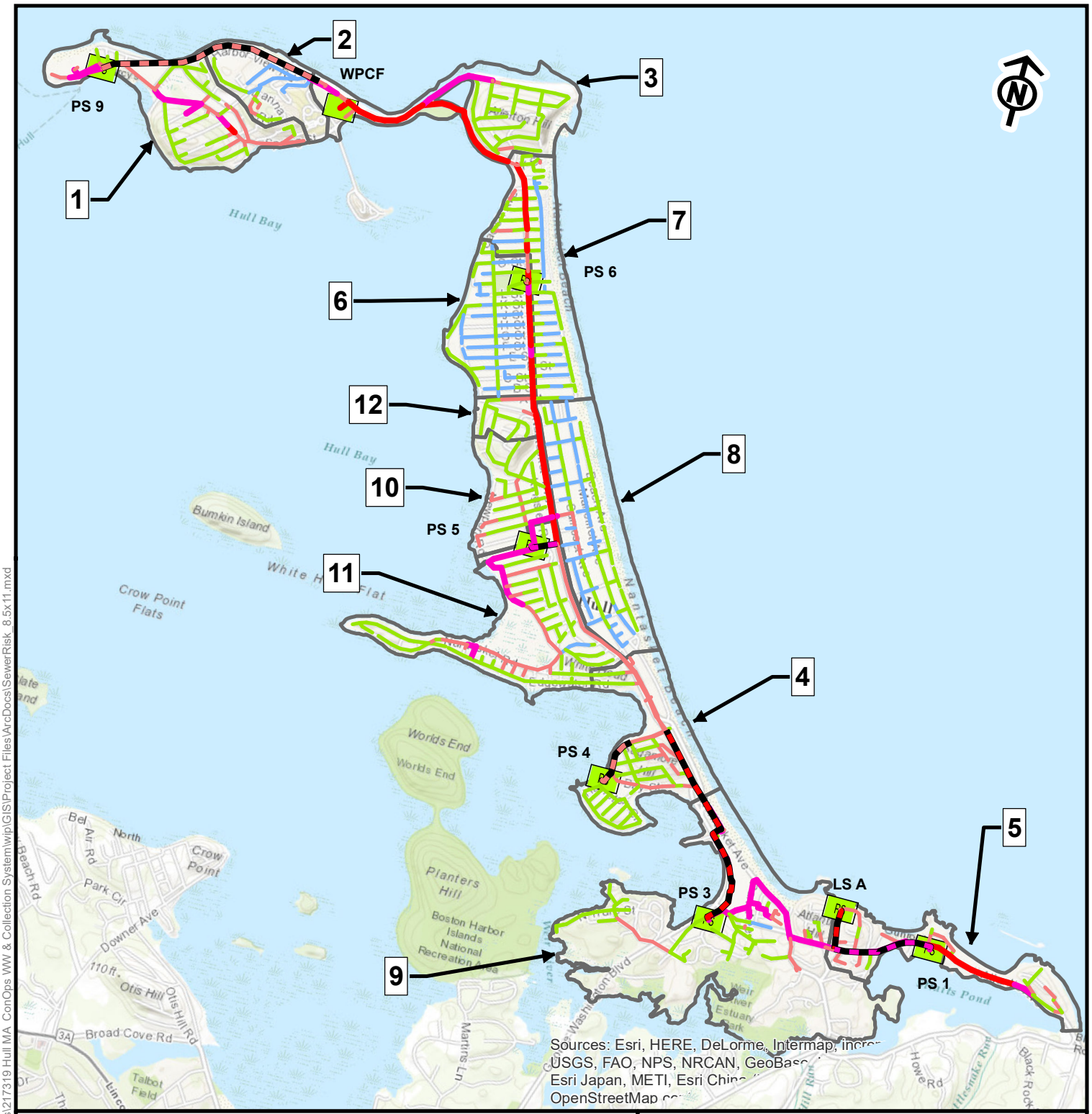


Figure 3-15 illustrates the risk associated with individual collection system assets. Note that manholes are not shown on the figure.



Legend

- Sewershed
- PS Pump Station

Force Main

- Medium
- High
- Extreme

Gravity Main

- Negligible
- Low
- Medium
- High
- Extreme

* Although risk was calculated for each sewer manhole, note that for clarity they are not shown on this figure. Manhole risk is similar to gravity pipe risk shown on this figure.

Sewer Collection System Overview
Sanitary Sewer Risk Assessment
Town of Hull, MA
Figure 3-15

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SCALE: 1 " = 2,920 '	DOC: SewerRisk_8.5x11.mxd
DATE: JUNE 2017	PROJECT #: 0217319.02
DRAWN BY: PJL	SOURCE: Town of Hull, ESRI

Figure Exported: 6/15/2017 By: plyons Using: \\wc\shared\Projects\217319 Hull MA ConOps WW & Collection System\wip\GIS\Project Files\ArcDocs\SewerRisk_8.5x11.mxd

3.5 Priority List of POTW Assets

The priority list of assets combines all the individual system evaluations onto a single list. The diverse nature of the individual systems introduces a degree of complexity because each system evaluation has been evaluated by a method best suitable for that system. A data normalization process, or adjustment of COF and LOF onto the same score scale. This was accomplished by using the following equations basic for LOF and COF:

$$Normalized\ LOF = \frac{LOF_{eval}}{MAX_{observ}(LOF_{eval})} * 100$$

$$Normalized\ COF = \frac{COF_{eval}}{MAX_{observ}(COF_{eval})} * 100$$

Then, each asset falls into a scaled score class: 0-30, 30-60, and 60-100. For each asset, the risk grade would be looked up based on the corresponding LOF and COF scores. Below is an image of the Risk Grade chart used.

Figure 3-16: Risk Grade

Normalized LOF			
	3	4	5
	2	3	4
	1	2	3
	Normalized COF		

Then, the resulting risk grades were ranked from highest to lowest to determine the overall priority and secondary lists of assets. The priority list is comprised of extreme risk, or category 5 risk-ranked values. These assets require replacement or rehabilitation within the next 6-18 months and may require capital improvements.

Due to the large number of assets, sorting within the risk grade categories was necessary. Normalized risk was also calculated as a reference value to provide that sorting within the risk grading. The equation for normalized risk is below.

$$Normalized\ Risk = \frac{COF_{eval} * LOF_{eval}}{MAX(COF_{eval} * LOF_{eval})} * 100$$

The normalization process also scaled all the values for each system into a 1 to 5 scale for purposes of reference, since equipment is scored on a 1-5 scale. The equation below is the basic formula used to generate a scaled value for all assets.

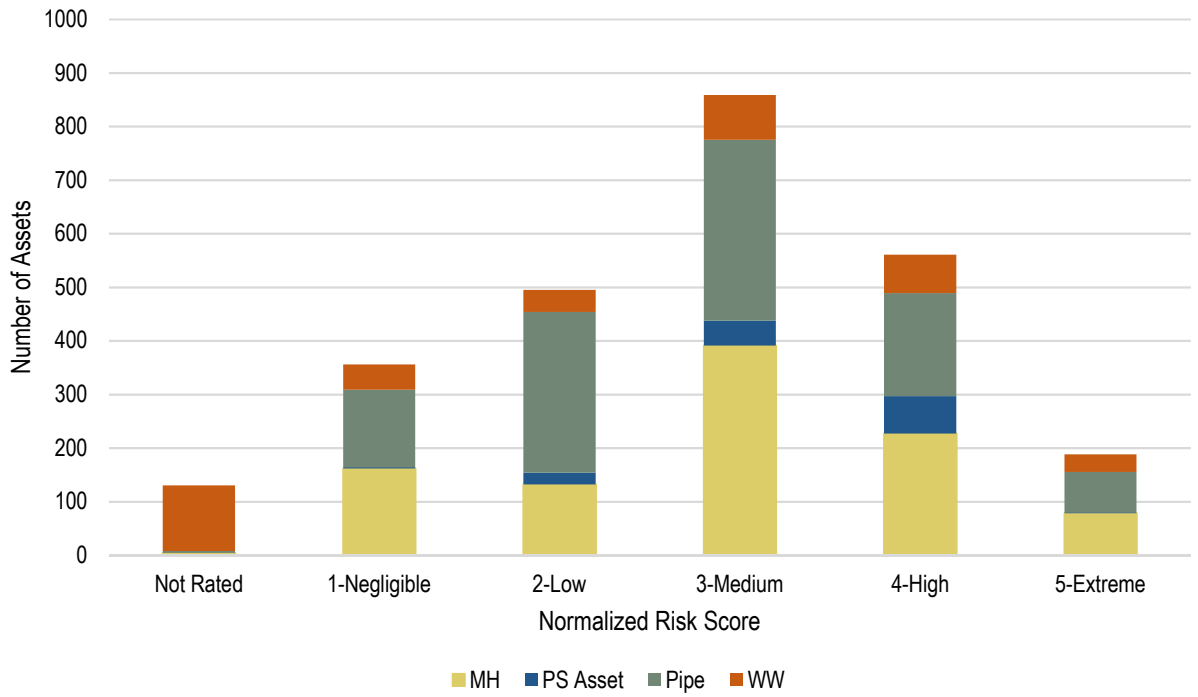
$$Normalized\ LOF = \frac{LOF_{eval}}{MAX_{observ}(LOF_{eval})} * 5$$

$$Normalized\ COF = \frac{COF_{eval}}{MAX_{observ}(COF_{eval})} * 5$$

Figure 3-17 summarizes the breakdown of POTW assets by Normalized Risk Score, and distribution by Asset Class. The most common normalized risk score is “3 – Medium,” with over 800 assets present. Overall, there are less than

200 “5 – Extreme” rated assets, but there are well over 500 “4 – High” risk assets. The WPCF contains the highest “unrated” portion of asset distribution, which suggests additional condition assessments should be prioritized to determine which risk score these unknown assets fall into.

Figure 3-17: Overall Risk Score Distribution of Combined Asset List

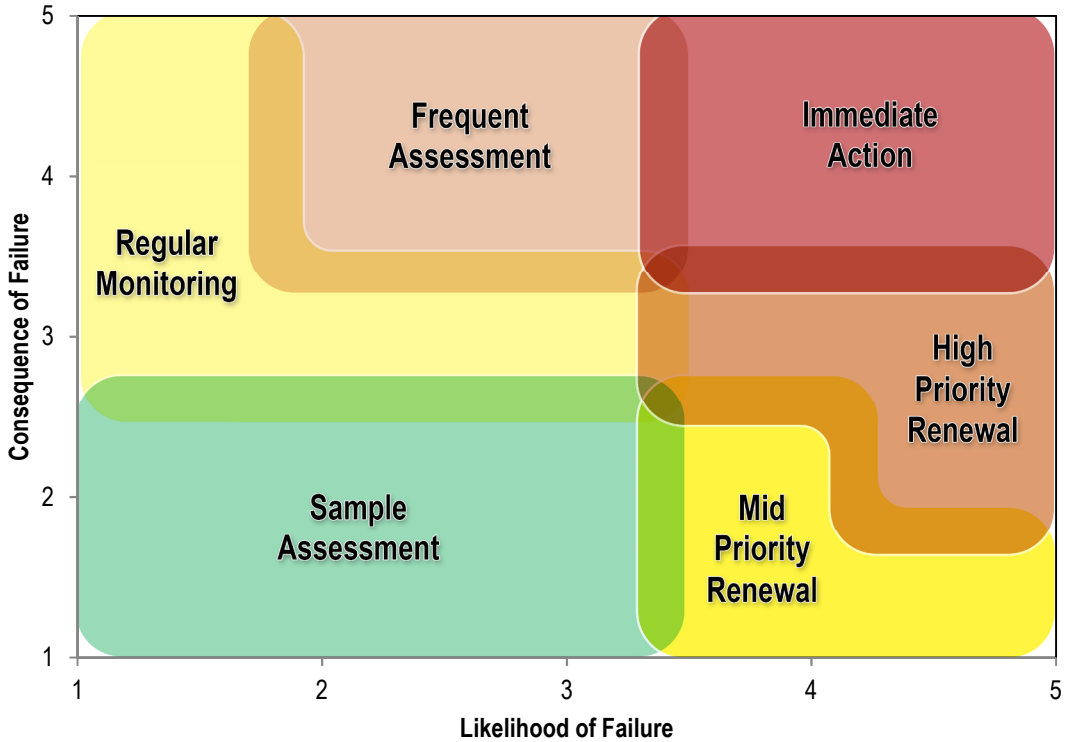


3.6 Secondary List of POTW Assets

The secondary list is comprised mostly of “watch-and-wait” continuous monitoring requirements (in general, combined risk score of less than 45). These assets are not immediately in need of replacement, but are recommended to be under regularly documented observation and testing requirements to observe the deterioration over time. By continuing to measure and observe the assets progress, the better timeline of replacement can be updated. In other words, these include items not included on the Capital Improvement List specifically, but are included as a part of long-term monitoring program (e.g. SSES and rehabilitation programs) and through improved inspection and CMMS work-order assignments.

The risk matrix action level chart, shown in Figure 3-18, illustrates how the LOF and COF of an asset can influence and prioritize the type of response or action necessary for maintaining the asset.

Figure 3-18: Risk Matrix Action Level Chart



While assets ranked on the right side of the risk matrix action level chart with a LOF greater than three should be a priority for renewal projects as described in Section 4, assets categorized on the left side of the chart should have Frequent Assessment, Regular Monitoring, and Sample Assessment incorporated into planned maintenance activities. These types of maintenance activities are described below:

- **Frequent Assessment**: Assets with a high COF are critical to the operation of the system and should be the highest priority assets in regards to maintenance activities to ensure they remain operational. As these assets' LOF increases, they become high risk assets, which require immediate action outside of regular maintenance activities.
- **Regular Monitoring**: Assets requiring regular monitoring may have a high COF and low LOF, such that they should be prioritized for maintenance to ensure they remain operational, because the high COF indicates that they are critical to the operation of the system. As these assets' LOF increases, they become high risk assets, which may require more frequent or immediate attention.
- **Sample Assessment**: Assets with a low COF and LOF are considered the lowest priority for maintenance activities and planning. The most cost effective method of maintaining these kinds of assets is to periodically observe and track the condition of the assets.

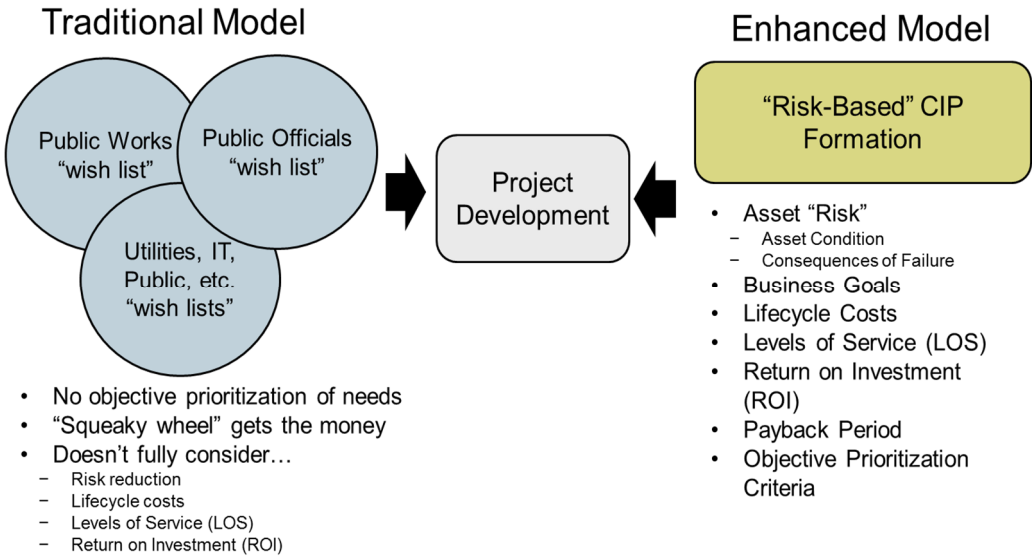
Effective capital planning ensures an organization's long-term sustainability by helping it deliver the desired levels of service at the lowest possible lifecycle costs, while managing overall risk. It requires a careful balance between the competing elements of money (funding), service and risk. Without the proper balance, negative consequences such as wasted resources, higher costs and unnecessary risks occur.

4 CAPITAL IMPROVEMENT PLANNING

The overarching philosophy of asset management-centric capital planning is to select and prioritize projects to reduce Business Risk Exposure, while ensuring that Level of Service Goals are achieved and life cycle costs are minimized. The organizations that represent local government and utility interests, such as the International Town/County Management Association (ICMA), the American Public Works Association (APWA), American Water Works Association (AWWA), and Water Environment Foundation (WEF), endorse enhanced capital planning using structured "risk-based" asset management approaches. Many public organizations practice the traditional capital improvement plan (CIP) model as shown on the left side of Figure 4-1.

The process typically involves department representatives developing a "wish list" of projects based on their experience and knowledge of their department's assets, which are then brought to a finance or capital-planning group and pared down based on available budgets, historical spending trends and other subjective factors. Staff attempt to coordinate with broad organizational needs and goals, however the process is not objective or structured based on objective information. Risk reduction, lifecycle costs, return on investment (ROI) and levels of service (LOS) are not formally considered using this approach.

Figure 4-1: Traditional Model of CIP Development vs. Enhanced



The enhanced model is structured and more defensible as it results in overall lower asset costs and improved results. To achieve risk-based capital planning, the Town must continue to do two things:

Develop and follow a business case evaluation approach for capital projects, and

Develop a consistent and equitable approach to project prioritization.

Once all the potential projects have been identified in the capital planning process, project prioritization will then allow the Town to compare all projects consistently, score based on agreed metrics, and then rank each project. This approach has been used in the development of the recommended capital improvement plan and shows the estimated needed level of funding and timing for each project.

1.1 Annual Capital Improvements

For the following Capital Improvement plans, the risk-based list of assets was compiled and then projects were bundled together based on logical association to produce the Priority List of Assets (PLA) and Secondary List of Assets (SLA). For each asset, replacement costs were developed based upon a combination of vendor quotes (equipment), previous bid results, and industry experience with similar projects. Some estimates are based on preliminary engineering work, such as the Tighe & Bond HVAC system upgrade, designed after the 2013 flood event. The following capital plans prioritize work that needs to be done within years one, five and ten, reflecting the collection system, Pump Station and WPCF and resiliency projects. It is important to note that there are several immediate improvements in process for this year (2017); including the installation of a replacement influent flood protection gate and the permanent installation of the GODWIN Auxiliary pump at the WPCF.

4.1.1 One-Year Plan

The following grouped projects contain one or more extreme risk, or category 5, ranked assets. The following projects were included as priority year one items:

Table 4-1: One Year Capital Improvement Plan

Project Description	Estimated Cost
Reinforced Concrete Interceptor Rehabilitation	$4,600,000
Gunrock Area Rehabilitation	$970,000
I/I Study	$230,000
Force Main 3 Rehabilitation	$1,400,000
Vactor & TV Truck	$400,000
UST Replacement	$400,000
POTW Critical Spares/Replacements	$200,000
Secondary Clarifier Upgrades	$300,000
Total	**$8,500,000**

As the CCTV inspection of Spring 2017 revealed, several segments of the Concrete Interceptor, Gunrock Area and Forcemain 3 need rehabilitation or repair. There were several segments of pipe shown in the Priority List of Assets which have been grouped into these three collection system projects. Year one costs associated the collection system work include estimates that include engineering and contingency. The costs associated with the other items are estimates based on preliminary purchase, repair and/or replacement quotes and will be further refined as the actual details of the work required are further defined, but do reflect anticipated costs to be incurred in the near future. Also, as a part of collection systems capital improvements, an I/I Study during the first year is recommended as well as cost-benefit analysis of purchasing a Town of Hull Vactor/CCTV truck, to implement more frequent pipeline assessment for segments/areas identified as in need of regular monitoring (currently, the Town of Hull and Contract Operator contract with subcontractors for this work).

The POTW critical Spares/Replacements “project” is on the year one priority list due to many failed pumps and other assets within the POTW, at both the Pump Stations and the WPCF. The estimated costs reflect anticipated repairs that are expected in the near future. The Secondary Clarifier Upgrade project is on the year one priority list due to known failure conditions with the secondary clarifiers. The actual failure details of the secondary clarifiers are unknown at this time as the exact cause of the failures has yet to be determined, but the draft tube systems on both secondary clarifiers are not functioning properly and extensive wear and tear on the gear boxes and rake mechanisms, due to excessive corrosion, are readily apparent and internal piping corrosion and leaks are suspected as well. The UST replacement project is on the priority list due to its age (40 years old) and the need to determine replacement options.

4.1.2 Five-Year Plan

The collection system CIP project list addresses the critical high risk infrastructure repairs initially, as noted above, then provides for an ongoing condition assessments and repairs of the remaining assets based on their risk grade. The collection system Goals of the five-year plan include setting up a long term SSES program, to better assess infiltration and inflow, identify areas where collection system failures or interconnections exist (and then abate them), continue to set up an effective FOG program to reduce system/service blockages and set up a full-time inspection system to allow for proactively educating business owners and other residents for the best care of their individual service connections. The collection system projects in year one total $7.6 million dollars, then the next 9 years totals $8.7 million dollars.

Outside of year one immediate repairs, the main objectives for the treatment plant capital plan include system, process and resiliency upgrades. Over $20 million dollars of upgrade projects are proposed, including protection of the WPCF main power source and distribution equipment, backup power upgrades, storm flow discharge capacity upgrade, installation of a Vactor dump station and critical process upgrades; including: chemical system upgrades and/or rehabilitation, underground piping renewal/replacement/and/or relocation, pump repairs/replacements, etc. The basis of the priority list of assets is based on a combination of Woodard & Curran recommended capital repairs and improvements to the collection system and pump stations, as well as treatment plant equipment and unit process upgrade recommendations.

The resiliency upgrade projects are further described in Section 5.3 Resiliency and Adaptation Planning. The specific items identified include addressing the most critical assets, that are also vulnerable to the greatest risk of failure. The CREAT tool has been utilized to perform a preliminary review of risks and potential adaptation measures. Further analysis will be performed to provide guidance to the Town help to guide the decision making of the planned infrastructure investments for resiliency upgrades. The resiliency adaption measures within the plant include raising electrical components out of the basement (flood zone) and installing a perimeter wall around the plant, or sealing just the Control Building (i.e., raising the height of the storm gates, doors and walls that were put into place after the Blizzard of ’78), and other similar site adaption improvements. The specific adaption measures have yet to be finalized and designed, so the cost estimates in the plan will be updated as the detailed design proceeds. The resiliency costs are estimates from several sources; for instance, the Tighe& Bond 1998 PEF provided a cost for adding a pumping system to the chlorine contact tank and outfall, so that estimate was increased for inflation to current costs. The costs associated with the pump stations resiliency measures were based on the preliminary findings in the 2016 Kleinfelder Adaptation report. The WPCF plant perimeter wall was based on a preliminary evaluation estimate by Tighe & Bond in 2015. The raising of the electrical system is a very preliminary estimate as the engineering evaluation for this specific adaption measure has yet to be completed. The resiliency upgrade cost estimates total $7.25 million dollars.

The WPCF upgrade projects, not including the resiliency upgrade projects or the UST replacement project, is currently estimated at $13 million dollars. This estimate is very preliminary for most of the projects and will need to be refined as the actual design details are developed, the actual cost for some projects may be less and some could more than the amount shown. Some of the items estimated, such as the HVAC upgrades, are based on a preliminary design and cost estimate associated with the design. But, the HVAC cost estimate will change depending on the actual resiliency adaption measures that will ultimately be chosen for implementation, as well as specific unit process upgrades and modifications that are chosen for implementation. Many of the CIP needs for the WPCF were known prior to the development of this asset management tool, as they were identified over many years through many previous reports, many listed in Section 6. While some of these reports go back many years, many of these reports are the current reports and current condition assessments, including the W&C CIP recommendations from 2017. The asset risk grades for the WPCF assets were used in conjunction with these previous and current reports to develop the 5-year PLA.

We also recently evaluated “major” unit process changes that would raise the major treatment unit processes above the future flood zone and eliminate effluent pumping. The very conservative cost to do this extent of a major unit process upgrade was estimated to be in the $40-50 million-dollar range. If the plant was designed from scratch today,

this would be a better alternative than the current design. Depending on the ultimate design period, it may be worth looking at a major unit process change at some point in the future, but at this point the cost was considered too high to implement. One notable outcome of this evaluation would be to understand the potential future considerations that could be needed as the planned detailed design of the process upgrades in done. For instance, one of the key items that was included in the major process evaluation was to replace the primary treatment process by eliminating the primary clarifiers and installing a rotary screen or rotary belt sieve primary treatment unit. This modification is one of the items included in the Process Upgrades project for consideration.

The WPCF PROCESS UPGRADES list includes the critical capital upgrades needed for the wastewater plant. The cost estimates will be refined as the specific repair, replacement and/or upgrade has yet to be determined or designed. Many of the details of the specific upgrades depend upon the ultimate adaptation measures, unit process upgrades, and on unknown conditions (buried piping, underground wiring, tanks structural integrity, etc.).

A summary of each WCPF capital project is as follows:

- **Disinfection system upgrade** – the hypo-chlorination system is over 20 years old, has worn-out tanks, piping, leaking containment area; temporary pumps, etc. The sodium bisulfite system is a temporary system that is not resilient and needs to be upgraded as well. These systems need to be totally rehabilitated or replaced with an alternative chemical system, such as PAA (Peracetic Acid).
- **Dump pit for Vactor Truck** –As we increase our collection system Vactor truck work, the amount of debris we remove from the collection system is increasing, and the impending closing of the Town landfill for debris disposal is a concern we would plan to address by having an efficient system to dump and concentrate (dewater debris) for off-site disposal.
- **Sludge system upgrade** – This work includes replacing or major overhaul of the 20-year-old Rotary sludge thickener, associated feed piping and pumps as well as modifying the underground septage tanks to be thickened sludge tanks as the above ground sludge tank has severe corrosion issues and is also not available for use in the winter due to freezing potential. This also interrelates with eliminating the primary clarifiers and the gravity thickeners, which is the current operation that as substantially reduced odor and corrosion issues.
- **HVAC upgrade** – the HAVC system design upgrade to replace the failed system was used as the basis for this project, with the caveat that some of the process upgrades under consideration will impact the specific rating for certain rooms or areas which will impact the final design details
- **Influent Pump Upgrade** – the influent pumps require rebuilding or replacing the pumps the suction and discharge piping (some piping Is buried underground) & valves and related components to restore the pumping system capacity. Resiliency and process upgrades would impact the specific design upgrade details for these pumps (i.e., changing one or more of the pumps to dry pit submersible pumps which would not be damaged if the building flooded)
- **Process Upgrades** - Items included in the Process Upgrades include the following; Screening system, Grit system, Odor Control System, Primary treatment, Secondary Treatment, Plant Water system, Energy conservation measures. These items are interrelated and the final determination of specific upgrades will impact the overall cost estimates within this proposed project, as well as many of the other interrelated WPCF projects.
    - **Screening System:** the new influent screens have been preliminarily evaluated to modify these screens to an a finer ¼ inch screen and thereby increase the debris removal.
    - **Grit Removal:** the grit system is very old and requires continuous repairs and maintenance – plan is to evaluate abandoning the girt equipment and just scheduling a monthly or bi-monthly Vactor truck cleaning of the grit chamber.

- **Odor Control System:** the odor control system is old and in need of repairs and upgrades and is located in the subbasement. Some upgrade options include replacement of the unit with a sea shell scrubber unit(s) located elsewhere – eliminates need for chemicals and sub-basement location
- **Primary Treatment:** the primary clarifiers need total mechanical replacement, structural tank repairs, and piping/pump/gates upgrades and repairs. In lieu of refurbishing the existing units, we are evaluating a process change to eliminate the normal use of the primary clarifiers (which is the current operation) and implement a screen/sieve primary treatment system upgrade in lieu of the primary clarifiers; keep the primary clarifier tanks for peak flow management
- **Secondary Treatment:** the secondary treatment system consists of a conventional activated sludge system and the tanks need some structural repairs (need a comprehensive internal tank structural assessment for each tank to determine the actual extend of repairs) and the associated mechanical systems, piping and gates need upgrades and repair. The aeration tank 2&4 needs are discussed below. The overall process modification would be to retrofit the system to use the MLE process (using the primary clarifiers as part of the activated sludge process) to enhance the overall process efficiency and capacity of the system. In addition, the gravity recycle of some or all the RAS to the plant influent would be reviewed for over process simplicity and energy conservation.
- **Plant Water system:** the plant water system is in the sub-basement and was only partially rebuilt after the flood of 2013. It is the key asset for overall water conservation within the WPCF, and is a key asset as it provides cooling water for the generators and seal water for key pumps. The current location and system needs to be review and the system needs to be upgraded and replaced, and moving it out of the sub-basement to a more resilient location is to be evaluated. In addition, most on the hydrants and underground and building piping are severely corroded and many failures have occurred over the past couple of years.
- **Energy conservation measures:** Energy conservation measures are integral with the evaluation and implementation of all process upgrade and further details are provided in Section 5.2.

- **Underground piping and assets at the WPCF** – there is considerable buried piping and wiring that has some history of failures due mainly to corrosion and wear and tear. Many of the pipelines have been on-line for 40 years and require internal inspections and condition assessments which will require by-pass pumping and similar measures to do the actual condition assessments and during any upgrade work. The estimated costs for this project are a place holder that will be adjusted as needed as more specific actual condition assessments are performed.
- **Control Building Upgrades and Roof** – the Control Building has a long history of identified needs related to the deterioration of the building exterior, roof issues, interior structural issues, piping and plumbing issues, etc. The specific details of some of the items again will depend on the process upgrade decisions.
- **Aeration Upgrade** –these two tanks have the original mechanical aerators that are 40 years old, the goal would be to install fine bubble aeration like what was installed in tanks 1 & 3 in 2002. There is also extensive wear and tear on in-tank piping, inlet and outlet valves and related components. The specific details of some of the items again will depend on the process upgrade decisions.
- **RAS & WAS Pump Upgrades** – The RAS and WAS system components, pumps, piping, valves, etc., have shown severe deterioration over the past few years and long term major replacements and upgrades will be needed. The specific details of some of the items again will depend on the process upgrade decisions.

- **Effluent System Upgrade** - the effluent pumps require detailed condition assessments, but based on historical reports and data, the rebuilding or replacing the pumps and discharge piping (some piping Is buried underground) & valves and related components will be needed to restore the pumping system capacity. Additional pumps or increasing the size of some of the current pumps also needs to be evaluated.
- **Controls Upgrade** - the SCADA system was partially upgraded from 2013 through 2016; it is anticipated that in about 5 years the system will need to be totally replaced. The specific details of some of the items again will depend on the process upgrade decisions.

The Pump Station upgrade projects are based on similar information as the WPCF projects, including the reports listed in section 6 and ongoing current condition assessment information. The specific items that will be upgraded will be impacted by the chosen resiliency adaption measures. Addition condition assessments will need to be completed, but the projects and associated costs estimates provide a base line for rehabilitating and upgrading the pump stations as needed for continued efficient operation and maintenance.

Table 4-2: Five-Year Capital Improvement Plan

Year	Description	Estimated Cost
2019	SSES Program (Flow Iso., CCTV, MH Inspect, Smoke Testing, Building Inspection)	$925,000
2019	Electrical Upgrade - move system upstairs	$1,500,000
2019	WPCF (Perimeter Wall OR Building/Site/Design improvements)	$3,000,000
2019	Add pumping system to chlorine contact tank and outfall	$1,000,000
2019	Pump Station resiliency measures - raise assets	$1,750,000
2019	Disinfection system upgrade	$400,000
2019	Vactor Dump Station	$75,000
2019	Sludge System Upgrade	$600,000
2019	HVAC Upgrade	$1,500,000
2019	Influent pump upgrades	$500,000
2019	Process Upgrades	$5,000,000
2019	Underground piping and assets at the Wastewater Treatment Plant	$600,000
2019	Control Building Upgrades and Roof	$1,500,000
2020	Chemical feed system - PS 3	$300,000
2020	Pump Station 3 Capital Upgrades	$600,000
2020	Pump Station 4	$400,000
2020	Aeration Upgrade - tanks 2 & 4	$750,000
2021	Rehabilitation Contract I (Focus on I/I Removal and Structural Defects)	$2,000,000
2021	RAS & WAS Pump Upgrades	$150,000
2022	Pump Station 5 & 6	$400,000
2022	Effluent System Upgrade	$1,000,000
2022	Controls Upgrade - SCADA	$500,000
	Total	**$24,450,000**

4.1.3 Ten Year Plan

The following capital improvement strategies were recommended for implementation beyond the priority and 5 year plans, respectively.

Description	Estimated Cost
Rehabilitation Contract II (Gravity System)	$2,000,000
Pump Station A, 1 & 9	$600,000
Rehabilitation Contract III (FORCE MAIN - PS4, PS5, PS1 Rehabilitation)	$1,200,000
Rehabilitation Contract III (Gravity System)	$2,000,000
I/I Study (Metering Program, approx. 15 meters for 12 weeks)	$230,000
Total	**$6,030,000**

4.2 Funding Plan Tool

As part of the planning process, W&C met with Town decision makers to compile, review and approve a Funding Plan Development tool to demonstrate the effect of the above-mentioned Capital Improvement Plan on rate payers for the next five years. The project kick-off included gathering initial data such as:

- Past three annual Comprehensive Annual Financial Reports
- Three years of Sewer Operating results
- Summary of grant/loan funds received by Sewer Department
- Copies of consent decrees/binding agreements

This information was input into the Funding Plan Development tool to better understand the revenue generation success and/or limitations of the existing rate structure. As the Town of Hull operates a Sewer Utility Enterprise Fund, it was imperative to create an accurate account representation to project how future debts would be incurred.

The result was a rate planning tool in Excel that can be readily controlled by Town staff to consider various investment and rate scenarios. Memo outlining the tool and its components is included in Appendix G.

5 IMPLEMENTATION STRATEGY

This plan serves as the introduction to the Asset Management process, and it is expected to change over time. Therefore, the following recommendations serve as the next steps for implementation. This section reviews the software tools, and the expectation for updating condition assessments and asset inventory over time, as well as next steps for areas to investigate further.

5.1 Software Tools for Asset Management

Software can provide a platform for collaboration and advanced analysis to provide up-to-date, accurate, asset specific information. This method of information flow has evolved asset management decision making into a measurable process, allowing for optimization. Municipalities, such as the Town of Hull, are seizing the opportunity to increase the level of service while lowering costs by leveraging this type of software for optimization.

The Town of Hull and W&C have evaluated the readily available software options and selected to use a combination of Utility Cloud© and Innovyze's Info Master®. The software evaluation, attached as Appendix E, looked to find a solution that best incorporated mobile technology and spatial analysis. Mobile technology allows asset conditions to become updated in real time by field staff based upon maintenance activity. Spatial analysis can provide fast, complex visualization and analysis, system wide which allows for new levels of comparisons and insight. The sections below provide a brief description of each software, and generally how it is intended to be used.

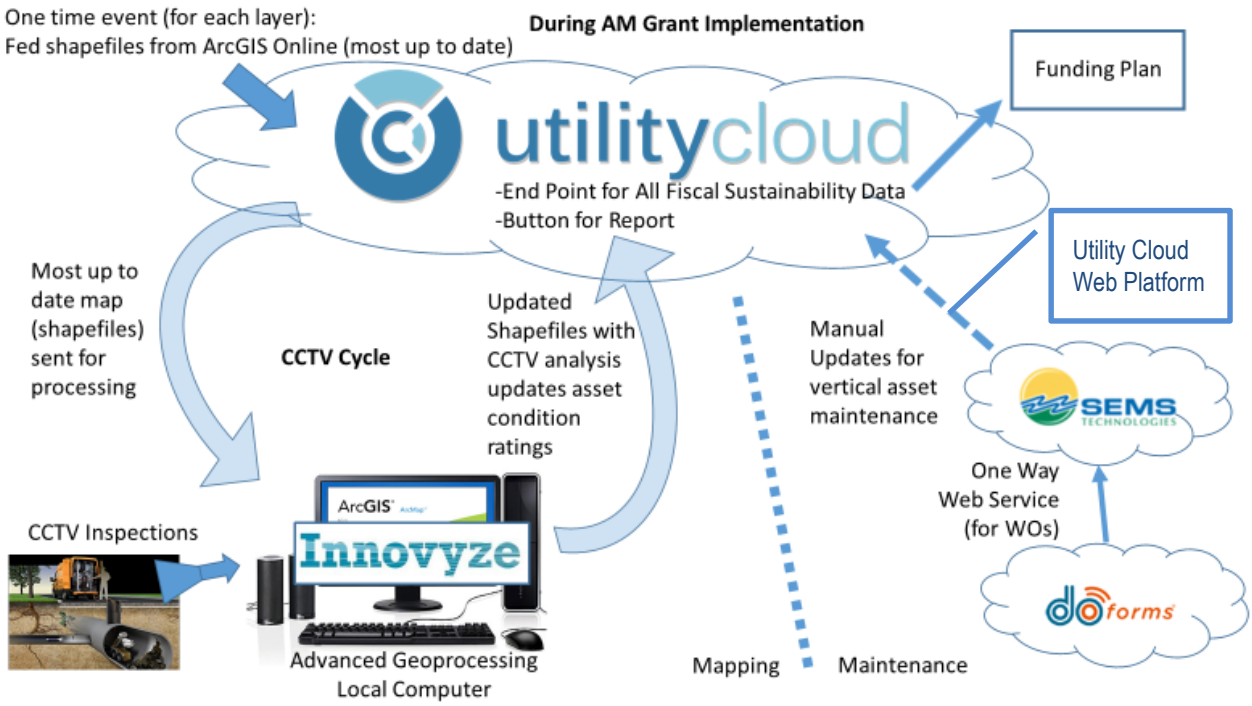


Figure 5-1: Software Integration Map

5.1.1 Utility Cloud©

Utility Cloud© is customizable cloud-based software that simplifies the process of tracking and visualizing assets, managing field operations, and sharing information. This software is a GIS based computerized maintenance management system (CMMS). The level of customization, and abilities to import, export, and direct interface with other systems give it the flexibility to act as an intersection of information. This software will act as the cornerstone for the asset management program. Utility Cloud© will:

1. Maintain the full list of assets, both for the WPCF and collection system,

Act as the repository for asset management data (likelihood of failure, consequence of failure, risk), and

Generate asset reports for comparison and evaluation

Staff will be able to review collection system assets as mapped assets. This provides relief of the need to rely on naming of very similar assets, like pipe and manholes. They will be able to use GPS to updated and continue to build out a complete and accurate asset inventory. Vertical assets, such as pump stations and the wastewater treatment facility, will also be navigated visually through a 'schematic' feature, where assets can be located on an image of a given room or area. This type of navigation also uses the concept of visualization to help clarify similar assets (pump 1 vs pump 2). Clear asset navigation helps lead to a better understanding of both what is missing and what is already included, leading to a better, complete asset inventory.

Utility Cloud© is an ideal repository for information from a variety of sources because of its customizable data structure and flexible importing and exporting features. The customizable data structure allows each asset and history event to be configured to retain data specific to that record, stored asset specific. This provides a place for all pertinent information in one place for easy review and decision making. All data types (asset and history records) can be quickly updated in bulk by importing excel tables, or in the case of assets, excel or shapefile. Both assets and history records can be exported, updated by outside sources (like Info Master®) and reimported, providing a smooth transition of data.

Utility Cloud© interfaces directly to Google Sheets™, an excel like web application, to create custom templates for powerful analysis. Once templates are created, users can generate reports through Utility Cloud© and get real time asset information without any additional updating.

As shown, Utility Cloud© will shine as an operational, day to day tool for managing assets, but for the purposes of assessing similar assets spread over a large area (horizontal assets), Utility Cloud© lacked some ability process information as efficiently as ArcGIS based products. Innovyze® Info Master® was selected to fill that gap.

5.1.2 Innovyze® Info Master®

Info Master® is a complete ArcGIS-based asset integrity management and capital planning software for water and wastewater networks. NASSCO PACP, MACP and Lateral Assessment Certification Program (LACP) certified, it leverages CCTV inspection data with existing GIS information with advanced modeling and sophisticated predictive analytics to give utilities a cost-effective business intelligence platform for more informed, action-oriented decision making.

A highly advanced and powerful analytical asset management tool, Info Master® uses state-of-the-art mathematical models to predict when a water or sewer pipes and manholes will fail, helping utilities determine the most cost-effective solution for avoiding or correcting the problem. In this way, users can ensure the best distribution of dollars spent on replacement and repair of underground assets.

Info Master® and Utility Cloud© have been designed to communicate through the shapefiles. Field collected data, such as new points or line, or updated conditions can be shared through shapefile spatial data and asset attributes.

5.2 Energy and Conservation Assessment

As recommended by MassDEP, an energy and conservation assessment is suggested for high eligibility for State Revolving Loan Funds. As a part of this Asset Management Plan, a brief evaluation was performed and is included in Appendix D. As part of this evaluation, we developed an equipment power estimate spreadsheet that assists in evaluating the individual processes and related equipment that use the most energy. Based on current processes and equipment currently being used, the following items were flagged as potential considerations for future upgrades and/or overall facility energy savings improvements:

- Aeration systems –
    - Fine bubble aeration for 2 aeration tanks [primary train – used >99 % of the time]
    - Mechanical aerators for 2 aeration tanks [backup train – used <1% of the time]
- Influent pumping system
- Effluent pumping system
- HVAC system – portions operate 24/7; current electrical unit heaters are main energy user during winter months
- Water conservation and plant water reuse system

Other systems that will be evaluated for energy efficiency would include:

- Return activated sludge system improvements/modifications
- Overall energy efficiency with regards to upgrading to high efficient LED lighting
- Pump station wet well aeration energy upgrades

Aeration system and the activated sludge process

The aeration system was upgraded in 2002 as part of the last major facility upgrade. Two of the four aeration tanks were upgraded to fine bubble aeration with DO control, and the other two aeration tanks have the original mechanical aerators. As part of our ongoing capital improvements program, we plan to replace the 2002 PLC that controls the aeration system with a new PLC that will allow for enhanced SCADA control over the current system. The current system is oversized [turndown capability of the aeration blowers is limited] for much of the operating time and the controls provide for limited on/off blower control, providing only partial DO control and energy savings. We plan to enhance the ability to provide DO and energy savings with the new PLC and SCADA control upgrade. We also plan to evaluate if the excess air from the existing blowers can be re-directed to other tanks/processes with the plant, which could allow for one or more other blowers to be turned off. We will also evaluate if a smaller blower should be added into the system to operate during times of less aeration demand.

We have already implemented a process change where we bypass the primary clarifiers and send influent directly to the aeration tank. This allows for the primary clarifier and the gravity thickener to be shutdown, saving energy by not having to run the units, as well as not having to provide plant water (dilution water) for the gravity thickeners. This also eliminates the need to pump primary sludge, primary scum and gravity thickener sludge. The major advantage of bypassing the primary/gravity thickener process is significantly reduced generation of Hydrogen Sulfide (H_2S). This not only reduces odors within the facility, it reduces air flow to the odor scrubber system, reduces chemical usage is the odor scrubber as well as the gravity thickener. Lower chemical usage also translates into less trucking of chemicals; less trucking is an overall energy benefit.

The other energy impact of bypassing the primary clarifiers is that it takes more aeration energy to treat the higher BOD load to the aeration system. Under the current conditions in Hull, since the aeration blowers are oversized, this

additional loading provides for a more efficient use of the aeration system. The waste sludge generated by the activated sludge process does increase due to the increased loading, but since this waste sludge (WAS) is now treated and processed via an existing aerated waste sludge tank, the production of H_2S is eliminated. The other benefit of processing the WAS is that it is thickened via a rotary sludge thickening (RST). The RST consistently produces 6-6.5 % solids. The gravity thickener produces only about 3.5 to 4% solids. So, the actual volume of sludge that needs to be trucked off site for ultimate disposal is reduced. Reduced trucking of sludge, as with reduced trucking of chemicals is an overall energy benefit.

As part of the future plant process upgrades we will evaluate options to enhance the current way we operate the plant, including using a rotary sieve process as an alternative to the current primary treatment process, as well as options to enhance the current activated sludge process, such as the MLE process. We will also be reviewing if the two aeration tanks that have the mechanical aerators should remain as backup units or be upgraded to the fine bubble aeration system.

Influent pumping system

The influent pumping system is the next major energy user. Maximizing the efficiency of the influent pumps and the pumping system, i.e., force mains, is the main goal. The function of the influent pumps is to pump the influent and plant recycle flows, after preliminary screening and grit removal, to the primary/secondary treatment process. There are five dry pit vertical pumps, 2 @ 20Hp and 3 @ 50Hp; all pumps are variable speed via VFDs. One or more of the influent pumps run 24 /7. Currently the two small 20 HP pumps use the 8-inch force main, and the three larger 50 HP pumps use a separate 16-inch force main. We performed pump efficiency testing of the influent pumping system and determined that the pump hydraulic efficiencies are lower than the design due to system wear and tear, on both the pumps and the force mains. A copy of the pump efficiency test report is included in Appendix D as well. Influent pump system efficiency upgrades being evaluated include:

- Rebuilding pumps with new impellers
- Coating impellers for improved hydraulic efficiency
- Installing higher efficiency motors
- Evaluating the condition of the 8 and 16 force mains, and then rehabilitating, if required
- Adding online pump pressure readings to the SCADA to allow for real time pump efficiency monitoring

When we rebuilt influent pump 5 in early 2016, we repaired and coated the impeller to try to improve reliability and well as hydraulic efficiency. This pump was not operational when we performed the pump efficiency testing in 2015, so we plan to perform additional pump efficiency testing in 2017. We also have enhanced our SCADA control of the pumps by connecting the VFDs to the SCADA system to allow for energy for each pump to be monitored. We have influent pump wet well level and flow meters on the 8 and 16-inch force mains. The next level of enhanced monitoring will be the pressure transducers noted above. Once the pressure transducers are in place, we will be able to use the SCADA system to continuously monitor pump efficiency in a manner like that provided in the pump efficiency test report in Appendix D. This will allow for improved reliability data for the O&M of the pump system as well as the ability to operate the system in the most energy efficient manner.

Effluent pump system

The effluent pump system is the next major energy user. Maximizing the efficiency of the effluent pumps and the effluent force main is the main goal. The function of the effluent pumps is to pump the treated secondary effluent to the chlorine contact tank for disinfection. There are four submersible pumps, 1 @ 20HP, 1 @ 35HP and 2 @ 60HP; all pumps are variable speed via VFDs. One or more of the effluent pumps run 24 /7. All four effluent pumps pump into one 16-inch force main.

We plan to perform pump efficiency testing of the effluent pumping system in 2017. The effluent pump system efficiency upgrades being evaluated include:

- Rebuilding pumps with new impellers
- Coating impellers for improved hydraulic efficiency
- Installing higher efficiency submersible pumps, when units need to be replaced
- Evaluating the condition of the effluent force main, and then rehabbing it to improve reliability and improve hydraulic efficiency, possibly by relining.
- Adding online pump pressure readings to the SCADA to allow for real time pump efficiency monitoring

HVAC system

The HVAC system is currently only partially functional, as many of the components were damaged from the plant flood that occurred in 2013. There are electric heaters and a few split heat pump systems that provide for partial heat and air conditioning. A major upgrade has been designed and includes bringing a six-inch natural gas line into the plant to allow for high efficiency heating to be installed. The plan moving forward will be to implement the HVAC upgrade in phases, as some of the process modifications, such as the primary sieve system mentioned above, could change the classification of certain rooms, which would impact HVAC details. Overall, the HVAC upgrade will provide for new high efficiency systems to be installed.

Water Conservation and Plant Water Reuse

The treatment facility has a plant water reuse system, comprised of two 25 HP pumps, that provides treated secondary effluent reuse water for many plant uses. This system is a critical asset, as it provides several key systems with water;

- Cooling water for the primary and backup up generators
- Influent pump seal water
- Odor scrubber makeup water
- Return and waste activated pumps seal water
- Gravity thickener dilution water
- Plant yard hydrants
- Service the spray for the secondary clarifiers
- Provide service water for the dichlorination system

The plant water control system was only partially repaired after the 2013 flood, as only manually controlled VFDs were installed on the plant water system. The plant water system needs to be upgraded with a new control panel and flow meter to allow for efficient automatic system monitoring and operation. In addition, the location of the plant water skid/pumps need to be evaluated as it relates to long term reliability and O&M. The plant water piping, both with the

control building and the plant pump stations, as well as the underground yard piping, needs to be evaluated and much of it needs to be replaced or upgraded. The plant water system is a key asset for water conservation and reuse, and it reduces the use of potable water for the treatment facility.

Return activated sludge system improvements/modifications

The RAS pumping system consists of three pumps @ 20 HP each, each with VFD controls, and typically one pump operates 24/7; during peak flow events, when a 2nd secondary clarifier is put on line, two pumps operate 24/7. All three pumps have recently been upgraded and rebuilt. As the pumps are rebuilt to restore hydraulic efficiency, the motors have been upgraded with higher efficiency motors. We are currently finishing the rebuild of the 3rd pump and will be installing a high efficiency motor on that unit. As part of a longer-term process evaluation, we will look to allow the return activated sludge to flow to the influent sewer or headworks via gravity and use a control valve for flow control. This would allow for the RAS pumps to be shut down most the time. The RAS flow would become part of the influent flow, potentially saving energy by taking advantage of the influent pump system operation.

Overall energy efficiency with regards to upgrading to high efficient LED lighting

As part of future plant upgrades, we will evaluate switching to more energy efficient LED lighting.

Pump Station Wet Well Aeration Energy Upgrades

We have recently installed wet well aeration systems in all the wastewater pump stations. These aeration systems have reduced debris build up in the wet wells, reduced the impact of FOG in the wet wells and the collection system, and provided for oxygen addition into the collection system. The initial first year of operation of these aerators proved that they are beneficial. We are now in the evaluation process with the manufacturer to determine if solar power can be added to the pump stations to power these aerators, as part of our overall energy efficiency improvements.

As we move forward with the detailed design of treatment plant unit process improvements, we will evaluate additional energy efficiency options. Our energy efficiency program as described above is also a part of our Corrective Action Plan for the Administrative Order on Consent.

1.2 Resiliency and Adaptation Planning

The Town of Hull is considering many different adaptation options to reduce the consequences from storm related surges, flooding and high flows, related to rising sea levels and increased intensity of storm/rain events. This is a key component for consideration as part of the wastewater system long term capital plan. In June 2016, the Town of Hull released its Coastal Climate Change Vulnerability Assessment and Adaptation Study, which made high-level adaptation recommendations for many of the Town's assets, including the wastewater treatment facility and several pump stations.

During a similar timeframe, from December 2015 to March 2017, the Town of Hull engaged in a series of webinars and an in-person meeting to conduct a climate change risk assessment using the U.S. Environmental Protection Agency's (EPA) Climate Resilience Evaluation and Awareness Tool (CREAT) to understand wastewater system vulnerabilities to climate change impacts. A preliminary CREAT report provided some initial evaluation of several adaptation options (see full report in Appendix F).

Some of the options that were preliminarily reviewed include; constructing a wall around the WPCF to protect the plant assets from flooding; building a permanent bypass for peak flows; modifying the WPCF to be a headworks facility and connecting to the Deer Island Sewage Treatment Plant operated by the Massachusetts Water Resources Authority (MWRA); evaluating treatment plant process upgrades that included raising major unit processes out of the flood zone,

and performing various adaption measures at several pump stations. These adaptation options have various degrees of cost effectiveness when comparing the cost of implementing the options with their potential risk reduction benefits.

The actual adaptation measures to be implemented have not yet been finalized. The MWRA option has been removed from the table due to an unfavorable response from the MWRA, coupled with an extremely costly capital outlay to build a connection into the MRWA system. The other resiliency adaptation measures will be further vetted as part of future engineering design work.

Currently, the Town of Hull has submitted a Coastal Resilience Grant application to the Massachusetts Office of Coastal Zone Management (CZM) for one of the recommended improvements, and the Sewer Department has already began investing in some immediate capital upgrades to mitigate some of the WPCF. The CREAT tool is one of the future methods/tools the town can use to assist in trying to determine which adaption measures would be recommended for implementation.

To continue to use the model and to best assess adaptation impacts, the following next steps are needed:

- Incorporate new, and refine further existing adaptation options in CREAT file.
- Incorporate Collection and Treated Wastewater Conveyance System adaptation measures.
- Incorporate more accurate costs based on ongoing engineering design

6 REFERENCES

Various report and documents were used to assist in developing the asset condition assessments and developing the list of capital plan recommendations; including, but not limited to the following:

Dec. 1983 – Evaluation of Sewage Facilities for Hull, MA – Black & Veatch

1995 - Wresting with High Storm Tides at the Hull Water Pollution Control Facility

1996 – Heating, Ventilation and Air Conditioning System Study – William H. Rowe Associates

1998 - Tighe & Bond Project Evaluation Report

1989 - Metcalf & Eddy Design Criteria for Deer Island Storm Surge …

March 1999 Tighe & Bond Memo – Sewage Pump Station Inspections

September 2004 Process Energy Services, LLC Energy Plan for Hull Wastewater Facility

April 2005, Basis of Design Report for Pump Station Upgrades, Hull, MA - Aquarion Engineering Services

March 2008 Wight-Pierce Hull WWTP Operational Assessment

2014 Woodard & Curran Contract Operations Proposal

June 15, 2015 EPA and DEP inspection reports

September 24, 2015 W&C Capital Planning & Godwin Pump Setup - Meeting Notes

November 6, 2015 Hazard Mitigation Grant Program Recommendations – Tighe & Bond

June 2016 Coastal Climate Change Vulnerability Assessment and Adaptation Study, Tow Hull, MA – Kleinfelder

2017 – Tighe & Bond HVAC design and opinion of Probable Construction Cost

2017 Woodard & Curran Capital Improvement Spreadsheet (update from 2015 and 2016 versions)

Various W&C Condition Assessment reports:

- 2015 Electrical System Maintenance shutdown for main switch board, ATSs, preventative maintenance and testing & INFRARED testing report
- 2015 electrical system ARC FLASH Analysis
- 2015 Vibration analysis report for key WPCF equipment
- 2015 Influent Pump Efficiency testing report
- 2015 SCADA system overall condition assessment
- 2017 Structural inspection reports – WPCF and PS 3 and PS 4
- 2017 UST options evaluation memo
- 2015-2017 Various W&C “open” corrective maintenance work orders

APPENDIX A: COLLECTION SYSTEM ASSET INVENTORY AND RISK ANALYSIS

SEWER PIPE RISK ASSESSMENT

GIS ID	Diameter	Material	Length	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	LOF	Risk	Risk	Risk
				Diameter	Critical Facilities	Road Classification	Water Resources	Total Score	By Grading	CCTV Inspection	Pipe Material	Multi-Combined	Total Score	By Grading	Total	Normalized	By Grading
20072-20065	15	VC	216	12	4	4	1	21	High	4	3	4	4	High	84	70	5: Extreme
20122-20121	36	RC	215	15	1	2	4	22	High	0	5	5	5	High	110	92	5: Extreme
20125-20122	36	RC	310	15	1	2	4	22	High	0	5	5	5	High	110	92	5: Extreme
20126-20125	36	RC	367	15	1	4	4	24	High	0	5	5	5	High	120	100	5: Extreme
20127-20126	36	RC	205	15	1	4	4	24	High	0	5	5	5	High	120	100	5: Extreme
20128-20127	36	RC	257	15	1	4	4	24	High	0	5	5	5	High	120	100	5: Extreme
20129-20128	36	RC	187	15	1	4	4	24	High	0	5	5	5	High	120	100	5: Extreme
20130-20129	36	RC	241	15	1	4	4	24	High	5	5	5	5	High	120	100	5: Extreme
20131-20130	36	RC	207	15	1	4	4	24	High	0	5	5	5	High	120	100	5: Extreme
20134-20131	36	RC	409	15	1	4	4	24	High	0	5	5	5	High	120	100	5: Extreme
20136-20134	36	RC	184	15	1	4	4	24	High	0	5	5	5	High	120	100	5: Extreme
20138-20136	36	RC	160	15	1	4	4	24	High	0	5	5	5	High	120	100	5: Extreme
20141-30001	36	RC	101	15	1	4	4	24	High	0	5	5	5	High	120	100	5: Extreme
20143-20141	36	RC	130	15	1	4	4	24	High	0	5	5	5	High	120	100	5: Extreme
20147-20143	36	RC	302	15	1	4	4	24	High	0	5	5	5	High	120	100	5: Extreme
20150-20147	36	RC	162	15	1	4	4	24	High	0	5	5	5	High	120	100	5: Extreme
20159-20150	36	RC	268	15	1	4	4	24	High	0	5	5	5	High	120	100	5: Extreme
20167-20159	36	RC	236	15	1	4	4	24	High	0	5	5	5	High	120	100	5: Extreme
20195-20167	36	RC	309	15	1	4	4	24	High	0	5	5	5	High	120	100	5: Extreme
20245-20221	36	RC	341	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20256-20245	36	RC	183	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20262-20256	36	RC	222	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20273-20262	36	RC	226	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20281-20273	36	RC	211	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20293-20281	36	RC	212	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20309-20299	36	RC	226	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20332-20325	36	RC	218	15	1	4	1	21	High	5	5	5	5	High	105	88	5: Extreme
20355-20345	36	RC	218	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20360-20355	36	RC	225	15	1	4	1	21	High	5	5	5	5	High	105	88	5: Extreme
20364-20360	36	RC	222	15	1	4	1	21	High	5	5	5	5	High	105	88	5: Extreme
20371-20364	36	RC	218	15	1	4	1	21	High	5	5	5	5	High	105	88	5: Extreme
20380-20371	36	RC	224	15	1	4	1	21	High	5	5	5	5	High	105	88	5: Extreme
20395-20390	36	RC	226	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20405-20395	36	RC	218	15	1	4	1	21	High	5	5	5	5	High	105	88	5: Extreme
20414-20405	36	RC	229	15	4	4	1	24	High	5	5	5	5	High	120	100	5: Extreme
20424-20414	36	RC	245	15	4	4	1	24	High	5	5	5	5	High	120	100	5: Extreme
20432-20424	36	RC	190	15	4	4	1	24	High	0	5	5	5	High	120	100	5: Extreme
20444-20432	36	RC	157	15	4	4	1	24	High	0	5	5	5	High	120	100	5: Extreme
20449-20444	36	RC	79	15	4	4	1	24	High	0	5	5	5	High	120	100	5: Extreme
20458-20449	36	RC	138	15	4	4	1	24	High	0	5	5	5	High	120	100	5: Extreme
20476-20458	36	RC	437	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20490-20476	36	RC	305	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20508-20490	36	RC	306	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20520-20508	36	RC	292	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20542-20520	36	RC	312	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20543-20542	36	RC	33	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20552-20543	36	RC	290	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20568-20552	36	RC	313	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20580-20568	36	RC	257	15	1	4	1	21	High	0	5	5	5	High	105	88	5: Extreme
20965-20963	10	VC	209	9	1	4	4	18	High	5	3	5	5	High	90	75	5: Extreme
20967-20965	10	VC	267	9	1	4	4	18	High	4	3	4	4	High	72	60	5: Extreme
20970-20967	10	VC	195	9	1	4	4	18	High	4	3	4	4	High	72	60	5: Extreme
20971-20970	10	VC	373	9	1	4	4	18	High	5	3	5	5	High	90	75	5: Extreme
20972-20971	10	VC	250	9	1	4	4	18	High	4	3	4	4	High	72	60	5: Extreme
20973-20972	10	VC	462	9	1	4	4	18	High	4	3	4	4	High	72	60	5: Extreme
20974-20973	10	VC	251	9	1	4	4	18	High	4	3	4	4	High	72	60	5: Extreme
30001N-30002N	24	DI	59	15	1	3	4	23	High	0	4	4	4	High	92	77	5: Extreme
30001S-30002S	18	DI	59	12	1	3	4	20	High	0	4	4	4	High	80	67	5: Extreme
30002-20138	36	RC	103	15	1	4	4	24	High	0	5	5	5	High	120	100	5: Extreme
20002-20005	6	VC	193	3	5	4	4	16	High	0	3	3	3	Medium	48	40	4: High
20004-20003	6	VC	146	3	5	4	4	16	High	0	3	3	3	Medium	48	40	4: High
20004-20005	6	VC	26	3	5	4	4	16	High	0	3	3	3	Medium	48	40	4: High
20005-20006	18	AC	235	12	5	4	4	25	High	2	3	2	2	Medium	50	42	4: High
20006-20010	18	AC	284	12	5	3	4	24	High	0	3	3	3	Medium	72	60	4: High
20008-20004	18	VC	415	12	5	4	4	25	High	0	3	3	3	Medium	75	63	4: High
20010-20008	6	VC	83	3	5	4	4	16	High	0	3	3	3	Medium	48	40	4: High
20020-20017	24	BRICK	143	15	1	4	4	24	High	0	3	3	3	Medium	72	60	4: High
20022-20020	24	BRICK	150	15	1	4	4	24	High	0	3	3	3	Medium	72	60	4: High
20036-20022	18	VC	386	12	1	4	1	18	High	0	3	3	3	Medium	54	45	4: High
20045-20036	6	VC	366	12	1	4	1	18	High	0	3	3	3	Medium	54	45	4: High
20045-20036	18	VC	386	12	1	4	1	18	High	0	3	3	3	Medium	54	45	4: High
20065-20058	15	VC	272	12	4	4	1	21	High	3	3	3	3	Medium	63	53	4: High
20111-20116	12	VC	378	9	1	2	4	16	High	0	3	3	3	Medium	48	40	4: High
20119-20116	12	VC	294	9	1	2	4	16	High	0	3	3	3	Medium	48	40	4: High
20132-20131	12	AC	189	9	1	4	4	18	High	0	3	3	3	Medium	54	45	4: High
20133-20132	12	AC	196	9	1	2	4	16	High	0	3	3	3	Medium	48	40	4: High
20135-20133	12	AC	291	9	1	2	4	16	High	0	3	3	3	Medium	48	40	4: High
20137-20135	12	AC	281	9	1	2	4	16	High	0	3	3	3	Medium	48	40	4: High
20137-20139	12	AC	199	9	1	2	4	16	High	0	3	3	3	Medium	48	40	4: High
20139-20140	12	AC	96	9	1	2	4	16	High	0	3	3	3	Medium	48	40	4: High
20140-20151	12	AC	425	9	1	2	4	16	High	0	3	3	3	Medium	48	40	4: High

				COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	LOF	Risk	Risk	Risk
20345-20332	36	RC	225	15	3	4	1	23	High	3	5	3	3	Medium	69	58	4: High
20390-20380	36	RC	219	15	1	4	1	21	High	3	5	3	3	Medium	63	53	4: High
20423-20434	16	AC	121	12	1	2	4	19	High	0	3	3	3	Medium	57	48	4: High
20425-20450	12	AC	184	9	1	2	4	16	High	2	3	2	2	Medium	32	27	4: High
20434-20496	16	AC	593	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20442-20423	16	AC	172	12	1	2	4	19	High	0	3	3	3	Medium	57	48	4: High
20450-20445	12	AC	245	9	1	2	4	16	High	0	3	3	3	Medium	48	40	4: High
20460-20442	16	AC	153	12	1	2	4	19	High	0	3	3	3	Medium	57	48	4: High
20471-20460	16	AC	197	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20471-20482	12	AC	215	9	1	2	4	16	High	0	3	3	3	Medium	48	40	4: High
20482-20491	12	AC	130	9	1	2	4	16	High	0	3	3	3	Medium	48	40	4: High
20491-20501	12	AC	98	9	1	2	4	16	High	0	3	3	3	Medium	48	40	4: High
20501-20511	12	AC	104	9	1	2	4	16	High	0	3	3	3	Medium	48	40	4: High
20504-20515	16	AC	293	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20504-20533	16	AC	254	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20511-20541	12	AC	212	9	1	2	4	16	High	0	3	3	3	Medium	48	40	4: High
20515-20535	16	AC	259	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20521-20496	16	AC	242	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20521-20535	16	AC	150	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20533-20552	16	AC	216	12	1	4	1	18	High	0	3	3	3	Medium	54	45	4: High
20562-20552	16	AC	97	12	1	4	1	18	High	0	3	3	3	Medium	54	45	4: High
20835-20834	10	VC	106	9	1	5	1	16	High	0	3	3	3	Medium	48	40	4: High
20836-20835	10	VC	86	9	1	5	1	16	High	0	3	3	3	Medium	48	40	4: High
20837-20838	12	AC	74	9	1	4	4	18	High	0	3	3	3	Medium	54	45	4: High
20839-20836	10	VC	252	9	1	5	1	16	High	0	3	3	3	Medium	48	40	4: High
20843-20845	12	AC	47	9	1	5	1	16	High	0	3	3	3	Medium	48	40	4: High
20845-20839	10	VC	125	9	1	5	1	16	High	0	3	3	3	Medium	48	40	4: High
20846-20837	12	AC	302	9	1	4	4	18	High	0	3	3	3	Medium	54	45	4: High
20847-20846	12	AC	202	9	1	4	4	18	High	0	3	3	3	Medium	54	45	4: High
20848-20848	16	AC	72	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20849-20847	12	AC	22	9	1	3	4	17	High	0	3	3	3	Medium	51	43	4: High
20849-20849	12	AC	76	9	1	3	4	17	High	0	3	3	3	Medium	51	43	4: High
20851-20849	12	AC	235	9	1	3	4	17	High	0	3	3	3	Medium	51	43	4: High
20852-20848	16	AC	325	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20856-20852	16	AC	167	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20858-20856	16	AC	170	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20864-20865	16	AC	214	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20865-20868	16	AC	235	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20866-20867	16	AC	70	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20867-20858	16	AC	268	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20867-20871	14	VC	89	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20868-20866	16	AC	37	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20869-20864	16	AC	75	12	1	5	1	19	High	0	3	3	3	Medium	57	48	4: High
20871-20871	14	VC	116	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20877-20868	16	AC	186	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20877-20878	16	AC	71	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20878-20884	16	AC	175	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20881-20869	16	AC	313	12	1	5	1	19	High	0	3	3	3	Medium	57	48	4: High
20884-20886	14	VC	57	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20886-20889	14	VC	41	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20889-20891	14	VC	129	12	1	2	1	16	High	0	3	3	3	Medium	48	40	4: High
20890-20881	16	AC	203	12	1	5	1	19	High	0	3	3	3	Medium	57	48	4: High
20897-20890	16	AC	151	12	1	5	1	19	High	0	3	3	3	Medium	57	48	4: High
20903-20897	16	AC	285	12	1	5	1	19	High	0	3	3	3	Medium	57	48	4: High
20905-20903	14	AC	156	12	1	5	1	19	High	0	3	3	3	Medium	57	48	4: High
20906-20905	14	AC	291	12	1	5	1	19	High	0	3	3	3	Medium	57	48	4: High
20907-20906	14	AC	85	12	1	5	1	19	High	0	3	3	3	Medium	57	48	4: High
20909-20907	14	AC	54	12	1	5	1	19	High	0	3	3	3	Medium	57	48	4: High
20912-20909	14	AC	159	12	1	4	1	18	High	0	3	3	3	Medium	54	45	4: High
20922-20912	14	AC	254	12	1	4	1	18	High	0	3	3	3	Medium	54	45	4: High
20927-20922	14	AC	235	12	4	4	1	21	High	0	3	3	3	Medium	63	53	4: High
20934-20927	14	AC	272	12	4	4	1	21	High	0	3	3	3	Medium	63	53	4: High
20950-20953	8	VC	176	3	1	4	1	9	Medium	5	3	5	5	High	45	38	4: High
20953-20956	8	VC	268	3	1	4	4	12	Medium	5	3	5	5	High	60	50	4: High
20953-20956	8	VC	125	3	1	4	4	12	Medium	5	3	5	5	High	60	50	4: High
20956-20957	8	VC	132	3	1	4	4	12	Medium	5	3	5	5	High	60	50	4: High
20957-20958	8	VC	126	3	1	4	4	12	Medium	5	3	5	5	High	60	50	4: High
20959-20962	8	VC	269	3	1	4	4	12	Medium	5	3	5	5	High	60	50	4: High
20963-20963	10	VC	101	9	1	4	4	18	High	0	3	3	3	Medium	54	45	4: High
20976-20974	10	VC	220	9	1	4	4	18	High	2	3	2	2	Medium	36	30	4: High
20979-20976	10	VC	219	9	1	4	4	18	High	2	3	2	2	Medium	36	30	4: High
20000-20001	8	AC	195	3	1	4	4	12	Medium	0	3	3	3	Medium	36	30	3: Medium
20001-20002	6	VC	200	3	1	4	4	12	Medium	0	3	3	3	Medium	36	30	3: Medium
20003-20003	6	VC	83	3	5	2	1	11	Medium	0	3	3	3	Medium	33	28	3: Medium
20009-20010	8	PVC	59	3	5	4	4	16	High	0	1	1	1	Low	16	13	3: Medium
20012-20010	18	PVC	200	12	5	4	4	25	High	0	1	1	1	Low	25	21	3: Medium
20014-20012	18	PVC	182	12	1	4	4	21	High	0	1	1	1	Low	21	18	3: Medium
20015-20014	18	PVC	25	12	1	4	4	21	High	0	1	1	1	Low	21	18	3: Medium
20016-20015	24	PVC	910	15	1	4	4	24	High	0	1	1	1	Low	24	20	3: Medium
20016-20018	6	VC	59	3	1	4	4	12	Medium	0	3	3	3	Medium	36	30	3: Medium
20017-20016	24	BRICK	65	15	1	4	4	24	High	1	3	1	1	Low	24	20	3: Medium
20018-20019	6	VC	158	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium

				COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	LOF	Risk	Risk	Risk
20022-20024	6	VC	86	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20045-20050	6	VC	296	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20052-20045	15	VC	206	12	1	4	1	18	High	1	3	1	1	Low	18	15	3: Medium
20052-20051	6	VC	150	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20058-20052	15	VC	241	12	4	4	1	21	High	1	3	1	1	Low	21	18	3: Medium
20062-20062	6	VC	101	3	4	2	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20070-20064	6	VC	161	3	4	2	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20072-20067	6	VC	196	3	4	4	1	12	Medium	0	3	3	3	Medium	36	30	3: Medium
20078-20071	6	VC	340	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20078-20072	12	VC	197	9	4	4	1	18	High	1	3	1	1	Low	18	15	3: Medium
20079-20079	6	VC	118	3	4	2	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20079-20094	6	VC	148	3	4	2	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20080-20070	6	VC	418	3	4	2	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20081-20079	6	VC	244	3	4	2	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20083-20078	12	VC	93	9	1	4	1	15	Medium	0	3	3	3	Medium	45	38	3: Medium
20083-20088	12	VC	142	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20084-20080	6	VC	94	3	4	2	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20091-20083	6	VC	102	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20091-20084	6	VC	160	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20092-20089	6	VC	99	3	1	3	1	8	Medium	0	3	3	3	Medium	24	20	3: Medium
20097-20091	6	VC	156	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20100-20097	6	VC	144	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20107-20100	6	VC	385	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20107-20113	6	VC	346	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20108-20107	6	VC	77	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20114-20117	6	VC	170	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20115-20108	6	VC	405	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20116-20117	6	VC	32	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20117-20118	6	VC	275	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20118-20121	6	VC	279	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20119-20124	8	VC	506	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20121-20122	6	VC	36	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20124-20123	8	VC	285	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20142-20152	10	VC	364	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20151-20152	12	AC	13	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20152-20160	10	VC	216	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20199-20168	6	VC	347	3	1	3	1	8	Medium	0	3	3	3	Medium	24	20	3: Medium
20221-20195	36	CIPP	201	15	1	4	4	24	High	0	1	1	1	Low	24	20	3: Medium
20221-20232	8	VC	104	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20226-20233	8	AC	225	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20249-20202	10	PVC	392	9	1	2	4	16	High	0	1	1	1	Low	16	13	3: Medium
20278-20280	8	VC	30	3	1	3	1	8	Medium	0	3	3	3	Medium	24	20	3: Medium
20299-20293	36	CIPP	232	15	1	4	1	21	High	0	1	1	1	Low	21	18	3: Medium
20321-20309	36	RC	216	15	1	4	1	21	High	1	5	1	1	Low	21	18	3: Medium
20325-20321	36	CIPP	222	15	1	4	1	21	High	1	1	1	1	Low	21	18	3: Medium
20327-20347	12	AC	177	9	1	2	1	13	Medium	2	3	2	2	Medium	26	22	3: Medium
20352-20376	8	AC	286	3	4	2	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20361-20392	12	AC	290	9	1	2	1	13	Medium	2	3	2	2	Medium	26	22	3: Medium
20372-20389	8	AC	213	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20376-20410	8	AC	267	3	4	2	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20383-20379	8	AC	104	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20384-20382	8	AC	144	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20392-20425	12	AC	247	9	1	2	4	16	High	1	3	1	1	Low	16	13	3: Medium
20393-20372	8	AC	178	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20410-20424	8	AC	113	3	4	4	1	12	Medium	0	3	3	3	Medium	36	30	3: Medium
20413-20383	8	AC	263	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20419-20384	8	AC	307	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20422-20425	8	AC	100	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20439-20406	8	AC	240	3	4	2	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20440-20456	12	AC	247	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20444-20439	8	AC	41	3	4	4	1	12	Medium	0	3	3	3	Medium	36	30	3: Medium
20446-20440	12	AC	133	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20450-20478	12	AC	220	9	1	2	4	16	High	1	3	1	1	Low	16	13	3: Medium
20456-20469	12	AC	227	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20469-20480	12	AC	217	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20478-20506	12	AC	249	9	1	2	4	16	High	1	3	1	1	Low	16	13	3: Medium
20480-20492	12	AC	221	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20482-20502	8	AC	153	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20492-20504	12	AC	103	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20500-20471	10	AC	265	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20501-20536	8	AC	302	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20506-20537	12	AC	226	9	1	2	4	16	High	1	3	1	1	Low	16	13	3: Medium
20528-20500	10	AC	262	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20537-20530	8	AC	209	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20537-20559	12	AC	232	9	1	2	4	16	High	1	3	1	1	Low	16	13	3: Medium
20550-20528	10	AC	237	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20550-20572	10	AC	229	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20555-20541	12	AC	159	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20559-20554	8	AC	269	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20559-20583	12	AC	235	9	1	2	4	16	High	1	3	1	1	Low	16	13	3: Medium
20567-20555	12	AC	136	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20573-20567	12	AC	106	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium

				COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	LOF	Risk	Risk	Risk
20583-20579	8	AC	196	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20583-20609	12	AC	242	9	1	2	4	16	High	1	3	1	1	Low	16	13	3: Medium
20584-20573	12	AC	126	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20591-20562	16	PVC	324	12	1	2	1	16	High	0	1	1	1	Low	16	13	3: Medium
20595-20584	12	AC	140	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20596-20580	30	CIPP	394	15	1	4	1	21	High	0	1	1	1	Low	21	18	3: Medium
20600-20595	12	AC	76	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20604-20591	15	PVC	323	12	1	2	1	16	High	0	1	1	1	Low	16	13	3: Medium
20604-20617	15	PVC	317	12	1	2	1	16	High	0	1	1	1	Low	16	13	3: Medium
20609-20625	12	AC	276	9	1	2	4	16	High	1	3	1	1	Low	16	13	3: Medium
20611-20600	12	AC	243	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20614-20596	30	CIPP	419	15	1	4	1	21	High	0	1	1	1	Low	21	18	3: Medium
20617-20626	15	PVC	309	12	1	2	1	16	High	0	1	1	1	Low	16	13	3: Medium
20625-20634	12	AC	154	9	1	2	4	16	High	1	3	1	1	Low	16	13	3: Medium
20628-20625	8	AC	152	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20629-20611	12	AC	237	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20630-20614	30	CIPP	363	15	1	4	1	21	High	0	1	1	1	Low	21	18	3: Medium
20634-20640	12	AC	194	9	1	2	4	16	High	1	3	1	1	Low	16	13	3: Medium
20640-20629	12	AC	119	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20656-20630	30	CIPP	426	15	1	4	1	21	High	0	1	1	1	Low	21	18	3: Medium
20664-20656	30	CIPP	234	15	1	4	1	21	High	0	1	1	1	Low	21	18	3: Medium
20671-20664	30	CIPP	105	15	1	4	1	21	High	0	1	1	1	Low	21	18	3: Medium
20697-20671	30	CIPP	397	15	1	4	1	21	High	0	1	1	1	Low	21	18	3: Medium
20712-20697	30	CIPP	248	15	1	4	1	21	High	0	1	1	1	Low	21	18	3: Medium
20721-20712	30	CIPP	235	15	1	4	1	21	High	0	1	1	1	Low	21	18	3: Medium
20721-20736	8	AC	329	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20736-20740	8	AC	85	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20739-20736	8	AC	56	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20740-20734	8	AC	123	3	1	3	1	8	Medium	0	3	3	3	Medium	24	20	3: Medium
20744-20721	30	CIPP	518	15	1	4	1	21	High	0	1	1	1	Low	21	18	3: Medium
20745-20731	8	AC	252	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20745-20739	8	AC	115	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20754-20752	10	VC	65	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20757-20744	30	CIPP	238	15	1	4	1	21	High	0	1	1	1	Low	21	18	3: Medium
20757-20746	8	AC	145	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20759-20745	8	AC	261	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20761-20754	10	VC	125	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20762-20759	8	VC	131	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20764-20779	10	AC	219	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20766-20762	8	VC	58	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20770-20761	10	VC	122	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20774-20757	30	CIPP	362	15	1	4	1	21	High	0	1	1	1	Low	21	18	3: Medium
20774-20772	6	VC	79	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20774-20777	6	VC	64	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20779-20796	10	AC	259	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20781-20766	8	VC	285	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20791-20770	10	VC	302	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20795-20781	8	VC	299	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20796-20811	10	AC	323	9	1	4	1	15	Medium	0	3	3	3	Medium	45	38	3: Medium
20799-20815	6	VC	370	3	5	2	1	11	Medium	0	3	3	3	Medium	33	28	3: Medium
20803-20774	30	CIPP	495	15	1	4	1	21	High	0	1	1	1	Low	21	18	3: Medium
20803-20795	8	VC	85	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20804-20812	6	VC	114	3	5	2	1	11	Medium	0	3	3	3	Medium	33	28	3: Medium
20804-20815	6	VC	232	3	5	2	1	11	Medium	0	3	3	3	Medium	33	28	3: Medium
20809-20791	10	VC	281	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20810-20801	8	VC	271	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20810-20803	8	VC	297	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20811-20803	30	CIPP	282	15	1	4	1	21	High	0	1	1	1	Low	21	18	3: Medium
20812-20817	6	VC	215	3	5	2	1	11	Medium	0	3	3	3	Medium	33	28	3: Medium
20814-20823	6	VC	418	3	5	2	1	11	Medium	0	3	3	3	Medium	33	28	3: Medium
20815-20819	6	VC	153	3	5	2	1	11	Medium	0	3	3	3	Medium	33	28	3: Medium
20817-20824	6	VC	242	3	5	4	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20818-20810	6	VC	304	3	5	4	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20820-20809	10	VC	259	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20822-20819	6	VC	243	3	5	2	1	11	Medium	0	3	3	3	Medium	33	28	3: Medium
20823-20823	6	VC	254	3	5	2	1	11	Medium	0	3	3	3	Medium	33	28	3: Medium
20823-20832	6	VC	266	3	5	2	1	11	Medium	0	3	3	3	Medium	33	28	3: Medium
20824-20818	6	VC	334	3	5	4	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20824-20828	6	VC	311	3	5	4	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20826-20820	10	VC	241	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20829-20828	6	VC	87	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20829-20828	6	VC	252	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20830-20827	8	VC	220	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20830-20831	8	VC	98	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20831-20829	6	VC	63	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20831-20831	8	VC	23	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20832-20833	6	VC	435	3	5	4	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20838-20843	12	AC	103	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20845-20845	6	VC	43	3	1	5	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20852-20855	12	AC	204	9	1	2	1	13	Medium	0	3	3	3	Medium	39	33	3: Medium
20853-20851	12	AC	216	9	1	3	1	14	Medium	0	3	3	3	Medium	42	35	3: Medium
20854-20853	12	AC	253	9	1	3	1	14	Medium	0	3	3	3	Medium	42	35	3: Medium

				COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	LOF	Risk	Risk	Risk
20855-20854	12	AC	235	9	1	3	1	14	Medium	0	3	3	3	Medium	42	35	3: Medium
20870-20870	6	VC	45	3	1	3	1	8	Medium	0	3	3	3	Medium	24	20	3: Medium
20891-20893	6	VC	111	3	1	3	1	8	Medium	0	3	3	3	Medium	24	20	3: Medium
20891-20902	6	VC	246	3	1	3	1	8	Medium	0	3	3	3	Medium	24	20	3: Medium
20893-20894	6	VC	53	3	1	3	1	8	Medium	0	3	3	3	Medium	24	20	3: Medium
20894-20898	6	VC	30	3	1	3	1	8	Medium	0	3	3	3	Medium	24	20	3: Medium
20899-20894	6	VC	101	3	1	3	1	8	Medium	0	3	3	3	Medium	24	20	3: Medium
20907-20910	6	VC	178	3	1	5	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20910-20911	6	VC	205	3	1	5	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20911-20914	6	VC	260	3	1	5	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20914-20915	6	VC	41	3	1	5	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20915-20918	6	VC	47	3	1	3	1	8	Medium	0	3	3	3	Medium	24	20	3: Medium
20916-20913	6	VC	117	3	1	3	1	8	Medium	0	3	3	3	Medium	24	20	3: Medium
20919-20914	6	VC	103	3	1	5	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20922-20921	6	VC	128	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20926-20925	8	VC	277	3	4	2	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20927-20926	8	VC	35	3	4	4	1	12	Medium	0	3	3	3	Medium	36	30	3: Medium
20928-20927	8	VC	73	3	4	4	1	12	Medium	0	3	3	3	Medium	36	30	3: Medium
20928-20935	8	VC	216	3	4	4	1	12	Medium	0	3	3	3	Medium	36	30	3: Medium
20931-20929	6	VC	162	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20931-20931	6	VC	47	3	1	3	4	11	Medium	0	3	3	3	Medium	33	28	3: Medium
20932-20933	8	VC	141	3	4	2	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20933-20935	8	VC	170	3	4	4	1	12	Medium	0	3	3	3	Medium	36	30	3: Medium
20933-20938	8	VC	197	3	4	2	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20935-20943	8	VC	370	3	4	4	1	12	Medium	0	3	3	3	Medium	36	30	3: Medium
20936-20931	6	VC	81	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20937-20935	6	VC	240	3	4	4	1	12	Medium	0	3	3	3	Medium	36	30	3: Medium
20939-20936	6	VC	201	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20940-20939	6	VC	82	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20941-20937	6	VC	232	3	4	2	1	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20942-20940	8	AC	40	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20943-20946	6	VC	21	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20944-20942	8	AC	234	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20946-20945	6	VC	322	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20946-20947	6	VC	22	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20947-20949	8	VC	130	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20949-20948	6	VC	318	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20949-20950	6	VC	164	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20952-20950	6	VC	94	3	1	4	1	9	Medium	0	3	3	3	Medium	27	23	3: Medium
20954-20955	6	VC	187	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20955-20957	6	VC	234	3	1	4	4	12	Medium	0	3	3	3	Medium	36	30	3: Medium
20958-20959	8	VC	158	3	1	4	4	12	Medium	2	3	2	2	Medium	24	20	3: Medium
20958-20959	8	VC	53	3	1	4	4	12	Medium	2	3	2	2	Medium	24	20	3: Medium
20961-20962	8	AC	263	3	1	4	4	12	Medium	3	3	3	3	Medium	36	30	3: Medium
20964-20961	6	VC	142	3	1	2	1	7	Low	5	3	5	5	High	35	29	3: Medium
20966-20964	6	VC	124	3	1	2	1	7	Low	5	3	5	5	High	35	29	3: Medium
20967-20968	12	VC	22	9	1	4	4	18	High	1	3	1	1	Low	18	15	3: Medium
20969-20966	6	VC	360	3	1	2	1	7	Low	5	3	5	5	High	35	29	3: Medium
20977-20980	8	AC	267	3	1	2	4	10	Medium	0	3	3	3	Medium	30	25	3: Medium
20982-20985	6	VC	296	3	1	2	1	7	Low	4	3	4	4	High	28	23	3: Medium
20984-20987	6	VC	188	3	1	2	1	7	Low	4	3	4	4	High	28	23	3: Medium
20988-20986	6	VC	141	0	1	0	0	1	Low	5	3	5	5	High	5	4	3: Medium
20009-20007	8	PVC	301	3	5	2	1	11	Medium	0	1	1	1	Low	11	9	2: Low
20012-20011	8	PVC	180	3	1	4	4	12	Medium	0	1	1	1	Low	12	10	2: Low
20014-20013	8	PVC	248	3	1	4	4	12	Medium	0	1	1	1	Low	12	10	2: Low
20019-20021	6	VC	365	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20021-20023	6	VC	75	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20023-20025	6	VC	73	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20024-20026	6	VC	291	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20025-20027	6	VC	90	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20026-20028	6	VC	243	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20029-20027	6	VC	50	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20029-20034	6	VC	283	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20030-20028	6	VC	90	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20030-20032	6	VC	262	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20031-20029	6	VC	153	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20032-20040	6	VC	280	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20033-20030	6	VC	195	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20034-20048	6	VC	205	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20035-20032	6	VC	204	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20037-20031	6	VC	244	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20039-20035	6	VC	84	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20039-20043	6	VC	199	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20041-20039	6	VC	89	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20042-20037	6	VC	218	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20042-20047	6	VC	159	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20044-20041	6	VC	112	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20048-20034	6	VC	197	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20048-20046	6	VC	173	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20049-20044	6	VC	117	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20050-20042	6	VC	210	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20050-20053	6	VC	120	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low

				COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	LOF	Risk	Risk	Risk
20051-20038	6	VC	538	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20053-20053	6	VC	93	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20054-20048	6	VC	325	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20056-20049	6	VC	303	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20057-20054	6	VC	93	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20058-20062	8	PVC	279	3	4	4	1	12	Medium	0	1	1	1	Low	12	10	2: Low
20059-20055	6	VC	147	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20060-20056	6	VC	255	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20061-20059	6	VC	142	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20064-20062	8	PVC	27	3	4	2	1	10	Medium	0	1	1	1	Low	10	8	2: Low
20066-20063	6	VC	80	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20067-20061	6	VC	164	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20068-20057	6	VC	340	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20068-20076	6	VC	200	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20069-20066	6	VC	64	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20071-20060	6	VC	272	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20075-20069	6	VC	186	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20081-20092	6	VC	162	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20085-20081	6	VC	90	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20088-20075	6	VC	360	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20088-20095	6	VC	142	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20094-20094	6	VC	218	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20094-20113	6	VC	288	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20113-20113	6	VC	178	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20113-20113	6	VC	167	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20142-20142	6	VC	127	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20142-20144	6	VC	187	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20145-20144	6	VC	349	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20146-20145	6	VC	251	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20146-20148	6	VC	140	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20148-20157	6	VC	209	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20149-20146	6	VC	198	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20149-20155	6	VC	167	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20153-20152	6	VC	303	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20153-20176	6	VC	362	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20154-20153	6	VC	285	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20154-20157	6	VC	204	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20154-20169	6	VC	260	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20155-20166	6	VC	330	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20157-20169	6	VC	352	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20158-20149	6	VC	272	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20160-20174	8	VC	336	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20161-20156	8	AC	145	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20161-20165	8	AC	148	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20162-20161	8	AC	99	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20164-20158	6	VC	268	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20164-20171	6	VC	233	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20165-20181	8	AC	222	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20166-20201	6	VC	420	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20168-20164	6	VC	68	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20171-20163	6	VC	169	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20171-20182	6	VC	138	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20172-20164	6	VC	131	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20174-20176	6	VC	278	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20174-20198	8	VC	223	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20175-20170	8	PVC	271	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20175-20187	8	PVC	501	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20176-20178	6	VC	74	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20177-20162	8	AC	250	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20178-20179	6	VC	221	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20181-20203	8	AC	223	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20182-20194	6	VC	165	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20183-20173	8	PVC	128	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20184-20185	8	PVC	145	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20186-20184	8	PVC	143	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20187-20188	8	PVC	199	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20190-20229	8	AC	332	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20191-20192	8	PVC	211	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20194-20205	6	VC	96	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20198-20236	8	VC	309	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20202-20214	8	PVC	188	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20203-20246	8	AC	362	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20204-20199	6	VC	63	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20205-20252	6	VC	386	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20210-20180	6	VC	274	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20212-20201	6	VC	128	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20217-20219	8	PVC	148	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20217-20244	8	PVC	240	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20218-20191	8	PVC	234	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20218-20227	10	PVC	218	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20222-20225	8	PVC	154	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20223-20187	8	PVC	304	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low

				COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	LOF	Risk	Risk	Risk
20227-20186	8	PVC	341	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20227-20234	10	PVC	230	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20228-20183	8	PVC	406	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20229-20253	8	AC	211	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20230-20248	8	VC	180	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20232-20230	8	VC	180	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20232-20259	8	VC	237	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20234-20242	10	PVC	213	9	3	2	1	15	Medium	0	1	1	1	Low	15	13	2: Low
20236-20266	8	VC	257	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20238-20210	6	VC	229	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20238-20236	8	VC	287	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20238-20239	8	AC	95	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20239-20241	8	AC	124	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20240-20228	8	PVC	116	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20240-20261	8	PVC	259	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20240-20276	8	PVC	290	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20241-20241	8	AC	63	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20241-20241	8	AC	54	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20241-20247	8	AC	163	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20242-20207	8	PVC	299	3	3	2	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20242-20250	10	PVC	226	9	3	2	1	15	Medium	0	1	1	1	Low	15	13	2: Low
20243-20222	8	PVC	189	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20244-20281	8	PVC	304	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20246-20271	8	AC	180	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20247-20254	8	AC	308	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20250-20258	12	PVC	223	9	3	2	1	15	Medium	0	1	1	1	Low	15	13	2: Low
20251-20204	6	VC	384	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20252-20254	6	VC	26	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20253-20282	8	AC	225	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20256-20285	8	PVC	236	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20258-20265	12	PVC	224	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20259-20267	8	VC	148	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20259-20270	8	VC	137	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20262-20226	8	PVC	327	3	1	4	4	12	Medium	0	1	1	1	Low	12	10	2: Low
20262-20291	8	PVC	219	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20264-20231	10	PVC	289	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20265-20277	12	PVC	214	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20266-20304	8	VC	273	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20267-20296	8	VC	208	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20269-20234	8	PVC	301	3	3	2	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20270-20278	8	VC	55	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20271-20287	8	AC	115	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20272-20251	6	VC	146	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20273-20243	8	PVC	244	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20273-20311	8	PVC	285	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20274-20261	8	PVC	136	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20275-20298	8	PVC	191	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20281-20314	8	PVC	224	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20282-20303	8	AC	171	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20283-20328	8	PVC	405	3	3	3	1	10	Medium	0	1	1	1	Low	10	8	2: Low
20284-20277	12	PVC	224	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20286-20238	6	VC	371	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20287-20327	8	AC	298	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20289-20318	8	PVC	199	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20290-20250	8	PVC	311	3	3	2	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20290-20283	8	PVC	125	3	3	2	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20293-20249	10	PVC	338	9	1	4	1	15	Medium	0	1	1	1	Low	15	13	2: Low
20293-20324	8	PVC	256	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20295-20284	12	PVC	221	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20295-20300	12	PVC	235	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20297-20258	8	PVC	303	3	3	2	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20299-20288	8	PVC	94	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20299-20343	8	PVC	329	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20300-20315	12	PVC	210	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20303-20327	8	AC	232	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20304-20312	8	VC	45	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20306-20269	8	PVC	283	3	3	2	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20307-20313	8	AC	219	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20308-20307	8	AC	108	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20308-20310	8	AC	108	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20309-20264	10	PVC	334	9	1	4	1	15	Medium	0	1	1	1	Low	15	13	2: Low
20309-20342	8	PVC	258	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20310-20352	8	AC	302	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20312-20286	6	VC	289	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20313-20316	8	AC	291	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20321-20350	8	PVC	229	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20322-20315	12	PVC	221	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20326-20290	8	PVC	283	3	3	2	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20329-20322	12	PVC	217	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20332-20388	8	PVC	448	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20335-20297	8	PVC	325	3	3	2	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20338-20327	8	AC	104	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low

				COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	LOF	Risk	Risk	Risk
20341-20308	8	AC	248	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20344-20341	8	AC	102	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20344-20346	8	AC	293	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20347-20361	12	AC	139	9	1	2	1	13	Medium	1	3	1	1	Low	13	11	2: Low
20349-20348	8	AC	185	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20351-20349	8	AC	204	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20355-20373	8	PVC	219	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20357-20325	8	PVC	231	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20360-20385	8	PVC	249	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20367-20338	8	AC	261	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20368-20344	8	AC	242	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20370-20351	8	AC	263	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20371-20407	8	PVC	292	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20378-20345	8	PVC	336	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20381-20370	8	AC	131	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20386-20391	8	AC	99	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20391-20399	8	AC	209	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20394-20364	8	PVC	267	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20396-20365	8	PVC	293	3	4	2	1	10	Medium	0	1	1	1	Low	10	8	2: Low
20398-20381	8	AC	142	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20398-20401	8	AC	179	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20399-20402	8	AC	146	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20400-20398	8	AC	116	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20401-20409	8	AC	153	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20402-20368	8	AC	272	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20402-20420	8	AC	132	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20403-20378	8	PVC	191	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20405-20362	8	PVC	367	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20405-20438	8	PVC	242	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20408-20380	8	PVC	230	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20409-20418	8	AC	224	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20411-20387	8	AC	184	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20412-20400	8	AC	76	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20415-20403	8	PVC	195	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20416-20412	8	AC	43	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20417-20375	8	AC	319	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20419-20411	8	AC	326	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20420-20428	8	AC	83	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20424-20451	8	PVC	198	3	4	4	1	12	Medium	0	1	1	1	Low	12	10	2: Low
20426-20393	8	AC	288	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20427-20390	8	PVC	305	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20428-20435	8	AC	62	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20429-20415	8	PVC	234	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20433-20397	8	AC	281	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20435-20436	8	AC	72	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20436-20431	8	AC	81	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20437-20416	8	AC	136	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20443-20429	8	PVC	209	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20446-20437	8	AC	81	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20447-20417	8	AC	213	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20451-20494	8	PVC	381	3	4	2	1	10	Medium	0	1	1	1	Low	10	8	2: Low
20452-20443	8	PVC	138	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20453-20413	8	AC	311	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20454-20446	8	AC	296	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20455-20395	8	PVC	454	3	1	4	1	9	Medium	0	1	1	1	Low	9	8	2: Low
20456-20419	8	AC	300	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20456-20486	8	AC	303	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20457-20414	8	PVC	334	3	4	4	1	12	Medium	0	1	1	1	Low	12	10	2: Low
20459-20454	8	AC	125	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20460-20464	8	AC	44	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20462-20426	8	AC	318	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20464-20493	8	AC	279	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20468-20446	8	AC	186	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20469-20433	8	AC	314	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20470-20441	8	PVC	235	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20470-20463	8	PVC	118	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20472-20447	8	AC	219	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20472-20503	8	AC	238	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20473-20459	8	AC	243	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20474-20472	8	AC	139	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20477-20465	8	AC	210	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20479-20461	8	PVC	317	3	4	2	1	10	Medium	0	1	1	1	Low	10	8	2: Low
20480-20453	8	AC	276	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20480-20483	8	AC	54	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20481-20470	8	PVC	233	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20483-20514	8	AC	293	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20487-20468	8	AC	158	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20487-20477	8	AC	217	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20487-20499	8	AC	239	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20492-20462	8	AC	297	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20493-20522	8	AC	284	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20495-20479	12	PVC	169	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low

				COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	LOF	Risk	Risk	Risk
20495-20509	12	PVC	263	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20497-20481	8	PVC	279	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20502-20524	8	AC	215	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20503-20503	8	AC	149	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20505-20469	8	AC	351	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20509-20517	12	PVC	182	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20512-20487	8	AC	207	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20513-20497	8	PVC	300	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20514-20532	8	AC	137	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20516-20488	8	PVC	260	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20517-20527	12	PVC	138	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20519-20505	8	AC	150	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20522-20549	8	AC	263	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20524-20556	8	AC	305	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20526-20516	8	PVC	126	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20527-20539	12	PVC	167	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20529-20503	8	AC	229	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20536-20561	8	AC	282	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20538-20544	8	AC	214	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20539-20546	12	PVC	178	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20541-20553	8	AC	168	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20544-20557	8	AC	237	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20546-20548	12	PVC	114	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20548-20565	12	PVC	294	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20549-20563	8	AC	133	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20553-20576	8	AC	261	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20554-20529	8	AC	225	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20554-20579	8	AC	315	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20557-20535	8	AC	227	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20557-20570	8	AC	153	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20565-20577	12	PVC	306	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20566-20558	8	PVC	182	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20567-20585	8	AC	224	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20569-20550	8	AC	293	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20571-20551	8	PVC	205	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20571-20566	8	PVC	147	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20572-20575	8	AC	43	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20575-20590	8	AC	278	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20577-20591	12	PVC	321	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20581-20571	8	PVC	196	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20582-20569	8	AC	308	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20584-20599	8	AC	176	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20587-20572	8	AC	153	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20590-20603	8	AC	299	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20592-20581	8	PVC	222	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20593-20610	8	PVC	239	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20597-20582	8	AC	249	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20599-20613	8	AC	222	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20602-20594	8	PVC	208	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20603-20612	8	AC	198	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20606-20579	8	AC	206	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20607-20597	8	AC	131	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20610-20602	8	PVC	212	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20610-20619	8	PVC	163	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20612-20621	8	AC	135	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20612-20623	8	AC	216	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20616-20600	8	AC	239	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20616-20624	8	AC	133	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20618-20638	8	PVC	250	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20622-20606	8	AC	202	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20623-20636	8	AC	222	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20626-20641	12	PVC	220	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20631-20633	8	AC	63	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20633-20616	8	AC	307	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20633-20639	8	AC	170	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20636-20643	8	AC	132	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20638-20620	8	PVC	397	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20638-20644	8	PVC	138	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20641-20652	12	PVC	177	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20642-20640	8	AC	65	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20643-20651	8	AC	125	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20643-20657	8	AC	198	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20644-20654	8	PVC	170	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20646-20663	8	AC	220	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20647-20622	8	AC	270	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20649-20642	8	AC	275	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20652-20666	12	PVC	328	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20653-20628	8	AC	236	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20660-20676	8	PVC	273	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20663-20674	8	AC	105	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20663-20680	8	AC	198	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20666-20681	12	PVC	323	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low

				COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	LOF	Risk	Risk	Risk
20667-20660	12	PVC	217	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20668-20658	8	PVC	277	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20669-20653	8	AC	225	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20669-20665	8	AC	210	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20672-20647	8	AC	313	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20672-20670	8	AC	88	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20674-20687	8	AC	211	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20676-20668	8	PVC	232	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20676-20685	8	PVC	297	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20678-20667	12	PVC	239	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20679-20669	8	AC	116	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20680-20688	8	AC	144	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20681-20692	12	PVC	328	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20684-20678	12	PVC	227	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20684-20698	8	PVC	240	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20686-20679	8	AC	115	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20687-20695	8	AC	159	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20688-20703	8	AC	241	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20689-20698	8	PVC	259	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20690-20672	8	AC	250	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20691-20683	8	AC	115	3	1	2	1	7	Low	3	3	3	3	Medium	21	18	2: Low
20693-20684	12	PVC	215	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20694-20686	8	AC	159	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20695-20706	8	AC	152	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20698-20704	8	PVC	148	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20699-20690	8	AC	154	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20701-20693	12	PVC	217	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20703-20710	8	AC	150	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20705-20692	12	PVC	240	9	1	2	1	13	Medium	0	1	1	1	Low	13	11	2: Low
20708-20696	8	AC	196	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20709-20717	8	PVC	232	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20710-20716	8	AC	172	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20713-20707	8	PVC	174	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20715-20702	6	VC	248	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20717-20713	8	PVC	237	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20717-20726	8	PVC	231	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20718-20708	8	AC	205	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20723-20724	6	VC	91	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20724-20737	6	VC	324	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20725-20718	8	AC	139	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20726-20732	8	PVC	275	3	1	2	4	10	Medium	0	1	1	1	Low	10	8	2: Low
20728-20715	6	VC	301	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20729-20723	6	VC	162	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20729-20735	6	VC	145	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20731-20725	8	AC	137	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20733-20733	6	VC	127	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20733-20733	6	VC	211	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20733-20769	6	VC	414	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20735-20742	6	VC	263	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20737-20741	6	VC	139	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20738-20729	6	VC	204	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20741-20741	6	VC	63	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20741-20747	6	VC	189	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20742-20737	6	VC	92	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20743-20738	6	VC	174	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20746-20728	6	VC	304	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20747-20752	8	VC	63	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20748-20750	6	VC	220	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20749-20750	6	VC	118	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20750-20771	6	VC	327	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20751-20738	6	VC	208	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20752-20749	6	VC	67	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20754-20783	6	VC	421	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20755-20748	6	VC	192	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20756-20742	6	VC	186	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20756-20743	6	VC	293	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20758-20753	6	VC	114	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20760-20755	6	VC	46	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20763-20751	6	VC	229	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20765-20776	6	VC	180	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20768-20756	6	VC	211	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20768-20758	6	VC	307	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20769-20769	6	VC	85	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20769-20769	6	VC	206	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20769-20805	6	VC	368	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20771-20760	6	VC	292	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20771-20784	6	VC	193	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20773-20767	6	VC	136	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20775-20765	6	VC	189	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20776-20801	6	VC	310	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20778-20768	6	VC	150	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20778-20785	6	VC	137	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low

				COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	LOF	Risk	Risk	Risk
20780-20804	6	VC	421	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20782-20763	6	VC	216	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20782-20787	6	VC	194	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20783-20771	6	VC	248	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20783-20797	6	VC	226	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20784-20775	6	VC	192	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20784-20799	6	VC	195	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20785-20773	6	VC	332	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20785-20802	6	VC	204	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20787-20802	6	VC	254	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20788-20782	6	VC	103	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20789-20783	6	VC	167	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20792-20792	6	VC	179	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20793-20789	6	VC	100	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20793-20791	6	VC	34	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20794-20786	6	VC	200	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20794-20791	6	VC	50	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20797-20798	6	VC	383	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20800-20804	6	VC	179	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20801-20800	6	VC	43	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20802-20807	6	VC	234	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20805-20792	6	VC	281	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20805-20805	6	VC	144	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20805-20814	6	VC	191	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20805-20821	6	VC	328	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20806-20789	6	VC	321	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20807-20808	6	VC	41	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20808-20788	6	VC	370	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20813-20811	6	VC	23	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20813-20813	6	VC	62	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20814-20790	6	VC	407	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20816-20805	6	VC	265	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20822-20798	6	VC	222	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20822-20806	6	VC	350	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20825-20822	6	VC	228	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20826-20825	6	VC	43	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20827-20826	8	VC	171	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20828-20822	6	VC	155	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20828-20828	6	VC	103	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20828-20828	6	VC	48	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20833-20841	6	VC	356	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20833-20842	6	VC	555	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20838-20840	8	AC	72	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20841-20844	6	VC	287	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20842-20842	6	VC	290	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20842-20848	6	VC	289	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20850-20862	6	VC	531	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20856-20859	6	VC	208	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20857-20861	6	VC	178	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20859-20856	8	VC	275	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20859-20873	8	VC	376	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20859-20875	6	VC	333	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20861-20860	6	VC	152	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20861-20862	6	VC	234	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20862-20863	6	VC	281	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20863-20859	8	VC	108	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20872-20863	8	VC	169	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20874-20880	6	VC	113	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20876-20876	6	VC	53	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20880-20879	6	VC	86	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20880-20882	6	VC	203	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20882-20872	8	VC	248	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20882-20883	6	VC	71	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20882-20895	6	VC	285	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20887-20884	8	VC	152	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20888-20884	6	VC	25	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20892-20901	6	VC	195	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20895-20900	6	VC	155	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20901-20904	6	VC	122	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20904-20908	6	VC	178	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20908-20911	6	VC	84	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20921-20916	6	VC	117	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20921-20917	6	VC	147	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20923-20920	8	VC	102	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20924-20923	8	VC	73	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20925-20924	8	VC	103	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20929-20930	6	VC	164	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20930-20932	6	VC	230	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20945-20944	8	AC	253	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20952-20951	6	VC	266	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20960-20961	6	VC	82	3	1	2	1	7	Low	3	3	3	3	Medium	21	18	2: Low
20963-20962	10	VC	23	0	1	0	0	1	Low	0	3	3	3	Medium	3	3	2: Low

				COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	LOF	Risk	Risk	Risk
20968-20969	6	VC	117	3	1	2	4	10	Medium	1	3	1	1	Low	10	8	2: Low
20975-20977	6	VC	106	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20978-20977	6	VC	207	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20980-20979	8	AC	40	3	1	4	4	12	Medium	1	3	1	1	Low	12	10	2: Low
20981-20978	6	VC	228	3	1	2	1	7	Low	0	3	3	3	Medium	21	18	2: Low
20983-30008	8	VC	129	0	1	0	0	1	Low	0	3	3	3	Medium	3	3	2: Low
20985-20984	6	VC	70	3	1	2	1	7	Low	2	3	2	2	Medium	14	12	2: Low
20986-20983	8	VC	217	3	1	3	4	11	Medium	1	3	1	1	Low	11	9	2: Low
20987-20988	6	VC	138	3	1	2	1	7	Low	2	3	2	2	Medium	14	12	2: Low
30008-20979	8	VC	256	0	1	0	0	1	Low	0	3	3	3	Medium	3	3	2: Low
20073-20074	8	PVC	55	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20074-20077	8	PVC	112	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20076-20087	8	PVC	271	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20077-20086	8	PVC	286	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20082-20087	8	PVC	39	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20086-20093	8	PVC	179	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20087-20085	8	PVC	133	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20090-20082	8	PVC	122	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20093-20098	8	PVC	148	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20096-20090	8	PVC	201	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20098-20101	8	PVC	200	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20099-20096	8	PVC	114	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20101-20106	8	PVC	284	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20102-20103	8	PVC	78	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20104-20099	8	PVC	221	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20105-20102	8	PVC	152	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20106-20104	8	PVC	182	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20106-20109	8	PVC	132	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20109-20111	8	PVC	124	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20110-20105	5	PVC	378	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20111-20112	8	PVC	93	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20112-20110	8	PVC	99	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20188-20189	8	PVC	239	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20189-20193	8	PVC	169	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20197-20200	8	PVC	130	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20197-20255	8	PVC	488	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20207-20196	8	PVC	93	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20207-20216	8	PVC	230	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20216-20206	8	PVC	70	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20216-20235	8	PVC	165	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20218-20213	8	PVC	130	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20220-20257	8	PVC	314	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20224-20208	8	PVC	209	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20227-20263	8	PVC	324	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20234-20209	8	PVC	227	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20237-20211	8	PVC	224	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20237-20265	8	PVC	253	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20255-20284	8	PVC	236	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20257-20295	8	PVC	294	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20258-20223	8	PVC	305	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20260-20224	8	PVC	328	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20263-20305	8	PVC	318	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20268-20215	8	PVC	466	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20277-20320	8	PVC	308	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20279-20275	8	PVC	117	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20279-20292	8	PVC	106	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20285-20289	8	PVC	29	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20285-20302	8	PVC	239	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20288-20268	8	PVC	148	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20289-20279	8	PVC	103	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20300-20260	8	PVC	316	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20300-20339	8	PVC	297	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20301-20265	8	PVC	277	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20302-20317	8	PVC	227	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20315-20276	8	PVC	291	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20317-20323	8	PVC	216	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20319-20284	8	PVC	239	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20320-20356	8	PVC	289	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20323-20331	8	PVC	223	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20329-20294	8	PVC	285	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20329-20334	8	PVC	169	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20330-20295	8	PVC	299	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20331-20336	8	PVC	163	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20337-20301	8	PVC	285	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20339-20369	8	PVC	271	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20340-20333	8	PVC	133	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20343-20354	8	PVC	216	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20353-20315	8	PVC	294	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20353-20377	8	PVC	272	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20354-20359	8	PVC	226	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20358-20319	8	PVC	316	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20359-20366	8	PVC	334	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible

				COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	LOF	Risk	Risk	Risk
20362-20340	8	PVC	212	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20363-20330	8	PVC	281	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20365-20329	8	PVC	326	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20373-20404	8	PVC	249	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20378-20374	8	PVC	122	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20385-20421	8	PVC	282	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20407-20448	8	PVC	305	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20430-20394	8	PVC	274	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20438-20467	8	PVC	247	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20441-20408	8	PVC	255	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20466-20427	8	PVC	320	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20467-20498	8	PVC	270	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20484-20475	8	PVC	224	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20485-20455	8	PVC	273	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20488-20457	8	PVC	277	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20494-20523	8	PVC	254	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20495-20484	8	PVC	195	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20517-20489	8	PVC	255	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20525-20510	8	PVC	267	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20531-20495	8	PVC	310	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20531-20525	8	PVC	112	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20539-20507	8	PVC	257	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20545-20531	8	PVC	131	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20547-20540	8	PVC	172	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20548-20518	8	PVC	287	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20551-20517	8	PVC	313	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20551-20547	8	PVC	158	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20564-20551	8	PVC	236	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20565-20534	8	PVC	321	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20565-20593	8	PVC	315	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20574-20564	8	PVC	243	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20577-20560	8	PVC	192	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20586-20578	8	PVC	162	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20593-20586	8	PVC	164	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20598-20589	8	PVC	79	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20604-20588	8	PVC	182	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20605-20593	8	PVC	298	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20615-20608	8	PVC	125	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20615-20626	8	PVC	182	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20617-20598	8	PVC	249	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20618-20601	8	PVC	213	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20618-20605	8	PVC	332	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20626-20660	8	PVC	348	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20627-20615	8	PVC	326	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20632-20618	8	PVC	328	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20640-20646	8	AC	128	3	1	2	1	7	Low	1	3	1	1	Low	7	6	1: Negligible
20645-20627	8	PVC	342	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20648-20635	8	PVC	265	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20648-20637	8	PVC	123	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20648-20660	8	PVC	231	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20655-20646	8	AC	113	3	1	2	1	7	Low	1	3	1	1	Low	7	6	1: Negligible
20659-20648	8	PVC	114	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20661-20650	8	PVC	274	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20662-20655	8	AC	151	3	1	2	1	7	Low	1	3	1	1	Low	7	6	1: Negligible
20666-20650	8	PVC	243	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20666-20673	8	PVC	102	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20677-20661	8	PVC	282	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20682-20675	8	PVC	115	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20683-20662	8	AC	266	3	1	2	1	7	Low	1	3	1	1	Low	7	6	1: Negligible
20692-20682	8	PVC	229	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20692-20700	8	PVC	149	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20705-20711	8	PVC	163	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20709-20701	8	PVC	220	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20714-20705	8	PVC	232	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20714-20719	8	PVC	164	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20720-20709	8	PVC	287	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20722-20714	8	PVC	248	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20722-20727	8	PVC	128	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20730-20720	8	PVC	270	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20873-20875	6	PVC	61	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20875-20885	6	PVC	212	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible
20885-20896	6	PVC	193	3	1	2	1	7	Low	0	1	1	1	Low	7	6	1: Negligible

SEWER MANHOLE RISK ASSESSMENT

GIS ID	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
	Diameter	Critical Facilities	Road Classification	Water Resources	Total Score	By Grading	MH Inspection	Pipe Material	Multi-Combined	Total Score	By Grading	Total	Normalized	By Grading
20005	4	8	4	5	21	High	4	3	4	4	High	84	100	5: Extreme
20414	4	10	1	4	19	High	0	4	4	4	High	76	90	5: Extreme
20432	4	10	1	4	19	High	0	4	4	4	High	76	90	5: Extreme
20449	4	10	1	4	19	High	0	4	4	4	High	76	90	5: Extreme
30001	3	10	4	1	18	High	0	4	4	4	High	72	86	5: Extreme
30002	3	10	4	1	18	High	0	4	4	4	High	72	86	5: Extreme
20065	4	8	1	4	17	High	4	3	4	4	High	68	81	5: Extreme
20122	2	10	4	1	17	High	4	4	4	4	High	68	81	5: Extreme
20245	4	10	1	1	16	High	4	4	4	4	High	64	76	5: Extreme
20256	4	10	1	1	16	High	0	4	4	4	High	64	76	5: Extreme
20273	4	10	1	1	16	High	4	4	4	4	High	64	76	5: Extreme
20293	4	10	1	1	16	High	0	4	4	4	High	64	76	5: Extreme
20325	4	10	1	1	16	High	0	4	4	4	High	64	76	5: Extreme
20332	4	10	1	1	16	High	0	4	4	4	High	64	76	5: Extreme
20355	4	10	1	1	16	High	0	4	4	4	High	64	76	5: Extreme
20364	4	10	1	1	16	High	0	4	4	4	High	64	76	5: Extreme
20380	4	10	1	1	16	High	0	4	4	4	High	64	76	5: Extreme
20390	4	10	1	1	16	High	0	4	4	4	High	64	76	5: Extreme
20405	4	10	1	1	16	High	0	4	4	4	High	64	76	5: Extreme
20458	4	10	1	1	16	High	0	4	4	4	High	64	76	5: Extreme
20490	4	10	1	1	16	High	0	4	4	4	High	64	76	5: Extreme
20508	4	10	1	1	16	High	0	4	4	4	High	64	76	5: Extreme
20542	4	10	1	1	16	High	0	4	4	4	High	64	76	5: Extreme
20543	4	10	1	1	16	High	0	4	4	4	High	64	76	5: Extreme
20552	4	10	1	1	16	High	0	4	4	4	High	64	76	5: Extreme
20004	4	8	4	5	21	High	0	3	3	3	High	63	75	5: Extreme
20008	4	8	4	5	21	High	0	3	3	3	High	63	75	5: Extreme
20803	3	10	1	1	15	High	4	3	4	4	High	60	71	5: Extreme
20962	4	6	4	1	15	High	4	3	4	4	High	60	71	5: Extreme
20963	4	6	4	1	15	High	4	3	4	4	High	60	71	5: Extreme
20016	4	10	4	1	19	High	3	3	3	3	High	57	68	5: Extreme
20126	4	10	4	1	19	High	3	4	3	3	High	57	68	5: Extreme
20127	4	10	4	1	19	High	3	4	3	3	High	57	68	5: Extreme
20129	4	10	4	1	19	High	3	4	3	3	High	57	68	5: Extreme
20130	4	10	4	1	19	High	3	4	3	3	High	57	68	5: Extreme
20147	4	10	4	1	19	High	3	4	3	3	High	57	68	5: Extreme
20195	4	10	4	1	19	High	3	4	3	3	High	57	68	5: Extreme
20072	4	8	1	4	17	High	0	3	3	3	High	51	61	5: Extreme
20927	4	8	1	4	17	High	0	3	3	3	High	51	61	5: Extreme
20934	4	8	1	4	17	High	0	3	3	3	High	51	61	5: Extreme
20022	4	10	1	1	16	High	0	3	3	3	High	48	57	5: Extreme
20221	4	10	1	1	16	High	3	4	3	3	High	48	57	5: Extreme
20299	4	10	1	1	16	High	3	4	3	3	High	48	57	5: Extreme
20309	4	10	1	1	16	High	3	4	3	3	High	48	57	5: Extreme
20371	4	10	1	1	16	High	3	4	3	3	High	48	57	5: Extreme
20580	4	10	1	1	16	High	3	4	3	3	High	48	57	5: Extreme
20596	4	10	1	1	16	High	3	1	3	3	High	48	57	5: Extreme
20614	4	10	1	1	16	High	3	1	3	3	High	48	57	5: Extreme
20630	4	10	1	1	16	High	3	1	3	3	High	48	57	5: Extreme
20656	4	10	1	1	16	High	3	1	3	3	High	48	57	5: Extreme
20664	4	10	1	1	16	High	3	1	3	3	High	48	57	5: Extreme
20671	4	10	1	1	16	High	3	1	3	3	High	48	57	5: Extreme
20010	4	2	4	5	15	High	0	3	3	3	High	45	54	5: Extreme
20423	2	8	4	1	15	High	0	3	3	3	High	45	54	5: Extreme

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20434	2	8	4	1	15	High	0	3	3	3	High	45	54	5: Extreme
20442	2	8	4	1	15	High	0	3	3	3	High	45	54	5: Extreme
20496	2	8	4	1	15	High	0	3	3	3	High	45	54	5: Extreme
20504	2	8	4	1	15	High	0	3	3	3	High	45	54	5: Extreme
20515	2	8	4	1	15	High	0	3	3	3	High	45	54	5: Extreme
20521	2	8	4	1	15	High	0	3	3	3	High	45	54	5: Extreme
20535	2	8	4	1	15	High	0	3	3	3	High	45	54	5: Extreme
20757	3	10	1	1	15	High	3	3	3	3	High	45	54	5: Extreme
20837	4	6	4	1	15	High	0	3	3	3	High	45	54	5: Extreme
20846	4	6	4	1	15	High	0	3	3	3	High	45	54	5: Extreme
20869	5	8	1	1	15	High	0	3	3	3	High	45	54	5: Extreme
20881	5	8	1	1	15	High	0	3	3	3	High	45	54	5: Extreme
20890	5	8	1	1	15	High	0	3	3	3	High	45	54	5: Extreme
20897	5	8	1	1	15	High	0	3	3	3	High	45	54	5: Extreme
20903	5	8	1	1	15	High	0	3	3	3	High	45	54	5: Extreme
20905	5	8	1	1	15	High	0	3	3	3	High	45	54	5: Extreme
20906	5	8	1	1	15	High	0	3	3	3	High	45	54	5: Extreme
20907	5	8	1	1	15	High	0	3	3	3	High	45	54	5: Extreme
20967	4	6	4	1	15	High	3	3	3	3	High	45	54	5: Extreme
20972	4	6	4	1	15	High	3	3	3	3	High	45	54	5: Extreme
20976	4	6	4	1	15	High	3	3	3	3	High	45	54	5: Extreme
20979	4	6	4	1	15	High	3	3	3	3	High	45	54	5: Extreme
20045	4	8	1	1	14	High	0	3	3	3	High	42	50	5: Extreme
20052	4	8	1	1	14	High	3	3	3	3	High	42	50	5: Extreme
20847	3	6	4	1	14	High	0	3	3	3	High	42	50	5: Extreme
20849	3	6	4	1	14	High	0	3	3	3	High	42	50	5: Extreme
20909	4	8	1	1	14	High	0	3	3	3	High	42	50	5: Extreme
20912	4	8	1	1	14	High	0	3	3	3	High	42	50	5: Extreme
20922	4	8	1	1	14	High	0	3	3	3	High	42	50	5: Extreme
20116	2	6	4	1	13	High	0	3	3	3	High	39	46	5: Extreme
20119	2	6	4	1	13	High	0	3	3	3	High	39	46	5: Extreme
20132	2	6	4	1	13	High	0	3	3	3	High	39	46	5: Extreme
20133	2	6	4	1	13	High	0	3	3	3	High	39	46	5: Extreme
20135	2	6	4	1	13	High	0	3	3	3	High	39	46	5: Extreme
20137	2	6	4	1	13	High	0	3	3	3	High	39	46	5: Extreme
20139	2	6	4	1	13	High	0	3	3	3	High	39	46	5: Extreme
20140	2	6	4	1	13	High	0	3	3	3	High	39	46	5: Extreme
20482	2	6	4	1	13	High	0	3	3	3	High	39	46	5: Extreme
20491	2	6	4	1	13	High	0	3	3	3	High	39	46	5: Extreme
20492	2	6	4	1	13	High	0	3	3	3	High	39	46	5: Extreme
20501	2	6	4	1	13	High	0	3	3	3	High	39	46	5: Extreme
20506	2	6	4	1	13	High	3	3	3	3	High	39	46	5: Extreme
20511	2	6	4	1	13	High	0	3	3	3	High	39	46	5: Extreme
20625	2	6	4	1	13	High	3	3	3	3	High	39	46	5: Extreme
20834	5	6	1	1	13	High	0	3	3	3	High	39	46	5: Extreme
20835	5	6	1	1	13	High	0	3	3	3	High	39	46	5: Extreme
20836	5	6	1	1	13	High	0	3	3	3	High	39	46	5: Extreme
20839	5	6	1	1	13	High	0	3	3	3	High	39	46	5: Extreme
20845	5	6	1	1	13	High	0	3	3	3	High	39	46	5: Extreme
20877	3	8	1	1	13	High	0	3	3	3	High	39	46	5: Extreme
20891	3	8	1	1	13	High	0	3	3	3	High	39	46	5: Extreme
20078	4	6	1	1	12	Medium	4	3	4	4	High	48	57	4: High
20006	3	8	4	5	20	High	2	3	2	2	Medium	40	48	4: High
20017	4	10	4	1	19	High	2	2	2	2	Medium	38	45	4: High
20020	4	10	4	1	19	High	0	2	2	2	Medium	38	45	4: High
20128	4	10	4	1	19	High	2	4	2	2	Medium	38	45	4: High

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20134	4	10	4	1	19	High	2	4	2	2	Medium	38	45	4: High
20136	4	10	4	1	19	High	2	4	2	2	Medium	38	45	4: High
20138	4	10	4	1	19	High	2	4	2	2	Medium	38	45	4: High
20141	4	10	4	1	19	High	2	4	2	2	Medium	38	45	4: High
20143	4	10	4	1	19	High	2	4	2	2	Medium	38	45	4: High
20150	4	10	4	1	19	High	2	4	2	2	Medium	38	45	4: High
20159	4	10	4	1	19	High	2	4	2	2	Medium	38	45	4: High
20167	4	10	4	1	19	High	2	4	2	2	Medium	38	45	4: High
20444	4	10	1	4	19	High	2	4	2	2	Medium	38	45	4: High
20125	3	10	4	1	18	High	2	4	2	2	Medium	36	43	4: High
20460	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20471	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20533	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20562	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20818	4	2	1	5	12	Medium	0	3	3	3	High	36	43	4: High
20824	4	2	1	5	12	Medium	0	3	3	3	High	36	43	4: High
20848	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20852	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20856	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20858	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20864	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20865	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20866	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20867	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20868	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20871	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20878	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20884	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20886	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20889	2	8	1	1	12	Medium	0	3	3	3	High	36	43	4: High
20058	4	8	1	4	17	High	2	3	2	2	Medium	34	40	4: High
20131	2	10	4	1	17	High	2	4	2	2	Medium	34	40	4: High
20000	4	2	4	1	11	Medium	0	3	3	3	High	33	39	4: High
20001	4	2	4	1	11	Medium	0	3	3	3	High	33	39	4: High
20002	4	2	4	1	11	Medium	0	3	3	3	High	33	39	4: High
20151	3	6	1	1	11	Medium	0	3	3	3	High	33	39	4: High
20843	3	6	1	1	11	Medium	0	3	3	3	High	33	39	4: High
20851	3	6	1	1	11	Medium	0	3	3	3	High	33	39	4: High
20853	3	6	1	1	11	Medium	0	3	3	3	High	33	39	4: High
20854	3	6	1	1	11	Medium	0	3	3	3	High	33	39	4: High
20855	3	6	1	1	11	Medium	0	3	3	3	High	33	39	4: High
20928	4	2	1	4	11	Medium	0	3	3	3	High	33	39	4: High
20935	4	2	1	4	11	Medium	0	3	3	3	High	33	39	4: High
20262	4	10	1	1	16	High	2	4	2	2	Medium	32	38	4: High
20281	4	10	1	1	16	High	2	4	2	2	Medium	32	38	4: High
20345	4	10	1	1	16	High	2	4	2	2	Medium	32	38	4: High
20476	4	10	1	1	16	High	2	4	2	2	Medium	32	38	4: High
20520	4	10	1	1	16	High	2	4	2	2	Medium	32	38	4: High
20568	4	10	1	1	16	High	2	4	2	2	Medium	32	38	4: High
20697	4	10	1	1	16	High	2	1	2	2	Medium	32	38	4: High
20712	4	10	1	1	16	High	2	1	2	2	Medium	32	38	4: High
20744	4	10	1	1	16	High	2	1	2	2	Medium	32	38	4: High
20774	4	10	1	1	16	High	2	3	2	2	Medium	32	38	4: High
20003	2	2	1	5	10	Medium	0	3	3	3	High	30	36	4: High
20083	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20088	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20111	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20114	3	2	4	1	10	Medium	0	3	3	3	High	30	36	4: High
20142	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20152	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20160	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20392	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20440	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20445	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20446	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20456	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20469	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20480	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20500	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20541	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20550	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20555	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20567	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20572	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20573	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20584	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20595	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20600	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20611	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20629	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20752	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20754	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20761	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20764	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20770	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20779	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20791	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20796	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20809	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20812	2	2	1	5	10	Medium	0	3	3	3	High	30	36	4: High
20815	2	2	1	5	10	Medium	0	3	3	3	High	30	36	4: High
20817	2	2	1	5	10	Medium	0	3	3	3	High	30	36	4: High
20819	2	2	1	5	10	Medium	0	3	3	3	High	30	36	4: High
20820	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20823	2	2	1	5	10	Medium	0	3	3	3	High	30	36	4: High
20826	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20832	2	2	1	5	10	Medium	0	3	3	3	High	30	36	4: High
20838	2	6	1	1	10	Medium	0	3	3	3	High	30	36	4: High
20931	3	2	4	1	10	Medium	0	3	3	3	High	30	36	4: High
20941	3	2	1	4	10	Medium	0	3	3	3	High	30	36	4: High
20965	4	6	4	1	15	High	2	3	2	2	Medium	30	36	4: High
20970	4	6	4	1	15	High	2	3	2	2	Medium	30	36	4: High
20971	4	6	4	1	15	High	2	3	2	2	Medium	30	36	4: High
20973	4	6	4	1	15	High	2	3	2	2	Medium	30	36	4: High
20974	4	6	4	1	15	High	2	3	2	2	Medium	30	36	4: High
20986	3	2	4	1	10	Medium	3	3	3	3	High	30	36	4: High
30008	3	2	4	1	10	Medium	3	3	3	3	High	30	36	4: High
20721	2	10	1	1	14	High	2	3	2	2	Medium	28	33	4: High
20811	2	10	1	1	14	High	2	3	2	2	Medium	28	33	4: High
20018	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20062	2	2	1	4	9	Medium	0	3	3	3	High	27	32	4: High
20064	2	2	1	4	9	Medium	0	3	3	3	High	27	32	4: High

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20070	2	2	1	4	9	Medium	0	3	3	3	High	27	32	4: High
20079	2	2	1	4	9	Medium	0	3	3	3	High	27	32	4: High
20080	2	2	1	4	9	Medium	0	3	3	3	High	27	32	4: High
20117	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20118	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20121	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20124	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20226	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20233	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20372	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20376	2	2	1	4	9	Medium	0	3	3	3	High	27	32	4: High
20379	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20382	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20383	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20384	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20389	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20406	2	2	1	4	9	Medium	0	3	3	3	High	27	32	4: High
20410	2	2	1	4	9	Medium	0	3	3	3	High	27	32	4: High
20439	2	2	1	4	9	Medium	0	3	3	3	High	27	32	4: High
20910	5	2	1	1	9	Medium	0	3	3	3	High	27	32	4: High
20914	5	2	1	1	9	Medium	0	3	3	3	High	27	32	4: High
20919	5	2	1	1	9	Medium	0	3	3	3	High	27	32	4: High
20926	2	2	1	4	9	Medium	0	3	3	3	High	27	32	4: High
20936	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20937	2	2	1	4	9	Medium	0	3	3	3	High	27	32	4: High
20939	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20940	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20942	2	2	4	1	9	Medium	0	3	3	3	High	27	32	4: High
20425	2	6	4	1	13	High	2	3	2	2	Medium	26	31	4: High
20450	2	6	4	1	13	High	2	3	2	2	Medium	26	31	4: High
20478	2	6	4	1	13	High	2	3	2	2	Medium	26	31	4: High
20537	2	6	4	1	13	High	2	3	2	2	Medium	26	31	4: High
20559	2	6	4	1	13	High	2	3	2	2	Medium	26	31	4: High
20583	2	6	4	1	13	High	2	3	2	2	Medium	26	31	4: High
20609	2	6	4	1	13	High	2	3	2	2	Medium	26	31	4: High
20634	2	6	4	1	13	High	2	3	2	2	Medium	26	31	4: High
20968	2	6	4	1	13	High	2	3	2	2	Medium	26	31	4: High
20091	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20097	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20100	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20107	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20108	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20115	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20736	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20739	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20745	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20759	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20762	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20766	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20781	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20795	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20810	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20829	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20830	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20831	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20943	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20946	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20947	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20949	4	2	1	1	8	Medium	0	3	3	3	High	24	29	4: High
20950	4	2	1	1	8	Medium	3	3	3	3	High	24	29	4: High
20089	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20092	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20168	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20199	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20272	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20278	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20280	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20734	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20740	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20748	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20772	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20777	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20840	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20844	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20859	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20870	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20883	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20893	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20894	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20898	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20899	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20902	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20913	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20915	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20916	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20918	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20948	3	2	1	1	7	Medium	0	3	3	3	High	21	25	4: High
20120	4	0	1	1	6	Low	0	4	4	4	High	24	29	3: Medium
20956	4	2	4	1	11	Medium	2	3	2	2	Medium	22	26	3: Medium
20957	4	2	4	1	11	Medium	2	3	2	2	Medium	22	26	3: Medium
20959	4	2	4	1	11	Medium	2	3	2	2	Medium	22	26	3: Medium
30006	4	2	4	1	11	Medium	2	3	2	2	Medium	22	26	3: Medium
30007	4	2	4	1	11	Medium	2	3	2	2	Medium	22	26	3: Medium
20123	3	0	1	1	5	Low	0	4	4	4	High	20	24	3: Medium
20327	2	6	1	1	10	Medium	2	3	2	2	Medium	20	24	3: Medium
20347	2	6	1	1	10	Medium	2	3	2	2	Medium	20	24	3: Medium
20361	2	6	1	1	10	Medium	2	3	2	2	Medium	20	24	3: Medium
20640	2	6	1	1	10	Medium	2	3	2	2	Medium	20	24	3: Medium
20958	3	2	4	1	10	Medium	2	3	2	2	Medium	20	24	3: Medium
20983	3	2	4	1	10	Medium	2	3	2	2	Medium	20	24	3: Medium
20015	4	10	4	1	19	High	0	1	1	1	Low	19	23	3: Medium
20424	4	10	1	4	19	High	1	4	1	1	Low	19	23	3: Medium
20019	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20021	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20023	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20024	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20025	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20026	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20027	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20028	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20029	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20030	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20031	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20032	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20033	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20034	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20035	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20036	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20037	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20038	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20039	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20040	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20041	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20042	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20043	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20044	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20046	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20047	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20048	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20049	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20050	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20051	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20053	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20054	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20055	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20056	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20057	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20059	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20060	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20061	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20063	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20066	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20067	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20068	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20069	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20071	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20075	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20076	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20081	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20084	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20085	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20094	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20095	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20113	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20144	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20145	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20146	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20148	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20149	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20153	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20155	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20156	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20157	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20158	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20161	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20162	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20163	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20164	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20165	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20166	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20169	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20171	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20172	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20174	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20176	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20177	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20178	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20179	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20180	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20181	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20182	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20190	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20194	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20198	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20201	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20203	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20204	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20205	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20210	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20212	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20229	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20230	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20232	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20236	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20238	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20239	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20241	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20246	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20247	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20248	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20251	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20252	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20253	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20254	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20259	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20266	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20267	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20270	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20271	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20282	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20286	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20287	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20296	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20303	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20304	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20307	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20308	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20310	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20312	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20313	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20316	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20338	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20341	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20344	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20346	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20348	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20349	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20351	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20352	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20367	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20368	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20370	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20375	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20381	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20386	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20387	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20391	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20393	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20397	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20398	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20399	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20400	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20401	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20402	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20409	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20411	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20412	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20413	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20416	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20417	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20418	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20419	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20420	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20422	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20426	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20428	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20431	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20433	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20435	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20436	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20437	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20447	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20453	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20454	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20459	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20462	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20464	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20465	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20468	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20472	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20473	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20474	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20477	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20483	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20486	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20487	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20493	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20499	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20502	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20503	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20505	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20512	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20514	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20519	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20522	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20524	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20529	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20530	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20532	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20536	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20538	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20544	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20549	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20553	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20554	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20556	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20557	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20561	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20563	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20569	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20570	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20575	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20576	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20579	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20582	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20585	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20587	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20590	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20597	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20599	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20603	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20606	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20607	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20612	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20613	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20616	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20621	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20622	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20623	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20624	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20628	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20631	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20633	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20636	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20639	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20642	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20643	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20647	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20649	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20651	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20653	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20657	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20663	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20665	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20669	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20670	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20672	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20674	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20679	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20680	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20683	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20686	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20687	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20690	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20694	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20695	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20696	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20699	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20702	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20703	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20706	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20708	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20710	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20715	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20716	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20718	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20723	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20724	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20725	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20728	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20729	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20731	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20733	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20735	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20737	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20738	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20741	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20742	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20743	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20746	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20747	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20749	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20750	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20751	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20753	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20755	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20756	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20758	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20760	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20763	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20765	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20767	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20768	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20769	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20771	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20773	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20775	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20776	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20778	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20780	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20782	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20783	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20784	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20785	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20786	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20787	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20788	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20789	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20790	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20792	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20793	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20794	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20797	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20798	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20799	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20800	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20801	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20802	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20804	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20805	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20807	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20808	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20813	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20814	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20816	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20821	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20822	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20825	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20827	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20828	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20833	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20841	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20842	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20850	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20857	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20860	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20861	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20862	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20863	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20872	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20874	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20875	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20879	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20880	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20882	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20887	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20888	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20892	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20895	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20900	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20901	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20904	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20908	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20911	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20917	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20920	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20921	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20923	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20924	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20925	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20929	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20930	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20932	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20933	2	2	1	4	9	Medium	2	3	2	2	Medium	18	21	3: Medium
20938	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20944	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20945	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20951	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20952	2	2	1	1	6	Low	0	3	3	3	High	18	21	3: Medium
20955	2	2	4	1	9	Medium	2	3	2	2	Medium	18	21	3: Medium
20980	2	2	4	1	9	Medium	2	3	2	2	Medium	18	21	3: Medium
20985	2	2	1	1	6	Low	3	3	3	3	High	18	21	3: Medium
20987	2	2	1	1	6	Low	3	3	3	3	High	18	21	3: Medium
20988	2	2	1	1	6	Low	3	3	3	3	High	18	21	3: Medium
20012	4	8	4	1	17	High	0	1	1	1	Low	17	20	3: Medium
20014	4	8	4	1	17	High	0	1	1	1	Low	17	20	3: Medium
20321	4	10	1	1	16	High	1	4	1	1	Low	16	19	3: Medium
20360	4	10	1	1	16	High	1	4	1	1	Low	16	19	3: Medium
20395	4	10	1	1	16	High	1	4	1	1	Low	16	19	3: Medium
20953	4	2	1	1	8	Medium	2	3	2	2	Medium	16	19	3: Medium
20969	3	2	1	1	7	Medium	2	3	2	2	Medium	14	17	3: Medium
20975	3	2	1	1	7	Medium	2	3	2	2	Medium	14	17	3: Medium
20981	3	2	1	1	7	Medium	2	3	2	2	Medium	14	17	3: Medium
20202	2	6	4	1	13	High	0	1	1	1	Low	13	15	3: Medium
20154	2	2	1	1	6	Low	2	3	2	2	Medium	12	14	2: Low
20242	2	6	1	3	12	Medium	0	1	1	1	Low	12	14	2: Low
20250	2	6	1	3	12	Medium	0	1	1	1	Low	12	14	2: Low
20591	2	8	1	1	12	Medium	0	1	1	1	Low	12	14	2: Low
20604	2	8	1	1	12	Medium	0	1	1	1	Low	12	14	2: Low
20617	2	8	1	1	12	Medium	0	1	1	1	Low	12	14	2: Low
20626	2	8	1	1	12	Medium	0	1	1	1	Low	12	14	2: Low
20646	2	2	1	1	6	Low	2	3	2	2	Medium	12	14	2: Low
20655	2	2	1	1	6	Low	2	3	2	2	Medium	12	14	2: Low
20662	2	2	1	1	6	Low	2	3	2	2	Medium	12	14	2: Low
20688	2	2	1	1	6	Low	2	3	2	2	Medium	12	14	2: Low
20691	2	2	1	1	6	Low	2	3	2	2	Medium	12	14	2: Low
20806	2	2	1	1	6	Low	2	3	2	2	Medium	12	14	2: Low
20873	2	2	1	1	6	Low	2	1	2	2	Medium	12	14	2: Low
20954	2	2	1	1	6	Low	2	3	2	2	Medium	12	14	2: Low
20960	2	2	1	1	6	Low	2	3	2	2	Medium	12	14	2: Low
20961	2	2	1	1	6	Low	2	3	2	2	Medium	12	14	2: Low
20964	2	2	1	1	6	Low	2	3	2	2	Medium	12	14	2: Low
20966	2	2	1	1	6	Low	2	3	2	2	Medium	12	14	2: Low
20977	2	2	1	1	6	Low	2	3	2	2	Medium	12	14	2: Low
20978	2	2	1	1	6	Low	2	3	2	2	Medium	12	14	2: Low
20982	2	2	1	1	6	Low	2	3	2	2	Medium	12	14	2: Low
20984	2	2	1	1	6	Low	2	3	2	2	Medium	12	14	2: Low
20009	2	2	1	5	10	Medium	0	1	1	1	Low	10	12	2: Low
20218	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20227	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20231	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20234	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20249	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20258	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20264	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20265	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20277	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20284	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20295	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20300	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20315	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20318	3	2	4	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20322	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20329	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20479	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20495	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20509	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20517	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20527	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20528	2	6	1	1	10	Medium	1	3	1	1	Low	10	12	2: Low
20539	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20546	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20548	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20565	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20577	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20641	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20652	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20660	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20666	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20667	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20678	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20681	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20684	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20692	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20693	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20701	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20705	2	6	1	1	10	Medium	0	1	1	1	Low	10	12	2: Low
20170	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20173	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20175	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20183	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20184	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20185	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20186	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20187	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20191	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20192	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20214	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20217	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20219	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20222	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20225	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20228	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20240	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20261	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20274	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20283	3	2	1	3	9	Medium	0	1	1	1	Low	9	11	2: Low
20298	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20328	3	2	1	3	9	Medium	0	1	1	1	Low	9	11	2: Low
20396	2	2	1	4	9	Medium	0	1	1	1	Low	9	11	2: Low

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20403	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20415	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20429	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20443	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20451	2	2	1	4	9	Medium	0	1	1	1	Low	9	11	2: Low
20452	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20461	2	2	1	4	9	Medium	0	1	1	1	Low	9	11	2: Low
20463	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20470	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20481	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20497	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20513	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20516	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20526	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20558	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20566	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20571	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20581	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20592	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20594	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20602	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20610	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20619	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20620	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20638	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20644	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20654	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20658	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20668	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20676	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20685	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20689	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20698	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20704	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20707	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20713	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20717	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20726	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20732	2	2	4	1	9	Medium	0	1	1	1	Low	9	11	2: Low
20269	2	2	1	3	8	Medium	0	1	1	1	Low	8	10	2: Low
20290	2	2	1	3	8	Medium	0	1	1	1	Low	8	10	2: Low
20297	2	2	1	3	8	Medium	0	1	1	1	Low	8	10	2: Low
20326	2	2	1	3	8	Medium	0	1	1	1	Low	8	10	2: Low
20087	3	2	1	1	7	Medium	0	1	1	1	Low	7	8	2: Low
20105	3	2	1	1	7	Medium	0	1	1	1	Low	7	8	2: Low
20112	3	2	1	1	7	Medium	0	1	1	1	Low	7	8	2: Low
20206	3	2	1	1	7	Medium	0	1	1	1	Low	7	8	2: Low
20292	3	2	1	1	7	Medium	0	1	1	1	Low	7	8	2: Low
20333	3	2	1	1	7	Medium	0	1	1	1	Low	7	8	2: Low
20588	3	2	1	1	7	Medium	0	1	1	1	Low	7	8	2: Low
20007	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20011	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20013	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20073	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20074	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20077	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20082	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20086	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20090	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20093	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20096	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20098	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20099	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20101	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20102	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20103	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20104	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20106	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20109	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20110	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20188	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20189	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20193	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20196	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20197	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20200	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20207	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20208	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20209	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20211	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20213	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20215	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20216	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20220	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20223	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20224	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20235	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20237	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20243	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20244	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20255	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20257	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20260	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20263	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20268	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20275	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20276	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20279	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20285	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20288	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20289	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20291	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20294	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20301	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20302	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20305	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20306	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20311	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20314	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20317	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20319	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20320	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20323	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20324	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20330	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20331	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20334	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20335	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20336	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20337	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20339	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20340	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20342	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20343	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20350	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20353	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20354	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20356	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20357	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20358	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20359	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20362	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20363	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20365	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20366	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20369	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20373	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20374	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20377	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20378	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20385	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20388	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20394	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20404	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20407	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20408	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20421	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20427	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20430	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20438	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20441	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20448	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20455	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20457	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20466	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20467	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20475	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20484	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20485	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20488	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20489	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20494	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20498	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20507	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20510	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20518	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20523	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20525	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible

	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	LOF	COF	Risk	Risk	Risk
20531	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20534	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20540	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20545	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20547	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20551	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20560	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20564	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20574	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20578	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20586	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20589	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20593	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20598	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20601	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20605	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20608	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20615	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20618	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20627	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20632	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20635	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20637	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20645	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20648	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20650	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20659	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20661	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20673	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20675	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20677	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20682	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20700	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20709	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20711	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20714	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20719	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20720	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20722	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20727	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20730	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20876	2	2	1	1	6	Low	1	3	1	1	Low	6	7	1: Negligible
20885	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible
20896	2	2	1	1	6	Low	0	1	1	1	Low	6	7	1: Negligible

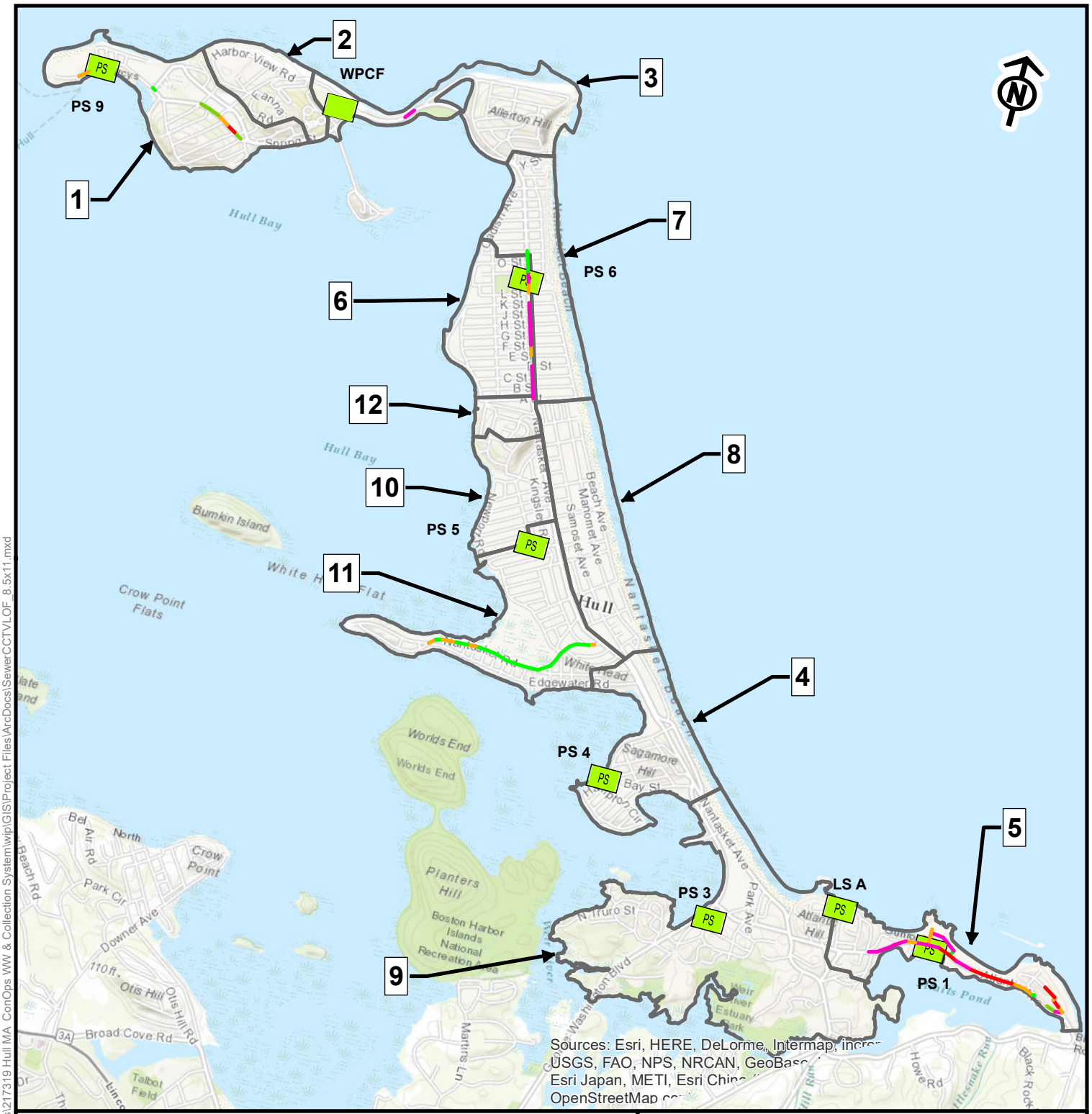
6.3

12.6

SEWER FORCE MAIN RISK ASSESSMENT

PS	ID	Diameter	Material	Length	COF	COF	COF	COF	COF	COF	LOF	LOF	LOF	Risk	Risk	Risk
					Diameter	Critical Facilities	Road Classification	Water Resources	Total Score	By Grading	W&C Condition Estimate	Total Score	By Grading	Total Risk	Normalized Risk	By Grading
PS 3	10896	14	DI	4763	10	5	5	5	25	High	5	5	High	125	100	5: Extreme
LS A	10984	4	DI	871	4	4	5	4	17	High	4	4	High	68	54	5: Extreme
PS 1	10979	8	DI	2138	6	4	5	4	19	High	3	3	Medium	57	45	4: High
PS 5	10587	14	DI	584	10	4	2	1	17	High	2	2	Medium	34	27	4: High
Ps 4	10798	8	DI	1136	6	2	2	1	11	Medium	3	3	Medium	33	26	3: Medium
PS 6	10359	6	DI	78	4	4	2	4	14	Medium	2	2	Medium	28	22	3: Medium
PS 9	10012	10	HDPE	4840	8	4	5	5	22	High	1	1	Low	22	18	3: Medium

SPRING 2017 CCTV INSPECTION



Legend

Sewershed

PS Pump Station

CCTV Inspection (Spring 2017)
Peak Defect Score

- 0 - 0
- 0 - 1
- 1 - 3
- 3 - 4
- 4 - 5

Sewer Collection System Overview
Sewer Pipe CCTV Inspection Assessment

Town of Hull, MA

WOODARD & CURRAN

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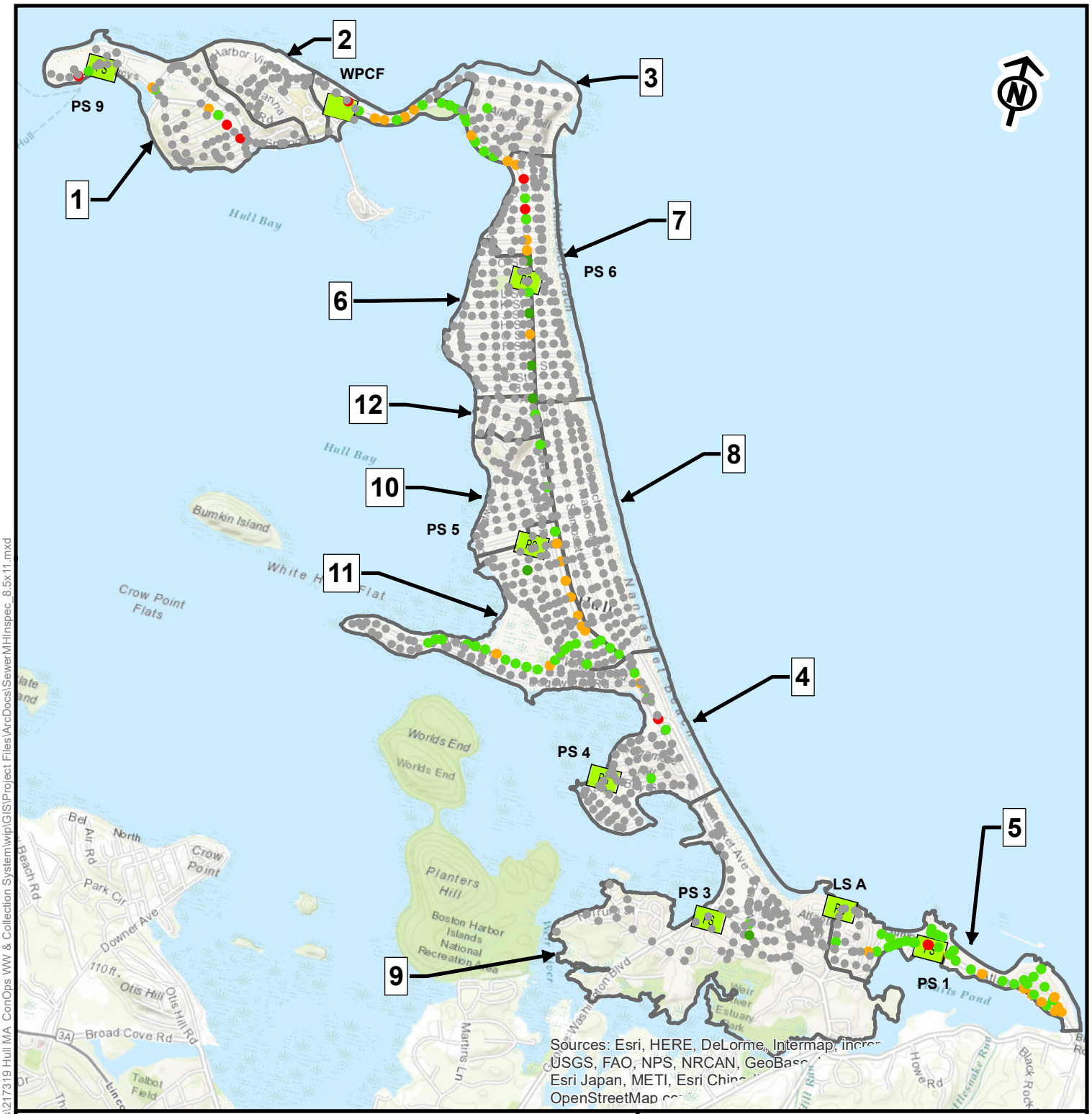
SCALE: 1 " = 2,920 '	DOC: SewerCCTVLOF_8.5x11.mxd
DATE: JUNE 2017	PROJECT #: 0217319.02
DRAWN BY: PJL	SOURCE: Town of Hull, ESRI

Figure Exported: 6/12/2017 By: plyons Using: \\wc\shared\Projects\217319 Hull MA ConOps WW & Collection System\wip\GIS\Project Files\ArcDocs\SewerCCTVLOF_8.5x11.mxd

SPRING 2017 MANHOLE INSPECTIONS



Legend

MH Inspections (Spring 2017)
LOF

- Not Inspected
- 1
- 2
- 3
- 4
- PS Pump Station
- Sewershed

Sewer Collection System Overview
MH Inspections LOF Assessment

Town of Hull, MA

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SCALE: 1 " = 2,920 '	DOC: SewerMHInspec_8.5x11.mxd
DATE: JUNE 2017	PROJECT #: 0217319.02
DRAWN BY: PJL	SOURCE: Town of Hull, ESRI

Figure Exported: 6/12/2017 By: plyons Using: \\wc\shared\Projects\217319 Hull MA ConOps WW & Collection System\wip\GIS\Project Files\ArcDocs\SewerMHInspec_8.5x11.mxd

APPENDIX B: WASTEWATER TREATMENT FACILITY ASSET INVENTORY AND RISK ANALYSIS

Utility CloudID	AssetDescription	AssetID	Parent Group	SEMS ID	Category	Location	Type	Class Number	Class Description	Year Installed	Condition Rating	Current Performance	Current Reliability Rating	Consequence of Failure	Renewal Strategy
105128825	110V Panelboard & LC-2	HULL_WWTP-348			Electrical	2nd Floor - Hallway	Electric	7	Electrical		2	1	1	3	2-Continue with Status Quo
96144135	ADV EF Disconnect Switch	HULL_WWTP-48	34 - WW Secondary Treatment	24737	Electrical	Roof	Electric	7	Electrical	01/01/2013	1	1	1	2	2-Continue with Status Quo
96144166	Aerated Grit Chamber	HULL_WWTP-79	30 - WW Treatment Plant - General	24768	Mechanical	Control Building-Headworks (Basement)	Headworks	12	Equipment (20 years)	01/01/2002	3	3	3	4	2-Continue with Status Quo
105144224	Aerated Grit Chamber Effluent Piping	HULL_WWTP-			Mechanical	Underground	Piping	2		01/01/1978					
96144416	Aerated grit piping	HULL_WWTP-329		29763							8	3	3	4	6-Refurbish/rehabilitate
96144415	Aerated Grit System	HULL_WWTP-		29762							5	3	4	4	4-Operate differently
96144224	Aeration Blower 1	HULL_WWTP-137	Plant Water System	24827	Mechanical	Control Building- Aeration Blower Room	Blowers	12	Equipment (20 years)	01/01/2002	3	3	3	3	7-Replace asset with similar
96144225	Aeration Blower 2	HULL_WWTP-138	36 - WW Effluent Process	24828	Mechanical	Control Building- Aeration Blower Room	Blowers	12	Equipment (20 years)	01/01/2002	3	3	3	3	7-Replace asset with similar
96144223	Aeration Blowers	HULL_WWTP-	Main Switchboard	24826						01/01/2002					
96144388	Aeration Electrical Control Manhole	HULL_WWTP-	39 - WW Sludge Treatment	28279	Electrical	Underground	Electric	7	Electrical	01/01/1978	4	2	3	8	3-Maintain differently
96144387	Aeration Electrical Power Manhole	HULL_WWTP-		28278	Electrical	Underground	Electric	7	Electrical	01/01/1978	4	2	3	8	3-Maintain differently
96144235	Aeration Tank 1	HULL_WWTP-148	Effluent Pump 4	24838	Mechanical	AT-310 Tank 1	Aeration Tanks	9	Building Assets	01/01/1978	7	3	4	8	2-Continue with Status Quo
96144239	Aeration Tank 1 Oxygen Probe	HULL_WWTP-152	39 - WW Sludge Treatment	24842						01/01/2002	3	2	4	2	2-Continue with Status Quo
96144236	Aeration Tank 2	HULL_WWTP-149	Primary Clarifiers	24839	Mechanical	AT-320 Tank 2	Aeration Tanks	9	Building Assets	01/01/1978	4	3	5	3	7-Replace asset with similar
96144309	Aeration Tank 2 Motor	HULL_WWTP-	30 - WW Treatment Plant - General	25210											
96144237	Aeration Tank 3	HULL_WWTP-150	Primary Clarifiers	24840	Mechanical	AT-330 Tank 3	Aeration Tanks	9	Building Assets	01/01/1978	2	1	1	3	2-Continue with Status Quo
96144240	Aeration Tank 3 Oxygen Probe	HULL_WWTP-153	39 - WW Sludge Treatment	24843						01/01/2002	3	2	4	2	2-Continue with Status Quo
96144238	Aeration Tank 4	HULL_WWTP-151	30 - WW Treatment Plant - General	24841	Mechanical	AT-340 Tank 4	Aeration Tanks	9	Building Assets	01/01/1978	10	3	3	3	7-Replace asset with similar
96144310	Aeration Tank 4 Motor	HULL_WWTP-	30 - WW Treatment Plant - General	25211											
96144234	Aeration Tanks	HULL_WWTP-	Effluent Pump 2	24837											
105128836	Aerator 2	HULL_WWTP-359			Electrical	Basement Hallway	Electric	7	Electrical	01/01/2013	1	1	1	8	2-Continue with Status Quo
105128837	Aerator 4	HULL_WWTP-360			Electrical	Basement Hallway	Electric	7	Electrical	01/01/2013	1	1	1	8	2-Continue with Status Quo
96144136	Aerator Motor Disconnect Switch	HULL_WWTP-49	32 - WW Influent Process	24738	Electrical	Aeration Tanks	Electric	7	Electrical	01/01/2004	2	1	1	5	2-Continue with Status Quo
96144097	Air Compressor	HULL_WWTP-11		24699	Electrical	Basement	Electric	6	Motors	01/01/2013	1	1	1	5	2-Continue with Status Quo
96144227	Air Diffuser AT-310	HULL_WWTP-140	Electrical Manholes	24830						01/03/2002	5	3	4	7	6-Refurbish/rehabilitate
96144228	Air Diffuser AT-330	HULL_WWTP-	Electrical Manholes	24831						01/04/2002					
96144226	Air Diffusers	HULL_WWTP-	36 - WW Effluent Process	24829						01/02/2002					
96144262	Archive Chlorine Residual Probe	HULL_WWTP-175	39 - WW Sludge Treatment	24890	Mechanical	Control Building - Sludge Pump Room	Sludge Handling	4	Pumps	01/01/2013	4	1	3	3	7-Replace asset with similar
105128853	AT 2 Aerator/mixer	HULL_WWTP-376	30 - WW Treatment Plant - General								10	4	2	3	7-Replace asset with similar
105128854	AT 4 Aerator/mixer	HULL_WWTP-377	39 - WW Sludge Treatment		Mechanical	AT 4 Aerator/mixer	Aeration Tanks	12	Equipment (20 years)	01/01/1978	10	4	2	3	7-Replace asset with similar
105128818	ATS-1	HULL_WWTP-342			Electrical	Basement	Electric	7	Electrical	01/01/2013	4	2	1	10	2-Continue with Status Quo
105128820	ATS-2	HULL_WWTP-343			Electrical	Basement	Electric	7	Electrical	01/01/2013	4	2	1	10	2-Continue with Status Quo
96144160	Backflow Preventer - Generator Room	HULL_WWTP-73	37 - WW Odor Control	24762	Piping		piping		Pressure Pipework	01/01/1978	2	2	3	6	6-Refurbish/rehabilitate
96144161	Backflow Preventer - HVAC Room	HULL_WWTP-74	36 - WW Effluent Process	24763	Piping		Piping		Pressure Pipework	01/01/1978	2	2	3	6	6-Refurbish/rehabilitate
96144162	Backflow Preventer - HVAC Room Back Wall	HULL_WWTP-75	31 - WW Headworks	24764	Piping		piping		Pressure Pipework	01/01/1978	2	2	3	6	6-Refurbish/rehabilitate
96144163	Backflow Preventer - HVAC Room Boiler Makeup Feed	HULL_WWTP-76	30 - WW Treatment Plant - General	24765	Piping		piping		Pressure Pipework		10	5	5	2	6-Refurbish/rehabilitate
96144164	Backflow Preventer - Primary	HULL_WWTP-77	34 - WW Secondary Treatment	24766	Piping		piping		Pressure Pipework		10	5	5	2	6-Refurbish/rehabilitate
96144165	Backflow Preventer - Secondary	HULL_WWTP-78	30 - WW Treatment Plant - General	24767	Piping		piping		Pressure Pipework		10	5	5	2	6-Refurbish/rehabilitate
96144159	Backflow preventers	HULL_WWTP-72	31 - WW Headworks	24761	Piping		piping		Pressure Pipework	01/01/1978	2	2	3	6	
96144311	Bisulfite System	HULL_WWTP-	30 - WW Treatment Plant - General	25212											
96144137	Blast Disconnect Switch / Starter	HULL_WWTP-50	32 - WW Influent Process	24739	Electrical	2nd Floor - 201	Electric	7	Electrical	01/01/2001	4	2	1	3	2-Continue with Status Quo
96144297	Blend Box	HULL_WWTP-	Aerated Grit System	25108							2	2	2	2	
96144138	Blower Disconnect Switch	HULL_WWTP-51	34 - WW Secondary Treatment	24740	Electrical		Electric	7	Electrical	01/01/2002	2	1	1	3	2-Continue with Status Quo
96144100	Blower Room	HULL_WWTP-14	TVSS Disconnect	24702											
96144366	Building Flood Control	HULL_WWTP-		28248											
96144098	Buildings	HULL_WWTP-12	30 - WW Treatment Plant - General	24700											
96144361	Camera and Light Assembly	HULL_WWTP-	20 - WW - collections - general	28205											
96144357	Camera and Light assembly	HULL_WWTP-	30 - WW Treatment Plant - General	28205											
96144247	Caustic Soda Metering Pump	HULL_WWTP-160	34 - WW Secondary Treatment	24850	Mechanical	Control Building-Basement (Pump Room A)	Effluent PS & NaOH Sy	13	Equipment (10 years)	01/01/2013	2	1	4	4	2-Continue with Status Quo

Utility CloudID	AssetDescription	AssetID	Parent Group	SEMS ID	Category	Location	Type	Class Number	Class Description	Year Installed	Condition Rating	Current Performance	Current Reliability Rating	Consequence of Failure	Renewal Strategy
96144248	Caustic Soda Tank	HULL_WWTP-161	36 - WW Effluent Process	24851	Mechanical	Control Building-Basement (Pump Room A)	Effluent PS & NaOH Sy	12	Equipment (20 years)	01/01/2002	2	1	1	4	2-Continue with Status Quo
96144246	Caustic System	HULL_WWTP-159	34 - WW Secondary Treatment	24849						01/01/2002	7	4	5	5	6-Refurbish/rehabilitate
96144260	Chlorine Contact Tank 1	HULL_WWTP-173	39 - WW Sludge Treatment	24863	Mechanical	Exterior	Secondary Clarifiers	9	Building Assets	01/01/1978	3			3	2-Continue with Status Quo
96144261	Chlorine Contact Tank 2	HULL_WWTP-174	39 - WW Sludge Treatment	24864	Mechanical	Exterior	Secondary Clarifiers	9	Building Assets	01/01/1978	3			3	2-Continue with Status Quo
96144407	Chlorine probe ATI	HULL_WWTP-320		29125	Mechanical	Control Building	Instumentation	13	Equipment (10 years)	01/01/1978	7	5	5	4	8-Replace with improved asset
96144406	Chlorine probe Endress & Hauser	HULL_WWTP-319		29124	Mechanical	Control Building	Instumentation	13	Equipment (10 years)	01/01/1978	7	5	5	4	8-Replace with improved asset
96144101	CL2 Room	HULL_WWTP-15		24703											
96144167	Coarse Bubbler	HULL_WWTP-80	32 - WW Influent Process	24769	Mechanical	Control Building-Headworks (Basement)	Headworks & Inf Pumping	12	Equipment (20 years)	01/01/2002	3	2	2	1	2-Continue with Status Quo
96144168	Coarse Manual Bar Screen	HULL_WWTP-81	32 - WW Influent Process	24770	Mechanical	Control Building-Headworks (Basement)	Headworks	12	Equipment (20 years)	01/01/2013	4	2	1	1	1-Do nothing
96144112	Communications	HULL_WWTP-26	MDP 5 Feeder Breaker in MSB	24715	Controls	Control Building	SCADA	8	Controls	01/01/1978	5	3	4	5	8-Replace with improved asset
96144139	Compressor Disconnect Switch	HULL_WWTP-52	30 - WW Treatment Plant - General	24741	Electrical		Electric	7	Electrical	01/01/2002	2	1	1	3	2-Continue with Status Quo
96144395	Confined Space 4 Gas Meter	HULL_WWTP-	37 - WW Odor Control	28453											
96144414	Containment Pallets	HULL_WWTP-		29681											
105143295	Control Box 3	HULL_WWTP-405			Electrical	Underground	Electric	7	Electrical	01/01/2013	2	1	1	3	2-Continue with Status Quo
96144102	Control Room	HULL_WWTP-16	30 - WW Treatment Plant - General	24704	S- Building	Control Building	Windows	11	Equipment (40 years)	01/01/1978	6	2	3	4	
96144140	Crane Disconnect Switch	HULL_WWTP-53	30 - WW Treatment Plant - General	24742	Electrical	2nd Floor - 201	Electric	7	Electrical	01/01/1978	8	3	1	3	7-Replace asset with similar
96144421	DBI Davit "Confined Space"	HULL_WWTP-		30366											
96144420	Dig Safe Requests	HULL_WWTP-		29845											
96144134	Disconnect Switches	HULL_WWTP-47	Backflow preventers	24736											
96144302	DPW Support	HULL_WWTP-	Effluent Pump 2	25126											
105128868	Dump Station	HULL_WWTP-	39 - WW Sludge Treatment		S -Collections	Exterior	Dump Station	12	Equipment (20 years)		10	5	5	3	
96144141	EF Disconnect Switch	HULL_WWTP-54	32 - WW Influent Process	24743	Electrical		Electric	7	Electrical	01/01/2002	2	1	1	3	2-Continue with Status Quo
105128844	EF-480 Exhaust Fan	HULL_WWTP-367	39 - WW Sludge Treatment		Mechanical	Aeration Blower Room	Blowers	12	Equipment (20 years)	01/01/2002	2	2	2	4	7-Replace asset with similar
105128845	EF-481 Exhaust Fan	HULL_WWTP-368	39 - WW Sludge Treatment		Mechanical	Aeration Blower Room	Blowers	12	Equipment (20 years)	01/01/2002	2	2	2	4	7-Replace asset with similar
96144403	effluent flow meter	HULL_WWTP-316	Mechanical Screen & Washpress System	28538	Instrumentation	Control Building-Sub Basement (Pump Room B)	Instumentation	8	Controls	01/01/2013	2	2	2	4	8-Replace with improved asset
96144396	Effluent Pump #1 discharge valve	HULL_WWTP-309	32 - WW Influent Process	28511	Valves	Effluent Pump Room 0-14	Valves	5	Valves	01/01/2002	3	1	3	9	7-Replace asset with similar
96144397	Effluent Pump #2 discharge valve	HULL_WWTP-310	32 - WW Influent Process	28512	Valves	Effluent Pump Room 0-14	Valves	5	Valves	01/01/2002	3	1	3	8	7-Replace asset with similar
96144398	Effluent Pump #3 discharge valve	HULL_WWTP-311	32 - WW Influent Process	28513	Valves	Effluent Pump Room 0-14	Valves	5	Valves	01/01/2002	3	1	3	9	7-Replace asset with similar
96144399	Effluent Pump #4 discharge valve	HULL_WWTP-312	32 - WW Influent Process	28514	Valves	Effluent Pump Room 0-14	Valves	5	Valves	01/01/2002	3	1	3	8	7-Replace asset with similar
96144242	Effluent Pump 1	HULL_WWTP-155	Aerated Grit System	24845	Mechanical	Effluent Pump Room 0-14	Pumps	4	Pumps	01/01/2002	3	1	3	9	2-Continue with Status Quo
105128832	Effluent Pump 1 VFD	HULL_WWTP-355			Electrical	Basement	Electric	7	Electrical	01/01/2013	1	1	1	9	2-Continue with Status Quo
96144243	Effluent Pump 2	HULL_WWTP-156	37 - WW Odor Control	24846	Mechanical	Effluent Pump Room 0-14	Pumps	4	Pumps	01/01/2002	3	1	3	8	2-Continue with Status Quo
105128833	Effluent Pump 2 VFD	HULL_WWTP-356			Electrical	Basement	Electric	7	Electrical	01/01/2013	1	1	1	8	2-Continue with Status Quo
96144244	Effluent Pump 3	HULL_WWTP-157	30 - WW Treatment Plant - General	24847	Mechanical	Effluent Pump Room 0-14	Pumps	4	Pumps	01/01/2002	3	1	3	9	2-Continue with Status Quo
105128834	Effluent Pump 3 VFD	HULL_WWTP-357			Electrical	Basement	Electric	7	Electrical	01/01/2013	1	1	1	9	2-Continue with Status Quo
96144245	Effluent Pump 4	HULL_WWTP-158	33 - WW Primary Treatment	24848	Mechanical	Effluent Pump Room 0-14	Pumps	4	Pumps	01/01/2002	3	1	3	8	2-Continue with Status Quo
105128835	Effluent Pump 4 VFD	HULL_WWTP-358			Electrical	Basement	Electric	7	Electrical	01/01/2013	1	1	1	8	2-Continue with Status Quo
105128856	Effluent pump hatches	HULL_WWTP-379	34 - WW Secondary Treatment		Mechanical	Effluent Pump Room 0-14	Hatches	12	Equipment (20 years)	01/01/1978	6	2	5	2	7-Replace asset with similar
96144103	Effluent Pump Room	HULL_WWTP-17		24705	Structural	Effluent Pump Room 0-14	Structural	1	Civil	01/01/1978	3	2	2	9	6-Refurbish/rehabilitate
105128861	Effluent Pump Room Sluice Gates	HULL_WWTP-	30 - WW Treatment Plant - General		Mechanical	Effluent Pump Room 0-14	Sluice gates	12	Equipment (20 years)	01/01/1978	10	5	2	2	1-Do nothing
96144241	Effluent Pumps	HULL_WWTP-154	39 - WW Sludge Treatment	24844		Effluent Pump Room 0-14			Pumps	01/01/1978	3	3	3	9	6-Refurbish/rehabilitate
105128814	Effluent wet well back-up floats for pump control	HULL_WWTP-338	30 - WW Treatment Plant - General		Controls	Effluent Pump Room 0-14	Controls	8	Controls	01/01/2004	3	2	3	7	8-Replace with improved asset
105128812	Effluent wet well level sensor	HULL_WWTP-336	Plant Water System		Controls	Effluent Pump Room 0-14	Controls	8	Controls	01/01/2004	2	1	3	8	7-Replace asset with similar
105143288	Electrical Ductbanks	HULL_WWTP-			Electrical	Underground	Ductbank	7	Electrical	01/01/1978	4	2	3	5	3-Maintain differently
96144384	Electrical Manholes	HULL_WWTP-		28275	Electrical	Underground	Electric	7	Electrical	01/01/1978	4	2	3	5	3-Maintain differently
96144113	Electrical System	HULL_WWTP-27	Main Switchboard	24716	Electrical	Basement- Electric Room	Electric	7	Electrical	01/01/1980	4	2	3	10	6-Refurbish/rehabilitate

Utility CloudID	AssetDescription	AssetID	Parent Group	SEMS ID	Category	Location	Type	Class Number	Class Description	Year Installed	Condition Rating	Current Performance	Current Reliability Rating	Consequence of Failure	Renewal Strategy
96144133	Emergency Lighting & exit signs	HULL_WWTP-46	Backflow preventers	24735	Lighting	Control Building	Lighting	7	Electrical	01/01/2013	2	2	2	2	2-Continue with Status Quo
96144127	Exhaust Fan 1 Pump Room	HULL_WWTP-40	34 - WW Secondary Treatment	24729	Electrical	Roof	Electric	7	Electrical	01/01/1978	8	3	1	4	7-Replace asset with similar
96144128	Exhaust Fan 2 Generator Room	HULL_WWTP-41	31 - WW Headworks	24730											
96144125	Exhaust Fan 3 Generator Room	HULL_WWTP-38	38 - WW Disinfection	24727											
96144126	Exhaust Fan 4 Scrubber	HULL_WWTP-39	38 - WW Disinfection	24728	HVAC	Control Building	Exhaust Fans	12	Equipment (20 years)	01/01/1978	7	2	3	3	7-Replace asset with similar
105128817	Exterior Lighting	HULL_WWTP-341			Electrical	Control Building	Lighting	12	Equipment (20 years)	01/01/1978	4	3	5	3	8-Replace with improved asset
105128864	Exterior siding	HULL_WWTP-	39 - WW Sludge Treatment		S- Building	Control Building	Siding	9	Building Assets	01/01/1978	4	2	2	5	
96144405	Eyewash bisulfite shed	HULL_WWTP-		28551											
96144130	Eyewash Station - Lab	HULL_WWTP-43	34 - WW Secondary Treatment	24732											
96144129	Eyewash Stations	HULL_WWTP-42	32 - WW Influent Process	24731											
96144131	Eyewash Stations - Influent Pump Room	HULL_WWTP-44	34 - WW Secondary Treatment	24733	Safety Shower	Control Building-Sub Basement (Pump Room A)	Structure	9	Building Assets	01/01/1978	5	4	2	9	8
96144132	Eyewash Stations - LMI Pump Room	HULL_WWTP-45	Backflow preventers	24734											
96144413	Ferric Chloride Pump	HULL_WWTP-		29680											
96144412	Ferric Chloride Pump Room,	HULL_WWTP-		29679											
96144169	Fine Manual Bar Screen	HULL_WWTP-82	32 - WW Influent Process	24771	Mechanical	Control Building-Headworks (Basement)	Screen		Equipment (20 years)	01/01/2013	3	2	1	4	1-Do nothing
96144315	Fire Extinguishers	HULL_WWTP-	30 - WW Treatment Plant - General	25369								1	1	1	
96144363	Fire Extinguishers	HULL_WWTP-	30 - WW Treatment Plant - General	25369								1	1	1	
96144170	Fixed Gas Monitoring System	HULL_WWTP-83	32 - WW Influent Process	24772	Controls	Headworks	Gas Monitors	8	Controls	01/01/2015	7	3	4	7	8-Replace with improved asset
96144378	Flood Barrier #1	HULL_WWTP-		28260	S- Architectural	Building	Doors	9	Building Assets	01/01/1978	4	2	2	9	5-Repair
96144379	Flood Barrier #2	HULL_WWTP-		28261	S- Architectural	Building	Doors	9	Building Assets	01/01/1978	4	2	2	9	5-Repair
96144380	Flood Barrier #3	HULL_WWTP-		28262	S- Architectural	Building	Doors	9	Building Assets	01/01/1978	4	2	2	9	5-Repair
96144381	Flood Barrier #4	HULL_WWTP-		28263	S- Architectural	Building	Doors	9	Building Assets	01/01/1978	4	2	2	9	5-Repair
96144367	Flood Gate #1	HULL_WWTP-	30 - WW Treatment Plant - General	28249	S- Architectural	Building	Doors	9	Building Assets	01/01/1978	4	2	2	9	5-Repair
96144376	Flood Gate #10	HULL_WWTP-		28258	S- Architectural	Building	Doors	9	Building Assets	01/01/1978	4	2	2	9	5-Repair
96144377	Flood Gate #11	HULL_WWTP-		28259	S- Architectural	Building	Doors	9	Building Assets	01/01/1978	4	2	2	9	5-Repair
96144368	Flood Gate #2	HULL_WWTP-	30 - WW Treatment Plant - General	28250	S- Architectural	Building	Doors	9	Building Assets	01/01/1978	4	2	2	9	5-Repair
96144369	Flood Gate #3	HULL_WWTP-	30 - WW Treatment Plant - General	28251	S- Architectural	Building	Doors	9	Building Assets	01/01/1978	4	2	2	9	5-Repair
96144370	Flood Gate #4	HULL_WWTP-		28252	S- Architectural	Building	Doors	9	Building Assets	01/01/1978	4	2	2	9	5-Repair
96144371	Flood Gate #5	HULL_WWTP-		28253	S- Architectural	Building	Doors	9	Building Assets	01/01/1978	4	2	2	9	5-Repair
96144372	Flood Gate #6	HULL_WWTP-		28254	S- Architectural	Building	Doors	9	Building Assets	01/01/1978	4	2	2	9	5-Repair
96144373	Flood Gate #7	HULL_WWTP-		28255	S- Architectural	Building	Doors	9	Building Assets	01/01/1978	4	2	2	9	5-Repair
96144374	Flood Gate #8	HULL_WWTP-		28256	S- Architectural	Building	Doors	9	Building Assets	01/01/1978	4	2	2	9	5-Repair
96144375	Flood Gate #9	HULL_WWTP-		28257	S- Architectural	Building	Doors	9	Building Assets	01/01/1978	4	2	2	9	5-Repair
105128865	Garage Area Hatch	HULL_WWTP-388	39 - WW Sludge Treatment		S- Building	Control Building	Hatches	12	Equipment (20 years)	01/01/1978	8	5	5	2	7-Replace asset with similar
96144152	Generator #1- Emergency	HULL_WWTP-65	30 - WW Treatment Plant - General	24754	Electrical	Generator Room	Electric	7	Electrical	01/01/2003	3	2	3	9	2-Continue with Status Quo
96144151	Generator #2 - Backup	HULL_WWTP-64	32 - WW Influent Process	24753	Electrical	Generator Room	Electric	7	Electrical	01/01/1978	8	2	3	9	2-Continue with Status Quo
96144104	Generator Room	HULL_WWTP-18	39 - WW Sludge Treatment	24706	Room	Generator Room	Structure	9	Building Assets	01/01/1978	3	3	3	10	6-Refurbish/rehabilitate
96144323	GODWIN Portable Pump	HULL_WWTP-236	Main Switchboard	28147						01/01/2015	5	5	5	9	8-Replace with improved asset
96144322	Gravity Pipes	HULL_WWTP-	30 - WW Treatment Plant - General	27105											
96144265	Gravity Thickener 1	HULL_WWTP-178	37 - WW Odor Control	24868	Mechanical	Gravity Thickeners	Sludge Handling	12	Equipment (20 years)	01/01/2002	5	1	3	3	7-Replace asset with similar
96144266	Gravity Thickener 2	HULL_WWTP-179	30 - WW Treatment Plant - General	24869	Mechanical	Gravity Thickeners	Sludge Handling	12	Equipment (20 years)	01/01/1978	10	5	2	3	7-Replace asset with similar
96144264	Gravity Thickener Blend Box Mixer	HULL_WWTP-177	32 - WW Influent Process	24867	Mechanical	Gravity Thickeners	Sludge Handling	12	Equipment (20 years)	01/01/2013	3	1	4	3	7-Replace asset with similar
96144391	Gravity Thickener Electrical Power Manhole	HULL_WWTP-	30 - WW Treatment Plant - General	28282											
96144142	Gravity Thickener Mixer Disconnect Switch	HULL_WWTP-55	32 - WW Influent Process	24744											
96144263	Gravity Thickeners	HULL_WWTP-176	37 - WW Odor Control	24866	Structural	Gravity Thickeners / Sludge Holding Tanks	Structural	1	Civil	01/01/1978	3	1	1	2	6-Refurbish/rehabilitate
96144336	Grit Chamber Blower #4	HULL_WWTP-249	34 - WW Secondary Treatment	28164	Mechanical	Control Building-Compressor Room	Blowers	12	Equipment (20 years)	01/01/2002	4	1	3	4	7-Replace asset with similar
105128862	Grit flush water piping	HULL_WWTP-385			Mechanical	Control Building-Grit Pump Room (Sub-Basement)	Headworks & Inf Pump	12	Equipment (20 years)	01/01/1978	3	3	3	2	2-Continue with Status Quo
96144172	Grit Pump 1	HULL_WWTP-85	Plant Water System	24774	Pumps	Control Building-Grit Pump Room (Sub-Basement)	Pumps	4	Pumps	01/01/2002	2	1	1	3	7-Replace asset with similar
96144173	Grit Pump 2	HULL_WWTP-86	Plant Water System	24775	Pumps	Control Building-Grit Pump Room (Sub-Basement)	Pumps	4	Pumps	01/01/1978	4	1	1	3	7-Replace asset with similar
96144171	Grit Pumps	HULL_WWTP-84	32 - WW Influent Process	24773	Pumps	Control Building-Grit Pump Room (Sub-Basement)	Pumps				5	2	3	3	6-Refurbish/rehabilitate
96144174	Grit Screw Classifier	HULL_WWTP-87	30 - WW Treatment Plant - General	24776	Mechanical	Control Building - Maint. Shop	Headworks & Inf Pump	12	Equipment (20 years)	01/01/2002	4	3	3	3	7-Replace asset with similar
96144175	Grit Screw Drive	HULL_WWTP-88	30 - WW Treatment Plant - General	24777	Mechanical	Control Building	Headworks	13	Equipment (10 years)	01/01/2002	3	3	3	4	7-Replace asset with similar
96144320	H2S Meter	HULL_WWTP-233	30 - WW Treatment Plant - General	26908	Controls	Headworks	Gas Monitors	8	Controls	01/01/2015	10	5	5	7	2-Continue with Status Quo
96144317	H2S meter	HULL_WWTP-230	MCC 1	26908	Controls	Headworks	Gas Monitors	8	Controls	01/01/2015	10	5	5	7	2-Continue with Status Quo

Utility CloudID	AssetDescription	AssetID	Parent Group	SEMS ID	Category	Location	Type	Class Number	Class Description	Year Installed	Condition Rating	Current Performance	Current Reliability Rating	Consequence of Failure	Renewal Strategy
105128842	Headworks HVAC	HULL_WWTP-365	39 - WW Sludge Treatment		HVAC	Headworks	Fans, ducts	12	Equipment (20 years)	01/01/2002	10	5	5	8	6-Refurbish/rehabilitate
105128866	Headworks Railings and Gratings	HULL_WWTP-389	39 - WW Sludge Treatment		S- Building	Control Building	Railings	12	Equipment (20 years)	01/01/1978	2	3	2	2	2-Continue with Status Quo
105128841	Headworks Room	HULL_WWTP-364	39 - WW Sludge Treatment		Structural	Headworks Room 0-7	Structural	1	Civil	01/01/1978	8	3	4	8	6-Refurbish/rehabilitate
96144114	Health & Safety	HULL_WWTP-28	Main Switchboard	24717											
96144362	Health and Safety	HULL_WWTP-	30 - WW Treatment Plant - General	28210											
96144143	Hoist Disconnect Switch	HULL_WWTP-56	32 - WW Influent Process	24745	Electrical	2nd Floor - Incinerator	Electric	7	Electrical	01/01/2002	3	2	1	3	7-Replace asset with similar
96144144	HVAC Disconnect Switch	HULL_WWTP-57	32 - WW Influent Process	24746	Electrical		Electric	7	Electrical	01/01/1978	8	1	1	3	2-Continue with Status Quo
96144105	HVAC Room	HULL_WWTP-19	30 - WW Treatment Plant - General	24708											
96144116	HVAC System	HULL_WWTP-29	Plant Water System	24718	Mechanical	Mechanical	Building Misc Items	9	Building Assets	01/01/1978	9	5	5	9	8-Replace with improved asset
96144106	Hypo Pump Room	HULL_WWTP-20	30 - WW Treatment Plant - General	24709											
96144250	Hypochlorite Pump 1	HULL_WWTP-163	39 - WW Sludge Treatment	24853	Mechanical	Control Building	Pumps	13	Equipment (10 years)	01/01/1978	6	2	3	4	7-Replace asset with similar
96144251	Hypochlorite Pump 2	HULL_WWTP-164	39 - WW Sludge Treatment	24854	Mechanical	Control Building	Pumps	13	Equipment (10 years)	01/01/1978	3	1	3	3	7-Replace asset with similar
96144252	Hypochlorite Pump 3	HULL_WWTP-165	39 - WW Sludge Treatment	24855	Mechanical	Control Building	Pumps	13	Equipment (10 years)	01/01/1978	3	1	3	3	7-Replace asset with similar
96144249	Hypochlorite System	HULL_WWTP-162	Aerated Grit Chamber	24852	Mechanical	Control Building	Tanks	12	Equipment (20 years)	01/01/1997	5	2	5	7	7-Replace asset with similar
96144253	Hypochlorite Tank 1	HULL_WWTP-166	39 - WW Sludge Treatment	24856	Mechanical	Control Building	Tanks	12	Equipment (20 years)	01/01/1997	5	2	5	5	7-Replace asset with similar
96144254	Hypochlorite Tank 2	HULL_WWTP-167	39 - WW Sludge Treatment	24857	Mechanical	Control Building	Tanks	12	Equipment (20 years)	01/01/1997	5	2	5	5	7-Replace asset with similar
96144179	Influent Flow meter - 16 Inch	HULL_WWTP-92	Electrical Manholes	24781	Controls	Control Building	Controls	8	Controls	01/01/2013	3	1	3	1	8
96144180	Influent Flow meter - 8 Inch	HULL_WWTP-93	Electrical Manholes	24782	Controls	Control Building	Controls	8	Controls	01/01/2013	3	1	3	1	8
96144181	Influent Forcemain - 16 Inch	HULL_WWTP-94	Electrical Manholes	24783	Piping	Control Building-Sub Basement (Pump Room A)	Piping	2	Pressure Pipework	01/01/1978	7	3	2	10	6
96144182	Influent Forcemain - 8 Inch	HULL_WWTP-95	30 - WW Treatment Plant - General	24784	Piping	Control Building-Basement (Pump Room A)	Piping	2	Pressure Pipework	01/01/1978	7	3	2	10	6
105128863	Influent Piping & Valves	HULL_WWTP-386	30 - WW Treatment Plant - General		Mechanical	Control Building	Influent Wet Well	5	Valves	01/01/1978	6	1	3	9	7-Replace asset with similar
96144185	Influent Pump 1	HULL_WWTP-98	32 - WW Influent Process	24788	Mechanical	Control Building-Sub Basement (Pump Room A)	Pumps	4	Pumps	01/01/1978	6	3	4	3	8
96144186	Influent Pump 1 Check Valve	HULL_WWTP-99	32 - WW Influent Process	24789			Valves	5	Valves	01/01/1978	7	2	4	7	7
96144187	Influent Pump 1 Discharge Valve	HULL_WWTP-	32 - WW Influent Process	24790			Valves	5	Valves	01/01/1978	7	2	4	7	7
96144188	Influent Pump 1 Motor	HULL_WWTP-101	32 - WW Influent Process	24791	Electrical	Basement- Electric Room	Electric	6	Motors	01/01/1998	1	1	3	7	2-Continue with Status Quo
96144189	Influent Pump 1 Suction Valve	HULL_WWTP-	30 - WW Treatment Plant - General	24792			Valves	5	Valves	01/01/1978	7	2	4	7	7
96144190	Influent Pump 1 VFD	HULL_WWTP-	39 - WW Sludge Treatment	24793			Electric	6	Electrical	01/01/2013	1	1	1	7	2
96144191	Influent Pump 2	HULL_WWTP-104	37 - WW Odor Control	24794	Mechanical	Control Building-Sub Basement (Pump Room B)	Pumps	4	Pumps	01/01/1978	6	3	4	3	8
96144192	Influent Pump 2 Check Valve	HULL_WWTP-	32 - WW Influent Process	24795			Valves				3	2	4	7	7
96144193	Influent Pump 2 Discharge Valve	HULL_WWTP-	30 - WW Treatment Plant - General	24796			Valves				7	2	4	7	7
96144194	Influent Pump 2 Motor	HULL_WWTP-107	30 - WW Treatment Plant - General	24797	Electrical	Basement- Electric Room	Electric	6	Motors	01/01/2013	1	1	3	7	2-Continue with Status Quo
96144195	Influent Pump 2 Suction Valve	HULL_WWTP-	36 - WW Effluent Process	24798			Valves				7	2	4	7	7
96144196	Influent Pump 2 VFD	HULL_WWTP-	Electrical Manholes	24799			Electric					1	1	7	2
96144197	Influent Pump 3	HULL_WWTP-110	Electrical System	24800	Mechanical	Control Building-Sub Basement (Pump Room A)	Pumps	4	Pumps	01/01/1978	6	3	4	3	8
96144198	Influent Pump 3 Check Valve	HULL_WWTP-	32 - WW Influent Process	24801			Valves				3	2	4	7	7
96144199	Influent Pump 3 Discharge Valve	HULL_WWTP-	32 - WW Influent Process	24802			Valves				7	2	4	7	7
96144200	Influent Pump 3 Motor	HULL_WWTP-113	36 - WW Effluent Process	24803	Electrical	Basement- Electric Room	Electric	6	Motors	01/01/2013	1	1	3	9	2-Continue with Status Quo
96144201	Influent Pump 3 Suction Valve	HULL_WWTP-	Plant Water System	24804			Valves				7	2	4	7	7
96144202	Influent Pump 3 VFD	HULL_WWTP-	39 - WW Sludge Treatment	24805			Electric					1	1	7	2
96144203	Influent Pump 4	HULL_WWTP-116	39 - WW Sludge Treatment	24806	Mechanical	Control Building-Sub Basement (Pump Room B)	Pumps	4	Pumps	01/01/1978	6	3	4	3	8
96144204	Influent Pump 4 Check Valve	HULL_WWTP-	Aerated Grit System	24807			Valves				3	2	4	7	7
96144205	Influent Pump 4 Discharge Valve	HULL_WWTP-	30 - WW Treatment Plant - General	24808			Valves				7	2	4	7	7
96144206	Influent Pump 4 Motor	HULL_WWTP-119	30 - WW Treatment Plant - General	24809	Electrical	Basement- Electric Room	Electric	6	Motors	01/01/2013	1	1	4	9	2-Continue with Status Quo
96144207	Influent Pump 4 Suction Valve	HULL_WWTP-	Aerated Grit System	24810			Valves				7	2	4	7	7
96144208	Influent Pump 4 VFD	HULL_WWTP-	Aerated Grit System	24811			Electric					1	1	7	2
96144209	Influent Pump 5	HULL_WWTP-122	MCC 1	24812	Mechanical	Control Building-Sub Basement (Pump Room B)	Pumps	4	Pumps	01/01/1978	6	3	4	3	8
96144210	Influent Pump 5 Check Valve	HULL_WWTP-	30 - WW Treatment Plant - General				Valves				3	2	4	7	7
96144211	Influent Pump 5 Discharge Valve	HULL_WWTP-	34 - WW Secondary Treatment	24814			Valves				7	2	4	7	7
96144212	Influent Pump 5 Motor	HULL_WWTP-125	Aerated Grit System	24815	Electrical	Basement- Electric Room	Electric	6	Motors	01/01/2013	1	1	4	9	2-Continue with Status Quo
96144213	Influent Pump 5 Suction Valve	HULL_WWTP-	32 - WW Influent Process	24816			Valves				7	2	4	7	7
96144214	Influent Pump 5 VFD	HULL_WWTP-	32 - WW Influent Process	24817			Electric					1	1	7	2
96144107	Influent Pump Room	HULL_WWTP-21	30 - WW Treatment Plant - General	24710	Room	Basement - Influent Pump Room A	Structure	9	Building Assets	01/01/1978	5	2	2	10	6

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96144183	Influent Pumps	HULL_WWTP-96	30 - WW Treatment Plant - General	24785			Pumps	4	Pumps	01/01/1978	6	3	4	8	8
96144176	Influent Sluice Isolation Gate	HULL_WWTP-89	36 - WW Effluent Process	24778	Mechanical	Control Building-Headworks (Basement)	Headworks	12	Equipment (20 years)	01/01/1984	10	5	5	8	7
165093287	Influent wet well - 3 gates	HULL_WWTP-409			Mechanical	Control Building	Valves	5	Valves	06/30/2002	2	1	2	8	2 - Contunie with Status quo
96142723	Influent Wet Well 1	HULL_WWTP-10	30 - WW Treatment Plant - General	24787	Structural	Control Building	Structure	1	Civil	01/01/1978	6	1	2	10	6-Refurbish/rehabilitate
96144222	Influent Wet Well 2	HULL_WWTP-135	Main Switchboard	24825	Structural	Control Building	Structure	1	Civil	01/01/1978	6	1	2	10	6-Refurbish/rehabilitate
105128815	Influent wet well back-up floats for pump control	HULL_WWTP-339	30 - WW Treatment Plant - General		Controls	Control Building	Controls	8	Controls	01/01/2004	2	3	2	7	8-Replace with improved asset
105128813	Influent wet well level sensor	HULL_WWTP-337	Plant Water System		Controls	Control Building	Controls	8	Controls	01/01/2013	3	2	3	8	7-Replace asset with similar
165093286	Influent wet well piping - 36 IN DI	HULL_WWTP-408			underground piping	Control Building	Piping	3	Sewers	01/01/1978	5	2	2	10	6-Refurbish/rehabilitate
105128851	Knife Gate Valve No. 1	HULL_WWTP-374			Mechanical	Influent Wet Well	Valves	12	Equipment (20 years)	01/01/2002	2	2	3	7	7-Replace asset with similar
105128852	Knife Gate Valve No. 2	HULL_WWTP-375	Mechanical Screen & Washpress System		Mechanical	Influent Wet Well	Valves	12	Equipment (20 years)	01/01/2002	2	2	3	7	7-Replace asset with similar
96144117	Laboratory	HULL_WWTP-30	30 - WW Treatment Plant - General	24719											
105128823	LC-1 Panelboard	HULL_WWTP-346	30 - WW Treatment Plant - General		Electrical	2nd Floor - 201	Electric	7	Electrical	01/01/1978	8	3	1	3	6-Refurbish/rehabilitate
105128821	LC-3 Panelboard	HULL_WWTP-344			Electrical	Generator Room	Electric	7	Electrical	01/01/1978	9	3	2	3	7-Replace asset with similar
105128822	LC-4	HULL_WWTP-345	30 - WW Treatment Plant - General		Electrical	1st Floor - Hallway	Electric	7	Electrical	01/01/1978	8	3	2	3	8-Replace with improved asset
105128831	LCP-6	HULL_WWTP-354			Electrical	Basement	Electric	7	Electrical	01/01/2013	1	1	1	3	2-Continue with Status Quo
96144318	LEL Meter	HULL_WWTP-231	MCC 1	26909	Controls	Headworks	Gas Monitors	8	Controls	01/01/2015	3	1	3	3	2-Continue with Status Quo
96144108	LMI Pump Room	HULL_WWTP-22	30 - WW Treatment Plant - General	24711											
96144301	Main Office	HULL_WWTP-	Effluent Pump 1	25125							1	1	1	1	
96144157	Main Plant Transformer - PROPERTY of HMLP	HULL_WWTP-70	Aerated Grit System	24759	Electrical	Above Ground	Electric	7	Electrical	01/01/1978	5	2	2	10	8-Replace with improved asset
96144153	Main Switchboard	HULL_WWTP-66	37 - WW Odor Control	24755	Electrical	Basement	Electric	7	Electrical	01/01/1978	5	5	4	10	8-Replace with improved asset
96144154	MCC 1	HULL_WWTP-67	33 - WW Primary Treatment	24756				7	Electrical	01/01/1978	5	2	2	9	8-Replace with improved asset
105128828	MCC 1 LDP	HULL_WWTP-351	Primary Clarifier 2		Electrical	1st Floor - MCC Room	Electric	7	Electrical	01/01/2013	1	1	1	3	2-Continue with Status Quo
105128829	MCC 1 Unit Heater Panel	HULL_WWTP-352	Primary Clarifiers		Electrical	1st Floor - MCC Room	Electric	7	Electrical	01/01/2013	1	1	1	3	2-Continue with Status Quo
96144155	MCC 2	HULL_WWTP-68	39 - WW Sludge Treatment	24757	Electrical	1st Floor - MCC Room	Electric	7	Electrical	01/01/2013	3	2	2	8	6-Refurbish/rehabilitate
105128830	MCC Room Transformer	HULL_WWTP-353	33 - WW Primary Treatment		Electrical	1st Floor - MCC Room	Electric	7	Electrical	01/01/2013	1	1	1	3	2-Continue with Status Quo
96144156	MDP 4	HULL_WWTP-69	30 - WW Treatment Plant - General	24758	Electrical	Basement	Electric	7	Electrical	01/01/2013	1	1	1	4	2-Continue with Status Quo
96144325	MDP 5	HULL_WWTP-238	30 - WW Treatment Plant - General	28152	Electrical	Basement	Electric	7	Electrical	01/01/2013	1	1	2	10	2-Continue with Status Quo
96144324	MDP 5 Feeder Breaker in MSB	HULL_WWTP-237	38 - WW Disinfection	28151				7	Electrical	01/01/2013	1	1	2	10	2-Continue with Status Quo
96144327	MDP 6	HULL_WWTP-240	30 - WW Treatment Plant - General	28154	Electrical	Basement	Electric	7	Electrical	01/01/2013	3	2	2	10	6-Refurbish/rehabilitate
96144326	MDP 6 Feeder Breaker in MSB	HULL_WWTP-239	30 - WW Treatment Plant - General	28153				7	Electrical	01/01/2013	1	1	2	10	2-Continue with Status Quo
96144419	Mechanical Screen	HULL_WWTP-332		29766							3	1	4	3	2-Continue with Status Quo
96144177	Mechanical Screen & Washpress System	HULL_WWTP-90	32 - WW Influent Process	24779	Mechanical	Control Building-Headworks (Basement)	Headworks & Inf Pump	12	Equipment (20 years)	01/01/2015	3	1	4	3	2-Continue with Status Quo
96144338	Meter #1 - 4 Gas	HULL_WWTP-	34 - WW Secondary Treatment	28179											
96144408	Meter #10 4 Gas	HULL_WWTP-		29157											
96144339	Meter #2 - 4 Gas	HULL_WWTP-	34 - WW Secondary Treatment	28180											
96144340	Meter #3 - 4 Gas	HULL_WWTP-	34 - WW Secondary Treatment	28181											
96144341	Meter #4 - 4 Gas	HULL_WWTP-	34 - WW Secondary Treatment	28182											
96144342	Meter #5 - 4 Gas	HULL_WWTP-	Effluent Pump 4	28183											
96144343	Meter #6 - 4 Gas	HULL_WWTP-		28184											
96144344	Meter #7 - 4 Gas	HULL_WWTP-	30 - WW Treatment Plant - General	28185											
96144345	Meter #8 - 4 Gas	HULL_WWTP-	34 - WW Secondary Treatment	28186											
96144346	Meter #9 - 4 Gas	HULL_WWTP-	34 - WW Secondary Treatment	28187											
96144316	Meters - 4 Gas	HULL_WWTP-	MCC 1	25370								1	1	1	
105128826	Mixer DS	HULL_WWTP-349	30 - WW Treatment Plant - General		Electrical	Gravity Thickener Blender	Electric	7	Electrical	01/01/2000	2	1	1	2	2-Continue with Status Quo
96144383	New sewer to PS3	HULL_WWTP-		28274											
96144319	O2 Meter	HULL_WWTP-232	30 - WW Treatment Plant - General	26910	Controls	Headworks	Gas Monitors	8	Controls	01/01/2015	3	1	3	3	2-Continue with Status Quo
96144349	Odor Complaint	HULL_WWTP-	30 - WW Treatment Plant - General	28190											
96144255	Odor Control System	HULL_WWTP-	39 - WW Sludge Treatment	24858											
96144257	Odor Control Wet Scrubber Vessel	HULL_WWTP-170	32 - WW Influent Process	24860	Mechanical	Control Building - Pump Room A (Basement)	Effluent PS & NaOH Sy	12	Equipment (20 years)	01/01/2002	6	1	3	3	3-Maintain differently

Utility CloudID	AssetDescription	AssetID	Parent Group	SEMS ID	Category	Location	Type	Class Number	Class Description	Year Installed	Condition Rating	Current Performance	Current Reliability Rating	Consequence of Failure	Renewal Strategy
96144099	Operations Building	HULL_WWTP-13		24701	Structural	Control Building Exterior	Structural	1	Civil	01/01/1978	3	3	3	4	6-Refurbish/rehabilitate
105128846	P-650 RST Thickened Sludge Pump	HULL_WWTP-369	39 - WW Sludge Treatment		Mechanical	Control Building - RST Area	Sludge Handling	4	Pumps	01/01/2002				4	7-Replace asset with similar
96144158	Panelboard 110V & LC-2	HULL_WWTP-71	30 - WW Treatment Plant - General	24760				7	Electrical	01/01/1978	2	3	3	3	6-Refurbish/rehabilitate
96144178	Parshall Flume	HULL_WWTP-91	30 - WW Treatment Plant - General	24780	Mechanical	Control Building	Headworks	12	Equipment (20 years)	01/01/1978	10	5	5	1	1-Do nothing
96144347	Parts Washer	HULL_WWTP-	30 - WW Treatment Plant - General	28188											
105128816	PC sludge piping Flow Meter	HULL_WWTP-340			Controls	PC sludge piping	Controls	8	Controls	01/01/2002	2	1	3	3	7-Replace asset with similar
105128811	PC splitter box level transducer	HULL_WWTP-335	30 - WW Treatment Plant - General		Controls	PC splitter box	Controls	8	Controls		7	5	3	3	7-Replace asset with similar
96144331	Pinehills Ford Transit 2013	HULL_WWTP-	34 - WW Secondary Treatment	28159											
96144303	Plant Floor Drains	HULL_WWTP-	31 - WW Headworks	25134											
105128867	Plant security fence	HULL_WWTP-	39 - WW Sludge Treatment		S- Building	Exterior	Fence	11	Equipment (40 years)	01/01/1978	4	2	2	2	5-Repair
105143282	Plant Water Discharge	HULL_WWTP-392			Mechanical	Underground	Piping	2		01/01/1978	3	3	3	8	6-Refurbish/rehabilitate
96144305	Plant Water Pump 1	HULL_WWTP-218	Effluent Pump 1	25136	Electrical	Basement- Electric Room	Electric	6	Motors	01/01/2013	5	3	3	8	2-Continue with Status Quo
96144306	Plant Water Pump 2	HULL_WWTP-219	Effluent Pump 3	25137	Electrical	Basement- Electric Room	Electric	6	Motors	01/01/2013	5	3	3	8	2-Continue with Status Quo
105128855	Plant Water Strainer	HULL_WWTP-378	30 - WW Treatment Plant - General		Mechanical	Control Room Basement - Pump Room B	Building Misc Items	12	Equipment (20 years)	01/01/1995	5	2	3	4	7-Replace asset with similar
105143289	Plant Water Suction	HULL_WWTP-399			Mechanical	Underground	Piping	2			3	3	3	8	6-Refurbish/rehabilitate
96144304	Plant Water System	HULL_WWTP-217	37 - WW Odor Control	25135	Mechanical	Control Room Basement - Pump Room B	Building Misc Items	4	Pumps	01/01/2002	5	1	5	8	7-Replace asset with similar
96144308	Plant Water System Control Panel	HULL_WWTP-221	30 - WW Treatment Plant - General	25139							10	5	5	9	8-Replace with improved asset
96144307	Plant water yard hydrants	HULL_WWTP-220	30 - WW Treatment Plant - General	25138	Mechanical	Exterior	Piping/Hydrants	12	Equipment (20 years)	01/01/1978	5	2	2	4	2-Continue with Status Quo
96144118	Plumbing	HULL_WWTP-31	31 - WW Headworks	24720											
96144120	Portable Air Compressor	HULL_WWTP-33	Fixed Gas Monitoring System	24722											
96144350	Portable Diesel Pump 4A Thompson 4" 600 - 700gpm	HULL_WWTP-		28193											
96144351	Portable Diesel Pump 4B Thompson 4" 600 - 700 gpm	HULL_WWTP-		28194											
96144352	Portable Diesel Pump 6A Thompson 6" 900 - 1000 gpm	HULL_WWTP-	38 - WW Disinfection	28195											
96144353	Portable Diesel Pump 6B Thompson 6" 900 - 1000 gpm	HULL_WWTP-	38 - WW Disinfection	28197											
96144364	Portable Electric Pump 6A Gorman Rupp 6"	HULL_WWTP-		28212											
96144119	Portable Equipment	HULL_WWTP-32	31 - WW Headworks	24721											
96144121	Portable Generator - Honda	HULL_WWTP-34	30 - WW Treatment Plant - General	24723											
105143294	Power Manhole 3	HULL_WWTP-	39 - WW Sludge Treatment		Electrical	Underground	Manhole	7							
96144122	Pressure Washer	HULL_WWTP-35	31 - WW Headworks	24724											
96144110	Primary Building	HULL_WWTP-24	30 - WW Treatment Plant - General	24713											
96144216	Primary Clarifier 1	HULL_WWTP-129	36 - WW Effluent Process	24819	Mechanical	Primary Clarifier 1	Primary Clarifiers	12	Equipment (20 years)	01/01/2002	7	2	4	3	7-Replace asset with similar
96144221	Primary Clarifier 1 Drive System	HULL_WWTP-	Effluent Pump 3	24824											
96144217	Primary Clarifier 2	HULL_WWTP-130	36 - WW Effluent Process	24820	Mechanical	Primary Clarifier 2	Primary Clarifiers	12	Equipment (20 years)	01/01/2002	6	2	4	3	7-Replace asset with similar
96144220	Primary Clarifier 2 Drive System	HULL_WWTP-	Effluent Pump 1	24823											
96144219	Primary Clarifier Influent D-Box	HULL_WWTP-132	34 - WW Secondary Treatment	24822	Mechanical	Adjacent to Primary Clarifiers in Yard	Primary Clarifiers	12	Equipment (20 years)	01/01/1978	4	1	2	3	7-Replace asset with similar
96144218	Primary Clarifier Starters	HULL_WWTP-131	34 - WW Secondary Treatment	24821	Electrical	Basement	Electric	7	Electrical	01/01/2013	1	1	1	3	2-Continue with Status Quo
96144215	Primary Clarifiers	HULL_WWTP-	32 - WW Influent Process	24818											
96144390	Primary Electrical Control Manhole	HULL_WWTP-	30 - WW Treatment Plant - General	28281	Electrical	Underground	Electric	7	Electrical	01/01/1978	4	2	3	3	3-Maintain differently
96144389	Primary Electrical Power Manhole	HULL_WWTP-		28280	Electrical	Underground	Electric	7	Electrical	01/01/1978	4	2	3	3	3-Maintain differently
105128839	Primary Pump Room	HULL_WWTP-362	39 - WW Sludge Treatment		Structural	Primary Pump Room	Structural	1	Civil	01/01/1978	5	2	3	3	6-Refurbish/rehabilitate
105128838	Primary Pump Room Panelboard	HULL_WWTP-361			Electrical	Primary Pump Room	Electric	7	Electrical		9	4	2		7-Replace asset with similar
105143285	Primary Scum Discharge	HULL_WWTP-			Mechanical	Underground	Piping	2		01/01/1978					
96144280	Primary Scum Pump	HULL_WWTP-193	31 - WW Headworks	24883	Mechanical	Primary Pump Room	Primary Clarifiers	4	Pumps	01/01/2002	4	1	3	4	7-Replace asset with similar
105143291	Primary Scum Suction	HULL_WWTP-			Mechanical	Underground	Piping	2							
96144285	Primary Sludge Pump 1	HULL_WWTP-198	39 - WW Sludge Treatment	24888	Mechanical	Primary Pump Room	Primary Clarifiers	4	Pumps	01/01/2002	4	1	4	3	7-Replace asset with similar
96144286	Primary Sludge Pump 2	HULL_WWTP-199	39 - WW Sludge Treatment	24889	Mechanical	Primary Pump Room	Primary Clarifiers	4	Pumps	01/01/2002	4	1	4	3	7-Replace asset with similar
96144300	PS 6 Generator	HULL_WWTP-	32 - WW Influent Process	24782	Controls	Control Building	Controls	8	Controls	01/01/2013	3	1	3	1	8
96144333	PS Trailer Mounted Generator	HULL_WWTP-	39 - WW Sludge Treatment	28161											
105128849	PS-Sludge Piping and Valves associated with Sludge Recirculating Pump P-640	HULL_WWTP-372			Mechanical	Control Building - Sludge Pump Room	Sludge Processing	5	Valves	01/01/2002	2	2	2	4	7-Replace asset with similar
96144355	Push Camera Control Cabinet	HULL_WWTP-		28203											
96144359	Push Camera Control Cabinet	HULL_WWTP-		28203											
96144356	Push Camera Reel Assembly	HULL_WWTP-		28204											
96144360	Push Camera Reel Assembly	HULL_WWTP-	30 - WW Treatment Plant - General	28204											
96144354	Push Camera Set 1	HULL_WWTP-	30 - WW Treatment Plant - General	28202											
96144358	Push Camera Set 2	HULL_WWTP-		28206											
105143283	RAS Discharge	HULL_WWTP-	39 - WW Sludge Treatment		Mechanical	Underground	Piping	2		01/01/1978					

Utility CloudID	AssetDescription	AssetID	Parent Group	SEMS ID	Category	Location	Type	Class Number	Class Description	Year Installed	Condition Rating	Current Performance	Current Reliability Rating	Consequence of Failure	Renewal Strategy
96144268	RAS Pump 1	HULL_WWTP-181	30 - WW Treatment Plant - General	24871	Mechanical	Pump Room - Secondary Clarifiers	Secondary Clarifiers	4	Pumps	01/01/1978	5	1	4	3	7-Replace asset with similar
96144273	RAS Pump 1 VFD	HULL_WWTP-186	Fixed Gas Monitoring System	24876	Electrical	1st Floor - MCC Room	Electric	7	Electrical	01/01/2013	1	1	1	3	2-Continue with Status Quo
96144269	RAS Pump 2	HULL_WWTP-182	36 - WW Effluent Process	24872	Mechanical	Pump Room - Secondary Clarifiers	Secondary Clarifiers	4	Pumps	01/01/1978	5	1	4	3	7-Replace asset with similar
96144272	RAS Pump 2 VFD	HULL_WWTP-185	32 - WW Influent Process	24875	Electrical	1st Floor - MCC Room	Electric	7	Electrical	01/01/2013	1	1	1	3	2-Continue with Status Quo
96144270	RAS Pump 3	HULL_WWTP-183	39 - WW Sludge Treatment	24873	Mechanical	Pump Room - Secondary Clarifiers	Secondary Clarifiers	4	Pumps	01/01/1978	5	1	4	3	7-Replace asset with similar
96144271	RAS Pump 3 VFD	HULL_WWTP-184	Fixed Gas Monitoring System	24874	Electrical	1st Floor - MCC Room	Electric	7	Electrical	01/01/2013	1	1	1	3	2-Continue with Status Quo
96144267	RAS System	HULL_WWTP-	30 - WW Treatment Plant - General	24870											
96144394	Roof - Operations Building	HULL_WWTP-	30 - WW Treatment Plant - General	28414	S- Building	Control Building	Roof	13	Equipment (10 years)	01/01/1978	5	3	3	5	
96144274	Rotary Sludge Thickener	HULL_WWTP-187	Fixed Gas Monitoring System	24877	Mechanical	Control Building-RST Room	Sludge Handling	12	Equipment (20 years)	01/01/1999	5	2	4	4	7-Replace asset with similar
96144145	RST CD Disconnect Switch	HULL_WWTP-58	32 - WW Influent Process	24747	Electrical	2nd Floor - RST Room	Electric	7	Electrical	01/01/2000	8	3	1	3	7-Replace asset with similar
96144275	RST Feed Pump 1	HULL_WWTP-188	37 - WW Odor Control	24878	Electrical	Basement	Electric	6	Motors	01/01/2013	1	1	1	2	2-Continue with Status Quo
96144278	RST Feed Pump 1 Motor	HULL_WWTP-	31 - WW Headworks	24881											
96144276	RST Feed Pump 2	HULL_WWTP-189	37 - WW Odor Control	24879	Electrical	Basement	Electric	6	Motors	01/01/2013	1	1	1	2	2-Continue with Status Quo
96144277	RST Feed Pump 2 Motor	HULL_WWTP-	39 - WW Sludge Treatment	24880											
96144402	RST Polymer feed pump	HULL_WWTP-	30 - WW Treatment Plant - General	28518											
96144401	RST Polymer System	HULL_WWTP-	30 - WW Treatment Plant - General	28517											
96144400	RST Water Booster Pump	HULL_WWTP-	32 - WW Influent Process	28516											
96144330	Samsung Television	HULL_WWTP-	34 - WW Secondary Treatment	28158											
105128824	Sand blaster	HULL_WWTP-	30 - WW Treatment Plant - General												
96144123	SCADA	HULL_WWTP-36	30 - WW Treatment Plant - General	24725	Controls	Control Building	SCADA	8	Controls	01/01/2008	4	2	3	9	6-Refurbish/rehabilitate
96144417	Screenings washer-compactor	HULL_WWTP-330		29764							3	1	4	3	2-Continue with Status Quo
96144314	Scrubber - for truck filling	HULL_WWTP-	MCC 1	25368							1	1	1	1	
96144146	Scrubber Disconnect Switch	HULL_WWTP-59	32 - WW Influent Process	24748											
96144279	Scum Pumps	HULL_WWTP-	30 - WW Treatment Plant - General	24882											
96144111	Secondary Building	HULL_WWTP-25	MDP 6 Feeder Breaker in MSB	24714											
96144230	Secondary Clarifier 1	HULL_WWTP-143	Backflow preventers	24833	Mechanical	Pump Room - Secondary Clarifiers	Secondary Clarifiers	12	Equipment (20 years)	01/01/2002	7	2	5	8	7-Replace asset with similar
96144231	Secondary Clarifier 1 Drive System	HULL_WWTP-144	Backflow preventers	24834	Electrical	Secondary Clarifiers (x2) / Primary Clarifiers	Electric	7	Electrical	01/01/2000	3	1	1		2-Continue with Status Quo
96144232	Secondary Clarifier 2	HULL_WWTP-145	30 - WW Treatment Plant - General	24835	Mechanical	Pump Room - Secondary Clarifiers	Secondary Clarifiers	12	Equipment (20 years)	01/01/2002	7	2	5	8	7-Replace asset with similar
96144233	Secondary Clarifier 2 Drive System	HULL_WWTP-146	30 - WW Treatment Plant - General	24836	Electrical	Secondary Clarifiers (x2) / Primary Clarifiers	Electric	7	Electrical	01/01/2000	3	1	1		2-Continue with Status Quo
96144321	Secondary Clarifier Cathodic Protection	HULL_WWTP-234	30 - WW Treatment Plant - General	26912	Instrumentation	Secondary Clarifiers (x2) / Primary Clarifiers	Instumentation								
96144229	Secondary Clarifiers	HULL_WWTP-	Backflow preventers	24832						01/05/2002					
96144385	Secondary Electrical Power Manhole	HULL_WWTP-		28276											
96144147	Secondary Pump Disconnect Switches	HULL_WWTP-60	32 - WW Influent Process	24749											
105128840	Secondary Pump Room	HULL_WWTP-	39 - WW Sludge Treatment		Structural	Pump Room A	Structural	1	Civil	01/01/1978	3	2	3	5	
105128827	Secondary Pump Room Panel Board	HULL_WWTP-350	Primary Clarifier 1		Electrical	Exterior Underground - Secondary Pump Room	Electric	7	Electrical	01/01/2004	2	5	1		2-Continue with Status Quo
105143284	Secondary Scum Discharge	HULL_WWTP-			Mechanical	Underground	Piping	2		01/01/1978					
96144281	Secondary Scum Pump 1	HULL_WWTP-194	30 - WW Treatment Plant - General	24884	Mechanical	Pump Room - Secondary Clarifiers	Secondary Clarifiers	4	Pumps	01/01/2002	3	1	4	3	7-Replace asset with similar
96144282	Secondary Scum Pump 2	HULL_WWTP-195	39 - WW Sludge Treatment	24885	Mechanical	Pump Room - Secondary Clarifiers	Secondary Clarifiers	4	Pumps	01/01/2002	3	1	4	3	7-Replace asset with similar
105143290	Secondary Scum Suction	HULL_WWTP-	23 - WW Pump Stations		Mechanical	Underground	Piping	2							
96144386	Seconday Electrical Control Manhole	HULL_WWTP-		28277	Electrical	Underground	Electric	7	Electrical	01/01/1978	4	2	3	8	3-Maintain differently
96144298	Security Fencing	HULL_WWTP-	30 - WW Treatment Plant - General	25113											
105128860	Sludge Holding Tank 1 Aeration System	HULL_WWTP-			Mechanical	Sludge Holding Tank 2	Aerator/Mixer	13	Equipment (10 years)	01/01/2009	4	1	2	3	5-Repair
105128857	Sludge Holding Tank 1 Hatch	HULL_WWTP-380	34 - WW Secondary Treatment		Mechanical	Sludge Holding Tank 1	Hatches	12	Equipment (20 years)	01/01/1978	6	2	5	2	7-Replace asset with similar
105128859	Sludge Holding Tank 2 Aeration System	HULL_WWTP-	34 - WW Secondary Treatment		Mechanical	Sludge Holding Tank 2	Aerator/Mixer	13	Equipment (10 years)	01/01/2009	4	1	2	3	5-Repair
105128858	Sludge Holding Tank 2 Hatch	HULL_WWTP-381			Mechanical	Sludge Holding Tank 1	Hatches	12	Equipment (20 years)	01/01/1978	6	2	5	2	7-Replace asset with similar
105143293	Sludge Holding Tank Odor Control Suction	HULL_WWTP-	Mechanical Screen & Washpress System		Mechanical	Above Ground	Piping	2							
96144283	Sludge Incinerator	HULL_WWTP-	39 - WW Sludge Treatment	24886											
105128850	Sludge Piping and Valves associated with RST Feed Pumps P- 620 and P-630	HULL_WWTP-373			Mechanical	Control Building	Sludge Processing	5	Valves	01/01/2002	2	3	2	2	7-Replace asset with similar
96144284	Sludge Pumps	HULL_WWTP-	33 - WW Primary Treatment	24887											
96144289	Sludge Recirculating Pump	HULL_WWTP-202	32 - WW Influent Process	24892	Mechanical	Control Building - Sludge Pump Room	Sludge Handling	4	Pumps	01/01/2013	2	1	3	4	7-Replace asset with similar
96144290	Sludge Storage Tank 1	HULL_WWTP-203	30 - WW Treatment Plant - General	24893	Mechanical	Control Building - First Fl, Ext	Sludge Handling	12	Equipment (20 years)	01/01/2002	5	1	1	3	7-Replace asset with similar
96144291	Sludge Storage Tank 2	HULL_WWTP-204	33 - WW Primary Treatment	24894	Mechanical	Control Building - First Fl, Ext	Sludge Handling	12	Equipment (20 years)	01/01/2002	5	1	1	3	7-Replace asset with similar
96144292	Sludge Storage Tank Blower #1	HULL_WWTP-	39 - WW Sludge Treatment	24895											

Utility CloudID	AssetDescription	AssetID	Parent Group	SEMS ID	Category	Location	Type	Class Number	Class Description	Year Installed	Condition Rating	Current Performance	Current Reliability Rating	Consequence of Failure	Renewal Strategy
96144334	Sludge Storage Tank Blower #2	HULL_WWTP-247	34 - WW Secondary Treatment	28162	Mechanical	Control Building-Compressor Room	Blowers	12	Equipment (20 years)	01/01/2002	4	1	3	4	7-Replace asset with similar
96144335	Sludge Storage Tank Blower #3	HULL_WWTP-	34 - WW Secondary Treatment	28163											
96144293	Sludge Storage Tank Loading Connection	HULL_WWTP-206	33 - WW Primary Treatment	24896	Mechanical	Control Building - Ext	Sludge Handling	3	Sewers	01/01/2002				4	2-Continue with Status Quo
105128843	Sludge Transfer Piping and Valves	HULL_WWTP-366	39 - WW Sludge Treatment		Mechanical	Control Building	Sludge Processing	12	Equipment (20 years)	01/01/1978	3	2	2	4	7-Replace asset with similar
96144287	Sludge Transfer Pump 1	HULL_WWTP-200	32 - WW Influent Process	24890	Mechanical	Control Building - Sludge Pump Room	Sludge Handling	4	Pumps	01/01/2013	4	1	3	3	7-Replace asset with similar
96144288	Sludge Transfer Pump 2	HULL_WWTP-201	32 - WW Influent Process	24891	Mechanical	Control Building - Sludge Pump Room	Sludge Handling	4	Pumps	01/01/2013	4	1	4	3	7-Replace asset with similar
96144382	Snow Blower	HULL_WWTP-		28264											
96144184	Sump Pump	HULL_WWTP-97	32 - WW Influent Process	24786	Mechanical	Basement - Influent Pump Room A	Building Misc Items	13	Equipment (10 years)	01/01/2004	2	2	3	2	8-Replace with improved asset
105128847	Tank 1 V-310 Air Diffuser	HULL_WWTP-370			Mechanical	AT-310 Tank 1	Aeration Tanks	12	Equipment (20 years)	01/01/2002	3	1	3	4	2-Continue with Status Quo
105128848	Tank 3 V-330 Air Diffuser	HULL_WWTP-371			Mechanical	AT-330 Tank 3	Aeration Tanks	12	Equipment (20 years)	01/01/2002	3	1	3	4	2-Continue with Status Quo
96144404	Thickened Sludge Tank "above ground"	HULL_WWTP-317	30 - WW Treatment Plant - General	28550	Mechanical	Gravity Thickeners / Sludge Holding Tanks	Tanks	12	Equipment (20 years)	01/01/2003	5	1	3	2	7-Replace asset with similar
96144109	Thickner Room	HULL_WWTP-23	Main Switchboard	24712											
96144337	Trailer 1 - Jetter	HULL_WWTP-	34 - WW Secondary Treatment	28165											
96144365	Trailer 2 - Utility	HULL_WWTP-		28213											
96144148	Transfer Pump Disconnect Switch	HULL_WWTP-61	32 - WW Influent Process	24750	Electrical	Aeration Tanks	Electric	7	Electrical	01/01/2004	2	1	1	3	2-Continue with Status Quo
96144332	Truck 1 - 2010 Dodge Ram 1500	HULL_WWTP-	34 - WW Secondary Treatment	28160											
96144348	Truck 2 - 2009 Chevy 2500 HD	HULL_WWTP-	38 - WW Disinfection	28189											
96144410	Truck 3 - 2015 Chevy 3500 HD	HULL_WWTP-		29519											
96144411	Truck 4 - 2015 Nissan Frontier	HULL_WWTP-		29520											
96144299	Truck 5 - Doosan Fork Truck	HULL_WWTP-	32 - WW Influent Process	25114											
96144329	TVSS	HULL_WWTP-	33 - WW Primary Treatment	28156	Electrical	Basement	Electric	7	Electrical	01/01/2013	1	1	1	1	1-Do nothing
96144328	TVSS Disconnect	HULL_WWTP-	33 - WW Primary Treatment	28155	Electrical	Basement	Electric	7	Electrical	01/01/2013	1	1	1	1	1-Do nothing
96144149	UN Disconnect Switch	HULL_WWTP-62	32 - WW Influent Process	24751			Electric	7	Electrical	01/01/2013	2	1	1	3	2-Continue with Status Quo
96144393	Universal waste area	HULL_WWTP-	30 - WW Treatment Plant - General	28289											
96144313	UST - Underground Storage Tank for diesel fuel	HULL_WWTP-226	Aerated Grit System	25367							5	2	4	10	8-Replace with improved asset
96144124	Vehicles	HULL_WWTP-37	37 - WW Odor Control	24726											
96144312	Verizon pump station modem circuit	HULL_WWTP-	39 - WW Sludge Treatment	25213							3	3	3	7	
96144418	Vertical screenings conveyor	HULL_WWTP-331	37 - WW Odor Control	29765							3	1	4	3	2-Continue with Status Quo
105143286	WAS Discharge	HULL_WWTP-			Mechanical	Underground	Piping	2		01/01/1978					
105143292	WAS Suction	HULL_WWTP-	30 - WW Treatment Plant - General		Mechanical	Underground	Piping	2							
96144294	WAS System	HULL_WWTP-	30 - WW Treatment Plant - General	24897											
96144295	Waste Activated Sludge Pump 1	HULL_WWTP-208	39 - WW Sludge Treatment	24898	Mechanical	Pump Room - Secondary Clarifiers	Secondary Clarifiers	4	Pumps	01/01/2012	2	1	3	3	7-Replace asset with similar
96144296	Waste Activated Sludge Pump 2	HULL_WWTP-209	31 - WW Headworks	24899	Mechanical	Pump Room - Secondary Clarifiers	Secondary Clarifiers	4	Pumps	01/01/2002	3	1	3	3	7-Replace asset with similar
96144392	Waste Oil Storage	HULL_WWTP-		28288											
105143287	Water	HULL_WWTP-397			Mechanical	Underground	Piping	2		01/01/1978	3	3	3	7	6-Refurbish/rehabilitate
96144258	Wet Scrubber Fan	HULL_WWTP-171	32 - WW Influent Process	24861	Mechanical	Control Building - Roof	Effluent PS & NaOH Sy	12	Equipment (20 years)	01/01/2002	3	1	3	4	2-Continue with Status Quo
96144259	Wet Scrubber Recirculation Pumps	HULL_WWTP-172	31 - WW Headworks	24862	Mechanical	Control Building	Odor Control System	4	Pumps	01/01/2002	3	1	3	4	7-Replace asset with similar
96144256	Wet Scrubber System	HULL_WWTP-	39 - WW Sludge Treatment	24859											
96144150	XF Disconnect Switch	HULL_WWTP-63	32 - WW Influent Process	24752	Electrical	1st Floor - MCC Room	Electric	7	Electrical	01/01/2013	1	1	1	3	2-Continue with Status Quo

APPENDIX C: PRIORITY LIST OF ASSETS

Fiscal Sustainability Plan - All Assets, All Grades

Layer	Asset Description	ID	System	Category	Normalized LoF	Normalized CoF	Normalized Risk	Risk Grade
WW	Main Switchboard	HULL_WWTP-66	WWTP	Electrical	5.00	5.00	100.00	5-Extreme
WW	Influent Forcemain - 16 Inch	HULL_WWTP-94	WWTP	Piping	4.92	5.00	100.00	5-Extreme
WW	Influent Wet Well 2	HULL_WWTP-135	WWTP	Structural	4.89	5.00	100.00	5-Extreme
WW	GODWIN Portable Pump	HULL_WWTP-236	WWTP		5.00	4.50	100.00	5-Extreme
WW	HVAC System	HULL_WWTP-29	WWTP	Mechanical	5.00	4.50	100.00	5-Extreme
MH	MH-20005	MH-20005	Collections	Manhole	5.00	4.77	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10471	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10466	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10454	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10446	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10444	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10435	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on FITZPATRIC WAY	10214	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on FITZPATRIC WAY	10192	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on FITZPATRIC WAY	10182	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on FITZPATRIC WAY	10173	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on FITZPATRIC WAY	10169	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on FITZPATRIC WAY	10164	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on FITZPATRIC WAY	10158	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on FITZPATRIC WAY	10156	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on FITZPATRIC WAY	10154	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10151	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10149	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10148	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on SPRING ST.	10147	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on SPRING ST.	10146	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
Pipe	Sewer 36" RC Pipe on SPRING ST.	10145	Collections	Gravity Pipe	5.00	4.62	100.00	5-Extreme
PS Asset	PS 3 Piping and Valves	HULL_PSASSET-40	Collections	Unk	5.00	5.00	100.00	5-Extreme
PS Asset	PS 3	HULL_PSASSET-22	Collections	Unk	5.00	5.00	100.00	5-Extreme
WW	Influent Forcemain - 8 Inch	HULL_WWTP-95	WWTP	Piping	4.92	5.00	98.30	5-Extreme
WW	Influent Wet Well 1	HULL_WWTP-10	WWTP	Structural	4.89	5.00	97.83	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10144	Collections	Gravity Pipe	5.00	4.23	91.67	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10143	Collections	Gravity Pipe	5.00	4.23	91.67	5-Extreme
MH	MH-20449	MH-20449	Collections	Manhole	5.00	4.32	90.48	5-Extreme
MH	MH-20432	MH-20432	Collections	Manhole	5.00	4.32	90.48	5-Extreme
MH	MH-20414	MH-20414	Collections	Manhole	5.00	4.32	90.48	5-Extreme
WW	Plant Water System Control Panel	HULL_WWTP-221	WWTP		5.00	4.50	90.00	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10597	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10579	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10578	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10567	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10566	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10546	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10536	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10517	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10482	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10436	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10415	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10406	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10399	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10393	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10389	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10384	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10366	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10337	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10320	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10308	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10299	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10284	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10276	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10264	Collections	Gravity Pipe	5.00	4.04	87.50	5-Extreme
WW	Effluent Pump Room	HULL_WWTP-17	WWTP	Structural	4.84	4.50	87.08	5-Extreme
Pipe	Sewer 18" VC Pipe on MAIN ST.	10008	Collections	Gravity Pipe	4.00	4.81	83.33	5-Extreme
WW	Plant Water System	HULL_WWTP-217	WWTP	Mechanical	5.00	4.00	81.38	5-Extreme
WW	Headworks HVAC	HULL_WWTP-365	WWTP	HVAC	5.00	4.00	81.38	5-Extreme
WW	Secondary Clarifier 1	HULL_WWTP-143	WWTP	Mechanical	5.00	4.00	81.38	5-Extreme
MH	MH-20803	MH-20803	Collections	Manhole	5.00	3.86	80.95	5-Extreme
MH	MH-20122	MH-20122	Collections	Manhole	5.00	3.86	80.95	5-Extreme

MH	MH-20065	MH-20065	Collections	Manhole	5.00	3.86	80.95	5-Extreme
WW	Headworks Room	HULL_WWTP-364	WWTP	Structural	4.94	4.00	80.43	5-Extreme
WW	Secondary Clarifier 2	HULL_WWTP-145	WWTP	Mechanical	5.00	4.00	80.00	5-Extreme
WW	Influent Sluice Isolation Gate	HULL_WWTP-89	WWTP	Mechanical	5.00	4.00	80.00	5-Extreme
WW	H2S meter	HULL_WWTP-230	WWTP	Controls	5.00	3.50	77.78	5-Extreme
WW	Plant Water Discharge	HULL_WWTP-392	WWTP	Mechanical	4.84	4.00	77.40	5-Extreme
MH	MH-20552	MH-20552	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20543	MH-20543	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20542	MH-20542	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20508	MH-20508	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20490	MH-20490	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20458	MH-20458	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20405	MH-20405	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20390	MH-20390	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20380	MH-20380	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20364	MH-20364	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20355	MH-20355	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20332	MH-20332	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20325	MH-20325	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20293	MH-20293	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20273	MH-20273	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20256	MH-20256	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20245	MH-20245	Collections	Manhole	5.00	3.64	76.19	5-Extreme
MH	MH-20008	MH-20008	Collections	Manhole	3.75	4.77	75.00	5-Extreme
MH	MH-20004	MH-20004	Collections	Manhole	3.75	4.77	75.00	5-Extreme
Pipe	Sewer 10" VC Pipe on ATLANTIC AVE.	11018	Collections	Gravity Pipe	5.00	3.46	75.00	5-Extreme
Pipe	Sewer 10" VC Pipe on ATLANTIC AVE.	11011	Collections	Gravity Pipe	5.00	3.46	75.00	5-Extreme
WW	Generator #2 - Backup	HULL_WWTP-64	WWTP	Electrical	4.00	4.50	72.00	5-Extreme
MH	MH-20963	MH-20963	Collections	Manhole	5.00	3.41	71.43	5-Extreme
MH	MH-20962	MH-20962	Collections	Manhole	5.00	3.41	71.43	5-Extreme
WW	Hypochlorite System	HULL_WWTP-162	WWTP	Mechanical	5.00	3.50	71.21	5-Extreme
WW	H2S Meter	HULL_WWTP-233	WWTP	Controls	5.00	3.50	70.00	5-Extreme
Pipe	Sewer 15" VC Pipe on MAIN ST.	10084	Collections	Gravity Pipe	4.00	4.04	70.00	5-Extreme
MH	MH-20195	MH-20195	Collections	Manhole	3.75	4.32	67.86	5-Extreme
MH	MH-20147	MH-20147	Collections	Manhole	3.75	4.32	67.86	5-Extreme
MH	MH-20130	MH-20130	Collections	Manhole	3.75	4.32	67.86	5-Extreme
MH	MH-20129	MH-20129	Collections	Manhole	3.75	4.32	67.86	5-Extreme
MH	MH-20127	MH-20127	Collections	Manhole	3.75	4.32	67.86	5-Extreme
MH	MH-20126	MH-20126	Collections	Manhole	3.75	4.32	67.86	5-Extreme
MH	MH-20020	MH-20020	Collections	Manhole	3.75	4.32	67.86	5-Extreme
MH	MH-20016	MH-20016	Collections	Manhole	3.75	4.32	67.86	5-Extreme
WW	Water	HULL_WWTP-397	WWTP	Mechanical	4.84	3.50	67.73	5-Extreme
WW	Influent Pump Room	HULL_WWTP-21	WWTP	Room	3.16	5.00	63.25	5-Extreme
WW	Aeration Tank 1	HULL_WWTP-148	WWTP	Mechanical	3.81	4.00	62.01	5-Extreme
WW	Effluent Pump 1	HULL_WWTP-155	WWTP	Mechanical	3.38	4.50	61.80	5-Extreme
WW	Effluent Pump 3	HULL_WWTP-157	WWTP	Mechanical	3.38	4.50	60.75	5-Extreme
MH	MH-20934	MH-20934	Collections	Manhole	3.75	3.86	60.71	5-Extreme
MH	MH-20927	MH-20927	Collections	Manhole	3.75	3.86	60.71	5-Extreme
MH	MH-20757	MH-20757	Collections	Manhole	3.75	3.86	60.71	5-Extreme
MH	MH-20072	MH-20072	Collections	Manhole	3.75	3.86	60.71	5-Extreme
Pipe	Sewer 10" VC Pipe on ATLANTIC AVE.	11021	Collections	Gravity Pipe	4.00	3.46	60.00	5-Extreme
Pipe	Sewer 10" VC Pipe on ATLANTIC AVE.	11020	Collections	Gravity Pipe	4.00	3.46	60.00	5-Extreme
Pipe	Sewer 10" VC Pipe on ATLANTIC AVE.	11019	Collections	Gravity Pipe	4.00	3.46	60.00	5-Extreme
Pipe	Sewer 10" VC Pipe on ATLANTIC AVE.	11015	Collections	Gravity Pipe	4.00	3.46	60.00	5-Extreme
Pipe	Sewer 10" VC Pipe on ATLANTIC AVE.	11014	Collections	Gravity Pipe	4.00	3.46	60.00	5-Extreme
Pipe	Sewer 10" VC Pipe on ATLANTIC AVE.	11010	Collections	Gravity Pipe	4.00	3.46	60.00	5-Extreme
Pipe	Sewer 18" VC Pipe on MAIN ST.	10055	Collections	Gravity Pipe	4.00	3.46	60.00	5-Extreme
Pipe	Sewer 18" VC Pipe on MAIN ST.	10054	Collections	Gravity Pipe	4.00	3.46	60.00	5-Extreme
Pipe	Sewer 6" VC Pipe on NEWTON ST.	10053	Collections	Gravity Pipe	4.00	3.46	60.00	5-Extreme
MH	MH-20849	MH-20849	Collections	Manhole	3.75	3.64	57.14	5-Extreme
MH	MH-20847	MH-20847	Collections	Manhole	3.75	3.64	57.14	5-Extreme
MH	MH-20671	MH-20671	Collections	Manhole	3.75	3.64	57.14	5-Extreme
MH	MH-20664	MH-20664	Collections	Manhole	3.75	3.64	57.14	5-Extreme
MH	MH-20656	MH-20656	Collections	Manhole	3.75	3.64	57.14	5-Extreme
MH	MH-20630	MH-20630	Collections	Manhole	3.75	3.64	57.14	5-Extreme
MH	MH-20614	MH-20614	Collections	Manhole	3.75	3.64	57.14	5-Extreme
MH	MH-20596	MH-20596	Collections	Manhole	3.75	3.64	57.14	5-Extreme
MH	MH-20580	MH-20580	Collections	Manhole	3.75	3.64	57.14	5-Extreme
MH	MH-20371	MH-20371	Collections	Manhole	3.75	3.64	57.14	5-Extreme
MH	MH-20309	MH-20309	Collections	Manhole	3.75	3.64	57.14	5-Extreme

MH	MH-20299	MH-20299	Collections	Manhole	3.75	3.64	57.14	5-Extreme
MH	MH-20221	MH-20221	Collections	Manhole	3.75	3.64	57.14	5-Extreme
MH	MH-20022	MH-20022	Collections	Manhole	3.75	3.64	57.14	5-Extreme
WW	Eyewash Stations - Influent Pump Room	HULL_WWTP-44	WWTP	Safety Shower	3.16	4.50	56.93	5-Extreme
WW	Effluent Pump 2	HULL_WWTP-156	WWTP	Mechanical	3.38	4.00	54.93	5-Extreme
WW	Effluent Pump 4	HULL_WWTP-158	WWTP	Mechanical	3.38	4.00	54.00	5-Extreme
MH	MH-20979	MH-20979	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20976	MH-20976	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20972	MH-20972	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20967	MH-20967	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20907	MH-20907	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20906	MH-20906	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20905	MH-20905	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20903	MH-20903	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20897	MH-20897	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20891	MH-20891	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20890	MH-20890	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20881	MH-20881	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20877	MH-20877	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20869	MH-20869	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20846	MH-20846	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20837	MH-20837	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20442	MH-20442	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20423	MH-20423	Collections	Manhole	3.75	3.41	53.57	5-Extreme
MH	MH-20010	MH-20010	Collections	Manhole	3.75	3.41	53.57	5-Extreme
Pipe	Sewer 14" VC Pipe on ATHERTON RD.	10937	Collections	Gravity Pipe	4.00	3.08	53.33	5-Extreme
Pipe	Sewer 14" VC Pipe on ATHERTON RD.	10935	Collections	Gravity Pipe	4.00	3.08	53.33	5-Extreme
Pipe	Sewer 14" VC Pipe on ATHERTON RD.	10932	Collections	Gravity Pipe	4.00	3.08	53.33	5-Extreme
Pipe	Sewer 14" VC Pipe on PARK AVE.	10925	Collections	Gravity Pipe	4.00	3.08	53.33	5-Extreme
Pipe	Sewer 14" VC Pipe on PARK AVE.	10920	Collections	Gravity Pipe	4.00	3.08	53.33	5-Extreme
Pipe	Sewer 10" VC Pipe on NANTASKET AVE.	10890	Collections	Gravity Pipe	4.00	3.08	53.33	5-Extreme
Pipe	Sewer 10" VC Pipe on NANTASKET AVE.	10888	Collections	Gravity Pipe	4.00	3.08	53.33	5-Extreme
Pipe	Sewer 10" VC Pipe on NANTASKET AVE.	10884	Collections	Gravity Pipe	4.00	3.08	53.33	5-Extreme
Pipe	Sewer 10" VC Pipe on NANTASKET AVE.	10883	Collections	Gravity Pipe	4.00	3.08	53.33	5-Extreme
Pipe	Sewer 12" VC Pipe on NANTASKET AVE.	10139	Collections	Gravity Pipe	4.00	3.08	53.33	5-Extreme
Pipe	Sewer 12" VC Pipe on NANTASKET AVE.	10130	Collections	Gravity Pipe	4.00	3.08	53.33	5-Extreme
Pipe	Sewer 6" VC Pipe on MAIN ST.	10011	Collections	Gravity Pipe	4.00	3.08	53.33	5-Extreme
Pipe	Sewer 6" VC Pipe on MAIN ST.	10006	Collections	Gravity Pipe	4.00	3.08	53.33	5-Extreme
Pipe	Sewer 6" VC Pipe on MAIN ST.	10004	Collections	Gravity Pipe	4.00	3.08	53.33	5-Extreme
Pipe	Sewer 6" VC Pipe on MAIN ST.	10002	Collections	Gravity Pipe	4.00	3.08	53.33	5-Extreme
WW	Knife Gate Valve No. 2	HULL_WWTP-375	WWTP	Mechanical	3.25	3.50	50.56	5-Extreme
MH	MH-20922	MH-20922	Collections	Manhole	3.75	3.18	50.00	5-Extreme
MH	MH-20912	MH-20912	Collections	Manhole	3.75	3.18	50.00	5-Extreme
MH	MH-20909	MH-20909	Collections	Manhole	3.75	3.18	50.00	5-Extreme
MH	MH-20052	MH-20052	Collections	Manhole	3.75	3.18	50.00	5-Extreme
MH	MH-20045	MH-20045	Collections	Manhole	3.75	3.18	50.00	5-Extreme
WW	Influent Pump 1 Suction Valve	HULL_WWTP-102	WWTP		3.50	3.50	49.00	5-Extreme
WW	Influent Pump 1 Check Valve	HULL_WWTP-99	WWTP		3.50	3.50	49.00	5-Extreme
WW	Influent Pump 1 Discharge Valve	HULL_WWTP-100	WWTP		3.50	3.50	49.00	5-Extreme
WW	Knife Gate Valve No. 1	HULL_WWTP-374	WWTP	Mechanical	3.25	3.50	45.50	5-Extreme
WW	Influent Pump 3 Suction Valve	HULL_WWTP-114	WWTP		2.50	3.50	100.00	4-High
WW	Effluent wet well level sensor	HULL_WWTP-336	WWTP	Controls	1.64	4.00	87.47	4-High
PS Asset	PS A Electrical MCC	HULL_PSASSET-139	Collections	Unk	4.00	5.00	80.00	4-High
PS Asset	PS A Building	HULL_PSASSET-134	Collections	Unk	4.00	5.00	80.00	4-High
PS Asset	PS 9 Wet Well	HULL_PSASSET-131	Collections	Unk	4.00	5.00	80.00	4-High
PS Asset	PS 6 Wet Well	HULL_PSASSET-110	Collections	Unk	4.00	5.00	80.00	4-High
PS Asset	PS 6 Electrical MCC	HULL_PSASSET-97	Collections	Unk	4.00	5.00	80.00	4-High
PS Asset	PS 6 Building	HULL_PSASSET-92	Collections	Unk	4.00	5.00	80.00	4-High
PS Asset	PS 5 Wet Well	HULL_PSASSET-90	Collections	Unk	4.00	5.00	80.00	4-High
PS Asset	PS 4 Wet Well	HULL_PSASSET-68	Collections	Unk	4.00	5.00	80.00	4-High
PS Asset	PS 3 Wet Well	HULL_PSASSET-47	Collections	Unk	4.00	5.00	80.00	4-High
PS Asset	PS 3 Electrical MCC	HULL_PSASSET-34	Collections	Unk	4.00	5.00	80.00	4-High
PS Asset	PS 1 Wet Well	HULL_PSASSET-21	Collections	Unk	4.00	5.00	80.00	4-High
PS Asset	PS 1 Piping and Valves	HULL_PSASSET-15	Collections	Unk	4.00	5.00	80.00	4-High
Pipe	Sewer 18" AC Pipe on MAIN ST.	10007	Collections	Gravity Pipe	3.00	5.00	65.00	4-High
PS Asset	PS A SCADA Panel	HULL_PSASSET-148	Collections	Unk	4.00	4.00	64.00	4-High
PS Asset	PS A Modem	HULL_PSASSET-144	Collections	Unk	4.00	4.00	64.00	4-High
PS Asset	PS 9 SCADA Panel	HULL_PSASSET-128	Collections	Unk	4.00	4.00	64.00	4-High
PS Asset	PS 9 Modem	HULL_PSASSET-124	Collections	Unk	4.00	4.00	64.00	4-High
PS Asset	PS 6 SCADA Panel	HULL_PSASSET-107	Collections	Unk	4.00	4.00	64.00	4-High

PS Asset	PS 6 Modem	HULL_PSASSET-103	Collections	Unk	4.00	4.00	64.00	4-High
PS Asset	PS 5 SCADA Panel	HULL_PSASSET-87	Collections	Unk	4.00	4.00	64.00	4-High
PS Asset	PS 5 Modem	HULL_PSASSET-82	Collections	Unk	4.00	4.00	64.00	4-High
PS Asset	PS 4 SCADA Panel	HULL_PSASSET-65	Collections	Unk	4.00	4.00	64.00	4-High
PS Asset	PS 4 Modem	HULL_PSASSET-61	Collections	Unk	4.00	4.00	64.00	4-High
PS Asset	PS 3 Building	HULL_PSASSET-24	Collections	Unk	4.00	4.00	64.00	4-High
PS Asset	PS 1 SCADA Panel	HULL_PSASSET-18	Collections	Unk	4.00	4.00	64.00	4-High
PS Asset	PS 1 Modem	HULL_PSASSET-14	Collections	Unk	4.00	4.00	64.00	4-High
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10377	Collections	Gravity Pipe	3.00	4.62	60.00	4-High
Pipe	Sewer 24" BRICK Pipe on MAIN ST.	10031	Collections	Gravity Pipe	3.00	4.62	60.00	4-High
Pipe	Sewer 24" BRICK Pipe on MAIN ST.	10028	Collections	Gravity Pipe	3.00	4.62	60.00	4-High
PS Asset	PS A Wet Well	HULL_PSASSET-151	Collections	Unk	3.00	5.00	60.00	4-High
PS Asset	PS A Piping and Valves	HULL_PSASSET-145	Collections	Unk	3.00	5.00	60.00	4-High
PS Asset	PS 9 Electrical MCC	HULL_PSASSET-117	Collections	Unk	3.00	5.00	60.00	4-High
PS Asset	PS 6 Transfer Switch	HULL_PSASSET-109	Collections	Unk	3.00	5.00	60.00	4-High
PS Asset	PS 6 Piping and Valves	HULL_PSASSET-104	Collections	Unk	3.00	5.00	60.00	4-High
PS Asset	PS 5 Piping and Valves	HULL_PSASSET-83	Collections	Unk	3.00	5.00	60.00	4-High
PS Asset	PS 5 Electrical MCC	HULL_PSASSET-76	Collections	Unk	3.00	5.00	60.00	4-High
PS Asset	PS 5 Building	HULL_PSASSET-71	Collections	Unk	3.00	5.00	60.00	4-High
PS Asset	PS 4 Piping and Valves	HULL_PSASSET-62	Collections	Unk	3.00	5.00	60.00	4-High
PS Asset	PS 4 Electrical MCC	HULL_PSASSET-54	Collections	Unk	3.00	5.00	60.00	4-High
PS Asset	PS 4 Building	HULL_PSASSET-49	Collections	Unk	3.00	5.00	60.00	4-High
PS Asset	PS 1 Pump 2	HULL_PSASSET-17	Collections	Unk	3.00	5.00	60.00	4-High
PS Asset	PS 1 Pump 1	HULL_PSASSET-16	Collections	Unk	3.00	5.00	60.00	4-High
PS Asset	PS 1 Flow Meter	HULL_PSASSET-9	Collections	Unk	5.00	3.00	60.00	4-High
MH	MH-20078	MH-20078	Collections	Manhole	5.00	2.73	57.14	4-High
WW	Generator Room	HULL_WWTP-18	WWTP	Room	2.73	5.00	55.44	4-High
WW	Influent Piping & Valves	HULL_WWTP-386	WWTP	Mechanical	3.00	4.50	54.00	4-High
Pipe	Sewer 14" AC Pipe on ATLANTIC AVE.	10974	Collections	Gravity Pipe	3.00	4.04	52.50	4-High
Pipe	Sewer 14" AC Pipe on ATLANTIC AVE.	10963	Collections	Gravity Pipe	3.00	4.04	52.50	4-High
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10405	Collections	Gravity Pipe	3.00	4.04	52.50	4-High
Pipe	Sewer 15" VC Pipe on MAIN ST.	10075	Collections	Gravity Pipe	3.00	4.04	52.50	4-High
MH	MH-20006	MH-20006	Collections	Manhole	2.50	5.00	52.38	4-High
WW	Flood Gate #4	HULL_WWTP-283	WWTP	S- Architectural	2.90	4.50	52.20	4-High
WW	Flood Gate #5	HULL_WWTP-284	WWTP	S- Architectural	2.90	4.50	52.20	4-High
WW	Flood Gate #6	HULL_WWTP-285	WWTP	S- Architectural	2.90	4.50	52.20	4-High
WW	Flood Gate #7	HULL_WWTP-286	WWTP	S- Architectural	2.90	4.50	52.20	4-High
WW	Flood Gate #8	HULL_WWTP-287	WWTP	S- Architectural	2.90	4.50	52.20	4-High
WW	Flood Gate #9	HULL_WWTP-288	WWTP	S- Architectural	2.90	4.50	52.20	4-High
WW	Flood Gate #10	HULL_WWTP-289	WWTP	S- Architectural	2.90	4.50	52.20	4-High
WW	Flood Gate #11	HULL_WWTP-290	WWTP	S- Architectural	2.90	4.50	52.20	4-High
WW	Flood Barrier #1	HULL_WWTP-291	WWTP	S- Architectural	2.90	4.50	52.20	4-High
WW	Flood Barrier #2	HULL_WWTP-292	WWTP	S- Architectural	2.90	4.50	52.20	4-High
WW	Flood Barrier #3	HULL_WWTP-293	WWTP	S- Architectural	2.90	4.50	52.20	4-High
WW	Flood Barrier #4	HULL_WWTP-294	WWTP	S- Architectural	2.90	4.50	52.20	4-High
WW	Flood Gate #1	HULL_WWTP-280	WWTP	S- Architectural	2.90	4.50	52.20	4-High
WW	Flood Gate #2	HULL_WWTP-281	WWTP	S- Architectural	2.90	4.50	52.20	4-High
WW	Flood Gate #3	HULL_WWTP-282	WWTP	S- Architectural	2.90	4.50	52.20	4-High
WW	Hypochlorite Tank 1	HULL_WWTP-166	WWTP	Mechanical	5.00	2.50	50.86	4-High
WW	Hypochlorite Tank 2	HULL_WWTP-167	WWTP	Mechanical	5.00	2.50	50.86	4-High
WW	Main Plant Transformer - PROPERTY of HMLP	HULL_WWTP-70	WWTP	Electrical	2.50	5.00	50.86	4-High
WW	UST - Underground Storage Tank for diesel fuel	HULL_WWTP-226	WWTP		2.50	5.00	50.86	4-High
WW	Caustic System	HULL_WWTP-159	WWTP		5.00	2.50	50.00	4-High
Pipe	Sewer 8" VC Pipe on ATLANTIC AVE.	11007	Collections	Gravity Pipe	5.00	2.31	50.00	4-High
Pipe	Sewer 8" VC Pipe on ATLANTIC AVE.	11003	Collections	Gravity Pipe	5.00	2.31	50.00	4-High
Pipe	Sewer 8" VC Pipe on ATLANTIC AVE.	11002	Collections	Gravity Pipe	5.00	2.31	50.00	4-High
Pipe	Sewer 12" VC Pipe on MAIN ST.	10096	Collections	Gravity Pipe	4.00	2.88	50.00	4-High
WW	Secondary Pump Room	HULL_WWTP-363	WWTP	Structural	4.84	2.50	49.21	4-High
WW	Influent Pumps	HULL_WWTP-96	WWTP		3.00	4.00	48.00	4-High
PS Asset	PS A Transfer Switch	HULL_PSASSET-150	Collections	Unk	3.00	4.00	48.00	4-High
PS Asset	PS A Pump 2	HULL_PSASSET-147	Collections	Unk	3.00	4.00	48.00	4-High
PS Asset	PS A Pump 1	HULL_PSASSET-146	Collections	Unk	3.00	4.00	48.00	4-High
PS Asset	PS 9 Transfer Switch	HULL_PSASSET-130	Collections	Unk	3.00	4.00	48.00	4-High
PS Asset	PS 9 Pump 2	HULL_PSASSET-127	Collections	Unk	3.00	4.00	48.00	4-High
PS Asset	PS 9 Pump 1	HULL_PSASSET-126	Collections	Unk	3.00	4.00	48.00	4-High
PS Asset	PS 9 Generator	HULL_PSASSET-121	Collections	Unk	3.00	4.00	48.00	4-High
PS Asset	PS 6 Pump 2	HULL_PSASSET-106	Collections	Unk	3.00	4.00	48.00	4-High
PS Asset	PS 6 Pump 1	HULL_PSASSET-105	Collections	Unk	3.00	4.00	48.00	4-High
PS Asset	PS 6	HULL_PSASSET-91	Collections	Unk	3.00	4.00	48.00	4-High
PS Asset	PS 5 Transfer Switch	HULL_PSASSET-89	Collections	Unk	3.00	4.00	48.00	4-High

PS Asset	PS 5 Pump 2	HULL_PSASSET-85	Collections	Unk	3.00	4.00	48.00	4-High
PS Asset	PS 5 Pump 1	HULL_PSASSET-84	Collections	Unk	3.00	4.00	48.00	4-High
PS Asset	PS 4 Sump Pump	HULL_PSASSET-66	Collections	Unk	3.00	4.00	48.00	4-High
PS Asset	PS 4 Pump 2	HULL_PSASSET-64	Collections	Unk	3.00	4.00	48.00	4-High
PS Asset	PS 4 Pump 1	HULL_PSASSET-63	Collections	Unk	3.00	4.00	48.00	4-High
PS Asset	PS 1 Transfer Switch	HULL_PSASSET-20	Collections	Unk	3.00	4.00	48.00	4-High
PS Asset	PS 1 Generator	HULL_PSASSET-11	Collections	Unk	3.00	4.00	48.00	4-High
MH	MH-20125	MH-20125	Collections	Manhole	2.50	4.55	47.62	4-High
Pipe	Sewer 14" AC Pipe on ATLANTIC AVE.	10950	Collections	Gravity Pipe	3.00	3.65	47.50	4-High
Pipe	Sewer 14" AC Pipe on NANTASKET AVE.	10948	Collections	Gravity Pipe	3.00	3.65	47.50	4-High
Pipe	Sewer 14" AC Pipe on NANTASKET AVE.	10947	Collections	Gravity Pipe	3.00	3.65	47.50	4-High
Pipe	Sewer 14" AC Pipe on NANTASKET AVE.	10946	Collections	Gravity Pipe	3.00	3.65	47.50	4-High
Pipe	Sewer 16" AC Pipe on NANTASKET AVE.	10945	Collections	Gravity Pipe	3.00	3.65	47.50	4-High
Pipe	Sewer 16" AC Pipe on NANTASKET AVE.	10943	Collections	Gravity Pipe	3.00	3.65	47.50	4-High
Pipe	Sewer 16" AC Pipe on NANTASKET AVE.	10938	Collections	Gravity Pipe	3.00	3.65	47.50	4-High
Pipe	Sewer 16" AC Pipe on NANTASKET AVE.	10929	Collections	Gravity Pipe	3.00	3.65	47.50	4-High
Pipe	Sewer 16" AC Pipe on NANTASKET AVE.	10924	Collections	Gravity Pipe	3.00	3.65	47.50	4-High
Pipe	ver 12" AC Pipe on GEORGE WASHINGTON BL	10905	Collections	Gravity Pipe	3.00	3.65	47.50	4-High
Pipe	ver 12" AC Pipe on GEORGE WASHINGTON BL	10904	Collections	Gravity Pipe	3.00	3.65	47.50	4-High
Pipe	ver 12" AC Pipe on GEORGE WASHINGTON BL	10903	Collections	Gravity Pipe	3.00	3.65	47.50	4-High
Pipe	Sewer 16" AC Pipe on NEWPORT RD.	10485	Collections	Gravity Pipe	3.00	3.65	47.50	4-High
Pipe	Sewer 16" AC Pipe on NEWPORT RD.	10464	Collections	Gravity Pipe	3.00	3.65	47.50	4-High
Pipe	Sewer 16" AC Pipe on DRAPER AVE.	10443	Collections	Gravity Pipe	3.00	3.65	47.50	4-High
MH	MH-20968	MH-20968	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20855	MH-20855	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20854	MH-20854	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20853	MH-20853	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20851	MH-20851	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20845	MH-20845	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20843	MH-20843	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20839	MH-20839	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20836	MH-20836	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20835	MH-20835	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20834	MH-20834	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20625	MH-20625	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20511	MH-20511	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20506	MH-20506	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20501	MH-20501	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20491	MH-20491	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20482	MH-20482	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20151	MH-20151	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20140	MH-20140	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20139	MH-20139	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20137	MH-20137	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20135	MH-20135	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20133	MH-20133	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20132	MH-20132	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20119	MH-20119	Collections	Manhole	3.75	2.95	46.43	4-High
MH	MH-20116	MH-20116	Collections	Manhole	3.75	2.95	46.43	4-High
WW	Influent Pump 5 Motor	HULL_WWTP-125	WWTP	Electrical	2.50	4.50	45.78	4-High
MH	MH-20444	MH-20444	Collections	Manhole	2.50	4.32	45.24	4-High
MH	MH-20167	MH-20167	Collections	Manhole	2.50	4.32	45.24	4-High
MH	MH-20159	MH-20159	Collections	Manhole	2.50	4.32	45.24	4-High
MH	MH-20150	MH-20150	Collections	Manhole	2.50	4.32	45.24	4-High
MH	MH-20143	MH-20143	Collections	Manhole	2.50	4.32	45.24	4-High
MH	MH-20141	MH-20141	Collections	Manhole	2.50	4.32	45.24	4-High
MH	MH-20138	MH-20138	Collections	Manhole	2.50	4.32	45.24	4-High
MH	MH-20136	MH-20136	Collections	Manhole	2.50	4.32	45.24	4-High
MH	MH-20134	MH-20134	Collections	Manhole	2.50	4.32	45.24	4-High
MH	MH-20128	MH-20128	Collections	Manhole	2.50	4.32	45.24	4-High
MH	MH-20017	MH-20017	Collections	Manhole	2.50	4.32	45.24	4-High
WW	Influent Pump 4 Motor	HULL_WWTP-119	WWTP	Electrical	2.50	4.50	45.00	4-High
WW	MCC 1	HULL_WWTP-67	WWTP		2.50	4.50	45.00	4-High
Pipe	Sewer 10" AC Pipe on ATLANTIC AVE.	11008	Collections	Gravity Pipe	3.00	3.46	45.00	4-High
Pipe	Sewer 14" AC Pipe on ATLANTIC AVE.	10957	Collections	Gravity Pipe	3.00	3.46	45.00	4-High
Pipe	Sewer 14" AC Pipe on ATLANTIC AVE.	10952	Collections	Gravity Pipe	3.00	3.46	45.00	4-High
Pipe	ver 12" AC Pipe on GEORGE WASHINGTON BL	10902	Collections	Gravity Pipe	3.00	3.46	45.00	4-High
Pipe	ver 12" AC Pipe on GEORGE WASHINGTON BL	10892	Collections	Gravity Pipe	3.00	3.46	45.00	4-High
Pipe	ver 12" AC Pipe on GEORGE WASHINGTON BL	10885	Collections	Gravity Pipe	3.00	3.46	45.00	4-High
Pipe	Sewer 16" AC Pipe on WARREN ST.	10590	Collections	Gravity Pipe	3.00	3.46	45.00	4-High

Pipe	Sewer 16" AC Pipe on WARREN ST.	10580	Collections	Gravity Pipe	3.00	3.46	45.00	4-High
Pipe	Sewer 12" AC Pipe on NANTASKET AVE.	10150	Collections	Gravity Pipe	3.00	3.46	45.00	4-High
Pipe	Sewer 6" VC Pipe on LOGAN AVE.	11054	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
Pipe	Sewer 8" VC Pipe on ATLANTIC AVE.	11031	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
Pipe	Sewer 6" VC Pipe on VALLEY BEACH AVE.	10969	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
Pipe	Sewer 10" VC Pipe on BAY ST.	10872	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10869	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
Pipe	Sewer 10" VC Pipe on BAY ST.	10865	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10864	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10863	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
Pipe	Sewer 6" VC Pipe on SAGAMORE TER.	10862	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
Pipe	Sewer 10" VC Pipe on BAY ST.	10855	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
Pipe	Sewer 10" VC Pipe on BAY ST.	10831	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
Pipe	Sewer 10" VC Pipe on BAY ST.	10807	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
Pipe	Sewer 10" VC Pipe on BAY ST.	10792	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
Pipe	Sewer 10" VC Pipe on BAY ST.	10783	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
Pipe	Sewer 10" VC Pipe on PT ALLERTON AVE	10174	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
Pipe	Sewer 10" VC Pipe on PT ALLERTON AVE	10161	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
Pipe	Sewer 12" VC Pipe on MT. PLEASANT	10097	Collections	Gravity Pipe	4.00	2.50	43.33	4-High
MH	MH-20986	MH-20986	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20983	MH-20983	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20941	MH-20941	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20931	MH-20931	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20889	MH-20889	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20886	MH-20886	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20884	MH-20884	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20878	MH-20878	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20871	MH-20871	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20868	MH-20868	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20867	MH-20867	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20866	MH-20866	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20865	MH-20865	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20864	MH-20864	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20858	MH-20858	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20856	MH-20856	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20852	MH-20852	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20848	MH-20848	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20824	MH-20824	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20818	MH-20818	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20562	MH-20562	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20535	MH-20535	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20533	MH-20533	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20521	MH-20521	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20515	MH-20515	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20504	MH-20504	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20496	MH-20496	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20471	MH-20471	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20460	MH-20460	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20434	MH-20434	Collections	Manhole	3.75	2.73	42.86	4-High
MH	MH-20114	MH-20114	Collections	Manhole	3.75	2.73	42.86	4-High
Pipe	Sewer 18" AC Pipe on MAIN ST.	10005	Collections	Gravity Pipe	2.00	4.81	41.67	4-High
WW	Electrical System	HULL_WWTP-27	WWTP	Electrical	2.00	5.00	40.89	4-High
MH	MH-20131	MH-20131	Collections	Manhole	2.50	3.86	40.48	4-High
MH	MH-20058	MH-20058	Collections	Manhole	2.50	3.86	40.48	4-High
WW	Chlorine probe Endress & Hauser	HULL_WWTP-319	WWTP	Mechanical	5.00	2.00	40.00	4-High
WW	Chlorine probe ATI	HULL_WWTP-320	WWTP	Mechanical	5.00	2.00	40.00	4-High
Pipe	Sewer 8" VC Pipe on ATLANTIC AVE.	11027	Collections	Gravity Pipe	4.00	2.31	40.00	4-High
Pipe	Sewer 8" VC Pipe on ATLANTIC AVE.	11004	Collections	Gravity Pipe	4.00	2.31	40.00	4-High
Pipe	Sewer 6" VC Pipe on STONY BEACH RD.	11001	Collections	Gravity Pipe	4.00	2.31	40.00	4-High
Pipe	Sewer 8" VC Pipe on ATLANTIC AVE.	11000	Collections	Gravity Pipe	4.00	2.31	40.00	4-High
Pipe	Sewer 8" VC Pipe on ATLANTIC AVE.	10989	Collections	Gravity Pipe	4.00	2.31	40.00	4-High
Pipe	Sewer 6" VC Pipe on SCHOOL ST.	10985	Collections	Gravity Pipe	4.00	2.31	40.00	4-High
Pipe	Sewer 8" VC Pipe on VALLEY BEACH AVE.	10973	Collections	Gravity Pipe	4.00	2.31	40.00	4-High
Pipe	Sewer 8" VC Pipe on ATLANTIC AVE.	10965	Collections	Gravity Pipe	4.00	2.31	40.00	4-High
Pipe	Sewer 8" VC Pipe on ATLANTIC AVE.	10964	Collections	Gravity Pipe	4.00	2.31	40.00	4-High
Pipe	Sewer 8" VC Pipe on ATLANTIC HOUSE RD.	10962	Collections	Gravity Pipe	4.00	2.31	40.00	4-High
Pipe	Sewer 16" AC Pipe on BERKELEY RD.	10934	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on BERKELEY RD.	10928	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on BERKELEY RD.	10923	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on PARK AVE.	10922	Collections	Gravity Pipe	3.00	3.08	40.00	4-High

Pipe	Sewer 16" AC Pipe on ROCKLAND CIRCLE	10921	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on PARK AVE.	10919	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on PARK AVE.	10918	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on PARK AVE.	10917	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on ROCKLAND CIRCLE	10913	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on ROCKLAND CIRCLE	10912	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	ver 12" AC Pipe on GEORGE WASHINGTON BL	10911	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	ver 12" AC Pipe on GEORGE WASHINGTON BL	10910	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	ver 12" AC Pipe on GEORGE WASHINGTON BL	10909	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on ROCKLAND CIRCLE	10907	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on ROCKLAND CIRCLE	10906	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 12" AC Pipe on WHARF AVE.	10889	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 12" AC Pipe on NEWPORT RD.	10565	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on DRAPER AVE.	10548	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on DRAPER AVE.	10547	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on FRONT ST.	10541	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on WARREN ST.	10533	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on FRONT ST.	10532	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 12" AC Pipe on NEWPORT RD.	10528	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 12" AC Pipe on NEWPORT RD.	10518	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 12" AC Pipe on NEWPORT RD.	10508	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on NEWPORT RD.	10496	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 12" AC Pipe on NEWPORT RD.	10495	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 12" AC Pipe on ELEVENTH ST.	10472	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 16" AC Pipe on DRAPER AVE.	10456	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 12" AC Pipe on PT ALLERTON AVE	10162	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 12" AC Pipe on NANTASKET AVE.	10159	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 12" AC Pipe on NANTASKET AVE.	10157	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 12" AC Pipe on NANTASKET AVE.	10155	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 12" AC Pipe on NANTASKET AVE.	10153	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 12" AC Pipe on NANTASKET AVE.	10152	Collections	Gravity Pipe	3.00	3.08	40.00	4-High
Pipe	Sewer 6" VC Pipe on VAUTRINOT AVE.	10083	Collections	Gravity Pipe	4.00	2.31	40.00	4-High
Pipe	Sewer 6" VC Pipe on MAIN ST.	10023	Collections	Gravity Pipe	4.00	2.31	40.00	4-High
Pipe	Sewer 6" VC Pipe on MAIN ST.	10001	Collections	Gravity Pipe	4.00	2.31	40.00	4-High
PS Asset	PS 5 Flow Meter	HULL_PSASSET-78	Collections	Unk	5.00	2.00	40.00	4-High
PS Asset	PS 5 Exhaust Fan	HULL_PSASSET-77	Collections	Unk	5.00	2.00	40.00	4-High
PS Asset	PS 4 Flow Meter	HULL_PSASSET-56	Collections	Unk	5.00	2.00	40.00	4-High
PS Asset	PS 3 By-pass valve to force main 4"	HULL_PSASSET-33	Collections	Unk	5.00	2.00	40.00	4-High
PS Asset	PS 3 By-pass valve	HULL_PSASSET-32	Collections	Unk	5.00	2.00	40.00	4-High
PS Asset	PS 3 By-Pass System (Old)	HULL_PSASSET-31	Collections	Unk	5.00	2.00	40.00	4-High
PS Asset	PS 3 By-pass system (New)	HULL_PSASSET-30	Collections	Unk	5.00	2.00	40.00	4-High
PS Asset	PS 3 By-pass stand pipe	HULL_PSASSET-29	Collections	Unk	5.00	2.00	40.00	4-High
PS Asset	PS 3 By-pass Stand pipe	HULL_PSASSET-28	Collections	Unk	5.00	2.00	40.00	4-High
PS Asset	PS 3 By-pass force main isolation valve 14"	HULL_PSASSET-27	Collections	Unk	5.00	2.00	40.00	4-High
PS Asset	PS 3 By-pass drain down valve	HULL_PSASSET-26	Collections	Unk	5.00	2.00	40.00	4-High
PS Asset	PS 3 By-pass drain down valve	HULL_PSASSET-25	Collections	Unk	5.00	2.00	40.00	4-High
PS Asset	PS 1 Sump Pump	HULL_PSASSET-19	Collections	Unk	5.00	2.00	40.00	4-High
MH	MH-20959	MH-20959	Collections	Manhole	3.75	2.50	39.29	4-High
MH	MH-20935	MH-20935	Collections	Manhole	3.75	2.50	39.29	4-High
MH	MH-20928	MH-20928	Collections	Manhole	3.75	2.50	39.29	4-High
MH	MH-20002	MH-20002	Collections	Manhole	3.75	2.50	39.29	4-High
MH	MH-20001	MH-20001	Collections	Manhole	3.75	2.50	39.29	4-High
MH	MH-20000	MH-20000	Collections	Manhole	3.75	2.50	39.29	4-High
WW	Control Room	HULL_WWTP-16	WWTP	S- Building	4.89	2.00	39.13	4-High
WW	Operations Building	HULL_WWTP-13	WWTP	Structural	4.84	2.00	38.70	4-High
MH	MH-20774	MH-20774	Collections	Manhole	2.50	3.64	38.10	4-High
MH	MH-20744	MH-20744	Collections	Manhole	2.50	3.64	38.10	4-High
MH	MH-20712	MH-20712	Collections	Manhole	2.50	3.64	38.10	4-High
MH	MH-20697	MH-20697	Collections	Manhole	2.50	3.64	38.10	4-High
MH	MH-20568	MH-20568	Collections	Manhole	2.50	3.64	38.10	4-High
MH	MH-20520	MH-20520	Collections	Manhole	2.50	3.64	38.10	4-High
MH	MH-20476	MH-20476	Collections	Manhole	2.50	3.64	38.10	4-High
MH	MH-20345	MH-20345	Collections	Manhole	2.50	3.64	38.10	4-High
MH	MH-20281	MH-20281	Collections	Manhole	2.50	3.64	38.10	4-High
MH	MH-20262	MH-20262	Collections	Manhole	2.50	3.64	38.10	4-High
Pipe	Sewer 6" VC Pipe on BARNSTABLE ST.	11053	Collections	Gravity Pipe	4.00	2.12	36.67	4-High
Pipe	Sewer 6" VC Pipe on BARNSTABLE ST.	11052	Collections	Gravity Pipe	4.00	2.12	36.67	4-High
Pipe	Sewer 6" VC Pipe on BARNSTABLE ST.	11051	Collections	Gravity Pipe	4.00	2.12	36.67	4-High
Pipe	Sewer 6" VC Pipe on PORRAZZO RD.	10868	Collections	Gravity Pipe	4.00	2.12	36.67	4-High
Pipe	Sewer 6" VC Pipe on MERRILL RD.	10861	Collections	Gravity Pipe	4.00	2.12	36.67	4-High

Pipe	Sewer 6" VC Pipe on PORRAZZO RD.	10860	Collections	Gravity Pipe	4.00	2.12	36.67	4-High
Pipe	Sewer 6" VC Pipe on SAGAMORE TER.	10857	Collections	Gravity Pipe	4.00	2.12	36.67	4-High
Pipe	Sewer 6" VC Pipe on SAGAMORE TER.	10850	Collections	Gravity Pipe	4.00	2.12	36.67	4-High
Pipe	Sewer 6" VC Pipe on PORRAZZO RD.	10849	Collections	Gravity Pipe	4.00	2.12	36.67	4-High
Pipe	Sewer 6" VC Pipe on MAIN ST.	10003	Collections	Gravity Pipe	4.00	2.12	36.67	4-High
WW	Rotary Sludge Thickener	HULL_WWTP-187	WWTP	Mechanical	4.48	2.00	36.60	4-High
WW	Influent wet well piping - 36 IN DI	HULL_WWTP-408	WWTP	nderground piping	1.80	5.00	35.95	4-High
WW	Air Diffuser AT-310	HULL_WWTP-140	WWTP		2.50	3.50	35.78	4-High
MH	MH-20974	MH-20974	Collections	Manhole	2.50	3.41	35.71	4-High
MH	MH-20973	MH-20973	Collections	Manhole	2.50	3.41	35.71	4-High
MH	MH-20971	MH-20971	Collections	Manhole	2.50	3.41	35.71	4-High
MH	MH-20970	MH-20970	Collections	Manhole	2.50	3.41	35.71	4-High
MH	MH-20965	MH-20965	Collections	Manhole	2.50	3.41	35.71	4-High
MH	MH-20838	MH-20838	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20832	MH-20832	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20826	MH-20826	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20823	MH-20823	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20820	MH-20820	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20819	MH-20819	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20817	MH-20817	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20815	MH-20815	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20812	MH-20812	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20809	MH-20809	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20796	MH-20796	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20791	MH-20791	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20779	MH-20779	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20770	MH-20770	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20764	MH-20764	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20761	MH-20761	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20754	MH-20754	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20752	MH-20752	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20629	MH-20629	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20611	MH-20611	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20600	MH-20600	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20595	MH-20595	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20584	MH-20584	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20573	MH-20573	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20572	MH-20572	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20567	MH-20567	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20555	MH-20555	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20550	MH-20550	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20541	MH-20541	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20500	MH-20500	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20492	MH-20492	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20480	MH-20480	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20469	MH-20469	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20456	MH-20456	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20446	MH-20446	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20445	MH-20445	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20440	MH-20440	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20392	MH-20392	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20160	MH-20160	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20152	MH-20152	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20142	MH-20142	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20111	MH-20111	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20088	MH-20088	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20083	MH-20083	Collections	Manhole	3.75	2.27	35.71	4-High
MH	MH-20003	MH-20003	Collections	Manhole	3.75	2.27	35.71	4-High
WW	Influent Pump 4 Check Valve	HULL_WWTP-117	WWTP		2.50	3.50	35.61	4-High
WW	Influent Pump 4 Suction Valve	HULL_WWTP-120	WWTP		2.50	3.50	35.61	4-High
WW	Influent Pump 2 Discharge Valve	HULL_WWTP-106	WWTP		2.50	3.50	35.00	4-High
WW	Influent Pump 4 Discharge Valve	HULL_WWTP-118	WWTP		2.50	3.50	35.00	4-High
WW	Influent Pump 5 Check Valve	HULL_WWTP-123	WWTP		2.50	3.50	35.00	4-High
WW	Fixed Gas Monitoring System	HULL_WWTP-83	WWTP	Controls	2.50	3.50	35.00	4-High
WW	Influent Pump 2 Check Valve	HULL_WWTP-105	WWTP		2.50	3.50	35.00	4-High
WW	Influent Pump 3 Check Valve	HULL_WWTP-111	WWTP		2.50	3.50	35.00	4-High
WW	Influent Pump 3 Discharge Valve	HULL_WWTP-112	WWTP		2.50	3.50	35.00	4-High
WW	Influent Pump 5 Suction Valve	HULL_WWTP-126	WWTP		2.50	3.50	35.00	4-High
WW	Influent Pump 5 Discharge Valve	HULL_WWTP-124	WWTP		2.50	3.50	35.00	4-High
WW	Influent Pump 2 Suction Valve	HULL_WWTP-108	WWTP		2.50	3.50	35.00	4-High

MH	MH-20811	MH-20811	Collections	Manhole	2.50	3.18	33.33	4-High
MH	MH-20721	MH-20721	Collections	Manhole	2.50	3.18	33.33	4-High
MH	MH-20123	MH-20123	Collections	Manhole	5.00	1.59	33.33	4-High
Pipe	Sewer 6" VC Pipe on VALLEY BEACH AVE.	11088	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	11083	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	11082	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	11081	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	11080	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on SUMMIT AVE.	11037	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on ATLANTIC AVE.	11034	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on STONY BEACH RD.	10999	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on SCHOOL ST.	10987	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on VALLEY BEACH AVE.	10986	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 8" VC Pipe on VALLEY BEACH AVE.	10972	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 8" VC Pipe on VALLEY BEACH AVE.	10971	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on VALLEY BEACH AVE.	10970	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on VALLEY BEACH AVE.	10968	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 8" VC Pipe on ATLANTIC HOUSE RD.	10961	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on MIDLEDGE AVE.	10953	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10951	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10949	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on ATHERTON RD.	10944	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on ATHERTON RD.	10942	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on ATHERTON RD.	10941	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on ATHERTON RD.	10940	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on ATHERTON RD.	10939	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on ROCKVIEW RD.	10927	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10891	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 8" VC Pipe on Y ST.	10304	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on BRADFORD	10218	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 8" VC Pipe on SPRING ST.	10142	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10141	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10140	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 8" VC Pipe on NANTASKET AVE.	10138	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10137	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10136	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10135	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on FARINA RD.	10110	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on FARINA RD.	10108	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on SPRING ST.	10098	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on FARINA RD.	10095	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on SPRING ST.	10094	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on FARINA RD.	10093	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on SPRING ST.	10081	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on SPRING ST.	10073	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
Pipe	Sewer 6" VC Pipe on OCEAN AVE.	10026	Collections	Gravity Pipe	4.00	1.92	33.33	4-High
WW	Aeration Electrical Control Manhole	HULL_WWTP-301	WWTP	Electrical	2.00	4.00	32.55	4-High
MH	MH-20981	MH-20981	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20975	MH-20975	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20955	MH-20955	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20948	MH-20948	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20942	MH-20942	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20940	MH-20940	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20939	MH-20939	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20937	MH-20937	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20936	MH-20936	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20933	MH-20933	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20926	MH-20926	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20919	MH-20919	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20918	MH-20918	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20916	MH-20916	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20915	MH-20915	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20914	MH-20914	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20913	MH-20913	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20910	MH-20910	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20902	MH-20902	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20899	MH-20899	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20898	MH-20898	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20894	MH-20894	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20893	MH-20893	Collections	Manhole	3.75	2.05	32.14	4-High

MH	MH-20883	MH-20883	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20870	MH-20870	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20859	MH-20859	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20844	MH-20844	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20840	MH-20840	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20777	MH-20777	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20772	MH-20772	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20748	MH-20748	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20740	MH-20740	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20734	MH-20734	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20439	MH-20439	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20410	MH-20410	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20406	MH-20406	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20389	MH-20389	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20384	MH-20384	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20383	MH-20383	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20382	MH-20382	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20379	MH-20379	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20376	MH-20376	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20372	MH-20372	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20280	MH-20280	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20278	MH-20278	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20272	MH-20272	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20233	MH-20233	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20226	MH-20226	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20199	MH-20199	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20168	MH-20168	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20124	MH-20124	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20121	MH-20121	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20118	MH-20118	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20117	MH-20117	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20092	MH-20092	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20089	MH-20089	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20080	MH-20080	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20079	MH-20079	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20070	MH-20070	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20064	MH-20064	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20062	MH-20062	Collections	Manhole	3.75	2.05	32.14	4-High
MH	MH-20018	MH-20018	Collections	Manhole	3.75	2.05	32.14	4-High
WW	Seconday Electrical Control Manhole	HULL_WWTP-299	WWTP	Electrical	2.00	4.00	32.00	4-High
WW	Aeration Electrical Power Manhole	HULL_WWTP-300	WWTP	Electrical	2.00	4.00	32.00	4-High
WW	Exhaust Fan 1 Pump Room	HULL_WWTP-40	WWTP	Electrical	4.00	2.00	32.00	4-High
WW	Effluent Pump #1 discharge valve	HULL_WWTP-309	WWTP	Valves	1.75	4.50	31.50	4-High
WW	Effluent Pump #3 discharge valve	HULL_WWTP-311	WWTP	Valves	1.75	4.50	31.50	4-High
WW	P-650 RST Thickened Sludge Pump	HULL_WWTP-369	WWTP	Mechanical	3.75	2.00	30.52	4-High
Pipe	Sewer 6" VC Pipe on ATLANTIC AVE.	11090	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 10" VC Pipe on ATLANTIC AVE.	11022	Collections	Gravity Pipe	2.00	3.46	30.00	4-High
Pipe	Sewer 6" VC Pipe on RICHARDS RD.	10997	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on ATLANTIC AVE.	10996	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on ATLANTIC AVE.	10995	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on SOUTH AVE.	10994	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 8" VC Pipe on ATLANTIC AVE.	10993	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on MEADE AVE.	10992	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on ATLANTIC AVE.	10956	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 8" VC Pipe on NANTASKET AVE.	10882	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10881	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 8" VC Pipe on BAY ST.	10880	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 8" VC Pipe on NANTASKET AVE.	10879	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10878	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on PORRAZZO RD.	10877	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 8" VC Pipe on NANTASKET AVE.	10856	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 8" VC Pipe on NANTASKET AVE.	10844	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 8" VC Pipe on BAY ST.	10840	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 8" VC Pipe on NANTASKET AVE.	10836	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 8" VC Pipe on NANTASKET AVE.	10820	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10813	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10811	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 8" VC Pipe on NANTASKET AVE.	10804	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 8" VC Pipe on NANTASKET AVE.	10793	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 8" VC Pipe on Y ST.	10236	Collections	Gravity Pipe	4.00	1.73	30.00	4-High

Pipe	Sewer 6" VC Pipe on SPRING ST.	10134	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on SPRING ST.	10126	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on GALLOPS HILL RD.	10125	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on SPRING ST.	10124	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on SPRING ST.	10117	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on SPRING ST.	10114	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on SPRING ST.	10106	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on SPRING ST.	10105	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on HIGHLAND AVE	10091	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on WESTERN AVE.	10062	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on WILLOW ST.	10056	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
Pipe	Sewer 6" VC Pipe on HIGHLAND AVE	10030	Collections	Gravity Pipe	4.00	1.73	30.00	4-High
MH	MH-20950	MH-20950	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20949	MH-20949	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20947	MH-20947	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20946	MH-20946	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20943	MH-20943	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20831	MH-20831	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20830	MH-20830	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20829	MH-20829	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20810	MH-20810	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20795	MH-20795	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20781	MH-20781	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20766	MH-20766	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20762	MH-20762	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20759	MH-20759	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20745	MH-20745	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20739	MH-20739	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20736	MH-20736	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20115	MH-20115	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20108	MH-20108	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20107	MH-20107	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20100	MH-20100	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20097	MH-20097	Collections	Manhole	3.75	1.82	28.57	4-High
MH	MH-20091	MH-20091	Collections	Manhole	3.75	1.82	28.57	4-High
WW	Primary Scum Pump	HULL_WWTP-193	WWTP	Mechanical	3.50	2.00	28.00	4-High
WW	Effluent Pump #2 discharge valve	HULL_WWTP-310	WWTP	Valves	1.75	4.00	28.00	4-High
WW	Effluent Pump #4 discharge valve	HULL_WWTP-312	WWTP	Valves	1.75	4.00	28.00	4-High
WW	Sludge Storage Tank Blower #2	HULL_WWTP-247	WWTP	Mechanical	3.50	2.00	28.00	4-High
WW	Grit Chamber Blower #4	HULL_WWTP-249	WWTP	Mechanical	3.50	2.00	28.00	4-High
WW	Tank 1 V-310 Air Diffuser	HULL_WWTP-370	WWTP	Mechanical	3.38	2.00	27.00	4-High
WW	Tank 3 V-330 Air Diffuser	HULL_WWTP-371	WWTP	Mechanical	3.38	2.00	27.00	4-High
WW	Aerated Grit Chamber	HULL_WWTP-79	WWTP	Mechanical	3.38	2.00	27.00	4-High
WW	Wet Scrubber Recirculation Pumps	HULL_WWTP-172	WWTP	Mechanical	3.38	2.00	27.00	4-High
WW	Wet Scrubber Fan	HULL_WWTP-171	WWTP	Mechanical	3.38	2.00	27.00	4-High
WW	EF-480 Exhaust Fan	HULL_WWTP-367	WWTP	Mechanical	3.25	2.00	26.45	4-High
WW	EF-481 Exhaust Fan	HULL_WWTP-368	WWTP	Mechanical	3.25	2.00	26.45	4-High
WW	Effluent wet well back-up floats for pump control	HULL_WWTP-338	WWTP	Controls	1.88	3.50	26.32	4-High
WW	Caustic Soda Tank	HULL_WWTP-161	WWTP	Mechanical	3.25	2.00	26.00	4-High
WW	Influent wet well back-up floats for pump control	HULL_WWTP-339	WWTP	Controls	1.64	3.50	22.96	4-High
WW	Influent Pump 1 Motor	HULL_WWTP-101	WWTP	Electrical	1.57	3.50	22.00	4-High
WW	Aeration Tank 2	HULL_WWTP-149	WWTP	Mechanical	5.00	1.50	100.00	3-Medium
WW	Aeration Blower 1	HULL_WWTP-137	WWTP	Mechanical	3.38	1.50	67.50	3-Medium
WW	Grit Pump 1	HULL_WWTP-85	WWTP	Pumps	3.25	1.50	55.71	3-Medium
WW	Influent wet well level sensor	HULL_WWTP-337	WWTP	Controls	1.00	4.00	53.33	3-Medium
PS Asset	PS 3 SCADA Panel	HULL_PSASSET-44	Collections	Unk	4.00	3.00	48.00	3-Medium
PS Asset	PS 3 Modem	HULL_PSASSET-39	Collections	Unk	4.00	3.00	48.00	3-Medium
PS Asset	PS 9 Piping and Valves	HULL_PSASSET-125	Collections	Unk	2.00	5.00	40.00	3-Medium
PS Asset	PS 9 Building	HULL_PSASSET-112	Collections	Unk	2.00	5.00	40.00	3-Medium
PS Asset	PS 1 Electrical MCC	HULL_PSASSET-7	Collections	Unk	2.00	5.00	40.00	3-Medium
PS Asset	PS 1 Building	HULL_PSASSET-1	Collections	Unk	2.00	5.00	40.00	3-Medium
Pipe	Sewer 10" AC Pipe on BAY ST.	10837	Collections	Gravity Pipe	3.00	2.88	37.50	3-Medium
PS Asset	PS A Sump Pump	HULL_PSASSET-149	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS A By-pass valve to force main	HULL_PSASSET-138	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS A By-Pass system	HULL_PSASSET-137	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS A By-pass stand pipe	HULL_PSASSET-136	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS A By-pass drain down valve	HULL_PSASSET-135	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 9 Sump Pump	HULL_PSASSET-129	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 6 Sump Pump	HULL_PSASSET-108	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 6 By-pass valve to force main	HULL_PSASSET-96	Collections	Unk	3.00	3.00	36.00	3-Medium

PS Asset	PS 6 By-Pass system	HULL_PSASSET-95	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 6 By-pass stand pipe	HULL_PSASSET-94	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 6 By-pass drain down valve	HULL_PSASSET-93	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 5 Sump Pump	HULL_PSASSET-88	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 5 Generator	HULL_PSASSET-80	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 5 By-pass valve to force main	HULL_PSASSET-75	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 5 By-Pass system	HULL_PSASSET-74	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 5 By-pass stand pipe	HULL_PSASSET-73	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 5 By-pass drain down valve	HULL_PSASSET-72	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 4 Transfer Switch	HULL_PSASSET-67	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 4 By-pass valve to force main	HULL_PSASSET-53	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 4 By-pass stand pipe	HULL_PSASSET-52	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 4 By-Pass Piping system	HULL_PSASSET-51	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 4 By-pass drain down valve	HULL_PSASSET-50	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 4	HULL_PSASSET-48	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 3 Generator	HULL_PSASSET-38	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 1 Exhaust Fan	HULL_PSASSET-8	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 1 by-pass valve to force main	HULL_PSASSET-6	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 1 By-Pass System	HULL_PSASSET-5	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 1 By-pass stand pipe	HULL_PSASSET-4	Collections	Unk	3.00	3.00	36.00	3-Medium
PS Asset	PS 1 By-pass drain down valve	HULL_PSASSET-3	Collections	Unk	3.00	3.00	36.00	3-Medium
Pipe	Sewer 12" AC Pipe on PT ALLERTON AVE	11089	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	ver 12" AC Pipe on GEORGE WASHINGTON BL	10908	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 12" AC Pipe on WHARF AVE.	10887	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 10" AC Pipe on BAY ST.	10818	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 10" AC Pipe on BAY ST.	10795	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 12" AC Pipe on NEWPORT RD.	10671	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 12" AC Pipe on NEWPORT RD.	10660	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 12" AC Pipe on NEWPORT RD.	10628	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 12" AC Pipe on NEWPORT RD.	10627	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 12" AC Pipe on NEWPORT RD.	10622	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 12" AC Pipe on NEWPORT RD.	10613	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 12" AC Pipe on NEWPORT RD.	10603	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 10" AC Pipe on KENBERMA ST.	10602	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 12" AC Pipe on NEWPORT RD.	10596	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 12" AC Pipe on NEWPORT RD.	10584	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 10" AC Pipe on KENBERMA ST.	10575	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 10" AC Pipe on KENBERMA ST.	10554	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 10" AC Pipe on KENBERMA ST.	10527	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 12" AC Pipe on WARREN ST.	10519	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 12" AC Pipe on BROCKTON CIR.	10505	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 12" AC Pipe on BROCKTON CIR.	10491	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 12" AC Pipe on BROCKTON CIR.	10478	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 12" AC Pipe on NEWPORT RD.	10468	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
Pipe	Sewer 12" AC Pipe on BROCKTON CIR.	10462	Collections	Gravity Pipe	3.00	2.50	32.50	3-Medium
PS Asset	PS A Exhaust Fan	HULL_PSASSET-140	Collections	Unk	4.00	2.00	32.00	3-Medium
PS Asset	PS A	HULL_PSASSET-132	Collections	Unk	4.00	2.00	32.00	3-Medium
PS Asset	PS 9 Exhaust Fan	HULL_PSASSET-118	Collections	Unk	4.00	2.00	32.00	3-Medium
PS Asset	PS 6 Exhaust Fan	HULL_PSASSET-98	Collections	Unk	4.00	2.00	32.00	3-Medium
PS Asset	PS 4 Generator	HULL_PSASSET-58	Collections	Unk	2.00	4.00	32.00	3-Medium
PS Asset	PS 4 Exhaust Fan	HULL_PSASSET-55	Collections	Unk	4.00	2.00	32.00	3-Medium
PS Asset	PS 3 Transfer Switch	HULL_PSASSET-46	Collections	Unk	4.00	2.00	32.00	3-Medium
PS Asset	PS 3 Exhaust Fan	HULL_PSASSET-35	Collections	Unk	4.00	2.00	32.00	3-Medium
MH	MH-20634	MH-20634	Collections	Manhole	2.50	2.95	30.95	3-Medium
MH	MH-20609	MH-20609	Collections	Manhole	2.50	2.95	30.95	3-Medium
MH	MH-20583	MH-20583	Collections	Manhole	2.50	2.95	30.95	3-Medium
MH	MH-20559	MH-20559	Collections	Manhole	2.50	2.95	30.95	3-Medium
MH	MH-20537	MH-20537	Collections	Manhole	2.50	2.95	30.95	3-Medium
MH	MH-20478	MH-20478	Collections	Manhole	2.50	2.95	30.95	3-Medium
MH	MH-20450	MH-20450	Collections	Manhole	2.50	2.95	30.95	3-Medium
MH	MH-20425	MH-20425	Collections	Manhole	2.50	2.95	30.95	3-Medium
WW	AT 4 Aerator/mixer	HULL_WWTP-377	WWTP	Mechanical	5.00	1.50	30.52	3-Medium
WW	Dump Station	HULL_WWTP-391	WWTP	S -Collections	5.00	1.50	30.52	3-Medium
WW	Exterior Lighting	HULL_WWTP-341	WWTP	Electrical	5.00	1.50	30.00	3-Medium
WW	Aeration Tank 4	HULL_WWTP-151	WWTP	Mechanical	5.00	1.50	30.00	3-Medium
WW	Gravity Thickener 2	HULL_WWTP-179	WWTP	Mechanical	5.00	1.50	30.00	3-Medium
WW	PC splitter box level transducer	HULL_WWTP-335	WWTP	Controls	5.00	1.50	30.00	3-Medium
Pipe	Sewer 8" AC Pipe on GUN ROCK AVE.	11005	Collections	Gravity Pipe	3.00	2.31	30.00	3-Medium
Pipe	Sewer 8" AC Pipe on NANTASKET AVE.	10467	Collections	Gravity Pipe	3.00	2.31	30.00	3-Medium
Pipe	Sewer 8" AC Pipe on A ST.	10431	Collections	Gravity Pipe	3.00	2.31	30.00	3-Medium

Pipe	Sewer 8" AC Pipe on MAIN ST.	10000	Collections	Gravity Pipe	3.00	2.31	30.00	3-Medium
WW	Primary Pump Room	HULL_WWTP-362	WWTP	Structural	4.87	1.50	29.72	3-Medium
WW	Exterior siding	HULL_WWTP-387	WWTP	S- Building	2.90	2.50	29.50	3-Medium
Pipe	Sewer 6" VC Pipe on GUN ROCK AVE.	11017	Collections	Gravity Pipe	5.00	1.35	29.17	3-Medium
Pipe	Sewer 6" VC Pipe on GUN ROCK AVE.	11012	Collections	Gravity Pipe	5.00	1.35	29.17	3-Medium
Pipe	Sewer 6" VC Pipe on GUN ROCK AVE.	11009	Collections	Gravity Pipe	5.00	1.35	29.17	3-Medium
MH	MH-20120	MH-20120	Collections	Manhole	5.00	1.36	28.57	3-Medium
WW	Communications	HULL_WWTP-26	WWTP	Controls	2.50	2.50	27.78	3-Medium
WW	LC-3 Panelboard	HULL_WWTP-344	WWTP	Electrical	4.50	1.50	27.00	3-Medium
MH	MH-20958	MH-20958	Collections	Manhole	2.50	2.50	26.19	3-Medium
MH	MH-20957	MH-20957	Collections	Manhole	2.50	2.50	26.19	3-Medium
MH	MH-20956	MH-20956	Collections	Manhole	2.50	2.50	26.19	3-Medium
WW	Roof - Operations Building	HULL_WWTP-307	WWTP	S- Building	2.50	2.50	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on SUMMIT AVE.	11029	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on VALLEY BEACH AVE.	10990	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on VALLEY BEACH AVE.	10988	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on SAMOSET AVE.	10769	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on FOURTH ST.	10659	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on SIXTH ST.	10610	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on SEVENTH ST.	10588	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on EIGHTH ST.	10559	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on GUILD ST.	10529	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on NEWPORT RD.	10509	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on BAY AVE. EAST	10461	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on OSMUNDSEN AVE.	10447	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on BROOKLINE AVE.	10440	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on TOURAINE AVE.	10434	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on WARREN ST.	10413	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on NEWPORT RD.	10409	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on NEWPORT RD.	10408	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on A ST.	10402	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on NEWPORT RD.	10400	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on A ST.	10381	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
Pipe	Sewer 8" AC Pipe on CADISH AVE	10239	Collections	Gravity Pipe	3.00	1.92	25.00	3-Medium
WW	Primary Clarifier 1	HULL_WWTP-129	WWTP	Mechanical	4.15	1.50	24.90	3-Medium
WW	Hypochlorite Pump 1	HULL_WWTP-163	WWTP	Mechanical	3.00	2.00	24.42	3-Medium
WW	Influent wet well - 3 gates	HULL_WWTP-409	WWTP	Mechanical	1.50	4.00	24.00	3-Medium
WW	Crane Disconnect Switch	HULL_WWTP-53	WWTP	Electrical	4.00	1.50	24.00	3-Medium
WW	LC-4	HULL_WWTP-345	WWTP	Electrical	4.00	1.50	24.00	3-Medium
WW	LC-1 Panelboard	HULL_WWTP-346	WWTP	Electrical	4.00	1.50	24.00	3-Medium
WW	HVAC Disconnect Switch	HULL_WWTP-57	WWTP	Electrical	4.00	1.50	24.00	3-Medium
PS Asset	PS A Flow Meter	HULL_PSASSET-141	Collections	Unk	3.00	2.00	24.00	3-Medium
PS Asset	PS 9 Flow Meter	HULL_PSASSET-119	Collections	Unk	3.00	2.00	24.00	3-Medium
PS Asset	PS 5	HULL_PSASSET-69	Collections	Unk	3.00	2.00	24.00	3-Medium
PS Asset	PS 1	HULL_PSASSET-2	Collections	Unk	3.00	2.00	24.00	3-Medium
MH	MH-20640	MH-20640	Collections	Manhole	2.50	2.27	23.81	3-Medium
MH	MH-20361	MH-20361	Collections	Manhole	2.50	2.27	23.81	3-Medium
MH	MH-20347	MH-20347	Collections	Manhole	2.50	2.27	23.81	3-Medium
MH	MH-20327	MH-20327	Collections	Manhole	2.50	2.27	23.81	3-Medium
WW	Odor Control Wet Scrubber Vessel	HULL_WWTP-170	WWTP	Mechanical	3.91	1.50	23.48	3-Medium
WW	Primary Clarifier 2	HULL_WWTP-130	WWTP	Mechanical	3.91	1.50	23.48	3-Medium
Pipe	Sewer 6" VC Pipe on HOLBROOK AVE.	11085	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on RICHARDS RD.	11084	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SHORE GARDENS RD.	11079	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SHORE GARDENS RD.	11078	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SHORE GARDENS RD.	11077	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SHORE GARDENS RD.	11076	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SHORE GARDENS RD.	11073	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SHORE GARDENS RD.	11072	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on ROCKLAND CIRCLE	11071	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on ROCKLAND CIRCLE	11070	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on PARK AVE.	11068	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on ROCKVIEW RD.	11067	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on PARK AVE.	11066	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on PARK AVE.	11065	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on WYOLA RD.	11064	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on ROCKVIEW RD.	11063	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on ROCKVIEW RD.	11062	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on ROCKAWAY AVE.	11061	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on WYOLA RD.	11060	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium

Pipe	Sewer 6" VC Pipe on R.R. BED	11059	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on R.R. BED	11058	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on R.R. BED	11057	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on LOGAN AVE.	11056	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on LOGAN AVE.	11055	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SOUTH TRURO ST.	11050	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on BARNSTABLE ST.	11049	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on NORTH TRURO ST.	11048	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on ORLEANS ST.	11047	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on DIGHTON ST.	11046	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on DIGHTON ST.	11045	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on ORLEANS ST.	11044	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on NORTH TRURO ST.	11043	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on NORTH TRURO ST.	11042	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on NORTH TRURO ST.	11041	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on NORTH TRURO ST.	11040	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on NORTH TRURO ST.	11039	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on NORTH TRURO ST.	11038	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SUMMIT AVE.	11035	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on REEF PT.	11026	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SUMMIT AVE.	11025	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SUMMIT AVE.	11024	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on VALLEY BEACH AVE.	10967	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on VALLEY BEACH AVE.	10966	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on ATLANTIC HOUSE RD.	10960	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on ATLANTIC HOUSE RD.	10959	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on STATE PARK RD.	10958	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MIDLEDGE AVE.	10955	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MIDLEDGE AVE.	10954	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on ATHERTON RD.	10936	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on ATHERTON RD.	10933	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on RALPH CROSSEN CIR.	10931	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on RALPH CROSSEN CIR.	10930	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on RALPH CROSSEN CIR.	10926	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on ROCKVIEW RD.	10916	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on ROCKVIEW RD.	10915	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on ROCKVIEW RD.	10914	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on PORRAZZO RD.	10876	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on PORRAZZO RD.	10875	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on PORRAZZO RD.	10874	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on BAY ST.	10873	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on BAY ST.	10871	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on EASTERN AVE.	10870	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on EASTERN AVE.	10867	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HILLSIDE RD.	10866	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on WATER ST.	10859	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on WATER ST.	10858	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10854	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10853	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HILLSIDE RD.	10852	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on PORRAZZO RD.	10851	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on ANDREW AVE.	10842	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10841	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on PORRAZZO RD.	10839	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on ROOSEVELT AVE.	10838	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MORELAND AVE.	10835	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on BAY ST.	10834	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on FAIRMOUNT WAY	10833	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on BAY ST.	10832	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10830	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MAYFLOWER RD.	10829	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10828	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MERRILL RD.	10827	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on OSLAND VIEW RD.	10826	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on FAIRMOUNT WAY	10825	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on FAIRMOUNT WAY	10824	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on ROOSEVELT AVE.	10823	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10822	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on ANDREW AVE.	10821	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SAGAMORE TER.	10819	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium

Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10817	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10816	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on BAY ST.	10815	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MAYFLOWER RD.	10810	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MERRILL RD.	10809	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on FAIRMOUNT WAY	10808	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10806	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on STANDISH RD.	10805	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on OSLAND VIEW RD.	10803	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on BAY ST.	10802	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10794	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on BAY ST.	10791	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on STANDISH RD.	10789	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10786	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on LINCOLN ST.	10785	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on BAY ST.	10784	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on ROOSEVELT AVE.	10782	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on BAY ST.	10781	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on BAY ST.	10780	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10779	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on BAY ST.	10778	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MERRILL RD.	10777	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on BAY ST.	10776	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on EDGEWATER RD.	10775	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10772	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MARGINAL RD.	10771	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MARGINAL RD.	10770	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on LINCOLN ST.	10767	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10766	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MARGINAL RD.	10765	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on OLD COLONY RD.	10763	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10760	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on OLD COLONY RD.	10759	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on EDGEWATER RD.	10758	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10755	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HAMPTON CIR.	10754	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on EDGEWATER RD.	10745	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HOLBROOK AVE.	10341	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on HOLBROOK AVE.	10332	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HOLBROOK AVE.	10313	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on BRADFORD	10296	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on Y ST.	10294	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on X ST.	10290	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on HOLBROOK AVE.	10289	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on X ST.	10281	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on Y ST.	10280	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on STANDISH AVE.	10272	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on BRADFORD	10271	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HOLBROOK AVE.	10253	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on BEACON	10251	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on HOLBROOK AVE.	10250	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on MAYFLOWER RD.	10247	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on Y ST.	10246	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on MAYFLOWER RD.	10245	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on BEACON	10226	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HOLBROOK AVE.	10225	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on STANDISH AVE.	10222	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on BRADFORD	10221	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on PT ALLERTON AVE	10217	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on STANDISH AVE.	10213	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on STANDISH AVE.	10204	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MERIDIAN AVE.	10202	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MERIDIAN AVE.	10200	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on PT ALLERTON AVE	10197	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MERIDIAN AVE.	10196	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10195	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on STANDISH AVE.	10194	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on ALDEN AVE.	10193	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on TIERNEY AVE.	10191	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on BRADFORD	10189	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium

Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10188	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on STANDISH AVE.	10187	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 8" VC Pipe on PT ALLERTON AVE	10183	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10181	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on WINTHROP AVE.	10180	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on TIERNEY AVE.	10179	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on GLOVER AVE.	10178	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on KENTON AVE.	10177	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on GLOVER AVE.	10176	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on GLOVER AVE.	10175	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10172	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on TIERNEY AVE.	10171	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on WINTHROP AVE.	10170	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10168	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on WINTHROP AVE.	10167	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10166	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10165	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on NANTASKET AVE.	10163	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on DOUGLAS AVE.	10133	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on DOUGLAS AVE.	10132	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on FARINA RD.	10112	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on FARINA RD.	10111	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on FARINA RD.	10107	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MAIN ST.	10103	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MT. PLEASANT	10102	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on FARINA RD.	10099	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MT. PLEASANT	10087	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HIGHLAND AVE	10082	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MT. PLEASANT	10080	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HARBOR VIEW RD.	10079	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HARBOR VIEW RD.	10078	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on VAUTRINOT AVE.	10077	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on MT. PLEASANT	10076	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on VAUTRINOT AVE.	10072	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HIGHLAND AVE	10071	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on VAUTRINOT AVE.	10070	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HARBOR VIEW RD.	10067	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HIGHLAND AVE	10066	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HARBOR VIEW RD.	10065	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SPRING ST.	10064	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on WESTERN AVE.	10061	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SPRING ST.	10060	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SPRING ST.	10059	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HIGHLAND AVE	10058	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HARBOR VIEW RD.	10057	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HIGHLAND AVE	10052	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SPRING ST.	10051	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on CREST RD.	10050	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HIGHLAND AVE	10049	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HIGHLAND AVE	10048	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on VAUTRINOT AVE.	10047	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SPRING ST.	10046	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HIGHLAND AVE	10045	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on CREST RD.	10044	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on LAFAYETTE RD.	10043	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on WESTERN AVE.	10042	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HIGHLAND AVE	10041	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on ANDREW AVE.	10040	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on SPRING ST.	10039	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HIGHLAND AVE	10038	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on LAFAYETTE RD.	10037	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on LAFAYETTE RD.	10036	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HIGHLAND AVE	10035	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on OCEAN AVE.	10034	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on HIGHLAND AVE	10033	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on OCEAN AVE.	10032	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on OCEAN AVE.	10029	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
Pipe	Sewer 6" VC Pipe on OCEAN AVE.	10027	Collections	Gravity Pipe	4.00	1.35	23.33	3-Medium
WW	Sludge Holding Tank 1 Aeration System	HULL_WWTP-383	WWTP	Mechanical	3.80	1.50	22.80	3-Medium
WW	Sludge Holding Tank 2 Aeration System	HULL_WWTP-382	WWTP	Mechanical	3.80	1.50	22.80	3-Medium

WW	RST CD Disconnect Switch	HULL_WWTP-58	WWTP	Electrical	3.79	1.50	22.75	3-Medium
MH	MH-20424	MH-20424	Collections	Manhole	1.25	4.32	22.62	3-Medium
MH	MH-20015	MH-20015	Collections	Manhole	1.25	4.32	22.62	3-Medium
WW	Gravity Thickener 1	HULL_WWTP-178	WWTP	Mechanical	3.69	1.50	22.51	3-Medium
Pipe	Sewer 8" VC Pipe on ATLANTIC AVE.	10998	Collections	Gravity Pipe	3.00	1.73	22.50	3-Medium
Pipe	Sewer 8" AC Pipe on NANTASKET AVE.	10790	Collections	Gravity Pipe	3.00	1.73	22.50	3-Medium
Pipe	Sewer 8" AC Pipe on EDGEWATER RD.	10787	Collections	Gravity Pipe	3.00	1.73	22.50	3-Medium
Pipe	Sewer 8" AC Pipe on NANTASKET AVE.	10774	Collections	Gravity Pipe	3.00	1.73	22.50	3-Medium
Pipe	Sewer 8" AC Pipe on WHITEHEAD AVE.	10773	Collections	Gravity Pipe	3.00	1.73	22.50	3-Medium
Pipe	Sewer 8" AC Pipe on NANTASKET AVE.	10768	Collections	Gravity Pipe	3.00	1.73	22.50	3-Medium
Pipe	Sewer 8" AC Pipe on NANTASKET AVE.	10764	Collections	Gravity Pipe	3.00	1.73	22.50	3-Medium
Pipe	Sewer 8" AC Pipe on NANTASKET AVE.	10750	Collections	Gravity Pipe	3.00	1.73	22.50	3-Medium
WW	Sludge Storage Tank 1	HULL_WWTP-203	WWTP	Mechanical	3.69	1.50	22.13	3-Medium
WW	Sludge Storage Tank 2	HULL_WWTP-204	WWTP	Mechanical	3.69	1.50	22.13	3-Medium
Pipe	Sewer 12" AC Pipe on NANTASKET RD.	10390	Collections	Gravity Pipe	2.00	2.50	21.67	3-Medium
MH	MH-20989	MH-20989	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20988	MH-20988	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20987	MH-20987	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20985	MH-20985	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20980	MH-20980	Collections	Manhole	2.50	2.05	21.43	3-Medium
MH	MH-20978	MH-20978	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20977	MH-20977	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20969	MH-20969	Collections	Manhole	2.50	2.05	21.43	3-Medium
MH	MH-20966	MH-20966	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20960	MH-20960	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20954	MH-20954	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20952	MH-20952	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20951	MH-20951	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20945	MH-20945	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20944	MH-20944	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20938	MH-20938	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20932	MH-20932	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20930	MH-20930	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20929	MH-20929	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20925	MH-20925	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20924	MH-20924	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20923	MH-20923	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20921	MH-20921	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20920	MH-20920	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20917	MH-20917	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20911	MH-20911	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20908	MH-20908	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20904	MH-20904	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20901	MH-20901	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20900	MH-20900	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20895	MH-20895	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20892	MH-20892	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20888	MH-20888	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20887	MH-20887	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20882	MH-20882	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20880	MH-20880	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20879	MH-20879	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20875	MH-20875	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20874	MH-20874	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20872	MH-20872	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20863	MH-20863	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20862	MH-20862	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20861	MH-20861	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20860	MH-20860	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20857	MH-20857	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20850	MH-20850	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20842	MH-20842	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20841	MH-20841	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20833	MH-20833	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20828	MH-20828	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20827	MH-20827	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20825	MH-20825	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20822	MH-20822	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20821	MH-20821	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20816	MH-20816	Collections	Manhole	3.75	1.36	21.43	3-Medium

MH	MH-20814	MH-20814	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20813	MH-20813	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20808	MH-20808	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20807	MH-20807	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20805	MH-20805	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20804	MH-20804	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20802	MH-20802	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20801	MH-20801	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20800	MH-20800	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20799	MH-20799	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20798	MH-20798	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20797	MH-20797	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20794	MH-20794	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20793	MH-20793	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20792	MH-20792	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20790	MH-20790	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20789	MH-20789	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20788	MH-20788	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20787	MH-20787	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20786	MH-20786	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20785	MH-20785	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20784	MH-20784	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20783	MH-20783	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20782	MH-20782	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20780	MH-20780	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20778	MH-20778	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20776	MH-20776	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20775	MH-20775	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20773	MH-20773	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20771	MH-20771	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20769	MH-20769	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20768	MH-20768	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20767	MH-20767	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20765	MH-20765	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20763	MH-20763	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20760	MH-20760	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20758	MH-20758	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20756	MH-20756	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20755	MH-20755	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20753	MH-20753	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20751	MH-20751	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20750	MH-20750	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20749	MH-20749	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20747	MH-20747	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20746	MH-20746	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20743	MH-20743	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20742	MH-20742	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20741	MH-20741	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20738	MH-20738	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20737	MH-20737	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20735	MH-20735	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20733	MH-20733	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20731	MH-20731	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20729	MH-20729	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20728	MH-20728	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20725	MH-20725	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20724	MH-20724	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20723	MH-20723	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20718	MH-20718	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20716	MH-20716	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20715	MH-20715	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20710	MH-20710	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20708	MH-20708	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20706	MH-20706	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20703	MH-20703	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20702	MH-20702	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20699	MH-20699	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20696	MH-20696	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20695	MH-20695	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20694	MH-20694	Collections	Manhole	3.75	1.36	21.43	3-Medium

MH	MH-20690	MH-20690	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20687	MH-20687	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20686	MH-20686	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20683	MH-20683	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20680	MH-20680	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20679	MH-20679	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20674	MH-20674	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20672	MH-20672	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20670	MH-20670	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20669	MH-20669	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20665	MH-20665	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20663	MH-20663	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20657	MH-20657	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20653	MH-20653	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20651	MH-20651	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20649	MH-20649	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20647	MH-20647	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20643	MH-20643	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20642	MH-20642	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20639	MH-20639	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20636	MH-20636	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20633	MH-20633	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20631	MH-20631	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20628	MH-20628	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20624	MH-20624	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20623	MH-20623	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20622	MH-20622	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20621	MH-20621	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20616	MH-20616	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20613	MH-20613	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20612	MH-20612	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20607	MH-20607	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20606	MH-20606	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20603	MH-20603	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20599	MH-20599	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20597	MH-20597	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20590	MH-20590	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20587	MH-20587	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20585	MH-20585	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20582	MH-20582	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20579	MH-20579	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20576	MH-20576	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20575	MH-20575	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20570	MH-20570	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20569	MH-20569	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20563	MH-20563	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20561	MH-20561	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20557	MH-20557	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20556	MH-20556	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20554	MH-20554	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20553	MH-20553	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20549	MH-20549	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20544	MH-20544	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20538	MH-20538	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20536	MH-20536	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20532	MH-20532	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20530	MH-20530	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20529	MH-20529	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20524	MH-20524	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20522	MH-20522	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20519	MH-20519	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20514	MH-20514	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20512	MH-20512	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20505	MH-20505	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20503	MH-20503	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20502	MH-20502	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20499	MH-20499	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20493	MH-20493	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20487	MH-20487	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20486	MH-20486	Collections	Manhole	3.75	1.36	21.43	3-Medium

MH	MH-20483	MH-20483	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20477	MH-20477	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20474	MH-20474	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20473	MH-20473	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20472	MH-20472	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20468	MH-20468	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20465	MH-20465	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20464	MH-20464	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20462	MH-20462	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20459	MH-20459	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20454	MH-20454	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20453	MH-20453	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20447	MH-20447	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20437	MH-20437	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20436	MH-20436	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20435	MH-20435	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20433	MH-20433	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20431	MH-20431	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20428	MH-20428	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20426	MH-20426	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20422	MH-20422	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20420	MH-20420	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20419	MH-20419	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20418	MH-20418	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20417	MH-20417	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20416	MH-20416	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20413	MH-20413	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20412	MH-20412	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20411	MH-20411	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20409	MH-20409	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20402	MH-20402	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20401	MH-20401	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20400	MH-20400	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20399	MH-20399	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20398	MH-20398	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20397	MH-20397	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20393	MH-20393	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20391	MH-20391	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20387	MH-20387	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20386	MH-20386	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20381	MH-20381	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20375	MH-20375	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20370	MH-20370	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20368	MH-20368	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20367	MH-20367	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20352	MH-20352	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20351	MH-20351	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20349	MH-20349	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20348	MH-20348	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20346	MH-20346	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20344	MH-20344	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20341	MH-20341	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20338	MH-20338	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20316	MH-20316	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20313	MH-20313	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20312	MH-20312	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20310	MH-20310	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20308	MH-20308	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20307	MH-20307	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20304	MH-20304	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20303	MH-20303	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20296	MH-20296	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20287	MH-20287	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20286	MH-20286	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20282	MH-20282	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20271	MH-20271	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20270	MH-20270	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20267	MH-20267	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20266	MH-20266	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20259	MH-20259	Collections	Manhole	3.75	1.36	21.43	3-Medium

MH	MH-20254	MH-20254	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20253	MH-20253	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20252	MH-20252	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20251	MH-20251	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20248	MH-20248	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20247	MH-20247	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20246	MH-20246	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20241	MH-20241	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20239	MH-20239	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20238	MH-20238	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20236	MH-20236	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20232	MH-20232	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20230	MH-20230	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20229	MH-20229	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20212	MH-20212	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20210	MH-20210	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20205	MH-20205	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20204	MH-20204	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20203	MH-20203	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20201	MH-20201	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20198	MH-20198	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20194	MH-20194	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20190	MH-20190	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20182	MH-20182	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20181	MH-20181	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20180	MH-20180	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20179	MH-20179	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20178	MH-20178	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20177	MH-20177	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20176	MH-20176	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20174	MH-20174	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20172	MH-20172	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20171	MH-20171	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20169	MH-20169	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20166	MH-20166	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20165	MH-20165	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20164	MH-20164	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20163	MH-20163	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20162	MH-20162	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20161	MH-20161	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20158	MH-20158	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20157	MH-20157	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20156	MH-20156	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20155	MH-20155	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20153	MH-20153	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20149	MH-20149	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20148	MH-20148	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20146	MH-20146	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20145	MH-20145	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20144	MH-20144	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20113	MH-20113	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20095	MH-20095	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20094	MH-20094	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20085	MH-20085	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20084	MH-20084	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20081	MH-20081	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20076	MH-20076	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20075	MH-20075	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20071	MH-20071	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20069	MH-20069	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20068	MH-20068	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20067	MH-20067	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20066	MH-20066	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20063	MH-20063	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20061	MH-20061	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20060	MH-20060	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20059	MH-20059	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20057	MH-20057	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20056	MH-20056	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20055	MH-20055	Collections	Manhole	3.75	1.36	21.43	3-Medium

MH	MH-20054	MH-20054	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20053	MH-20053	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20051	MH-20051	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20050	MH-20050	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20049	MH-20049	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20048	MH-20048	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20047	MH-20047	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20046	MH-20046	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20044	MH-20044	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20043	MH-20043	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20042	MH-20042	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20041	MH-20041	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20040	MH-20040	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20039	MH-20039	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20038	MH-20038	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20037	MH-20037	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20036	MH-20036	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20035	MH-20035	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20034	MH-20034	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20033	MH-20033	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20032	MH-20032	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20031	MH-20031	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20030	MH-20030	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20029	MH-20029	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20028	MH-20028	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20027	MH-20027	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20026	MH-20026	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20025	MH-20025	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20024	MH-20024	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20023	MH-20023	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20021	MH-20021	Collections	Manhole	3.75	1.36	21.43	3-Medium
MH	MH-20019	MH-20019	Collections	Manhole	3.75	1.36	21.43	3-Medium
WW	Exhaust Fan 4 Scrubber	HULL_WWTP-39	WWTP	HVAC	3.50	1.50	21.36	3-Medium
WW	Primary Sludge Pump 1	HULL_WWTP-198	WWTP	Mechanical	3.50	1.50	21.36	3-Medium
WW	Primary Sludge Pump 2	HULL_WWTP-199	WWTP	Mechanical	3.50	1.50	21.36	3-Medium
WW	Grit Screw Classifier	HULL_WWTP-87	WWTP	Mechanical	3.50	1.50	21.00	3-Medium
WW	SCADA	HULL_WWTP-36	WWTP	Controls	1.16	4.50	20.88	3-Medium
Pipe	Sewer 6" VC Pipe on MAIN ST.	10020	Collections	Gravity Pipe	1.00	4.81	20.83	3-Medium
WW	Secondary Scum Pump 2	HULL_WWTP-195	WWTP	Mechanical	3.38	1.50	20.60	3-Medium
WW	Garage Area Hatch	HULL_WWTP-388	WWTP	S- Building	5.00	1.00	20.35	3-Medium
WW	Secondary Scum Pump 1	HULL_WWTP-194	WWTP	Mechanical	3.38	1.50	20.25	3-Medium
WW	Waste Activated Sludge Pump 2	HULL_WWTP-209	WWTP	Mechanical	3.38	1.50	20.25	3-Medium
WW	Aeration Blower 2	HULL_WWTP-138	WWTP	Mechanical	3.38	1.50	20.25	3-Medium
MH	MH-20014	MH-20014	Collections	Manhole	1.25	3.86	20.24	3-Medium
MH	MH-20012	MH-20012	Collections	Manhole	1.25	3.86	20.24	3-Medium
WW	Electrical Manholes	HULL_WWTP-297	WWTP	Electrical	2.00	2.50	20.00	3-Medium
WW	Aerated Grit System	HULL_WWTP-328	WWTP		2.50	2.00	20.00	3-Medium
WW	Sludge Holding Tank 2 Hatch	HULL_WWTP-381	WWTP	Mechanical	5.00	1.00	20.00	3-Medium
WW	Electrical Ductbanks	HULL_WWTP-398	WWTP	Electrical	2.00	2.50	20.00	3-Medium
WW	ckflow Preventer - HVAC Room Boiler Makeup F	HULL_WWTP-76	WWTP	Piping	5.00	1.00	20.00	3-Medium
WW	Backflow Preventer - Secondary	HULL_WWTP-78	WWTP	Piping	5.00	1.00	20.00	3-Medium
WW	Plant water yard hydrants	HULL_WWTP-220	WWTP	Mechanical	2.50	2.00	20.00	3-Medium
WW	Plant Water Strainer	HULL_WWTP-378	WWTP	Mechanical	2.50	2.00	20.00	3-Medium
WW	Effluent Pump Room Sluice Gates	HULL_WWTP-384	WWTP	Mechanical	5.00	1.00	20.00	3-Medium
WW	Backflow Preventer - Primary	HULL_WWTP-77	WWTP	Piping	5.00	1.00	20.00	3-Medium
WW	Caustic Soda Metering Pump	HULL_WWTP-160	WWTP	Mechanical	2.50	2.00	20.00	3-Medium
WW	Effluent pump hatches	HULL_WWTP-379	WWTP	Mechanical	5.00	1.00	20.00	3-Medium
WW	Sludge Holding Tank 1 Hatch	HULL_WWTP-380	WWTP	Mechanical	5.00	1.00	20.00	3-Medium
Pipe	Sewer 36" RC Pipe on FITZPATRIC WAY	10235	Collections	Gravity Pipe	1.00	4.62	20.00	3-Medium
Pipe	Sewer 24" BRICK Pipe on MAIN ST.	10025	Collections	Gravity Pipe	1.00	4.62	20.00	3-Medium
Pipe	Sewer 24" BRICK Pipe on MAIN ST.	10024	Collections	Gravity Pipe	1.00	4.62	20.00	3-Medium
WW	Generator #1- Emergency	HULL_WWTP-65	WWTP	Electrical	1.10	4.50	19.80	3-Medium
WW	Plant security fence	HULL_WWTP-390	WWTP	S- Building	4.85	1.00	19.74	3-Medium
WW	Gravity Thickeners	HULL_WWTP-176	WWTP	Structural	4.84	1.00	19.68	3-Medium
MH	MH-20953	MH-20953	Collections	Manhole	2.50	1.82	19.05	3-Medium
MH	MH-20395	MH-20395	Collections	Manhole	1.25	3.64	19.05	3-Medium
MH	MH-20360	MH-20360	Collections	Manhole	1.25	3.64	19.05	3-Medium
MH	MH-20321	MH-20321	Collections	Manhole	1.25	3.64	19.05	3-Medium
WW	Effluent Pumps	HULL_WWTP-154	WWTP		1.00	4.50	18.31	3-Medium
WW	Influent Pump 3 Motor	HULL_WWTP-113	WWTP	Electrical	1.00	4.50	18.00	3-Medium

Pipe	Sewer 6" VC Pipe on MAIN ST.	11087	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 30" RC Pipe on NANTASKET AVE.	11086	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 30" RC Pipe on NANTASKET AVE.	10843	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 30" RC Pipe on NANTASKET AVE.	10814	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 30" RC Pipe on NANTASKET AVE.	10788	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 30" RC Pipe on NANTASKET AVE.	10751	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 30" RC Pipe on NANTASKET AVE.	10741	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 30" RC Pipe on NANTASKET AVE.	10740	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 30" RC Pipe on NANTASKET AVE.	10728	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 30" RC Pipe on NANTASKET AVE.	10703	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 30" RC Pipe on NANTASKET AVE.	10695	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 30" RC Pipe on NANTASKET AVE.	10686	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 30" RC Pipe on NANTASKET AVE.	10661	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 30" RC Pipe on NANTASKET AVE.	10643	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 30" RC Pipe on NANTASKET AVE.	10623	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10353	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10350	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 36" RC Pipe on NANTASKET AVE.	10325	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 15" VC Pipe on MAIN ST.	10069	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
Pipe	Sewer 6" VC Pipe on MAIN ST.	10022	Collections	Gravity Pipe	1.00	4.04	17.50	3-Medium
WW	Plant Water Pump 1	HULL_WWTP-218	WWTP	Electrical	1.00	4.00	16.28	3-Medium
WW	Plant Water Pump 2	HULL_WWTP-219	WWTP	Electrical	1.00	4.00	16.28	3-Medium
WW	Plant Water Suction	HULL_WWTP-399	WWTP	Mechanical	1.00	4.00	16.00	3-Medium
Pipe	Sewer 10" VC Pipe on ATLANTIC AVE.	11023	Collections	Gravity Pipe	1.00	3.46	15.00	3-Medium
Pipe	Sewer 12" VC Pipe on ATLANTIC AVE.	11013	Collections	Gravity Pipe	1.00	3.46	15.00	3-Medium
Pipe	Sewer 12" VC Pipe on MAIN ST.	10092	Collections	Gravity Pipe	1.00	3.46	15.00	3-Medium
Pipe	Sewer 15" VC Pipe on MAIN ST.	10063	Collections	Gravity Pipe	1.00	3.46	15.00	3-Medium
WW	Verizon pump station modem circuit	HULL_WWTP-225	WWTP		1.00	3.50	14.24	3-Medium
WW	Influent Pump 2 Motor	HULL_WWTP-107	WWTP	Electrical	1.00	3.50	14.00	3-Medium
WW	Thickened Sludge Tank "above ground"	HULL_WWTP-317	WWTP	Mechanical	3.43	1.00	13.70	3-Medium
Pipe	Sewer 12" AC Pipe on NANTASKET RD.	10666	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 12" AC Pipe on NANTASKET RD.	10655	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 12" AC Pipe on NANTASKET RD.	10654	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 15" AC Pipe on SAMOSET AVE.	10647	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 12" AC Pipe on NANTASKET RD.	10637	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 15" AC Pipe on SAMOSET AVE.	10632	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 15" AC Pipe on SAMOSET AVE.	10631	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 16" AC Pipe on WARREN ST.	10617	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 12" AC Pipe on NANTASKET RD.	10611	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 12" AC Pipe on NANTASKET RD.	10589	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 12" AC Pipe on NANTASKET RD.	10560	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 12" AC Pipe on NANTASKET RD.	10535	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 12" AC Pipe on NANTASKET RD.	10502	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 12" AC Pipe on NANTASKET RD.	10473	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 12" AC Pipe on NANTASKET RD.	10448	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 10" AC Pipe on CENTRAL AVE.	10270	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 12" AC Pipe on CENTRAL AVE.	10269	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 10" AC Pipe on R ST.	10268	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 10" AC Pipe on CENTRAL AVE.	10249	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
Pipe	Sewer 6" VC Pipe on MAIN ST.	10010	Collections	Gravity Pipe	1.00	3.08	13.33	3-Medium
WW	Parshall Flume	HULL_WWTP-91	WWTP	Mechanical	5.00	0.50	10.00	3-Medium
WW	Coarse Bubbler	HULL_WWTP-80	WWTP	Mechanical	3.38	0.50	6.75	3-Medium
WW	MDP 5 Feeder Breaker in MSB	HULL_WWTP-237	WWTP		0.25	5.00	5.09	3-Medium
WW	ATS-1	HULL_WWTP-342	WWTP	Electrical	0.25	5.00	5.00	3-Medium
WW	ATS-2	HULL_WWTP-343	WWTP	Electrical	0.25	5.00	5.00	3-Medium
WW	MDP 5	HULL_WWTP-238	WWTP	Electrical	0.25	5.00	5.00	3-Medium
WW	MDP 6 Feeder Breaker in MSB	HULL_WWTP-239	WWTP		0.25	5.00	5.00	3-Medium
WW	MDP 6	HULL_WWTP-240	WWTP	Electrical	0.25	5.00	5.00	3-Medium
WW	MCC 2	HULL_WWTP-68	WWTP	Electrical	0.25	4.00	4.07	3-Medium
WW	Effluent Pump 1 VFD	HULL_WWTP-355	WWTP	Electrical	0.00	4.50	0.00	3-Medium
WW	Effluent Pump 2 VFD	HULL_WWTP-356	WWTP	Electrical	0.00	4.00	0.00	3-Medium
WW	Effluent Pump 3 VFD	HULL_WWTP-357	WWTP	Electrical	0.00	4.50	0.00	3-Medium
WW	Effluent Pump 4 VFD	HULL_WWTP-358	WWTP	Electrical	0.00	4.00	0.00	3-Medium
WW	Aerator 2	HULL_WWTP-359	WWTP	Electrical	0.00	4.00	0.00	3-Medium
WW	Aerator 4	HULL_WWTP-360	WWTP	Electrical	0.00	4.00	0.00	3-Medium
WW	Influent Pump 5 VFD	HULL_WWTP-127	WWTP		0.00	3.50	0.00	3-Medium
WW	Influent Pump 1 VFD	HULL_WWTP-103	WWTP		0.00	3.50	0.00	3-Medium
WW	Influent Pump 3 VFD	HULL_WWTP-115	WWTP		0.00	3.50	0.00	3-Medium
WW	Influent Pump 4 VFD	HULL_WWTP-121	WWTP		0.00	3.50	0.00	3-Medium
WW	Influent Pump 2 VFD	HULL_WWTP-109	WWTP		0.00	3.50	0.00	3-Medium

WW	Aeration Tank 3	HULL_WWTP-150	WWTP	Mechanical	2.55	1.50	100.00	2-Low
WW	Grit Pump 2	HULL_WWTP-86	WWTP	Pumps	2.00	1.50	34.29	2-Low
PS Asset	PS 9	HULL_PSASSET-111	Collections	Unk	2.00	3.00	24.00	2-Low
WW	Influent Pump 5	HULL_WWTP-122	WWTP	Mechanical	3.00	1.50	20.00	2-Low
WW	Influent Pump 3	HULL_WWTP-110	WWTP	Mechanical	3.00	1.50	18.40	2-Low
WW	Influent Pump 2	HULL_WWTP-104	WWTP	Mechanical	3.00	1.50	18.31	2-Low
WW	Influent Pump 4	HULL_WWTP-116	WWTP	Mechanical	3.00	1.50	18.31	2-Low
WW	Influent Pump 1	HULL_WWTP-98	WWTP	Mechanical	3.00	1.50	18.00	2-Low
Pipe	Sewer 6" VC Pipe on DAMON PARK DR.	11006	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on MEADE AVE.	10991	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WHARF AVE.	10886	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WHITEHEAD AVE.	10762	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WHITEHEAD AVE.	10756	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WHITEHEAD AVE.	10748	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on MOUNTFORD RD.	10739	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WHITEHEAD AVE.	10736	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on MOUNTFORD RD.	10733	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on EDGEWATER RD.	10731	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WESTMINSTER RD.	10727	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WHITEHEAD AVE.	10726	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on NANTASKET RD.	10721	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on EDGEWATER RD.	10720	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on MOUNTFORD RD.	10719	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WESTMINSTER RD.	10718	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on MOUNTFORD RD.	10713	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WHITEHEAD AVE.	10712	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WHITEHEAD AVE.	10711	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WESTMINSTER RD.	10706	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on SECOND ST.	10705	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on EDGEWATER RD.	10704	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WHITEHEAD AVE.	10702	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on SECOND ST.	10701	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on MOUNTFORD RD.	10694	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WESTMINSTER RD.	10693	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WHITEHEAD AVE.	10684	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on THIRD ST.	10682	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on EDGEWATER RD.	10679	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on MOUNTFORD RD.	10678	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on KINGSLEY RD.	10675	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on SUMNER ST.	10674	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on THIRD ST.	10673	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on KINGSLEY RD.	10667	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on FAIR ST.	10665	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on SUMNER ST.	10664	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on SUMNER ST.	10662	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on KINGSLEY RD.	10653	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on EDGEWATER RD.	10652	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WALTHAM ST.	10646	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WALTHAM ST.	10645	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on KINGSLEY RD.	10642	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on REVERE ST.	10641	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on REVERE ST.	10636	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on EDGEWATER RD.	10635	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on KINGSLEY RD.	10630	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on BELMONT ST.	10626	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on STAFFORD RD.	10624	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on KINGSLEY RD.	10616	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on KENBERMA ST.	10615	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on BELMONT ST.	10612	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on STAFFORD RD.	10609	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on KINGSLEY RD.	10605	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on KINGSLEY RD.	10601	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on STAFFORD RD.	10598	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on REVERE ST.	10595	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on DRAPER AVE.	10586	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on DRAPER AVE.	10585	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on EDGEWATER RD.	10583	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on EDGEWATER RD.	10582	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on RUSSELL ST.	10581	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WARFIELD AVE.	10574	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low

Pipe	Sewer 8" AC Pipe on KINGSLEY RD.	10568	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on RUSSELL ST.	10564	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on KINGSLEY RD.	10561	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on GUILD ST.	10558	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on EDGEWATER RD.	10555	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on BATES ST.	10550	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WARFIELD AVE.	10549	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on LYNN AVE.	10545	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on TOURAINE AVE.	10540	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on COBURN ST.	10538	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on LYNN AVE.	10534	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on NINETH ST.	10531	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on BATES ST.	10530	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WARFIELD AVE.	10521	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WARREN ST.	10520	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on KINGSLEY RD.	10515	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on COBURN ST.	10514	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on KINGSLEY RD.	10513	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on TOURAINE AVE.	10510	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on TOURAINE AVE.	10506	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on TOURAINE AVE.	10504	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on KINGSLEY RD.	10501	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on TENTH ST.	10500	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on NEWPORT RD.	10499	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on EDGEWATER RD.	10498	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on EDGEWATER RD.	10497	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on LYNN AVE.	10492	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on COBURN ST.	10490	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WARFIELD AVE.	10487	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WARREN ST.	10486	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WARFIELD AVE.	10484	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on NEWPORT RD.	10483	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on BROOKLINE AVE.	10480	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on BROOKLINE AVE.	10479	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on NEWPORT RD.	10477	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on TOURAINE AVE.	10476	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on EDGEWATER RD.	10470	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on PROSPECT	10469	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on PROSPECT	10459	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on PROSPECT	10458	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on PROSPECT	10457	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on LYNN AVE.	10455	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on PROSPECT	10451	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on WARREN ST.	10449	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on PROSPECT	10442	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on DOVER ST.	10441	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on CLIFTON AVE.	10439	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on PROSPECT	10438	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on PROSPECT	10433	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on NEWPORT RD.	10432	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on PROSPECT	10430	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on PROSPECT	10424	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on PROSPECT	10423	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on PROSPECT	10422	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on PROSPECT	10421	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on VETERANS AVE.	10420	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on PROSPECT	10419	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on HALVORSEN AVE.	10418	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on VETERANS AVE.	10412	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on VETERANS AVE.	10411	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on HALVORSEN AVE.	10407	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on HALVORSEN AVE.	10397	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on PROSPECT	10396	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on EDGEWATER RD.	10395	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on HALVORSEN AVE.	10380	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on HALVORSEN AVE.	10379	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on HALVORSEN AVE.	10376	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on HALVORSEN AVE.	10375	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on HALVORSEN AVE.	10372	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on CLIFTON AVE.	10369	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low

Pipe	Sewer 8" AC Pipe on CLIFTON AVE.	10357	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on NANTASKET RD.	10356	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on MILFORD ST.	10342	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on A ST.	10340	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on MILFORD ST.	10336	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on MILFORD ST.	10335	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on MILFORD ST.	10334	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on NANTASKET RD.	10331	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on NANTASKET RD.	10309	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on CLIFTON AVE.	10295	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on NANTASKET RD.	10273	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on STANDISH AVE.	10267	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on STANDISH AVE.	10266	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on CLIFTON AVE.	10265	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on STANDISH AVE.	10260	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on STANDISH AVE.	10259	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on BEACON	10255	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on BEACON	10254	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on NANTASKET RD.	10244	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on CLIFTON AVE.	10220	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on CLIFTON AVE.	10203	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on NANTASKET RD.	10201	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on CLIFTON AVE.	10190	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on NANTASKET RD.	10186	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on CLIFTON AVE.	10185	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
Pipe	Sewer 8" AC Pipe on CLIFTON AVE.	10184	Collections	Gravity Pipe	3.00	1.35	17.50	2-Low
WW	Chlorine Contact Tank 1	HULL_WWTP-173	WWTP	Mechanical	2.73	1.50	16.63	2-Low
WW	Chlorine Contact Tank 2	HULL_WWTP-174	WWTP	Mechanical	2.73	1.50	16.63	2-Low
PS Asset	PS 6 Flow Meter	HULL_PSASSET-99	Collections	Unk	2.00	2.00	16.00	2-Low
PS Asset	PS 3 Flow Meter	HULL_PSASSET-36	Collections	Unk	4.00	1.00	16.00	2-Low
MH	MH-20202	MH-20202	Collections	Manhole	1.25	2.95	15.48	2-Low
WW	Vertical screenings conveyor	HULL_WWTP-331	WWTP		2.50	1.50	15.26	2-Low
WW	RAS Pump 3	HULL_WWTP-183	WWTP	Mechanical	2.50	1.50	15.26	2-Low
WW	Screenings washer-compactor	HULL_WWTP-330	WWTP		2.50	1.50	15.00	2-Low
WW	Mechanical Screen	HULL_WWTP-332	WWTP		2.50	1.50	15.00	2-Low
WW	RAS Pump 1	HULL_WWTP-181	WWTP	Mechanical	2.50	1.50	15.00	2-Low
WW	AT 2 Aerator/mixer	HULL_WWTP-376	WWTP		2.50	1.50	15.00	2-Low
WW	Mechanical Screen & Washpress System	HULL_WWTP-90	WWTP	Mechanical	2.50	1.50	15.00	2-Low
WW	Gravity Thickener Blend Box Mixer	HULL_WWTP-177	WWTP	Mechanical	2.50	1.50	15.00	2-Low
WW	Sludge Transfer Pump 2	HULL_WWTP-201	WWTP	Mechanical	2.50	1.50	15.00	2-Low
WW	RAS Pump 2	HULL_WWTP-182	WWTP	Mechanical	2.50	1.50	15.00	2-Low
MH	MH-20984	MH-20984	Collections	Manhole	2.50	1.36	14.29	2-Low
MH	MH-20982	MH-20982	Collections	Manhole	2.50	1.36	14.29	2-Low
MH	MH-20964	MH-20964	Collections	Manhole	2.50	1.36	14.29	2-Low
MH	MH-20961	MH-20961	Collections	Manhole	2.50	1.36	14.29	2-Low
MH	MH-20873	MH-20873	Collections	Manhole	2.50	1.36	14.29	2-Low
MH	MH-20806	MH-20806	Collections	Manhole	2.50	1.36	14.29	2-Low
MH	MH-20691	MH-20691	Collections	Manhole	2.50	1.36	14.29	2-Low
MH	MH-20688	MH-20688	Collections	Manhole	2.50	1.36	14.29	2-Low
MH	MH-20662	MH-20662	Collections	Manhole	2.50	1.36	14.29	2-Low
MH	MH-20655	MH-20655	Collections	Manhole	2.50	1.36	14.29	2-Low
MH	MH-20646	MH-20646	Collections	Manhole	2.50	1.36	14.29	2-Low
MH	MH-20626	MH-20626	Collections	Manhole	1.25	2.73	14.29	2-Low
MH	MH-20617	MH-20617	Collections	Manhole	1.25	2.73	14.29	2-Low
MH	MH-20604	MH-20604	Collections	Manhole	1.25	2.73	14.29	2-Low
MH	MH-20591	MH-20591	Collections	Manhole	1.25	2.73	14.29	2-Low
MH	MH-20318	MH-20318	Collections	Manhole	1.25	2.73	14.29	2-Low
MH	MH-20250	MH-20250	Collections	Manhole	1.25	2.73	14.29	2-Low
MH	MH-20242	MH-20242	Collections	Manhole	1.25	2.73	14.29	2-Low
MH	MH-20154	MH-20154	Collections	Manhole	2.50	1.36	14.29	2-Low
WW	PC sludge piping Flow Meter	HULL_WWTP-340	WWTP	Controls	2.20	1.50	13.20	2-Low
MH	MH-20328	MH-20328	Collections	Manhole	1.25	2.50	13.10	2-Low
MH	MH-20283	MH-20283	Collections	Manhole	1.25	2.50	13.10	2-Low
Pipe	Sewer 10" AC Pipe on P ST.	10339	Collections	Gravity Pipe	1.00	2.88	12.50	2-Low
Pipe	Sewer 10" AC Pipe on R ST.	10318	Collections	Gravity Pipe	1.00	2.88	12.50	2-Low
WW	Backflow Preventer - Generator Room	HULL_WWTP-73	WWTP	Piping	1.00	3.00	12.21	2-Low
WW	Sludge Transfer Piping and Valves	HULL_WWTP-366	WWTP	Mechanical	1.50	2.00	12.21	2-Low
WW	Primary Electrical Power Manhole	HULL_WWTP-302	WWTP	Electrical	2.00	1.50	12.00	2-Low
WW	ıg and Valves associated with Sludge Recirculati	HULL_WWTP-372	WWTP	Mechanical	1.50	2.00	12.00	2-Low
WW	Grit Screw Drive	HULL_WWTP-88	WWTP	Mechanical	1.50	2.00	12.00	2-Low

WW	Primary Electrical Control Manhole	HULL_WWTP-303	WWTP	Electrical	2.00	1.50	12.00	2-Low
WW	Backflow preventers	HULL_WWTP-72	WWTP	Piping	1.00	3.00	12.00	2-Low
WW	Backflow Preventer - HVAC Room Back Wall	HULL_WWTP-75	WWTP	Piping	1.00	3.00	12.00	2-Low
WW	Primary Clarifier Influent D-Box	HULL_WWTP-132	WWTP	Mechanical	2.00	1.50	12.00	2-Low
WW	Backflow Preventer - HVAC Room	HULL_WWTP-74	WWTP	Piping	1.00	3.00	12.00	2-Low
PS Asset	PS A GridBee Aerator	HULL_PSASSET-133	Collections	Unk	1.00	3.00	12.00	2-Low
PS Asset	PS 9 By-pass valve to force main	HULL_PSASSET-116	Collections	Unk	1.00	3.00	12.00	2-Low
PS Asset	PS 9 By-Pass system	HULL_PSASSET-115	Collections	Unk	1.00	3.00	12.00	2-Low
PS Asset	PS 9 By-pass stand pipe	HULL_PSASSET-114	Collections	Unk	1.00	3.00	12.00	2-Low
PS Asset	PS 9 By-pass drain down valve	HULL_PSASSET-113	Collections	Unk	1.00	3.00	12.00	2-Low
PS Asset	PS 3 Pump 2	HULL_PSASSET-42	Collections	Unk	1.00	3.00	12.00	2-Low
PS Asset	PS 3 Pump 1	HULL_PSASSET-41	Collections	Unk	1.00	3.00	12.00	2-Low
MH	MH-20705	MH-20705	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20701	MH-20701	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20693	MH-20693	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20692	MH-20692	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20684	MH-20684	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20681	MH-20681	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20678	MH-20678	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20667	MH-20667	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20666	MH-20666	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20660	MH-20660	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20652	MH-20652	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20641	MH-20641	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20577	MH-20577	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20565	MH-20565	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20548	MH-20548	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20546	MH-20546	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20539	MH-20539	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20528	MH-20528	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20527	MH-20527	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20517	MH-20517	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20509	MH-20509	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20495	MH-20495	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20479	MH-20479	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20329	MH-20329	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20322	MH-20322	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20315	MH-20315	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20300	MH-20300	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20295	MH-20295	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20284	MH-20284	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20277	MH-20277	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20265	MH-20265	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20264	MH-20264	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20258	MH-20258	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20249	MH-20249	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20234	MH-20234	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20231	MH-20231	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20227	MH-20227	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20218	MH-20218	Collections	Manhole	1.25	2.27	11.90	2-Low
MH	MH-20009	MH-20009	Collections	Manhole	1.25	2.27	11.90	2-Low
Pipe	Sewer 6" VC Pipe on SUMMIT AVE.	11036	Collections	Gravity Pipe	2.00	1.35	11.67	2-Low
Pipe	Sewer 6" VC Pipe on SUMMIT AVE.	11033	Collections	Gravity Pipe	2.00	1.35	11.67	2-Low
Pipe	Sewer 12" AC Pipe on SAMOSET AVE.	10735	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on MANOMET AVE.	10732	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on MANOMET AVE.	10725	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on SAMOSET AVE.	10724	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on MANOMET AVE.	10717	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on MANOMET AVE.	10710	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on MANOMET AVE.	10699	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on SAMOSET AVE.	10697	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on SAMOSET AVE.	10683	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on SAMOSET AVE.	10672	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on SAMOSET AVE.	10656	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on SAMOSET AVE.	10606	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on SAMOSET AVE.	10593	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on SAMOSET AVE.	10573	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on SAMOSET AVE.	10570	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on SAMOSET AVE.	10563	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on SAMOSET AVE.	10553	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low

Pipe	Sewer 12" AC Pipe on SAMOSET AVE.	10543	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on SAMOSET AVE.	10537	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on LEWIS ST.	10524	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on SAMOSET AVE.	10523	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on NANTASKET RD.	10378	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on CENTRAL AVE.	10362	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 8" AC Pipe on L. ST.	10358	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on NANTASKET RD.	10355	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on CENTRAL AVE.	10351	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on CENTRAL AVE.	10344	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on CENTRAL AVE.	10322	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on CENTRAL AVE.	10321	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on CENTRAL AVE.	10310	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on CENTRAL AVE.	10303	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 10" AC Pipe on P ST.	10287	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 12" AC Pipe on CENTRAL AVE.	10279	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 10" AC Pipe on CENTRAL AVE.	10240	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
Pipe	Sewer 10" AC Pipe on CENTRAL AVE.	10233	Collections	Gravity Pipe	1.00	2.50	10.83	2-Low
MH	MH-20732	MH-20732	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20726	MH-20726	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20717	MH-20717	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20713	MH-20713	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20707	MH-20707	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20704	MH-20704	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20698	MH-20698	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20689	MH-20689	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20685	MH-20685	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20676	MH-20676	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20668	MH-20668	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20658	MH-20658	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20654	MH-20654	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20644	MH-20644	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20638	MH-20638	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20620	MH-20620	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20619	MH-20619	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20610	MH-20610	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20602	MH-20602	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20594	MH-20594	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20592	MH-20592	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20588	MH-20588	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20581	MH-20581	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20571	MH-20571	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20566	MH-20566	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20558	MH-20558	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20526	MH-20526	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20516	MH-20516	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20513	MH-20513	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20497	MH-20497	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20481	MH-20481	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20470	MH-20470	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20463	MH-20463	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20461	MH-20461	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20452	MH-20452	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20451	MH-20451	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20443	MH-20443	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20429	MH-20429	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20415	MH-20415	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20403	MH-20403	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20396	MH-20396	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20333	MH-20333	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20298	MH-20298	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20292	MH-20292	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20274	MH-20274	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20261	MH-20261	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20240	MH-20240	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20228	MH-20228	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20225	MH-20225	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20222	MH-20222	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20219	MH-20219	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20217	MH-20217	Collections	Manhole	1.25	2.05	10.71	2-Low

MH	MH-20214	MH-20214	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20206	MH-20206	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20192	MH-20192	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20191	MH-20191	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20187	MH-20187	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20186	MH-20186	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20185	MH-20185	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20184	MH-20184	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20183	MH-20183	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20175	MH-20175	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20173	MH-20173	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20170	MH-20170	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20112	MH-20112	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20105	MH-20105	Collections	Manhole	1.25	2.05	10.71	2-Low
MH	MH-20087	MH-20087	Collections	Manhole	1.25	2.05	10.71	2-Low
WW	Blast Disconnect Switch / Starter	HULL_WWTP-50	WWTP	Electrical	1.74	1.50	10.46	2-Low
WW	Aeration Tank 1 Oxygen Probe	HULL_WWTP-152	WWTP		2.50	1.00	10.17	2-Low
WW	Aeration Tank 3 Oxygen Probe	HULL_WWTP-153	WWTP		2.50	1.00	10.17	2-Low
Pipe	Sewer 8" AC Pipe on ATLANTIC AVE.	11028	Collections	Gravity Pipe	1.00	2.31	10.00	2-Low
Pipe	Sewer 8" AC Pipe on B ST.	10481	Collections	Gravity Pipe	1.00	2.31	10.00	2-Low
Pipe	Sewer 8" AC Pipe on A ST.	10445	Collections	Gravity Pipe	1.00	2.31	10.00	2-Low
Pipe	Sewer 8" AC Pipe on U ST.	10285	Collections	Gravity Pipe	1.00	2.31	10.00	2-Low
Pipe	Sewer 8" PVC Pipe on NANTASKET AVE.	10068	Collections	Gravity Pipe	1.00	2.31	10.00	2-Low
Pipe	Sewer 6" VC Pipe on MILDRED ST.	10021	Collections	Gravity Pipe	1.00	2.31	10.00	2-Low
Pipe	Sewer 6" VC Pipe on ARTHUR ST.	10019	Collections	Gravity Pipe	1.00	2.31	10.00	2-Low
MH	MH-20326	MH-20326	Collections	Manhole	1.25	1.82	9.52	2-Low
MH	MH-20297	MH-20297	Collections	Manhole	1.25	1.82	9.52	2-Low
MH	MH-20290	MH-20290	Collections	Manhole	1.25	1.82	9.52	2-Low
MH	MH-20269	MH-20269	Collections	Manhole	1.25	1.82	9.52	2-Low
Pipe	Sewer 6" VC Pipe on HELEN ST.	10009	Collections	Gravity Pipe	1.00	2.12	9.17	2-Low
Pipe	Sewer 6" VC Pipe on GUN ROCK AVE.	11016	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10757	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10747	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10746	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10742	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on MALTA ST.	10738	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10730	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10729	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on REVERE ST.	10716	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10708	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10707	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10700	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on KENBERMA ST.	10688	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10676	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10669	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10668	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on WARREN ST.	10649	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10639	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10638	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10629	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on COBURN ST.	10619	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10618	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10608	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10600	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on ADAMS ST.	10599	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10594	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10552	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on B ST.	10542	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10539	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10526	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10507	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on LEWIS ST.	10503	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on F ST.	10494	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10493	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10475	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on A ST.	10474	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10465	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10452	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on BEACH AVE.	10437	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on L. ST.	10425	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low

Pipe	Sewer 8" AC Pipe on B ST.	10417	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on K ST.	10367	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on L. ST.	10354	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on N ST.	10333	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on K ST.	10323	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on L. ST.	10317	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on L. ST.	10316	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on V ST.	10314	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on W ST.	10301	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on CADISH AVE	10300	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on N ST.	10293	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on T ST.	10262	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on M ST.	10261	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on D ST.	10258	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on SUNSET AVE.	10257	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on CADISH AVE	10256	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on SUNSET AVE.	10243	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on O ST.	10241	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on CADISH AVE	10237	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on P ST.	10231	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on CADISH AVE	10230	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on S ST.	10229	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on CADISH AVE	10219	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on CADISH AVE	10212	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on K ST.	10209	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on CADISH AVE	10208	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on CADISH AVE	10207	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on CADISH AVE	10206	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on SUNSET AVE.	10205	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on SUNSET AVE.	10199	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" AC Pipe on SUNSET AVE.	10198	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
Pipe	Sewer 8" PVC Pipe on NANTASKET AVE.	10074	Collections	Gravity Pipe	1.00	1.92	8.33	2-Low
WW	Aerated grit piping	HULL_WWTP-329	WWTP		1.00	2.00	8.00	2-Low
WW	Sludge Recirculating Pump	HULL_WWTP-202	WWTP	Mechanical	1.00	2.00	8.00	2-Low
PS Asset	PS A GridBee Aerator Compressor	HULL_PSASSET-143	Collections	Unk	1.00	2.00	8.00	2-Low
PS Asset	PS 9 GridBee Aerator Compressor	HULL_PSASSET-123	Collections	Unk	1.00	2.00	8.00	2-Low
PS Asset	PS 9 GridBee Aerator	HULL_PSASSET-122	Collections	Unk	1.00	2.00	8.00	2-Low
PS Asset	PS 6 Gridbee Aerator Compressor	HULL_PSASSET-102	Collections	Unk	1.00	2.00	8.00	2-Low
PS Asset	PS 6 Gridbee Aerator	HULL_PSASSET-101	Collections	Unk	1.00	2.00	8.00	2-Low
PS Asset	PS 5 Reliant Aeration Diffusor	HULL_PSASSET-86	Collections	Unk	1.00	2.00	8.00	2-Low
PS Asset	PS 5 Aeration Blower	HULL_PSASSET-70	Collections	Unk	1.00	2.00	8.00	2-Low
PS Asset	PS 4 GridBee Compressor	HULL_PSASSET-60	Collections	Unk	1.00	2.00	8.00	2-Low
PS Asset	PS 4 GridBee Aerator	HULL_PSASSET-59	Collections	Unk	1.00	2.00	8.00	2-Low
PS Asset	PS 3 Sump Pump	HULL_PSASSET-45	Collections	Unk	1.00	2.00	8.00	2-Low
PS Asset	PS 1 GridBee Compressor	HULL_PSASSET-13	Collections	Unk	1.00	2.00	8.00	2-Low
PS Asset	PS 1 GridBee Aerator	HULL_PSASSET-12	Collections	Unk	1.00	2.00	8.00	2-Low
Pipe	Sewer 8" AC Pipe on E ST.	10450	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on F ST.	10429	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on C ST.	10427	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" PVC Pipe on C ST.	10426	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on D ST.	10416	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on H ST.	10414	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on L. ST.	10404	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on G ST.	10398	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on J ST.	10388	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on N ST.	10385	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on K ST.	10383	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on M ST.	10365	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on O ST.	10349	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on P ST.	10338	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on Q ST.	10326	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on Q ST.	10324	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on R ST.	10319	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on S ST.	10307	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on T ST.	10298	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on T ST.	10297	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on U ST.	10283	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on V ST.	10275	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
Pipe	Sewer 8" AC Pipe on S ST.	10263	Collections	Gravity Pipe	1.00	1.73	7.50	2-Low
WW	Aerator Motor Disconnect Switch	HULL_WWTP-49	WWTP	Electrical	0.60	2.50	6.00	2-Low

WW	Sludge Storage Tank Loading Connection	HULL_WWTP-206	WWTP	Mechanical	0.75	2.00	6.00	2-Low
WW	effluent flow meter	HULL_WWTP-316	WWTP	Instrumentation	0.25	2.00	2.22	2-Low
WW	Fine Manual Bar Screen	HULL_WWTP-82	WWTP	Mechanical	0.25	2.00	2.00	2-Low
WW	Air Compressor	HULL_WWTP-11	WWTP	Electrical	0.00	2.50	0.00	2-Low
WW	MDP 4	HULL_WWTP-69	WWTP	Electrical	0.00	2.00	0.00	2-Low
WW	Hypochlorite Pump 2	HULL_WWTP-164	WWTP	Mechanical	1.50	1.50	9.16	1-Negligible
WW	Hypochlorite Pump 3	HULL_WWTP-165	WWTP	Mechanical	1.50	1.50	9.16	1-Negligible
WW	Hoist Disconnect Switch	HULL_WWTP-56	WWTP	Electrical	1.29	1.50	7.71	1-Negligible
MH	MH-20896	MH-20896	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20885	MH-20885	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20876	MH-20876	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20730	MH-20730	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20727	MH-20727	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20722	MH-20722	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20720	MH-20720	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20719	MH-20719	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20714	MH-20714	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20711	MH-20711	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20709	MH-20709	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20700	MH-20700	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20682	MH-20682	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20677	MH-20677	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20675	MH-20675	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20673	MH-20673	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20661	MH-20661	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20659	MH-20659	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20650	MH-20650	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20648	MH-20648	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20645	MH-20645	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20637	MH-20637	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20635	MH-20635	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20632	MH-20632	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20627	MH-20627	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20618	MH-20618	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20615	MH-20615	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20608	MH-20608	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20605	MH-20605	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20601	MH-20601	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20598	MH-20598	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20593	MH-20593	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20589	MH-20589	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20586	MH-20586	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20578	MH-20578	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20574	MH-20574	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20564	MH-20564	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20560	MH-20560	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20551	MH-20551	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20547	MH-20547	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20545	MH-20545	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20540	MH-20540	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20534	MH-20534	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20531	MH-20531	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20525	MH-20525	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20523	MH-20523	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20518	MH-20518	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20510	MH-20510	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20507	MH-20507	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20498	MH-20498	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20494	MH-20494	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20489	MH-20489	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20488	MH-20488	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20485	MH-20485	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20484	MH-20484	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20475	MH-20475	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20467	MH-20467	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20466	MH-20466	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20457	MH-20457	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20455	MH-20455	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20448	MH-20448	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20441	MH-20441	Collections	Manhole	1.25	1.36	7.14	1-Negligible

MH	MH-20438	MH-20438	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20430	MH-20430	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20427	MH-20427	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20421	MH-20421	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20408	MH-20408	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20407	MH-20407	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20404	MH-20404	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20394	MH-20394	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20388	MH-20388	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20385	MH-20385	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20378	MH-20378	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20377	MH-20377	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20374	MH-20374	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20373	MH-20373	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20369	MH-20369	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20366	MH-20366	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20365	MH-20365	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20363	MH-20363	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20362	MH-20362	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20359	MH-20359	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20358	MH-20358	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20357	MH-20357	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20356	MH-20356	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20354	MH-20354	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20353	MH-20353	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20350	MH-20350	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20343	MH-20343	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20342	MH-20342	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20340	MH-20340	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20339	MH-20339	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20337	MH-20337	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20336	MH-20336	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20335	MH-20335	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20334	MH-20334	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20331	MH-20331	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20330	MH-20330	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20324	MH-20324	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20323	MH-20323	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20320	MH-20320	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20319	MH-20319	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20317	MH-20317	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20314	MH-20314	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20311	MH-20311	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20306	MH-20306	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20305	MH-20305	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20302	MH-20302	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20301	MH-20301	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20294	MH-20294	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20291	MH-20291	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20289	MH-20289	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20288	MH-20288	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20285	MH-20285	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20279	MH-20279	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20276	MH-20276	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20275	MH-20275	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20268	MH-20268	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20263	MH-20263	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20260	MH-20260	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20257	MH-20257	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20255	MH-20255	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20244	MH-20244	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20243	MH-20243	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20237	MH-20237	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20235	MH-20235	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20224	MH-20224	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20223	MH-20223	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20220	MH-20220	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20216	MH-20216	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20215	MH-20215	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20213	MH-20213	Collections	Manhole	1.25	1.36	7.14	1-Negligible

MH	MH-20211	MH-20211	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20209	MH-20209	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20208	MH-20208	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20207	MH-20207	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20200	MH-20200	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20197	MH-20197	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20196	MH-20196	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20193	MH-20193	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20189	MH-20189	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20188	MH-20188	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20110	MH-20110	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20109	MH-20109	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20106	MH-20106	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20104	MH-20104	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20103	MH-20103	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20102	MH-20102	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20101	MH-20101	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20099	MH-20099	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20098	MH-20098	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20096	MH-20096	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20093	MH-20093	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20090	MH-20090	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20086	MH-20086	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20082	MH-20082	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20077	MH-20077	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20074	MH-20074	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20073	MH-20073	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20013	MH-20013	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20011	MH-20011	Collections	Manhole	1.25	1.36	7.14	1-Negligible
MH	MH-20007	MH-20007	Collections	Manhole	1.25	1.36	7.14	1-Negligible
WW	LEL Meter	HULL_WWTP-231	WWTP	Controls	1.00	1.50	6.67	1-Negligible
WW	Archive Chlorine Residual Probe	HULL_WWTP-175	WWTP	Mechanical	1.00	1.50	6.10	1-Negligible
WW	Waste Activated Sludge Pump 1	HULL_WWTP-208	WWTP	Mechanical	1.00	1.50	6.10	1-Negligible
WW	and Valves associated with RST Feed Pumps P-	HULL_WWTP-373	WWTP	Mechanical	1.50	1.00	6.00	1-Negligible
WW	Grit flush water piping	HULL_WWTP-385	WWTP	Mechanical	1.50	1.00	6.00	1-Negligible
WW	Panelboard 110V & LC-2	HULL_WWTP-71	WWTP		1.00	1.50	6.00	1-Negligible
WW	O2 Meter	HULL_WWTP-232	WWTP	Controls	1.00	1.50	6.00	1-Negligible
WW	Grit Pumps	HULL_WWTP-84	WWTP	Pumps	1.00	1.50	6.00	1-Negligible
WW	Sludge Transfer Pump 1	HULL_WWTP-200	WWTP	Mechanical	1.00	1.50	6.00	1-Negligible
WW	Compressor Disconnect Switch	HULL_WWTP-52	WWTP	Electrical	1.00	1.50	6.00	1-Negligible
WW	EF Disconnect Switch	HULL_WWTP-54	WWTP	Electrical	1.00	1.50	6.00	1-Negligible
WW	Blower Disconnect Switch	HULL_WWTP-51	WWTP	Electrical	1.00	1.50	6.00	1-Negligible
Pipe	Sewer 6" VC Pipe on ROCKLAND HOUSE RD.	11075	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 6" VC Pipe on ROCKLAND HOUSE RD.	11074	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 6" VC Pipe on PARK AVE.	11069	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 6" VC Pipe on SUMMIT AVE.	11032	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MANOMET AVE.	10761	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on SAMOSET AVE.	10753	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on PHIPPS ST.	10752	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MANOMET AVE.	10749	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on SAMOSET AVE.	10744	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on HAROLD PL.	10743	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MANOMET AVE.	10737	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on HARVEY PL.	10734	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MALTA ST.	10723	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MALTA ST.	10722	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on NANTASKET RD.	10715	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MALTA ST.	10714	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MASSASOIT AVE.	10709	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on REVERE ST.	10698	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on REVERE ST.	10696	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on NANTASKET RD.	10692	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MASSASOIT AVE.	10691	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on KENBERMA ST.	10690	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MANOMET AVE.	10689	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on ALDEN ST.	10687	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on NANTASKET RD.	10685	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MANOMET AVE.	10681	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on ALDEN ST.	10680	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MASSASOIT AVE.	10677	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible

Pipe	Sewer 8" AC Pipe on NANTASKET RD.	10670	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MANOMET AVE.	10663	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MASSASOIT AVE.	10658	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on KENBERMA ST.	10657	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on WARREN ST.	10651	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MANOMET AVE.	10650	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on LINCOLN AVE.	10648	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on KENBERMA ST.	10644	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MANOMET AVE.	10634	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on WEBSTER ST.	10633	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on LINCOLN AVE.	10625	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on COBURN ST.	10621	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MANOMET AVE.	10620	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MANOMET AVE.	10614	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on HADASSAH WAY	10607	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MANOMET AVE.	10604	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on COBURN ST.	10592	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MANOMET AVE.	10591	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on ADAMS ST.	10577	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MANOMET AVE.	10576	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on IRWIN ST.	10572	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MANOMET AVE.	10571	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on LEWIS ST.	10569	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on BREWSTER ST.	10562	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on LEWIS ST.	10557	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MANOMET AVE.	10556	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on MANOMET AVE.	10551	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on ADAMS ST.	10544	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on SAMOSET AVE.	10525	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on A ST.	10522	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on B ST.	10516	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on D ST.	10512	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on SAMOSET AVE.	10511	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on C ST.	10489	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on E ST.	10488	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on F ST.	10463	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on C ST.	10460	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on H ST.	10453	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on G ST.	10428	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on J ST.	10410	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on R.R. BED	10403	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on K ST.	10401	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on B ST.	10394	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on F ST.	10392	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on C ST.	10391	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on G ST.	10387	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on R.R. BED	10386	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on D ST.	10382	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on R.R. BED	10374	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on R.R. BED	10373	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on C ST.	10371	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on E ST.	10370	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on J ST.	10368	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on R.R. BED	10364	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on F ST.	10363	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on B ST.	10361	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on CENTRAL AVE.	10360	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on R.R. BED	10352	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on H ST.	10348	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on G ST.	10347	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on R.R. BED	10346	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on D ST.	10345	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on D ST.	10343	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on R.R. BED	10330	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on J ST.	10329	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on E ST.	10328	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on E ST.	10327	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on R.R. BED	10315	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on R.R. BED	10312	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on V ST.	10311	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible

Pipe	Sewer 8" AC Pipe on R.R. BED	10306	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on R.R. BED	10305	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on H ST.	10302	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on Q ST.	10292	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on Q ST.	10291	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on J ST.	10288	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on O ST.	10286	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on E ST.	10282	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on K ST.	10278	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on F ST.	10277	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on G ST.	10274	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on J ST.	10252	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on N ST.	10248	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on O ST.	10242	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on CADISH AVE	10238	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on F ST.	10234	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on CENTRAL AVE.	10232	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on L. ST.	10228	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on L. ST.	10227	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on L. ST.	10224	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on M ST.	10223	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on CADISH AVE	10216	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on G ST.	10215	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on CADISH AVE	10211	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" AC Pipe on CADISH AVE	10210	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on DUCK LN.	10131	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on DUCK LN.	10129	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 5" PVC Pipe on DUCK LN.	10128	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on NANTASKET AVE.	10127	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on NANTASKET AVE.	10123	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on NANTASKET AVE.	10122	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on DUCK LN.	10121	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on NANTASKET AVE.	10120	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on DUCK LN.	10119	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on NANTASKET AVE.	10118	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on NANTASKET AVE.	10116	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on HARBOR VIEW RD.	10115	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on NANTASKET AVE.	10113	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on HARBOR VIEW RD.	10109	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on NANTASKET AVE.	10104	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on FARINA RD.	10101	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on CHRISTINE RD.	10100	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on CHRISTINE RD.	10090	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on NANTASKET AVE.	10089	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on NANTASKET AVE.	10088	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on CHRISTINE RD.	10086	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
Pipe	Sewer 8" PVC Pipe on CHRISTINE RD.	10085	Collections	Gravity Pipe	1.00	1.35	5.83	1-Negligible
WW	Mixer DS	HULL_WWTP-349	WWTP	Electrical	1.40	1.00	5.60	1-Negligible
WW	Headworks Railings and Gratings	HULL_WWTP-389	WWTP	S- Building	1.00	1.00	4.07	1-Negligible
WW	Sump Pump	HULL_WWTP-97	WWTP	Mechanical	1.00	1.00	4.00	1-Negligible
PS Asset	PS 3 ReGen Blower	HULL_PSASSET-43	Collections	Unk	1.00	1.00	4.00	1-Negligible
PS Asset	PS 3 Aerator	HULL_PSASSET-23	Collections	Unk	1.00	1.00	4.00	1-Negligible
WW	Transfer Pump Disconnect Switch	HULL_WWTP-61	WWTP	Electrical	0.60	1.50	3.60	1-Negligible
WW	Influent Flow meter - 16 Inch	HULL_WWTP-92	WWTP	Controls	1.00	0.50	2.03	1-Negligible
WW	Influent Flow meter - 8 Inch	HULL_WWTP-93	WWTP	Controls	1.00	0.50	2.03	1-Negligible
WW	PS 6 Generator	HULL_WWTP-213	WWTP	Controls	1.00	0.50	2.00	1-Negligible
WW	Blend Box	HULL_WWTP-210	WWTP		0.25	1.00	1.02	1-Negligible
WW	Emergency Lighting & exit signs	HULL_WWTP-46	WWTP	Lighting	0.25	1.00	1.02	1-Negligible
WW	Coarse Manual Bar Screen	HULL_WWTP-81	WWTP	Mechanical	0.25	0.50	0.50	1-Negligible
WW	110V Panelboard & LC-2	HULL_WWTP-348	WWTP	Electrical	0.00	1.50	0.00	1-Negligible
WW	LCP-6	HULL_WWTP-354	WWTP	Electrical	0.00	1.50	0.00	1-Negligible
WW	Control Box 3	HULL_WWTP-405	WWTP	Electrical	0.00	1.50	0.00	1-Negligible
WW	Fire Extinguishers	HULL_WWTP-228	WWTP		0.00	0.50	0.00	1-Negligible
WW	Fire Extinguishers	HULL_WWTP-276	WWTP		0.00	0.50	0.00	1-Negligible
WW	UN Disconnect Switch	HULL_WWTP-62	WWTP		0.00	1.50	0.00	1-Negligible
WW	XF Disconnect Switch	HULL_WWTP-63	WWTP	Electrical	0.00	1.50	0.00	1-Negligible
WW	RAS Pump 2 VFD	HULL_WWTP-185	WWTP	Electrical	0.00	1.50	0.00	1-Negligible
WW	TVSS Disconnect	HULL_WWTP-241	WWTP	Electrical	0.00	0.50	0.00	1-Negligible
WW	TVSS	HULL_WWTP-242	WWTP	Electrical	0.00	0.50	0.00	1-Negligible
WW	MCC Room Transformer	HULL_WWTP-353	WWTP	Electrical	0.00	1.50	0.00	1-Negligible

WW	ADV EF Disconnect Switch	HULL_WWTP-48	WWTP	Electrical	0.00	1.00	0.00	1-Negligible
WW	Primary Clarifier Starters	HULL_WWTP-131	WWTP	Electrical	0.00	1.50	0.00	1-Negligible
WW	RST Feed Pump 1	HULL_WWTP-188	WWTP	Electrical	0.00	1.00	0.00	1-Negligible
WW	RST Feed Pump 2	HULL_WWTP-189	WWTP	Electrical	0.00	1.00	0.00	1-Negligible
WW	Main Office	HULL_WWTP-214	WWTP		0.00	0.50	0.00	1-Negligible
WW	RAS Pump 3 VFD	HULL_WWTP-184	WWTP	Electrical	0.00	1.50	0.00	1-Negligible
WW	RAS Pump 1 VFD	HULL_WWTP-186	WWTP	Electrical	0.00	1.50	0.00	1-Negligible
WW	Scrubber - for truck filling	HULL_WWTP-227	WWTP		0.00	0.50	0.00	1-Negligible
WW	Meters - 4 Gas	HULL_WWTP-229	WWTP		0.00	0.50	0.00	1-Negligible
WW	MCC 1 LDP	HULL_WWTP-351	WWTP	Electrical	0.00	1.50	0.00	1-Negligible
WW	MCC 1 Unit Heater Panel	HULL_WWTP-352	WWTP	Electrical	0.00	1.50		1-Negligible
WW	CL2 Room	HULL_WWTP-15	WWTP					
WW	Meter #6 - 4 Gas	HULL_WWTP-256	WWTP					
WW	rtable Diesel Pump 4A Thompson 4" 600 - 700gp	HULL_WWTP-263	WWTP					
WW	rtable Diesel Pump 4B Thompson 4" 600 - 700 gp	HULL_WWTP-264	WWTP					
WW	Push Camera Control Cabinet	HULL_WWTP-268	WWTP					
WW	Push Camera Reel Assembly	HULL_WWTP-269	WWTP					
WW	Push Camera Set 2	HULL_WWTP-271	WWTP					
WW	Push Camera Control Cabinet	HULL_WWTP-272	WWTP					
WW	Portable Electric Pump 6A Gorman Rupp 6"	HULL_WWTP-277	WWTP					
WW	Trailer 2 - Utility	HULL_WWTP-278	WWTP					
WW	Building Flood Control	HULL_WWTP-279	WWTP					
WW	Snow Blower	HULL_WWTP-295	WWTP					
WW	New sewer to PS3	HULL_WWTP-296	WWTP					
WW	Secondary Electrical Power Manhole	HULL_WWTP-298	WWTP					
WW	Waste Oil Storage	HULL_WWTP-305	WWTP					
WW	Eyewash bisulfite shed	HULL_WWTP-318	WWTP					
WW	Meter #10 4 Gas	HULL_WWTP-321	WWTP					
WW	Grinder Pump 14 Montana Ave	HULL_WWTP-322	WWTP					
WW	Truck 3 - 2015 Chevy 3500 HD	HULL_WWTP-323	WWTP					
WW	Truck 4 - 2015 Nissan Frontier	HULL_WWTP-324	WWTP					
WW	Ferric Chloride Pump Room,	HULL_WWTP-325	WWTP					
WW	Ferric Chloride Pump	HULL_WWTP-326	WWTP					
WW	Containment Pallets	HULL_WWTP-327	WWTP					
WW	Dig Safe Requests	HULL_WWTP-333	WWTP					
WW	DBI Davit "Confined Space"	HULL_WWTP-334	WWTP					
WW	Primary Pump Room Panelboard	HULL_WWTP-361	WWTP	Electrical	3.75			
WW	Secondary Scum Discharge	HULL_WWTP-394	WWTP	Mechanical	4.88			
WW	Primary Scum Discharge	HULL_WWTP-395	WWTP	Mechanical	4.88			
WW	WAS Discharge	HULL_WWTP-396	WWTP	Mechanical	4.88			
WW	Primary Scum Suction	HULL_WWTP-401	WWTP	Mechanical	0.00			
WW	Aerated Grit Chamber Effluent Piping	HULL_WWTP-407	WWTP	Mechanical	4.88			
WW	Camera and Light Assembly	HULL_WWTP-274	WWTP					
WW	Secondary Scum Suction	HULL_WWTP-400	WWTP	Mechanical	0.00			
WW	Buildings	HULL_WWTP-12	WWTP					
WW	HVAC Room	HULL_WWTP-19	WWTP					
WW	Hypo Pump Room	HULL_WWTP-20	WWTP					
WW	LMI Pump Room	HULL_WWTP-22	WWTP					
WW	Primary Building	HULL_WWTP-24	WWTP					
WW	Laboratory	HULL_WWTP-30	WWTP					
WW	Portable Generator - Honda	HULL_WWTP-34	WWTP					
WW	Secondary Clarifier 2 Drive System	HULL_WWTP-146	WWTP	Electrical	1.66			
WW	RAS System	HULL_WWTP-180	WWTP					
WW	Scum Pumps	HULL_WWTP-192	WWTP					
WW	WAS System	HULL_WWTP-207	WWTP					
WW	Security Fencing	HULL_WWTP-211	WWTP					
WW	Aeration Tank 2 Motor	HULL_WWTP-222	WWTP					
WW	Aeration Tank 4 Motor	HULL_WWTP-223	WWTP					
WW	Bisulfite System	HULL_WWTP-224	WWTP					
WW	Secondary Clarifier Cathodic Protection	HULL_WWTP-234	WWTP	Instrumentation				
WW	Gravity Pipes	HULL_WWTP-235	WWTP					
WW	Meter #7 - 4 Gas	HULL_WWTP-257	WWTP					
WW	Parts Washer	HULL_WWTP-260	WWTP					
WW	Odor Complaint	HULL_WWTP-262	WWTP					
WW	Push Camera Set 1	HULL_WWTP-267	WWTP					
WW	Camera and Light assembly	HULL_WWTP-270	WWTP					
WW	Push Camera Reel Assembly	HULL_WWTP-273	WWTP					
WW	Health and Safety	HULL_WWTP-275	WWTP					
WW	Gravity Thickener Electrical Power Manhole	HULL_WWTP-304	WWTP					
WW	Universal waste area	HULL_WWTP-306	WWTP					

WW	RST Polymer System	HULL_WWTP-314	WWTP					
WW	RST Polymer feed pump	HULL_WWTP-315	WWTP					
WW	Sand blaster	HULL_WWTP-347	WWTP					
WW	WAS Suction	HULL_WWTP-402	WWTP	Mechanical	0.00			
WW	Plumbing	HULL_WWTP-31	WWTP					
WW	Portable Equipment	HULL_WWTP-32	WWTP					
WW	Pressure Washer	HULL_WWTP-35	WWTP					
WW	Exhaust Fan 2 Generator Room	HULL_WWTP-41	WWTP					
WW	RST Feed Pump 1 Motor	HULL_WWTP-191	WWTP					
WW	Plant Floor Drains	HULL_WWTP-216	WWTP					
WW	Eyewash Stations	HULL_WWTP-42	WWTP					
WW	Gravity Thickener Mixer Disconnect Switch	HULL_WWTP-55	WWTP					
WW	Scrubber Disconnect Switch	HULL_WWTP-59	WWTP					
WW	Secondary Pump Disconnect Switches	HULL_WWTP-60	WWTP					
WW	Primary Clarifiers	HULL_WWTP-128	WWTP					
WW	Truck 5 - Doosan Fork Truck	HULL_WWTP-212	WWTP					
WW	RST Water Booster Pump	HULL_WWTP-313	WWTP					
WW	Sludge Pumps	HULL_WWTP-197	WWTP					
WW	Eyewash Station - Lab	HULL_WWTP-43	WWTP					
WW	Samsung Television	HULL_WWTP-243	WWTP					
WW	Pinehills Ford Transit 2013	HULL_WWTP-244	WWTP					
WW	Truck 1 - 2010 Dodge Ram 1500	HULL_WWTP-245	WWTP					
WW	Sludge Storage Tank Blower #3	HULL_WWTP-248	WWTP					
WW	Trailer 1 - Jetter	HULL_WWTP-250	WWTP					
WW	Meter #1 - 4 Gas	HULL_WWTP-251	WWTP					
WW	Meter #2 - 4 Gas	HULL_WWTP-252	WWTP					
WW	Meter #3 - 4 Gas	HULL_WWTP-253	WWTP					
WW	Meter #4 - 4 Gas	HULL_WWTP-254	WWTP					
WW	Meter #8 - 4 Gas	HULL_WWTP-258	WWTP					
WW	Meter #9 - 4 Gas	HULL_WWTP-259	WWTP					
WW	Air Diffusers	HULL_WWTP-139	WWTP					
WW	Vehicles	HULL_WWTP-37	WWTP					
WW	Confined Space 4 Gas Meter	HULL_WWTP-308	WWTP					
WW	Exhaust Fan 3 Generator Room	HULL_WWTP-38	WWTP					
WW	Truck 2 - 2009 Chevy 2500 HD	HULL_WWTP-261	WWTP					
WW	table Diesel Pump 6A Thompson 6" 900 - 1000 g	HULL_WWTP-265	WWTP					
WW	table Diesel Pump 6B Thompson 6" 900 - 1000 g	HULL_WWTP-266	WWTP					
WW	Odor Control System	HULL_WWTP-168	WWTP					
WW	Wet Scrubber System	HULL_WWTP-169	WWTP					
WW	RST Feed Pump 2 Motor	HULL_WWTP-190	WWTP					
WW	Sludge Incinerator	HULL_WWTP-196	WWTP					
WW	Sludge Storage Tank Blower #1	HULL_WWTP-205	WWTP					
WW	PS Trailer Mounted Generator	HULL_WWTP-246	WWTP					
WW	RAS Discharge	HULL_WWTP-393	WWTP	Mechanical	4.88			
WW	Power Manhole 3	HULL_WWTP-404	WWTP	Electrical	0.00			
WW	Eyewash Stations - LMI Pump Room	HULL_WWTP-45	WWTP					
WW	Disconnect Switches	HULL_WWTP-47	WWTP					
WW	Secondary Clarifiers	HULL_WWTP-142	WWTP					
WW	Secondary Clarifier 1 Drive System	HULL_WWTP-144	WWTP	Electrical	1.66			
WW	Primary Clarifier 2 Drive System	HULL_WWTP-133	WWTP					
WW	Aeration Tanks	HULL_WWTP-147	WWTP					
WW	DPW Support	HULL_WWTP-215	WWTP					
WW	Primary Clarifier 1 Drive System	HULL_WWTP-134	WWTP					
WW	Meter #5 - 4 Gas	HULL_WWTP-255	WWTP					
WW	Air Diffuser AT-330	HULL_WWTP-141	WWTP					
WW	Portable Air Compressor	HULL_WWTP-33	WWTP					
WW	Thickner Room	HULL_WWTP-23	WWTP					
WW	Health & Safety	HULL_WWTP-28	WWTP					
WW	Aeration Blowers	HULL_WWTP-136	WWTP					
WW	Secondary Building	HULL_WWTP-25	WWTP					
WW	Sludge Holding Tank Odor Control Suction	HULL_WWTP-403	WWTP	Mechanical	0.00			
WW	Secondary Pump Room Panel Board	HULL_WWTP-350	WWTP	Electrical	5.00			
WW	Blower Room	HULL_WWTP-14	WWTP					
Pipe	Sewer 6" VC Pipe on REEF PT.	11030	Collections	Gravity Pipe				
Pipe	Sewer 30" RC Pipe on NANTASKET AVE.	10812	Collections	Gravity Pipe				
Pipe	Sewer 12" AC Pipe on NEWPORT RD.	10640	Collections	Gravity Pipe				
Pipe	Sewer 36" RC Pipe on FITZPATRIC WAY	10160	Collections	Gravity Pipe				

APPENDIX D: ENERGY EFFICIENCY ASSESSMENT

National Rural Water Association

2915 South 13th Street, Duncan, Oklahoma 73533
580-252-0629 ♦ Fax 580-255-4476

Energy Efficiency Assessment for Small Wastewater Systems

Responses in grey areas indicate potential for gains in energy efficiency

1. INFLUENT/EFFLUENT PUMPING

	Yes	No
A. Do you have influent and/or effluent pumps?	X	
B. If yes, do you have variable speed control on influent pumps?	X	
C. If yes, are premium-efficiency motors currently installed on influent pumps?		X
D. If yes, do you have variable speed control on effluent pumps?	X	
E. If yes, are premium-efficiency motors currently installed on effluent pumps?		X

2. PRE-AERATION/POST-AERATION

	Yes	No
A. Do you utilize aeration blowers and/or compressors?	X	
B. If yes, can you throttle the amount of air delivered or otherwise adjust output?		X

3. INTERMEDIATE PUMPING

	Yes	No
A. Do you have intermediate pumps to convey flow between treatment processes?		X
B. If yes, do you have variable speed control on the intermediate pumps?		
C. If yes, are the intermediate pumps equipped with premium-efficiency motors?		

4. ACTIVATED SLUDGE PROCESSES

	Yes	No
A. Does you have aeration blowers/compressors in an activated sludge process?	X	
B. If yes, can you throttle the amount of air delivered or otherwise adjust output?	X	
C. If yes, are premium-efficiency motors currently installed?		X
D. Does your plant use mechanical aerators (including mixers)?		X
E. If yes, do the aerators have variable speed control?	X	
F. Is the aeration system controlled via DO levels and/or pressure differentials?	X	
G. If yes, are dissolved oxygen/pressure sensors located within the aeration basins?	X	
H. Do you currently use a fine-bubble aeration system?	X	
I. If you have a pure oxygen system, do you have a VPSA O2 generation system?		X
J. Do you currently have variable speed return activated sludge (RAS) pumps?	X	
K. Do you currently have variable speed waste activated sludge (WAS) pumps?		X

5. FIXED FILM PROCESSES

	Yes	No
A. Does you have aeration blowers/compressors as part of a fixed film process?		
B. If yes, can you throttle the amount of air delivered or otherwise adjust output?		
C. If yes, are premium-efficiency motors currently installed?		
D. Do you utilize pumping for conveying flow to the trickling filters?		
E. If yes, do you have variable speed control on these pumps?		
F. Are your trickling filter distribution arms mechanically driven?		

N/A

Adapted from NYSERDA's FOCUS on Municipal Water and Wastewater Program

Energy Efficiency Assessment for Small Wastewater Systems

6. DISINFECTION	Yes	No
A. Do you currently use an ultraviolet disinfection system?		X
B. If yes, does the UV system utilize low-pressure, high-output lamps?		
C. If yes, is the UV system operated via flow-pacing and/or dosing setpoint?		

7. SLUDGE PUMPING	Yes	No
A. Do you process sludge on an intermittent (less than 24 hours per day) basis?	X	
B. If yes, do you currently process sludge during off-peak hours?		X
C. Do you have equalization capacity within your existing sludge handling process?		X
D. If no, do you have variable speed capability on your sludge transfer pumps?		X

8. SLUDGE STABILIZATION	Yes	No
A. Does your plant utilize aerobic digestion?		X
B. If yes, have considered switching to anaerobic digestion or another method?		
C. Do you currently produce biogas (methane) from anaerobic digestion processes?		X
D. If yes, is biogas currently flared and/or vented?		
E. If yes, is biogas currently being used for thermal or electrical power generation?		
F. Does your plant currently accept hauled waste at the headworks to the plant?		X
G. If yes, is there equalization capacity for the introduction of hauled wastes?		X

9. SLUDGE THICKENING AND DEWATERING	Yes	No
A. Does your thickening and/or dewatering equipment run less than 24 hours per day?	X	
B. Do you use centrifuges for thickening, dewatering, or both?		X
C. Do you currently use sludge drying beds for dewatering?		X
D. Does your plant currently haul sludge to another location for processing?	X	
E. Does your plant use incineration for sludge stabilization/disposal?		X

10. FACILTY / OPERATIONS	Yes	No
A. Do you monitor your power bills?		X
B. Is there significant inflow/infiltration into the collection system?	X	
C. Has your plant had any energy efficiency improvements in the last 5 years?		X
D. If yes, have you switched to more efficient lighting?		X
E. If yes, have you done any load shedding and/or off-peak load shifting?		X
F. If yes, have you installed new or improved HVAC equipment?		X
G. Are energy efficiency measures included with future improvement plans?	X	

Total Shaded:
24 out of 48 (50%)

POWER ESTIMATE

BASE FLOW: 1.7 MGD

EQUIPMENT	HP	KW	% LOAD	ACTUAL KW	HOURS/ DAY	KWH/ DAY	COMMENTS	
AERO 2	25	22.40	0	0.00	0	0	0%	
AERO 4	25	22.40	0	0.00	0	0	0%	
AERO BLOWER 1	75	68.00	75	51.00	16	816	22.9%	22.9%
AERO BLOWER 2	75	68.00	0	0.00	0	0	0.0%	
CAUSTIC CHEM PUMP 1	3	2.86	70	2.00	24	48	1.4%	
CAUSTIC CHEM PUMP 2	3	2.86	0	0.00	0	0	0.0%	
CLARIF. 1	0.5	0.49	70	0.34	24	8	0.2%	
CLARIF. 2	0.5	0.49	0	0.00	0	0	0.0%	
CRANE	5	4.65	0	0.00	0	0	0.0%	
EFFLUENT 1	60	53.80	75	40.35	2	81	2.3%	
EFFLUENT 2	35	26.60	75	19.95	20	399	11.2%	
EFFLUENT 3	60	53.80	0	0.00	0	0	0.0%	
EFFLUENT 4	20	18.10	75	13.58	2	27	0.8%	14.2%
INFL FAN	5	4.65	75	3.49	24	84	2.4%	
INFLUENT 1	20	18.10	75	13.58	22	299	8.4%	
INFLUENT 2	20	18.10	0	0.00	0	0	0.0%	
INFLUENT 3	50	44.40	75	33.30	10	333	9.4%	
INFLUENT 4	50	44.40	0	0.00	0	0	0.0%	
INFLUENT 5	50	44.40	0	0.00	0	0	0.0%	17.8%
MCC-1 MTR GRP	123.75	88.00	25	22.00	24	528	14.8%	
MCC-2 MTR GRP	61.75	53.80	25	13.45	12	161	4.5%	
MCC-4 MTR GRP	60	53.80	25	13.45	12	161	4.5%	
NETCO PUMP	30	26.60	0	0.00	0	0	0.0%	
PLANT WTR 1	25	22.40	75	16.80	24	403	11.3%	
PLANT WTR 2	25	22.40	0	0.00	0	0	0.0%	
RST 1	15	13.70	70	9.59	6	58	1.6%	
RST 2	15	13.70	0	0.00	0	0	0.0%	
SCUM PUMP	5	4.65	70	3.26	2	7	0.2%	
SLUDGE PUMP 1	7.5	7.16	70	5.01	4	20	0.6%	
SLUDGE PUMP 2	7.5	7.16	0	0.00	0	0	0.0%	
TRASH PUMP	50	44.40	0	0.00	0	0	0.0%	
VALVES	1.5	1.49	0	0.00	0	0	0.0%	
ELEC HEAT 1	0.00	0.48	0	0.00	0	0	0.0%	
ELEC HEAT 2	0.00	0.48	0	0.00	0	0	0.0%	
HALLWAY HTR	0.00	0.48	0	0.00	0	0	0.0%	
HEAT MISC	0.00	0.21	0	0.00	0	0	0.0%	
HTR-1	0.00	0.48	70	0.34	12	4	0.1%	
HTR-2	0.00	0.48	70	0.34	12	4	0.1%	
HTR-3	0.00	0.48	70	0.34	12	4	0.1%	
LC-1 MISC	0.00	0.21	70	0.15	12	2	0.0%	
LC-1A MISC.	0.00	0.48	0	0.00	12	0	0.0%	
LC-2 MISC	0.00	0.21	70	0.15	12	2	0.0%	
LC-2A MISC	0.00	0.21	70	0.15	12	2	0.0%	
LC-3 MISC	0.00	0.21	70	0.15	12	2	0.0%	
LC-4 MISC	0.00	0.21	70	0.15	12	2	0.0%	
LC-5 MISC	0.00	0.21	0	0.00	0	0	0.0%	
LC-6 MISC	0.00	0.21	0	0.00	0	0	0.0%	
LS MISC	0.00	0.21	0	0.00	0	0	0.0%	
PC-6 MISC	0.00	0.21	0	0.00	0	0	0.0%	
PRIM LP MISC	0.00	0.21	0	0.00	0	0	0.0%	
SLDG HTR	0.00	0.48	0	0.00	0	0	0.0%	
	0.00	0.00	0	0.00	0	0	0.0%	

ELECTRIC POWER SUMMARY

	HP	KW	AVG DEM KW	PEAK DEM KW	KWH/ DAY	KWH/ MONTH
TOTALS	1,009.00	883.89	262.88	289.16	3,453.41	105,041.22
HVAC/LIGHTS @ 3.5% OF TOTAL			7.89	8.67	103.60	3,151.24
TOTALS	0.00	0.00	7.89	8.67	103.60	108,192.46

PUMP EFFICIENCY ASSESSMENT

Hull Waste Water Treatment
Woodard and Curran
September, 2015

Performed by: Benjamin Stevens and Anthony Santosuosso

CHESTERTON®
Global Solutions, Local Service.

Summary

The findings of the analysis show a varying range of pump deterioration. All pumps measured during the assessment showed a significant loss of efficiency when compared to the OEM rated performance. There are a number of factors that affect how the influent pumps perform including pump condition, pump operation, wet well level and system controls. All these factors should be considered to improve the performance of pumps and reduce overall energy use.

In order to determine the true effect of pump degradation we must present a system perspective that reflects the actual day to day operation of the plant. While only 4 pumps were assessed there are a total of 5 pumps in the influent system. Pump 5 was not in service at the time of the assessment so was excluded from this report. Each pump can be sequenced to start and stop according to preset wet well levels. Sequence is manually determined by personnel. Normal operation is Influent Pump 3 OR Influent Pump 4 running approximately 65% of the time, Influent Pump 1 AND Influent Pump 2 running simultaneously 25% of the time and lastly, the remaining 10% of the time being a blend of ANY 3, 4 or 5 pumps running simultaneously. The table below summarizes the potential savings when compared to a like new condition pump.

	Annual Savings		Repair Cost	ROI
Name	**kWh**	**$**	**$**	**Years**
INFLUENT PUMP 1	16,480	**$ 2,593**	$ 6,000	**2.3**
INFLUENT PUMP 2	11,769	**$ 1,860**	$ 6,000	**3.2**
INFLUENT PUMP 3	43,038	**$ 6,800**	$ 9,000	**1.3**
INFLUENT PUMP 4	34,688	**$ 5,481**	$ 9,000	**1.6**
Totals	105,975	**$ 16,734**	$ 30,000	**1.8**

Savings are based on each pump running independently. ROI (return on investment) was calculated using annual savings and estimated repair cost. Repair cost includes blasting, coating, and refurbishment of the volute and impeller, installation of new wear rings, impeller balancing, replace all bearings, replace all gaskets, replace lip seals with bearing protection isolators, replace current seal with a Chesterton 442 split mechanical seal, installation of a SpiralTrac environmental controller, and the repainting of all exterior surfaces. It does not include the price of a new shaft, impeller, wear rings, or shaft sleeve. Estimated repair cost based on pump size.

Each pump in the assessment (Influent Pumps 1-4) was individually tested for performance. The amperage, voltage, and power factor was measured at each test point. The findings below are compared to the OEM performance curves.

	OEM	Test	Delta	OEM	Test	Delta	OEM	Test	Delta
	Flow			**Power**			**Efficiency**		
Name	**GPM**			**kW**			**Hydraulic**		
INFLUENT PUMP 1	1100	1040	-60	14.37	20.22	+5.85	69.0%	43.8%	-25.3%
INFLUENT PUMP 2	1150	1080	-70	17.10	20.36	+3.26	69.4%	50.9%	-18.4%
INFLUENT PUMP 3	3940	3150	-790	37.64	40.47	+2.83	76.3%	48.4%	-27.9%
INFLUENT PUMP 4	3925	3194	-731	37.64	38.96	+1.32	76.5%	53.3%	-23.3%

While AW Chesterton does attempt to cross-reference data and investigate the validity of the data, AW Chesterton makes no warranty, either expressed or implied, as to the potential increase in efficiency. The contents, results, and technical data contained in this report may not be reproduced either electronically, photographically, or substantively without permission from AW Chesterton.

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Pump Analysis

Method

Each pump included in the audit was measured for hydraulic and electrical performance. Flow was measured with a clamp on ultrasonic transit-time flow meter. Digital pressure gauges were installed on the discharge and suction fittings. Flow, differential pressure, voltage, amperage, power factor, and driver RPM were recorded. Pump discharge valves were left in the open position set by the plant so as not to disturb operations or compromise the equipment. The facility electrician assisted with the installation of a power logger to measure voltage, amperage, power factor and frequency. See Appendix F for description of equipment used.

System Description

The Hull Influent Pump System contains a set of 5 vertically mounted centrifugal pumps. The pumps are responsible for handling influent to the facility. Each pump independently draws suction off a wet well. Smaller Pumps 1 and 2 discharge into a common 8" header. Each is driven by a 20 HP synchronous three phase motor. The motor is supplied with power from a variable frequency drive. Larger Pumps 3, 4 and 5 discharge to a 16" common header. Each is driven by a 50 HP synchronous three phase motor. The motor is supplied with power from a variable frequency drive. Pump 5 was not in service at the time of the assessment. See Appendix A for equipment nameplate data.

The static head of the system, the difference between the level of the wet well and the discharge basin, was determined during each test through level indicators and isometric drawings, see Appendix C for system reference drawing supplied by Woodard and Curran.

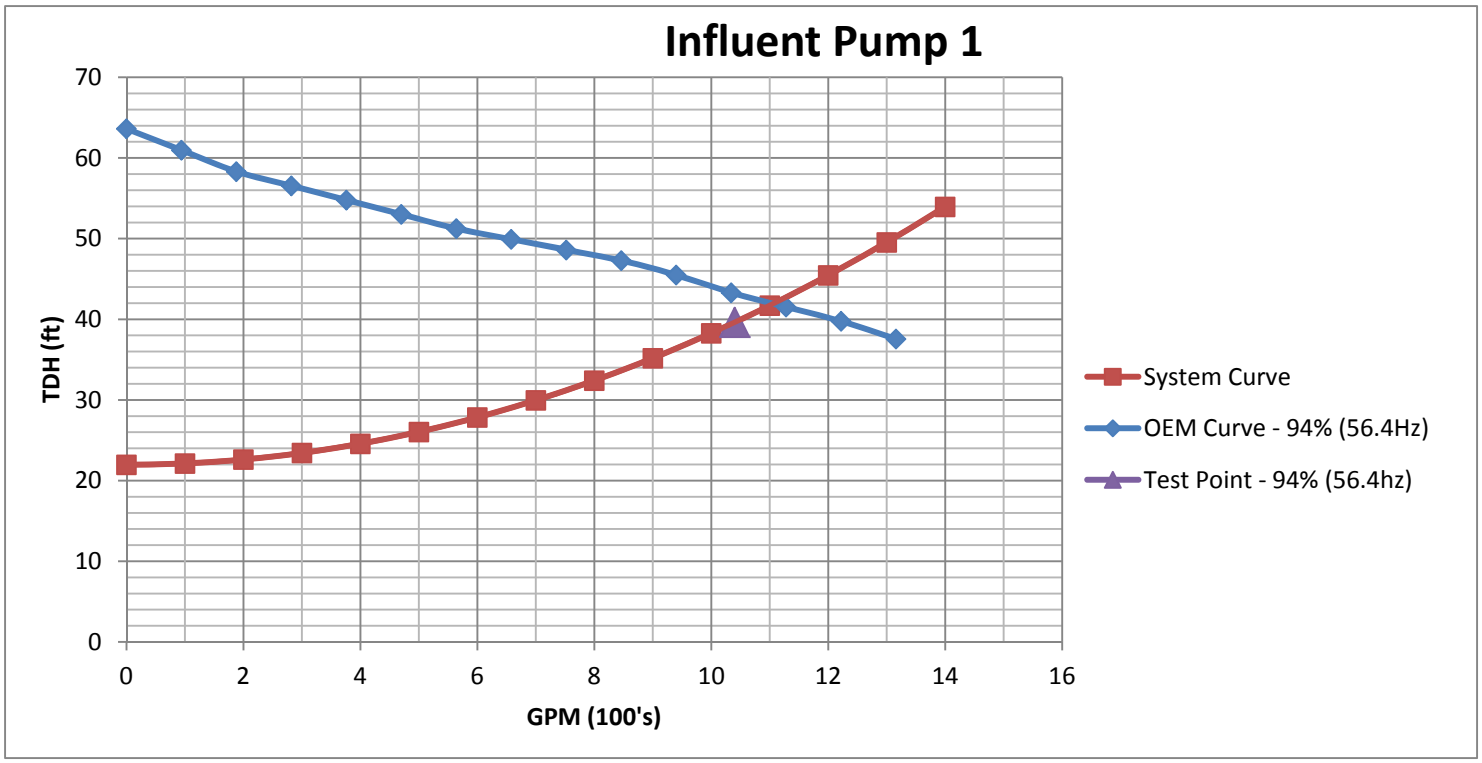
The system curve was derived from actual operating conditions and not the original system design. In other words the k factor for frictional losses was determined by varying the speed of the pump driver and not actually calculated by cataloging of all system components. Each pump was cycled at 100%, 90% and 80% speeds. This methodology provided several head resistance and flow capacity data points making the system curve used for analysis very accurate. This better reflects factors such as corrosion and tuberculation on the pipe internals. The data points recorded to plot the curve are a snapshot in time and do not account for changes in the wet well level.

Influent Pump 1

To determine the level of deterioration the test performance must be compared to the original performance curve while overlaying the system curve described in the previous section. While the original performance curve does show head and flow values based on various speeds, it does not do so for the actual operating speed measured during the test. For this reason, the original performance curve had to be modified using the pump affinity laws to reflect the actual operating speed.

The measurements in the Pump 1 operating data table illustrate the impact of lost efficiency on pump capacity and energy consumption. Refurbishing the pump to a like new condition would yield a 26% increase in efficiency and return the pump to its POR (preferred operating region). Running at the equivalent flow rate and run time, while using the recommended motor speed, would result in an energy savings of 16,408 kWh. We believe this is a good candidate for mechanical refurbishment and a low-friction, ceramic reinforced coating. This will restore the equipment to like-new conditions, and provide increased reliability and resistance to wear in the future.

Also of note is that the motor is operating well in to, and likely beyond, its service factor at 23.8 BHP. A 25 BHP motor would be more appropriate for this application. Please refer to Appendix E for more information on motor service factor.



Pump 1 – Operating Data

	Unit	Recommended	Test	Delta (Rec- Test)
VFD Speed	%	89	94	-11
Motor Speed	RPM	1044	1105	-61
Head	Feet	39.62	39.62	0
Flow	GPM	1,040	1,040	0
Hydraulic Power	HP	10.40	10.40	0
Voltage	kV	N/A	445.3	N/A
Amperage	A	N/A	26.8	N/A
PF		N/A	.96	N/A
Real Power	kW	12.7	20.2	-7.5
VFD Eff	%	98	98	0
Motor Eff	%	89.5	89.5	0
Shaft Power	BHP	15.0	23.8	-8.8
Hydraulic Efficiency	**%**	**69.50**	**43.75**	**25.75**
Annual Run-time	Hours	2190	2190	0
Annual Energy	kWh	27,883.5	44,291.8	-16,408.3
Annual Cost	**$**	**4,405**	**6,998**	**(2,593)**

Pump 1 – OEM vs. Measured

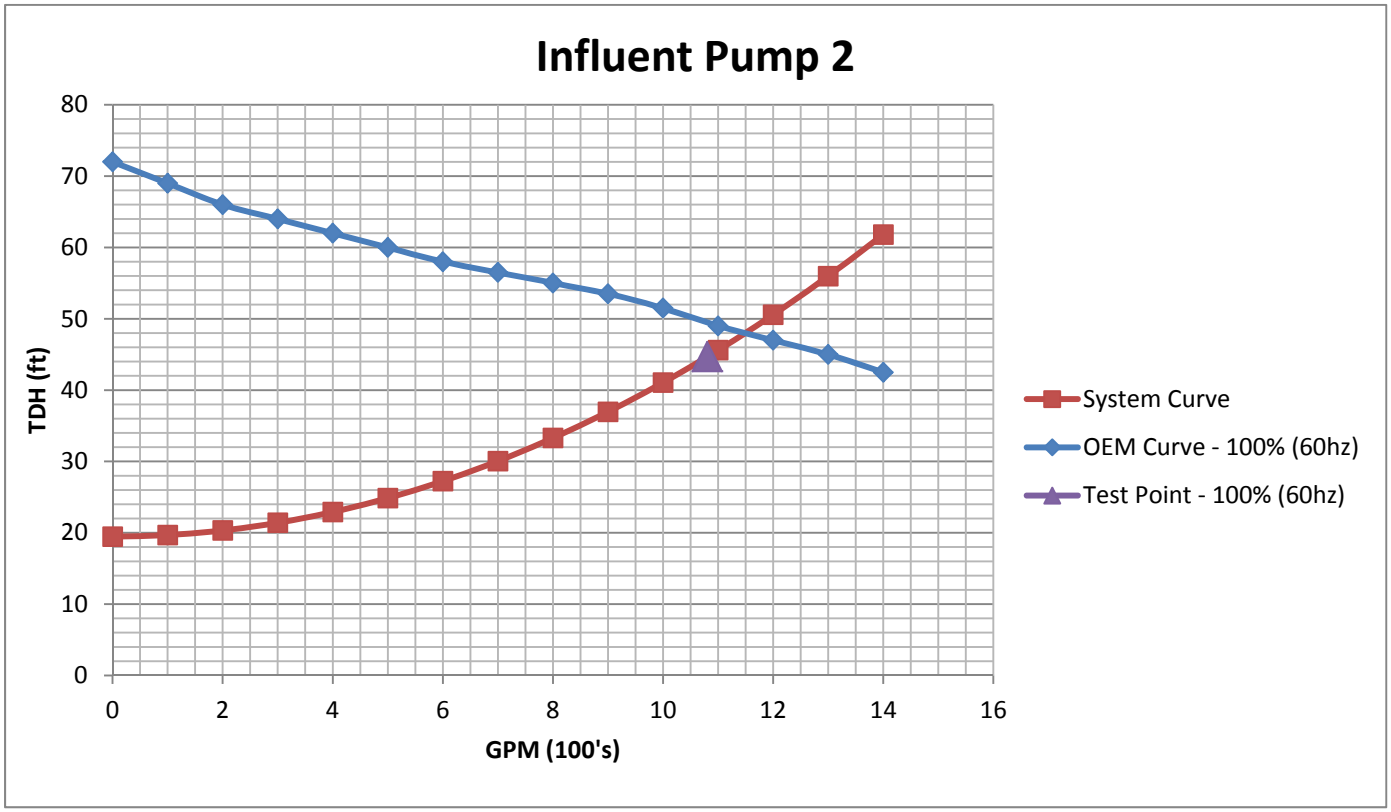
	Head (ft)	Flow (GPM)	Efficiency (%)	Specific Energy (kW/1000GPM)
OEM @ 1105RPM	42.00	1,100	69.03	1.31
As Measured @ 1105RPM	39.62	1,040	43.75	1.94

Influent Pump 2

To determine the level of deterioration the test performance must be compared to the original performance curve while overlaying the system curve described in the system description.

The measurements in the Pump 2 operating data table illustrate the impact of lost efficiency on pump capacity and energy consumption. Refurbishing the pump to a like new condition would yield an 18% increase in efficiency and return the pump to its POR (preferred operating region). Running at the equivalent flow rate and run time, while using the recommended motor speed, would result in an energy savings of 11,769 kWh. We believe this is a good candidate for mechanical refurbishment and a low-friction, ceramic reinforced coating. This will restore the equipment to like-new conditions, and provide increased reliability and resistance to wear in the future.

Also of note is that the motor is operating well in to, and likely beyond, its service factor at 23.9 BHP. A 25 BHP motor would be more appropriate for this application. Please refer to Appendix E for more information on motor service factor.



Pump 2 – Operating Data

	Unit	Recommended	Test	Delta (Rec- Test)
VFD Speed	%	89	100	-11
Motor Speed	RPM	1103	1175	-72
Head	Feet	44.7	44.7	0
Flow	GPM	1,080	1,080	0
Hydraulic Power	HP	12.19	12.19	0
Voltage	kV	N/A	462	N/A
Amperage	A	N/A	26	N/A
PF		N/A	.96	N/A
Real Power	kW	15	20.4	-5.4
VFD Eff	%	98	98	0
Motor Eff	%	89.5	89.5	0
Shaft Power	BHP	17.6	23.9	-6.3
Hydraulic Efficiency	**%**	**69.20**	**50.93**	**18.27**
Annual Run-time	Hours	2190	2190	0
Annual Energy	kWh	32,812.1	44,581.1	-11,768.9
Annual Cost	**$**	**5,184**	**7,044**	**(1,860)**

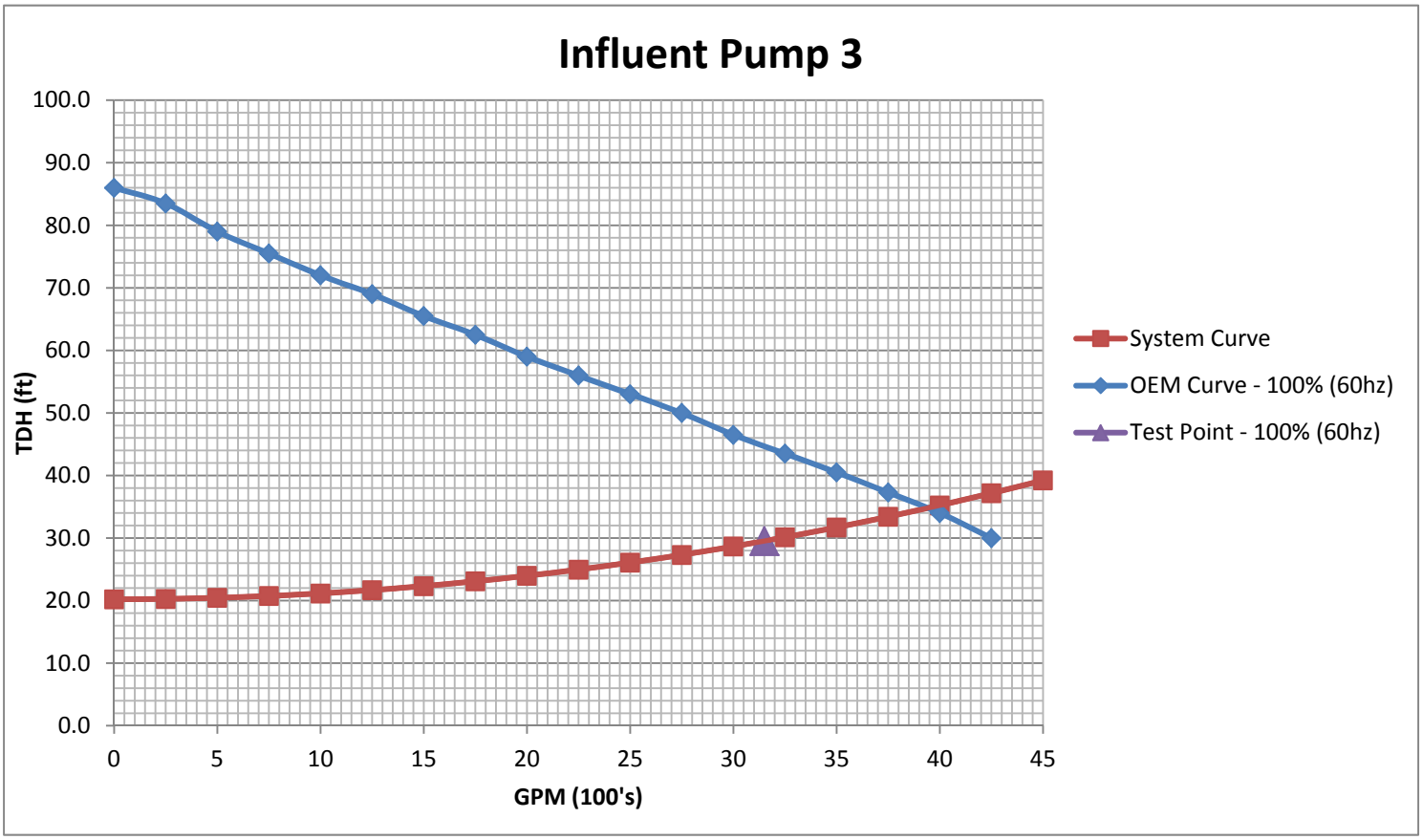
Pump 2 – OEM vs. Measured

	Head (ft)	Flow (GPM)	Efficiency (%)	Specific Energy (kW/1000GPM)
OEM @ 1175RPM	48.00	1,150	69.35	1.49
As Measured @ 1175RPM	44.70	1,080	50.93	1.88

Influent Pump 3

To determine the level of deterioration the test performance must be compared to the original performance curve while overlaying the system curve described in the previous section.

The measurements in the Pump 3 operating data table illustrate the impact of lost efficiency on pump capacity and energy consumption. Refurbishing the pump to a like new condition would yield a 28% increase in efficiency and return the pump to its POR (preferred operating region). Running at the equivalent flow rate and run time, while using the recommended motor speed, would result in an energy savings of 43,038 kWh. We believe this is a good candidate for mechanical refurbishment and a low-friction, ceramic reinforced coating. This will restore the equipment to like-new conditions, and provide increased reliability and resistance to wear in the future.



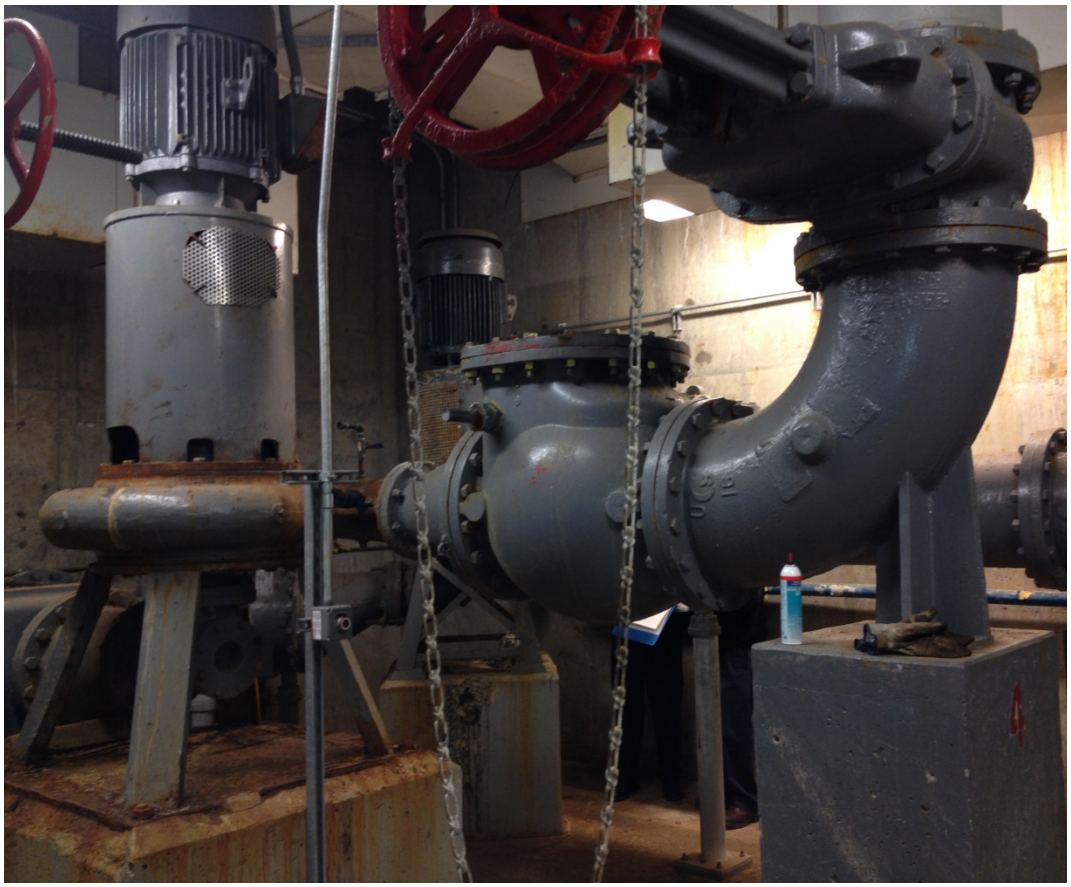
Pump 3 – Operating Data

	Unit	Recommended	Test	Delta (Rec- Test)
VFD Speed	%	80	100	-20
Motor Speed	RPM	696	870	-174
Head	Feet	29.53	29.53	0
Flow	GPM	3,150	3,150	0
Hydraulic Power	HP	23.49	23.49	0
Voltage	kV	N/A	473	N/A
Amperage	A	N/A	52.5	N/A
PF		N/A	.942	N/A
Real Power	kW	25.4	40.5	-15.1
VFD Eff	%	98	98	0
Motor Eff	%	91	91	0
Shaft Power	BHP	30.3	48.6	-18.3
Hydraulic Efficiency	**%**	**76.3**	**48.4**	**27.9**
Annual Run-time	Hours	2,847	2,847	0
Annual Energy	kWh	72,175.8	115,213.9	-43,038.1
Annual Cost	**$**	**11,404**	**18,204**	**(6,800)**

Pump 3 – OEM vs. Measured

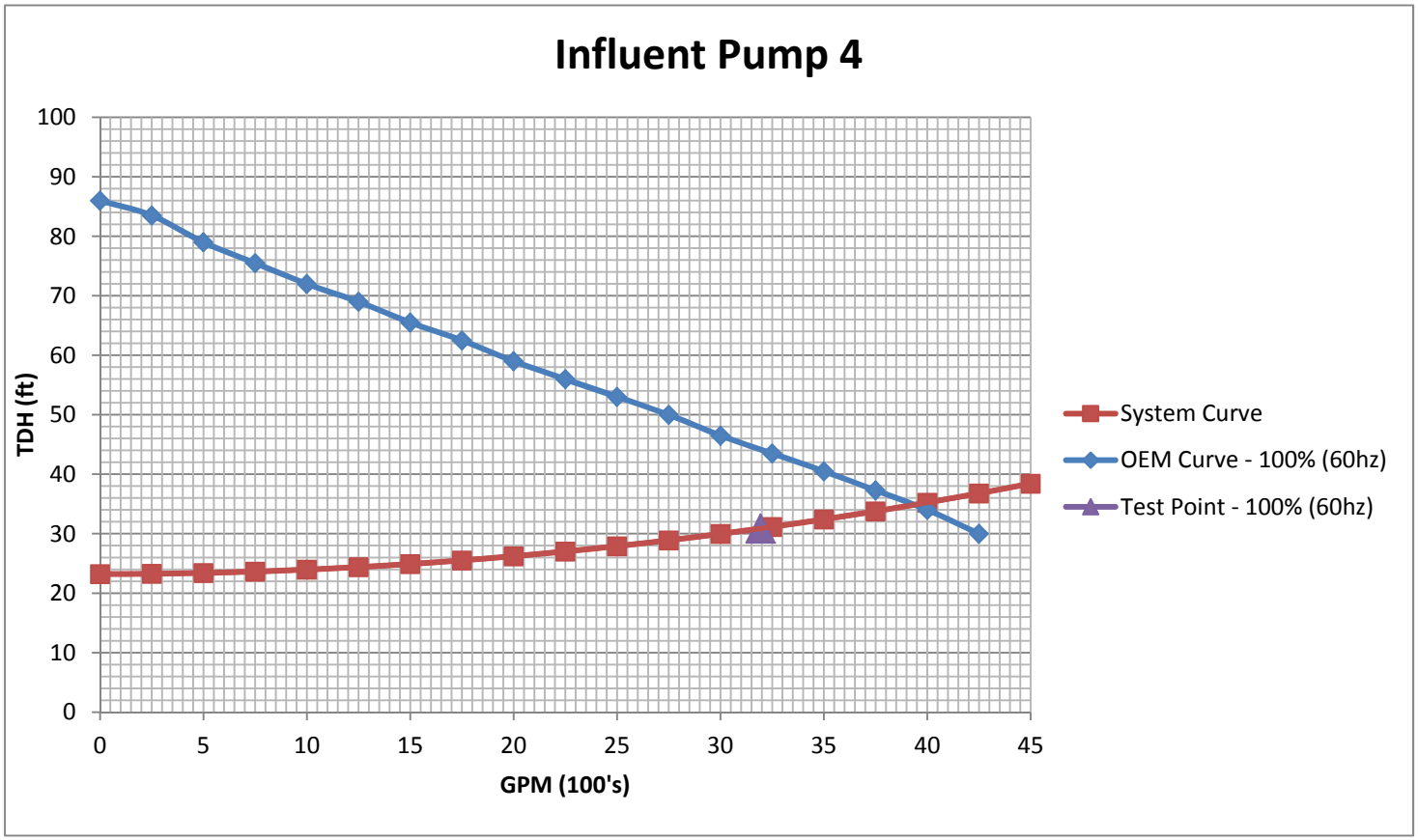
	Head (ft)	Flow (GPM)	Efficiency (%)	Specific Energy (kW/1000GPM)
OEM @ 870RPM	34.50	3,940	76.3	0.96
As Measured @ 870RPM	29.53	3,150	48.4	1.28

Influent Pump 4



To determine the level of deterioration the test performance must be compared to the original performance curve while overlaying the system curve described in the previous section.

The measurements in the Pump 4 operating data table illustrate the impact of lost efficiency on pump capacity and energy consumption. Refurbishing the pump to a like new condition would yield a 26% increase in efficiency and return the pump to its POR (preferred operating region). Running at the equivalent flow rate and run time, while using the recommended motor speed, would result in an energy savings of 34,688 kWh. We believe this is a good candidate for mechanical refurbishment and a low-friction, ceramic reinforced coating. This will restore the equipment to like-new conditions, and provide increased reliability and resistance to wear in the future.



Pump 4 – Operating Data

	Unit	Recommended	Test	Delta (Rec- Test)
VFD Speed	%	81	100	-19
Motor Speed	RPM	708	870	-162
Head	Feet	30.88	30.88	0
Flow	GPM	3,194	3,194	0
Hydraulic Power	HP	24.90	24.90	0
Voltage	kV	N/A	477.1	N/A
Amperage	A	N/A	50.7	N/A
PF		N/A	.931	N/A
Real Power	kW	26.8	39.0	-12.2
VFD Eff	%	98	98	0
Motor Eff	%	91	91	0
Shaft Power	BHP	32.0	46.7	-14.7
Hydraulic Efficiency	**%**	**77.8**	**53.3**	**25.5**
Annual Run-time	Hours	2,847	2,847	0
Annual Energy	kWh	76,230.0	110,917.64	-34,687.6
Annual Cost	**$**	**12,044**	**17,525**	**(5,481)**

Pump 4 – OEM vs. Measured

	Head (ft)	Flow (GPM)	Efficiency (%)	Specific Energy (kW/1000GPM)
OEM @ 870RPM	34.75	3,925	76.5	0.96
As Measured @ 870RPM	30.88	3,194	53.3	1.22

Conclusion

All of the 4 influent pumps assessed at Hull Waste Water Treatment show signs of significant efficiency loss. An analysis of the equipment and their operating conditions, along with OEM information, determined that they are operating 26%, 18%, 28% and 26% below OEM efficiency at the same flow rates measured.

It has been independently proven that reinforced ceramic coatings are, when combined with mechanical refurbishment, capable of restoring a pump to like-new or better condition. This will not only have the effect of restoring the equipment's efficiency and capacity, but its resistance to erosion will prolong the life of the equipment and prevent future losses of efficiency and capacity. The refurbishment and coating of these pumps is not only beneficial from an operational and reliability standpoint, there is also a strong business case to support the improvements.

AW Chesterton appreciates the opportunity to assist Hull Waste Water Treatment with the continuing initiative to improve their process and reduce operating costs.

Appendix A – Equipment Nameplate Data

Pump

Name	Manufacturer	Serial #	Model	Size	TDH (ft)	Flow (GPM)
INFLUENT PUMP 1	FAIRBANKS MORSE	1024021	B5444	5x8x12.25	54	800
INFLUENT PUMP 2	FAIRBANKS MORSE	1044866	B5444	5x8x12.25	54	800
INFLUENT PUMP 3	FAIRBANKS MORSE		5445	8x10x17.75	34	4000
INFLUENT PUMP 4	FAIRBANKS MORSE		5445	8x10x17.75	54	2500

Motor

Name	HP	RPM	Efficiency	Design	PF
INFLUENT PUMP 1	20	1175	89.5%	B	82.6
INFLUENT PUMP 2	20	1175	89.5%	B	82.6
INFLUENT PUMP 3	50	870	91.0%	B	N/A
INFLUENT PUMP 4	50	870	91.0%	B	N/A

Appendix B – Efficiency Profile

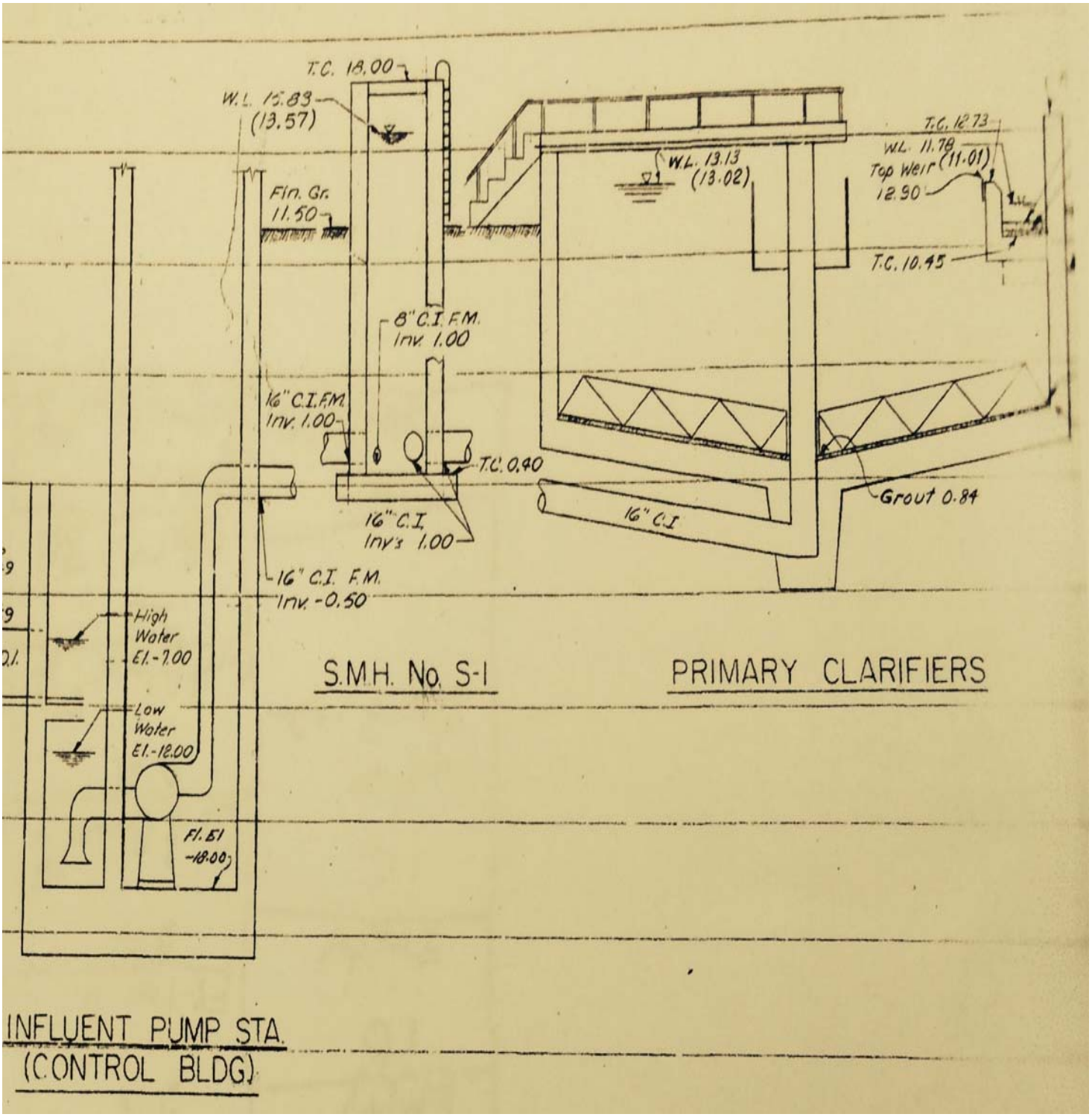
Pump 1	Speed		Power			Hydraulic Efficiency	Flow	Head	Specific Energy
	%	RPM	kW	Brake HP	Hydraulic HP	%	GPM	Feet	kW/1000GPM
OEM	94	1105	14.4	16.9	11.6	69.03	1,100	42.00	1.31
Test	**94**	**1105**	**20.2**	**23.8**	**10.4**	**43.75**	**1,040**	**39.62**	**1.94**

Pump 2	Speed		Power			Hydraulic Efficiency	Flow	Head	Specific Energy
	%	RPM	kW	Brake HP	Hydraulic HP	%	GPM	Feet	kW/1000GPM
OEM	100	1175	17.1	20.1	13.9	69.35	1,150	48.0	1.49
Test	**100**	**1175**	**20.4**	**23.9**	**12.2**	**50.93**	**1,080**	**44.7**	**1.88**

Pump 3	Speed		Power			Hydraulic Efficiency	Flow	Head	Specific Energy
	%	RPM	kW	Brake HP	Hydraulic HP	%	GPM	Feet	kW/1000GPM
OEM	100	870	37.6	45.0	34.3	76.3	3,940	34.50	0.95
Test	**100**	**870**	**40.5**	**48.6**	**23.5**	**48.4**	**3,150**	**29.53**	**1.28**

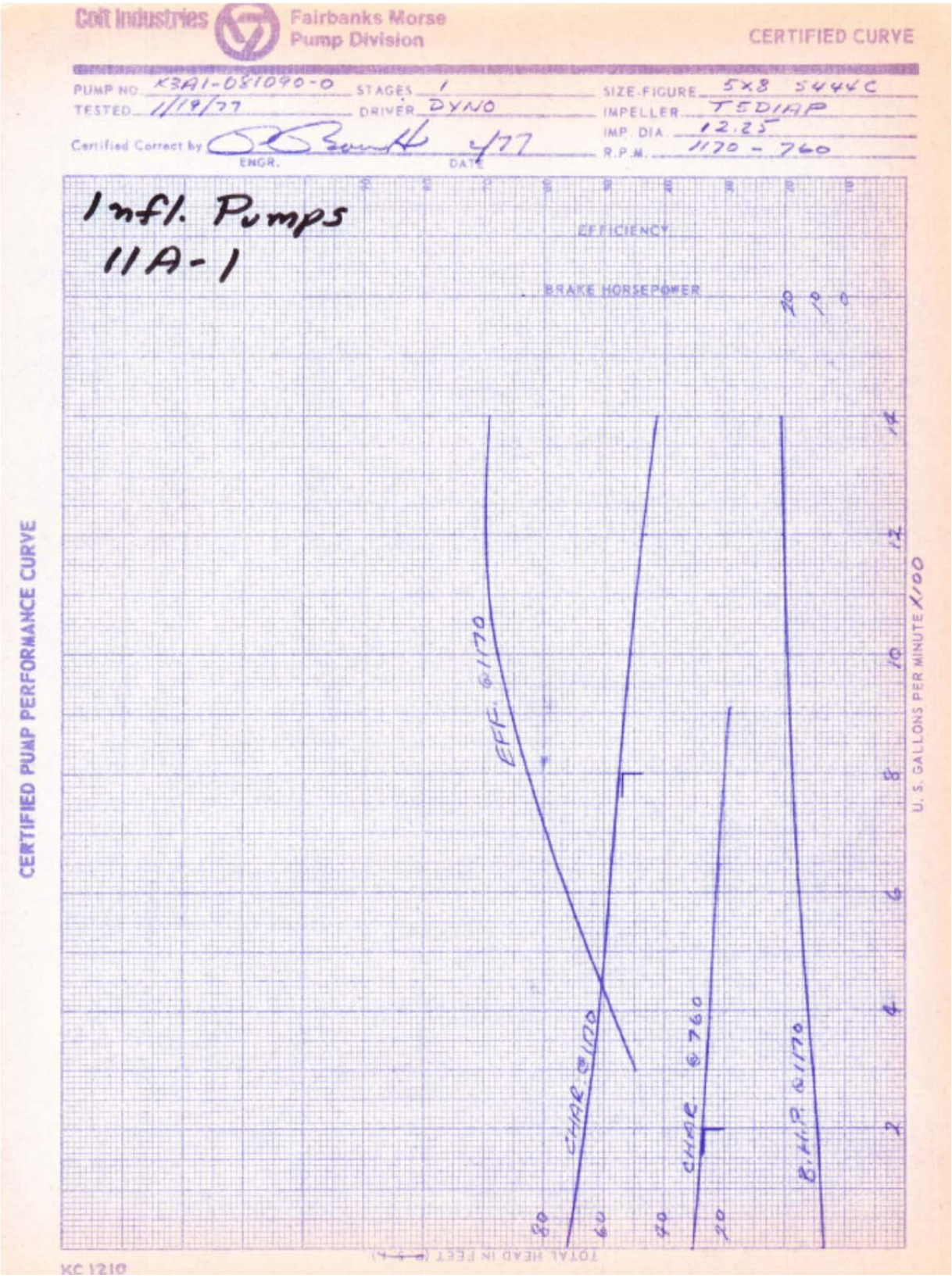
Pump 4	Speed		Power			Hydraulic Efficiency	Flow	Head	Specific Energy
	%	RPM	kW	Brake HP	Hydraulic HP	%	GPM	Feet	kW/1000GPM
OEM	100	870	37.6	45.0	34.4	76.5	3,925	34.75	0.96
Test	**100**	**870**	**39.0**	**46.7**	**24.9**	**53.3**	**3,194**	**30.88**	**1.22**

Appendix C – System Illustration

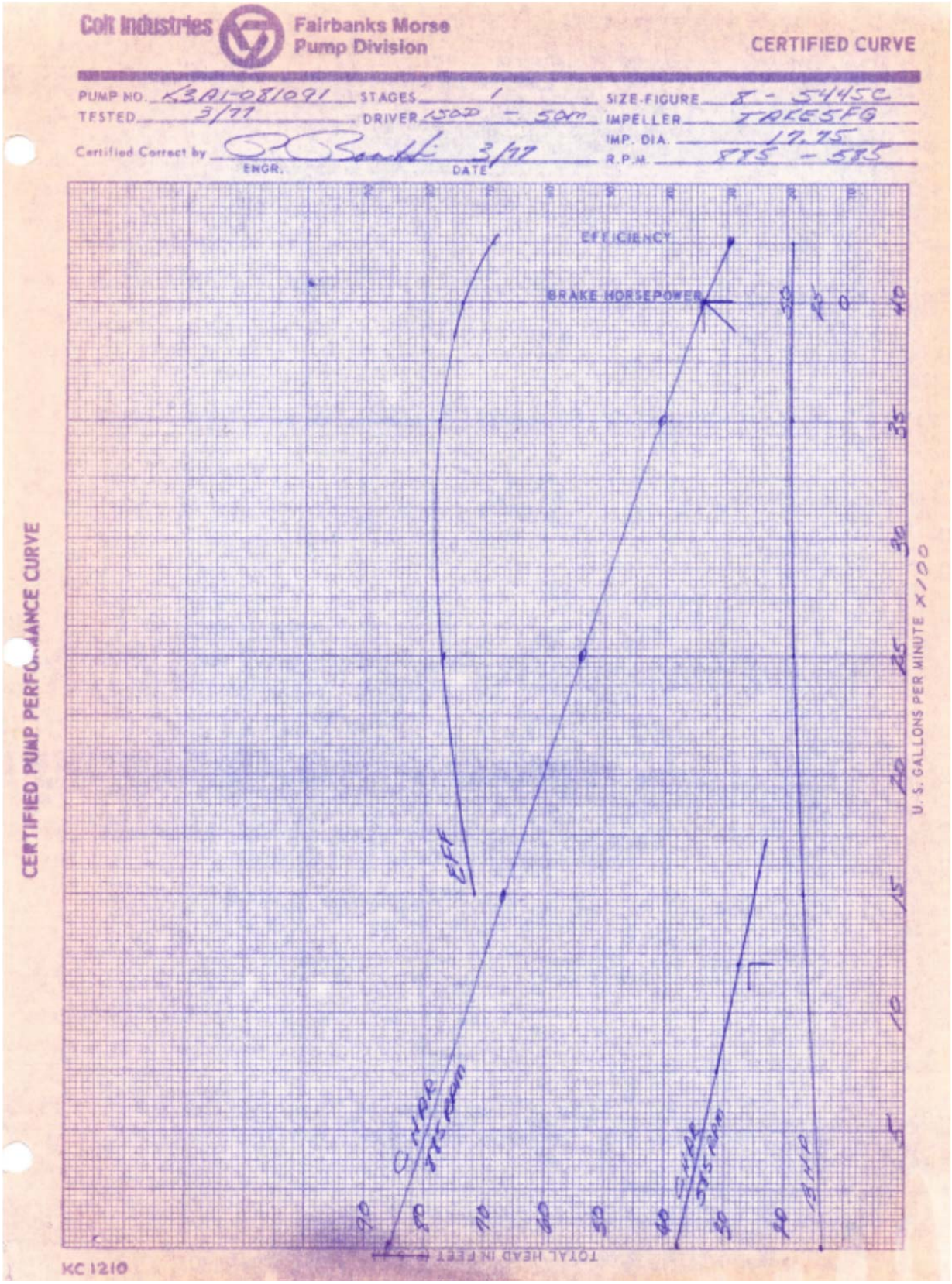


Appendix D – OEM Performance Curves

Pumps 1&2



Pumps 3&4


Colt Industries
Fairbanks Morse
Pump Division
CERTIFIED CURVE
PUMP NO. K3A1-081091
STAGES 1
SIZE-FIGURE 8 - 5445C
TESTED 3/77
DRIVER 150HP - 50hm
IMPELLER 7AKE5FG
IMP. DIA. 17.75
Certified Correct by
ENGR.
DATE 3/77
R.P.M. 875 - 585
EFFICIENCY
BRAKE HORSEPOWER
CERTIFIED PUMP PERFORMANCE CURVE
U. S. GALLONS PER MINUTE X100
TOTAL HEAD IN FEET
KC 1210

Appendix E – Motor Service Factor

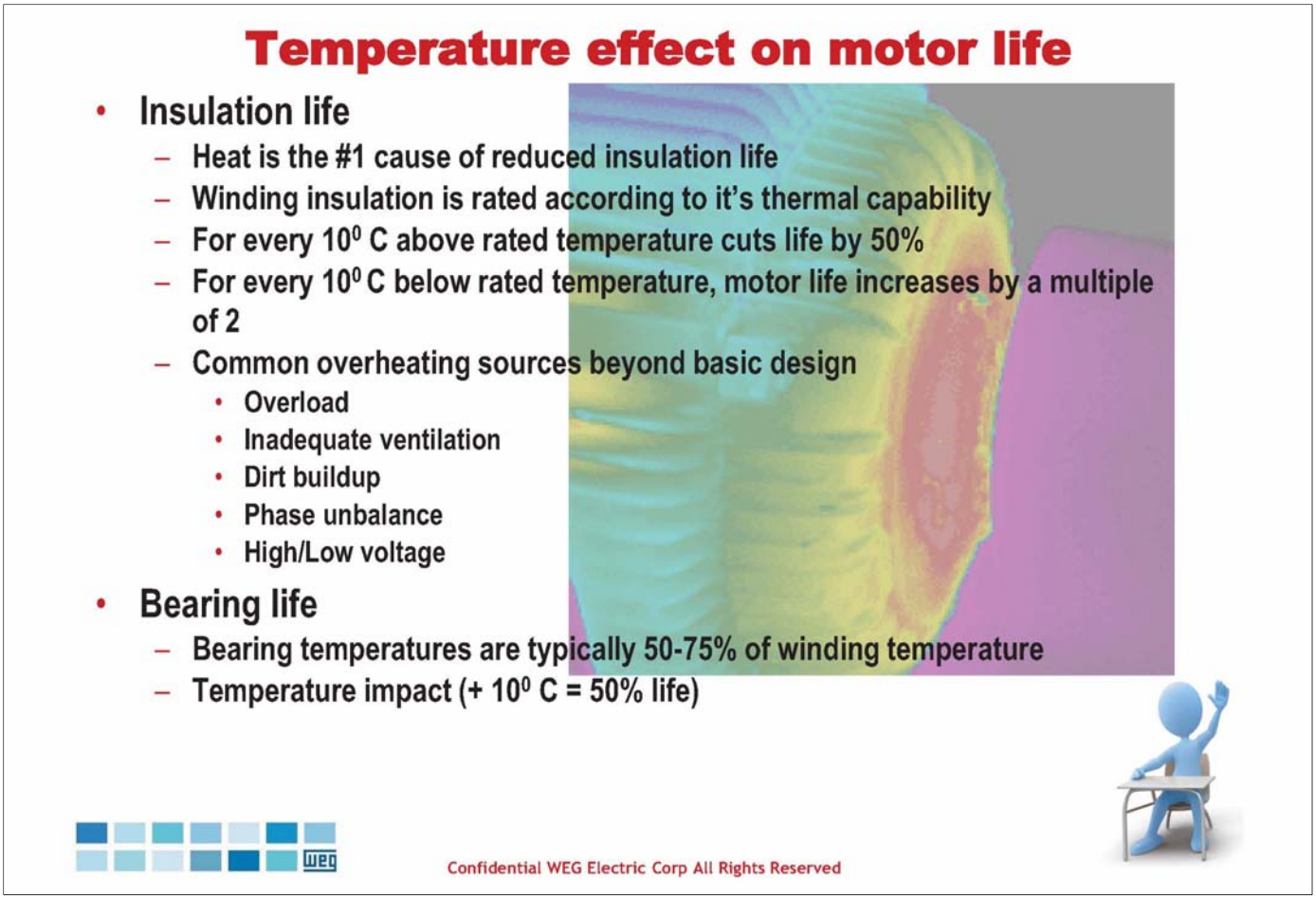
NEMA MG-1 defines service factor as an available continuous operating condition when voltage and frequency are maintained at the value specified on the name plate. Reference NEMA MG-1, 2011, 14.37.1

This section goes on to say that, "A motor operating continuously at any service factor greater than 1 will have a reduced life expectancy compared to operating at its rated name plate horsepower. Insulation life and bearing life are reduced by the service factor load."

Most all motor OEM's guidance states, as do many industry professionals that the temperature rise of the motor will increase by the square of the load change. For example, a motor running at 1.15SF will have winding temperature rise increased by (1.15) ^2 or 1.3225 x the rated HP temperature rise. The Michelin motor model number 10018ET3G405T-W22 has rated temperature rise of 75 degrees Celsius on sine wave power and 90 degrees Celsius on VFD power. Using these numbers, when operated at 113HP on the contactor (across the line), this motor will have winding temperature rise of 96 degrees Celsius.

The industry thumb rule for motor life related to temperature states that for every 10 degrees Celsius increase the motor is operated, the insulation life is reduced by half.

The design winding life of this motor is 20 years at rated power/temperature. At 96 degrees Celsius, the design winding life will decrease from 20 years to 5 years.



Source: William Livoti of WEG Electric Co.

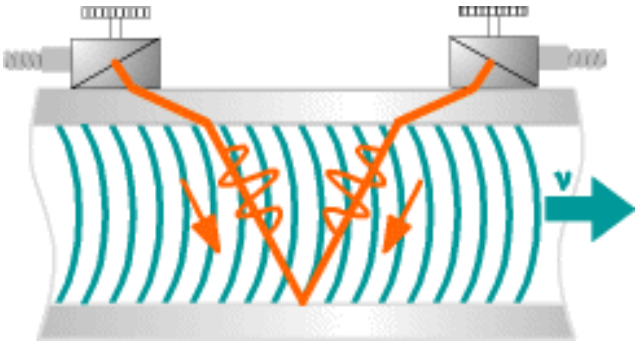
Appendix F – Test Equipment

Flow Meter

A clamp-on ultrasonic flow meter was used to measure water flow on the outlet of the condenser. This is a non-intrusive method of measuring flow through pipe walls. The flow meter can be utilized anywhere the pipe walls and pumped liquid are acoustically transmissive. Materials such as stainless steel, PVC piping and copper tubing are conducive to such tests.

The flow meter used is a FLUXUS ® ADM 601 series. The meter operates on the **transit time difference correlation method**. An ultrasonic signal's transmission speed will depend on the velocity of the liquid medium it is being carried though. Similar to a boat making way in a river, the ultrasonic signal will slow if traveling up current and accelerate when traveling down current.

Using two different points of reference (two clamp-on transducers), the meter will calculate the transit time difference, Δt, in either direction and determine the velocity of the liquid medium. This is accomplished with the transducers working alternatively as emitter and receiver. The meter then calculates the velocity with the cross sectional area of the pipe to determine volumetric flow.



***Courtesy of Flexim Incorporated

Power Logger

We utilized a Fluke 1735 Three-Phase Power Quality Logger to do our analysis. The power logger uses four flexible current probes as well as voltage probes for all three phases and a ground. Its software allows us to accurately and quickly measure voltage, amperage, and power factor. Its logging capabilities ensure that we are getting an accurate reading over a time period, rather than a snapshot that may not be indicative of normal function.

Pressure Gauges

In order to accurately measure the discharge and suction pressure of the pumps a set of digital gauges with silicone pressure sensors were used. The gauges are calibrated for accurate and reliable measurements. They are manufactured by Additel Corporation, model 680.

Appendix G – Important Calculations

$$\text{Hydraulic Horsepower} = \text{Flow(GPM)} \times \text{Head(ft)} \times \text{Specific Gravity} \times \frac{0.433\text{psi}}{1\text{ ft. head}} \times \frac{1\text{ HP}}{1714\text{ kW}}$$

$$\text{3-Phase Apparent Power (kVA)} = \text{Amps} \times \text{Volts} \times \sqrt[2]{3}\ \text{(3-phase correction)}$$

$$\text{Real Power (kW)} = \text{3-Phase Apparent Power (kVA)} \times \text{Motor Power Factor} \times \text{VFD Power Factor}$$

$$\text{Shaft Power (BHP)} = \text{Real Power (kW)} \times \text{Motor Efficiency} \times \text{VFD Efficiency} \times \frac{1.341\text{ HP}}{\text{kW}}$$

$$\text{Pump Efficiency (\%)} = \frac{\text{Hydraulic Horsepower}}{\text{Shaft Power}}$$

Pump Affinity Laws

Pump affinity laws express the relationship between pump speed (or impeller diameter), head, flow, and power. Using these, we were able to create pump curves for speeds not provided by the OEM.

Q = flow n = pump speed H = head P = Power

$$\frac{Q_1}{Q_2} = \frac{n_1}{n_2} \qquad \frac{H_1}{H_2} = \left(\frac{n_1}{n_2}\right)^2 \qquad \frac{P_1}{P_2} = \left(\frac{n_1}{n_2}\right)^2$$

APPENDIX E: SOFTWARE EVALUATION

COMMITMENT & INTEGRITY
DRIVE RESULTS

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Dedham, Massachusetts 02026
www.woodardcurran.com

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T 781.251.0200
F 781.251.0847

Software Evaluation Memo

TO: John Struzziery, Town of Hull Sewer Department

FROM: Andy Crawford, Assistant Technology Manager

DATE: April 18, 2017

Woodard & Curran (W&C) evaluated seven software packages, based on RFP requirements in the MassDEP Asset Management Grant, client feedback and W&C experience, for the Town of Hull Sewer Department Asset Management Program. W&C evaluated each software by reviewing websites, requesting software demonstrations from vendors, as well as current experience using the software. There were five main criteria for the Asset Management Software, and three requested features (see Table 1 for criteria and features.) Our evaluation focused on the ability for each software to provide the tools needed to perform asset management including maintaining an asset register, scheduling and tracking maintenance, collecting and processing relevant data, and generating appropriate reports. For Town ease of use, ideal software possessed general qualities such as flexibility for customization, ability to map assets, ability to process financials, and ability to be updated easily on a regular basis.

Based on our evaluation, the combination of Utility Cloud and Innovyze InfoMaster is recommended for the Town of Hull Sewer Department. Utility Cloud will serve as the real-time operational maintenance tool, and Innovyze InfoMaster will be used as a supplemental geoprocessing analysis feature. Table 1 below summarizes the evaluation criteria and scoring.

Table 1: Summary of Software Alternatives

Criteria/Software		SEMS & DoForms	Utility Cloud	iamGIS	Innovyze InfoMaster	Hippo CMMS	Assetic Predictor	CUPPS
Avalible Features	Maintenance	X	X	X		X		X
	Mapping/GIS		X	X	X		X	
	Asset Management	X	X	X	X	X	X	X
Criteria Rating	**Asset Management**							
	Vertrical Assets	5	4	2	2	5	3	4
	Horizontal Assets	2	5	5	5	2	4	1
	Specific Asset Information	2	5	5	5	4	4	1
	Condition Assesments	2	3	1	5	1	5	1
	Maintenance Procedures							
	PM Scheduling	4	3	1	n/a	4	n/a	2
	Corrective Documentation	4	5	2	n/a	4	n/a	1
	Operational Data Collection	2	5	3	n/a	2	n/a	1
	Mobile Abilities	3	5	4	n/a	3	n/a	1
	Mapping/GIS							
	Geoprocessing	n/a	2	3	5	n/a	4	n/a
	Web Map	n/a	5	5	2	n/a	2	n/a
	GPS Ability	n/a	5	5	1	n/a	1	n/a
	Reporting							
	Customizable Reports	4	5	3	3	2	3	1
	Repeatable Reports	4	5	2	5	4	5	4
	Useability							
	Access	4	5	5	2	5	2	1
	Customization	3	5	4	5	3	5	1
	Overall Score	**39**	**67**	**50**	**40**	**39**	**38**	**19**

Note: An X indicates whether the software package includes the feature indicated, and a numeral score of 1 through 5 indicates the effectiveness of this feature, 5 being the most effective.

Software Descriptions and Findings:

SEMS: SEMS is a more traditional computerized maintenance management system (CMMS). Assets can be organized in parent-child relationships to describe to overall system. The work order system has an ability to create automated schedules, track corrective maintenance and create, powerful customized reports. Integration with the doForms mobile application allows user to create and complete work orders in the field, however access to history records and asset information is only available via desktop. The software is installed locally on a windows machine and has no web capability. While software has recently developed some mapping capability, the use is limited to a desktop scenario, limiting field use.

Utility Cloud: Utility Cloud is a fully customizable operations management system that streamlines the collection of data for visualization and analysis. The visualization and analysis allows business decisions to be made more effectively and efficiently resulting in the optimization of operational activities and asset management. The software is designed to collect data, schedule work (e.g. work orders), and perform mapping of assets. Scheduled work (work orders) can be viewed in a list interface, or spatially by animation of icons (e.g. red=work due, green=work complete) and lines to help end users coordinate work. The custom report excel like templates can be integrated into the system to generate consolidated information and attached to the assets once work is completed. Other files including videos, photos, schematics and plans can also be added to individual assets for review at any time.

iamGIS: The iamGIS product is a web based GIS and asset management tool. It allows the user to map assets, search based on attribute data, and represent similar assets based on search criteria. While the software does do a good some of animating symbols based on criteria, there is little geoprocessing capability, meaning that the results cannot be leveraged for further analysis.

The software does have a work order system, but unfortunately is very primitive. Work orders are only created on an as needed basis with no ability to schedule recurring events, or across multiple assets. Work orders in iamGIS have no inherent relation to assets unless manually managed (tagged) for each individual work order. This fundamental flaw prevents the ability to develop many features like maintaining asset work history and analyzing maintenance data. The iamGIS software performs the basic functions of a GIS viewer well, but lacks the tools to be considered either a powerful geoprocessing system or day-to-day operational system.

Innovyze InfoMaster: Innovyse InfoMaster is an ArcGIS add-on module for processing GIS data into asset management data. Consequence of failure ratings can be developed from data such as pipe size, customers served, proximity, or any other conceivable data that can be applied to assets. It then takes CCTV data and geo-processes it to put numerical values such as 'number of point deficiencies' and 'length of linear deficiencies' to give condition data. Likelihood-of-failure values can then be generated on the CCTV metrics or other metrics such as number of jetting calls, estimated I&I flow, and other data that can be quantified for pipes. CoF and LoF values are then weighted and multiplied to give an ultimate "Risk" value for every asset. Using the risk value, pipes can be put into priority buckets of repair, replace, and do nothing with estimated costs. After input of approximate annual budgets, an approximate year of rehab or replacement will be the ultimate result. Results from Innovyze Infomaster can be exported and loaded into Asset Management systems as layers (Shapefiles) for viewing and CIP reporting.

Hippo CMMS: Hippo CMMS is a web based CMMS similar to the SEMS Technologies product. Assets are organized in a parent-child relationship to describe the system as a whole, but there is no mapping capability of the software. Hippo does contend that their graphical representation of assets (icons on a picture) constitutes a spatial representation of assets, but it has no capability with GPS or GIS.

Assetic Predictor: Assetic Predictor is a windows desktop software that provides prediction modelling and decision support tools for long-term planning of infrastructure assets. It enables organizations to optimize service level outcomes and capital and maintenance expenditure. Industry-specific algorithms accurately predict the future behavior of assets given available funding levels and enable scenario comparison to aid decision making. It assumes that a user has condition assessments on all assets, and approximate degradation curves for each type of asset. Using the current condition, and the rate at which it will continue to degrade, it can predict how an asset will survive over time. Specific treatments, such as lining or replacement, can be set to occur at specific condition set points. For example, using Assetic's custom condition scale (1 being poor, 6 being good), once a pipe reaches condition 2, the set point could indicate a potential lining project. Each treatment will raise the condition of that asset to a new level, and the cycle would begin again. Using degradations, treatments, Assetic shows the condition lifecycle of all assets in the system over time (20+ years), given an unconstrained budget. Budget approaches can be programmed in to then analyze how that will affect the long-term condition of the both individual assets and the system. This software is hosted on a local windows computer with no web or mapping capabilities.

CUPSS: Check Up Program for Small Systems, or CUPSS, is a windows desktop software package developed by the EPA for utilities to perform asset management. The evaluation determined that while CUPSS is very affordable (free), it lacks too many features that are available from other software providers. Some of the key missing features were the mapping component (none) and any mobile component (none). CUPSS is a desktop software, making it difficult for a staff larger than one or two people to collaborate on. Additionally, CUPSS maintenance system comes with a specific list of generic preventative maintenance schedules with limited ability to be customized to details of Hull's systems.

Recommendation

It is recommended that Hull proceed with Utility Cloud as a daily operational tool supported with Innovyze InfoMaster for advanced geo-processing capabilities. Utility Cloud will meet and exceed the requirements for the grant application. W&C, operator of the Hull wastewater plant and collection system, has designed a phased approach to transition in Utility Cloud out of our current asset management system - SEMS technologies.

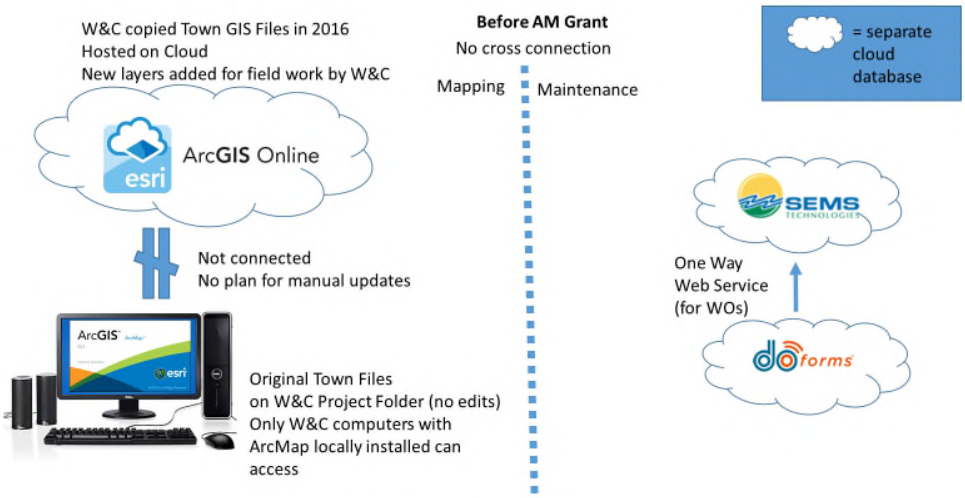


Figure 1: Existing Record Keeping Pathways

Timeline for Implementation:

Phase 1 – April/May 2017

The existing town GIS mapping has been imported into Utility Cloud to serve as the active inventory of assets. This data was generated based on geo-referencing plans, rather than physically locating the assets with high accuracy GPS. It is recognized that the accuracy of location and inventory is flawed, and needs updating. During this preliminary phase, it is recommended that GPS data be collected using the current ESRI ArcGIS Online account.

Operations will begin to use Utility Cloud for specific collection system activities, targeted at manholes and sewer mains. Manhole inspections (basic inspections / MACP Inspections) CCTV work will be the first activities managed by Utility Cloud.

CCTV data and manhole inspection data will be processed by Innovyse InfoMaster to populate relevant asset condition and asset management information. This will be an on-going process as more inspection data is generated.

Phase 2 – May 2017

Utility Cloud will produce a fiscal sustainability asset management report in line with the MASSDEP grant application submitted by others on behalf of the Town of Hull. This will require that all assets (including WWTF assets) will be imported into Utility Cloud, however the software may not necessarily be fully operational on a day to day basis for logging maintenance activities.

Phase 3 – Q3-Q4 2017

Operations will be managing all aspects of the collection system in Utility Cloud. This will include updating the existing town GIS mapping, all maintenance related activity, and collection of operational data. The existing town GIS mapping will be updated by adding, editing, and re-locating points via high accuracy GPS for all collection system assets. Maintenance related activities will include recurring preventative

maintenance, as needed corrective maintenance, and other events. Utility Cloud allows for operational data collection to occur at the time of maintenance to simplify things such as pump stations checks, grinder pump maintenance, service calls, CCTV inspection, and manhole inspections.

However, operational data collection will only be facilitated by an interface to the currently used HACH WIMS database software that is necessary for operational data management. We are currently engaging HACH to build an interface from Utility Cloud to HACH WIMS. If this is not possible, staff will continue to use doFORMs to collect operational data to populate the HACH WIMS database. Utility Cloud will be used primarily for maintenance related activities in the collection system and wastewater treatment plant but not for daily rounds, process control or laboratory data entry.

Phase 4 – Q4'17 – Q1'18

Operations will migrate all operational activity, including wastewater plant and collection system operations into Utility Cloud. Once in a single system This is anticipated to be facilitated by an improved scheduling and work order management system currently under development by Utility Cloud.

At project completion, the Town of Hull will be able to call upon reports from Utility Cloud to give real time insight into asset condition. Asset condition measurements will be controlled by field operations updating inspections and logging activity.

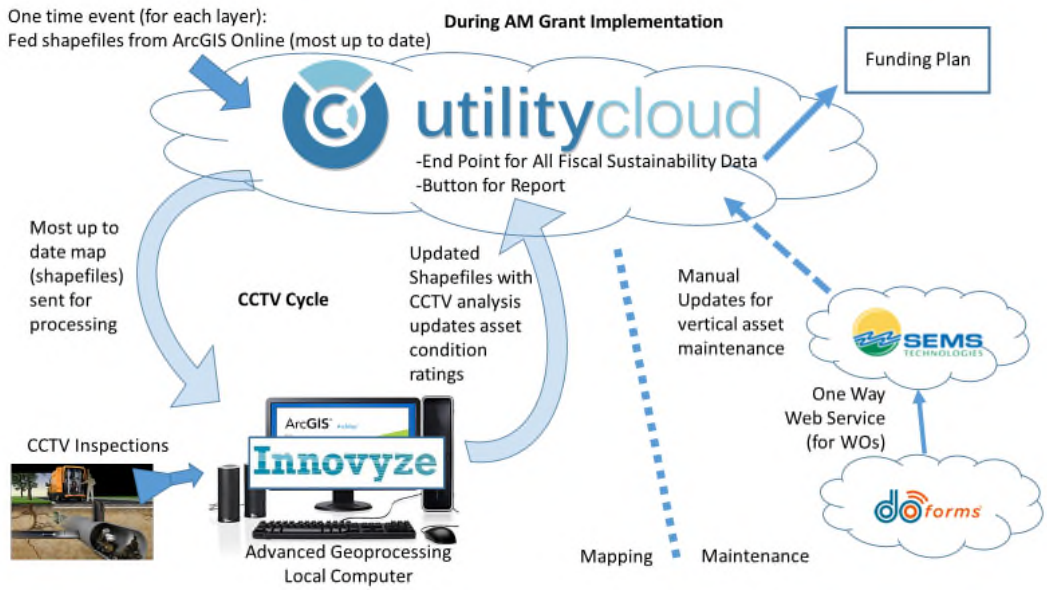


Figure 2: Proposed Asset Management Pathways

Comments JVS 4/6/17

PAGE 1 – Intro

1. Verify DEP's role (Patrick Rogers) in reviewing/approving selection of software. Is it Hull's decision only? Do we send intention report (this memo) for concurrence?
    a. We believe it is Hull's decision on what software to select, but recommend providing the final draft of this evaluation to MASSDEP, as suggested. While W&C believes that this package is the best solution for Asset Management, MASSDEP will need to verify the selected will be acceptable as 'equivalent' to the T&B grant proposal prior to investing in a full build out to produce the Fiscal Sustainability report.
2. Delete 'and'
    a. Deleted

PAGE 1 – CUPSS

No comments

PAGE 1 - Utility Cloud

3. Does UC Provide Work Orders
    a. Utility Cloud does provide work orders, although slightly different than a traditional CMMS. A work order is created, and then assigned a form, intended to be specific to what type of work is being performed. The intent is to collect the necessary operational data to while marking the work complete.
    b. Note: W&C has provided feedback to Utility Cloud to redesign and improve the way Work Orders are scheduled. The new system is expected to be live by September 2017, at which point W&C would feel comfortable moving plant maintenance from SEMS to UC.
4. Haven't seen this yet. (in reference to Utility Clouds ability to collected data).
    a. We would be happy to schedule a demonstration of this topic. Also their YouTube channel has some good example programs on what a data collection form looks like. https://www.youtube.com/user/MyAESC/videos

PAGE 2 – SEMS

No comments

PAGE 2 – Innovyse InfoMaster

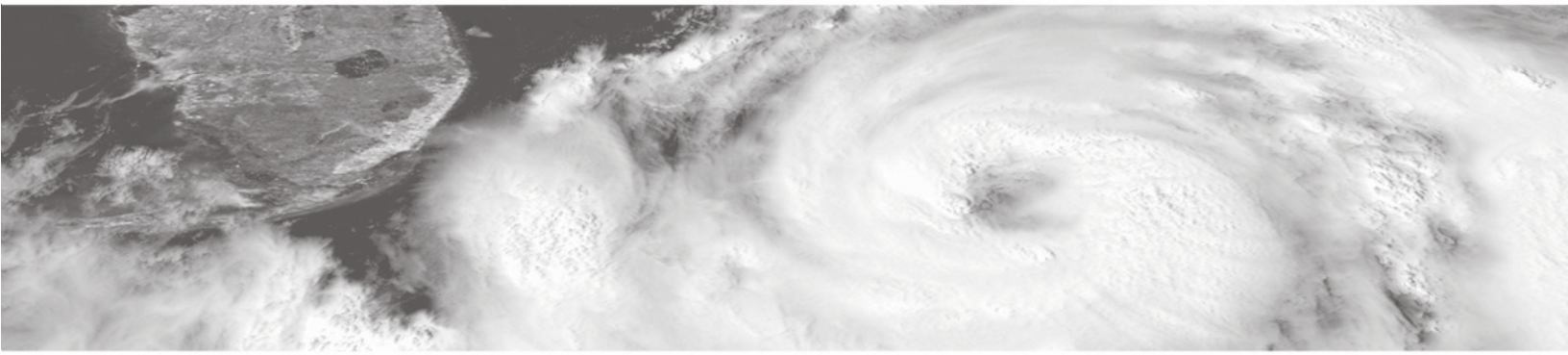
5. What about Risk of Failure? (in reference to Innovyze InfoMaster's condition assessment.)
    a. I believe Likelihood of Failure or LoF is another way of stating the 'Risk of Failure'?
6. Does UC offer this (in reference to Innovyze InfoMaster features)? If so, why not using?
    a. Other than ArcGIS based products, like InfoMaster, we have yet to find a program which can perform significant "geoprocessing" i.e. evaluation of custom criteria and generation of output data. Any ArcGIS based product that would be able to perform necessary geoprocessing requires significant processing power, making daily and/or mobile use prohibitive. We believe that hosting data primarily in the cloud and developing clear import/export SOPs is the most balanced usability-to-feature rich approach.

APPENDIX F: EPA CREAT REPORT

United States Environmental Protection Agency

Climate Resilience Evaluation and Awareness Tool (CREAT) Exercise Report

Town of Hull, Massachusetts



MARCH 2017

Climate Resilience
Evaluation and Awareness
Tool Exercise Report

TOWN OF HULL
HULL, MASSACHUSETTS

March 24, 2017

EXECUTIVE SUMMARY

The Town of Hull provides wastewater services to 10,000 people and has an average daily flow of 1.7 million gallons per day (MGD). Sections of the Hull wastewater system date back to the 1800s. The system has seven pump stations and one water pollution control facility (WPCF) that discharges treated wastewater to Massachusetts Bay (**Figure 1**). In the early 1970s, the Town of Hull upgraded its system to add secondary treatment to its WPCF. One month before the WPCF came online, the blizzard of 1978 flooded the near-complete facility. After the blizzard, the town added waterproofing measures to protect the facility from storm surge, and secondary treatment came online in the early 1980s.

Figure 1. *View of Massachusetts Bay and the Atlantic Ocean from Roof of Hull Water Pollution Control Facility*

The Town of Hull has experienced a number of storms and Nor'easters since the early 1980s that have caused infiltration issues and flooded the WPCF, pump stations and collection system. During the "No-Name" storm of 1991, increased flow into the WPCF exceeded the design capacity. All pumps remained operational but the surcharge in the system flooded 52 houses. Other storms have caused mechanical issues where power was lost and the WPCF was bypassed for several days. The utility also has experienced some saline intrusion via infiltration due to aging infrastructure. Sewers are slowly being repaired, but climate change could exacerbate or accelerate impacts already being seen.

Due to the Hull WPCF's location, flooding from sea level rise and storm surge from more frequent extreme events are a primary concern. When large coastal storms occur, the WPCF becomes surrounded by water on all sides, effectively creating an island. Accessing the WPCF can be challenging, if not impossible, during these events. Ensuring access and positioning staff and equipment prior to flooding events are necessary to maintain service throughout the storm. Sea level rise could exacerbate these flooding issues, as the utility is already seeing ocean water going through their parking lot even under normal daily conditions.

From December 2015 to March 2017, the Town of Hull engaged in a series of webinars and an in-person meeting to conduct a climate change risk assessment using the U.S. Environmental Protection Agency's (EPA) Climate Resilience Evaluation and Awareness Tool (CREAT). Town of Hull is using their assessment to understand wastewater system vulnerabilities to climate change impacts, such as how flooding from coastal storm surge, sea level rise, and intense precipitation events could affect utility operations.

The Town of Hull included flooding affected by sea level rise as the primary climate change threat of concern for their assessment. Increasing total annual precipitation and intense precipitation events from climate change could present service loss issues from flooding. In addition, critical wastewater infrastructure in low lying areas could be susceptible to inundation from coastal storm surge and sea level rise. The Town of Hull considered how climate change may increase the severity or frequency of these threats, and assessed the subsequent risks to wastewater assets and operations from these threats.

See **Table 1** for a summary of historical climate data and projected conditions that was used in the CREAT assessment. The Town of Hull considered warmer and wetter projected conditions with a stormy future to better understand the potential changes in temperature, precipitation, hot days, intense precipitation and sea level that could be expected. This scenario was used to ensure that the Town of Hull was conducting robust planning that considered different potential future climate conditions.

Table 1. CREAT-provided Historical and Projected Climate Data for the Town of Hull Assessment

CLIMATE VARIABLE	HISTORICAL CONDITIONS	PROJECTED CLIMATE CHANGE DATA WARMER AND WETTER CONDITIONS WITH A STORMY FUTURE
Average Annual Temperature	49.85°F	4.36°F increase
Hot Days Over 100°F	0.02 days (one every 50 years)	1 day
Total Annual Precipitation	47.95 inches	9.09% increase
100-Year Storm Event	6.1 inches in 24 hours	16.77% increase
Sea Level Rise by 2070	0.11 inches/year	39.45 inches total

CREAT enables users to assess the economic consequences of climate change threats to utility assets, if they were to occur, and identify adaptation options that reduce those consequences. The Town of Hull considered many different adaptation options to reduce the consequences from their threats, including constructing a sea wall to protect the utility's assets from flooding; building a permanent bypass; modifying the WPCF to be a headworks facility by connecting to the Deer Island Sewage Treatment Plant operated by the Massachusetts Water Resources Authority (MWRA); and constructing a new WPCF. These adaptation options had various degrees of cost effectiveness when comparing the cost of implementing the options with their potential risk reduction benefits.

In addition, CREAT guides users to make informed planning decisions that consider changing climate conditions by providing projected climate data, a structured and iterative risk assessment process and monetized values of risk. CREAT results can be used as metrics to support the implementation of adaptation options that provide benefits to the utility. The

Town of Hull is pursuing a hazard mitigation grant for improvements to their WPCF that could be further informed by the results from their CREAT assessment.

BACKGROUND

The Town of Hull provides wastewater services to 10,000 people and has an average daily flow of 1.7 million of gallons per day (MGD). Sections of the Hull wastewater system date back to the 1800s. The system has seven pump stations and one water pollution control facility (WPCF) that discharges treated wastewater to Massachusetts Bay (**Figure 2**).

Flooding from coastal storm events and heavy rains can impact the Town of Hull's WPCF and corresponding service area. The WPCF is at high risk from flooding, as it is located at the end of a peninsula. One part of the WPCF is situated approximately 30 feet from Hull Bay, while another part is approximately 70 feet from Massachusetts Bay and the Atlantic Ocean. The facility is at an elevation of about 12 feet above mean sea level, and has two floors below ground. The facility is in the Federal Emergency Management Agency's (FEMA) 100- (1% annual chance flood) and 500-year (0.2% annual chance flood) flood plains. The FEMA-calculated flood elevations in the North American Vertical Datum of 1988 (NGVD88) are 21 feet on the ocean side, 13 feet on the site of the WPCF, and 15 feet on the bay side.[1] The facility is also in a Category 4 Hurricane inundation zone with inundation depths calculated by the National Oceanic and Atmospheric Administration (NOAA) using its Sea, Lake, and Overland Surge from Hurricanes model of six to nine feet above ground level.[2] From 1900 to 2009, Plymouth County has experienced four Category 2 and three Category 3 hurricanes, based on data last updated February 4, 2010 by the National Hurricane Center.[3]

Figure 2. *Town of Hull Water Pollution Control Facility*

Critical WPCF infrastructure, such as the influent and effluent pumps, electrical service equipment and communication lines, are located below ground within the facility. During the "No Name" storm of 1991, the main electrical service was flooded. The WPCF does not have an operating influent gate to throttle or prevent high flows (>16 MGD) from entering the facility via its 36-inch influent sewer and there is no WPCF bypass. During an extreme flooding event, the facility could flood from the inside via the influent. This type of event will also cause the system to surcharge causing sewage spills into homes and onto streets. The utility can pump influent to a storage tank at the WPCF, but the tank has overflowed twice in the past. Expanding WPCF capacity is not possible at this time.

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[1] FEMA Flood Insurance Rate Map (FIRM) Number 25023C0017J, effective date July 17, 2012.
[2] See http://www.nhc.noaa.gov/surge/slosh.php.
[3] See http://www.nhc.noaa.gov/ms-excel/HurricaneStrikes_20100204.xls.

The WPCF has storm doors and flood gates to prevent inundation during coastal storms up to the FEMA 100-year flood elevation that was applicable at the time of the repairs following the blizzard of 1978; however, there are concerns that those measures may not be sufficient and require upgrades. The design flood elevations of existing flood protection measures, such as movable door flood barriers, did not consider increases in future flood elevations due to sea level rise. A partial sea wall (2,000 linear feet; 2 feet high) has been constructed across the street from the WPCF on the ocean side; however, its main purpose is to protect the roadways from waves, not to protect the WPCF from coastal flooding. The wall will provide some protection to the facility from wave action, but will not protect WPCF assets from flood waters. The sea wall was not built for a specific design storm; the FEMA 500-year flood elevation of 21 feet NGVD88 is several feet higher than the wall. The facility will also flood from the bay side, where there is no wall.

Figure 3. *Lift Station "A"*

The Town of Hull has seven pump stations, all of which are at low elevations and at risk to coastal storm surge conditions. Lift Station "A" (**Figure 3**) and Pump Station 1 are of particular concern given their relative locations adjacent to waterbodies. The pump stations have dry-pit submersible pumps and band backup power is provided by natural gas generators at each station, except for Lift Station "A." The generators depend on gas service lines to each site, which are susceptible to breaks from flood damage if roads or bridges are washed out. Lift Station "A" uses a portable diesel generator that must be transported to the lift station in the event of a power outage, which may not be possible if roads are washed out or blocked by debris. The Town of Hull is considering installing a permanent generator in the parking lot above the pump station.

Lift Station "A" is next to a cliff on a small beach, and can be subjected to storm surge up to 25 feet above the finished floor leading to total inundation. The lift station could also be buried by sand and debris during a large coastal storm event. Given the location of the pump station, a sea wall would not be convenient as a mitigation measure. As a result, the Town of Hull has considered raising the lift station controls to the top of the cliff.

Pump Station 1 is located next to Straits Pond. The brackish pond has a tide gate on Nantasket Avenue controlling water levels for water quality and mitigating the risk of flooding to nearby homes up to a certain flood elevation. However, coastal storm surges may wash out the nearby road and sewers.

The collection system has some sewers that are over 100 years old and were constructed from clay, brick and other materials that are subject to infiltration, and some manholes are still perforated and allow flood waters into the sewers during intense wet weather and coastal flooding. These issues, in tandem, can lead to a significant amount of infiltration and inflow during storms. The collection system was originally designed to be combined but it does not currently function that way. Since the interceptor is long, it has some inline storage capacity; however, that is only a temporary buffer during high wet weather flow or coastal flooding events. In addition, if the storm exceeds the design capacity, the interceptor could surcharge, which could potentially lead to house and street flooding in the service area.

Saltwater intrusion into the collection system is suspected via infiltration, especially at high and spring tides. The Town of Hull is interested in acquiring portable salinity sensors that would be placed throughout the system to identify specific

sources of saline intrusion that could then be reduced or eliminated by sewer rehabilitation to reduce the infiltration and improve WPCF treatment, since high salinity waters affect treatment processes. There are currently no tide gates on stormwater outfalls preventing extreme tides and flood waters from back-flowing through the outfalls and flooding low-lying areas.

ASSESSMENT

Exercise Process

From December 2015 to March 2017, the Town of Hull staff and its contracted engineers participated in a series of calls, webinars and one in-person event to walk through a climate change risk assessment process. To better understand the vulnerability of their utility's infrastructure and operations, the Town of Hull assessed potential climate change impacts using the U.S. Environmental Protection Agency's (EPA) Climate Resilience Evaluation and Awareness Tool (CREAT).[4] The CREAT assessment brought together individuals from Town of Hull, the Massachusetts Department of Environmental Protection and EPA (Office of Water, Water Security Division; Region 1) to think critically about potential climate impacts, prioritize assets and consider possible adaptation options (**Appendix A**: Exercise Participants). This preliminary CREAT assessment will assist the Town in identifying current and future climate hazard threats and risks, identifying potential resilience improvement options, and forming future facility planning efforts.

CREAT provides climate projection data within a risk assessment framework to help utilities understand climate change, assess risks from climate-related threats and evaluate potential adaptation options for implementation. Within CREAT, users assess consequences from climate-related threats that can impact utility assets and operations and the benefits from implementing adaptation options to protect those assets and operations. At the end of a CREAT assessment, users will have monetary values that compare the risk reduction following adaptation with the cost of implementing these options. As a decision support tool, CREAT also enables users to evaluate how the likelihood of climate change scenarios occurring can affect the cost effectiveness of adaptation options, as well as consider other benefits from adaptation, such as energy usage and socio-economic factors. The results of a CREAT assessment provide information that utilities can use to inform future utility investments and long-term planning processes.

CREAT Assessment

Several potential impacts from climate change were discussed, including the flooding events described above. The CREAT assessment addressed these issues, emphasizing how these events could potentially affect the infrastructure and operations of the Town of Hull. Using CREAT, the Town of Hull was able to gain a better understanding of the potential impacts from current and future risks with climate change considerations and to identify actions that could reduce these impacts.

CREAT provides data for historical and projected climate conditions that users can incorporate into scenarios to help them understand how threats are driven by climate change. Users build scenarios by selecting different future conditions defined by changes in annual average and monthly temperature and precipitation, as well as intense precipitation events and hot days that may exacerbate the climate-related threats of concern. While all Global Circulation Models (GCMs) project warming, the projected changes in precipitation vary. Some models project wetter conditions for a given location and others project drier conditions. The models also vary in the changes in the magnitude of intense precipitation events;

[4] EPA Climate Resilience Evaluation and Awareness Tool, available at: https://creat.epa.gov.

some project stormier conditions than others. CREAT averages the projected data from climate models to provide data for warmer and wetter, hotter and drier and moderate future conditions. The list of models used in CREAT is provided in **Appendix B:** Models Used in Developing Climate Data. The models provide a variety of future conditions that illustrate the range of potential changes in climate; no set of future conditions is more likely to occur than another.

The Town of Hull customized a Baseline Scenario with historical data and one additional scenario based on projected climate data. The projected scenario used CREAT-provided data for warmer and wetter conditions with a stormy future looking out to 2065. This selected time period aligns with a regional planning effort: a Massachusetts Department of Transportation (MassDOT) and Federal Highway Administration (FHWA) pilot project published in June 2015 that modeled flooding scenarios for Boston Harbor with climate change considerations.[5] The selected end year also corresponds to a 2060 time period in CREAT, which provides averaged projected climate data from 2050 to 2070. The Town of Hull included annual and monthly data in their scenario to gain a better understanding of the changes in temperature and precipitation patterns throughout the year. This data can inform the potential severity of future climate change threats. The Town of Hull also considered the 100-year storm event in their assessment. A summary of selected data from the Baseline and Warmer and Wetter Conditions scenario is shown in **Table 2**. The full data sets can be found in **Appendix C**: Methodology for Projected Climate Data in CREAT. Increased magnitude of extreme storm events could result in more intense coastal storm surge, and flooding events could damage low lying wastewater infrastructure and electrical equipment, including pump stations. In addition, sea level rise could cause saline intrusion into the collection system, which could cause damage to the system and present challenges to treatment processes.

The risk assessment framework in CREAT guides users through assessing the economic consequences they would experience if climate change threats occurred, and then adjusting those consequences if reduced through the implementation of adaptation options that protect utility assets.

CREAT provides economic consequence data for four categories that capture the range of impacts a utility may experience from a climate-related threat. These categories include utility business impacts, utility equipment damage, source and receiving water impacts and environmental impacts. There are cost ranges within these categories that represent low, medium, high and very high impacts to the utility. The economic data is based on water sector survey data, and calculated using the utility type, population served, total daily flow, public or private ownership and financial condition. The CREAT-provided values can be revised by a user to better relate to the utility's financial data. Users also have the ability to defer certain categories if they are not applicable to the utility or the assessment. The Town of Hull decided not to monetize Source/Receiving Water Impacts, since the types of flooding events they are concerned about would make impacts to receiving waters almost negligible during storm events. After review, the Town of Hull updated the economic consequences data for Utility Equipment Damage to more accurately reflect the loss of the WPCF and associated infrastructure. The categories and monetary ranges associated with the levels of consequences can be seen in **Table 3**.

Public health consequences can also be included and assessed as the expected number of fatalities and injuries from a threat occurring and impacting a utility asset. The Town of Hull did not use public health consequences in their CREAT assessment.

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[5] *MassDOT-FHWA Pilot Project Report: Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options for the Central Artery*, Massachusetts Department of Transportation and Federal Highway Administration. June 2015.

Table 2. Example Climate Data for the Baseline and Projected Climate Scenarios

CLIMATE VARIABLE	BASELINE SCENARIO	WARMER AND WETTER CONDITIONS SCENARIO
Average Annual Temperature	46.26°F	4.36°F increase
Average July Temperature	71.78°F	4.67°F increase
Average December Temperature	32.42°F	4.38°F increase
Hot Days over 100°F	0.02 days (one every 50 years)	1 day
Total Annual Precipitation	47.95 inches	9.09% increase
July Precipitation	3.31 inches	9.58% decrease
December Precipitation	4.29 inches	11.89% increase
100-Year Storm Event	7.2 inches in 24 hours	16.77% increase
Vertical Land Movement	-0.03 inches per year	-0.03 inches per year
Sea Level Rise by 2070	0.11 inches/year*	39.45 inches**

*Historical sea level rise trend recorded by NOAA at Boston. See Appendix C: Methodology for Projected Climate Data in CREAT.

**This value incorporates the vertical land movement entered in the Baseline Scenario to capture subsidence concerns.

Table 3. Economic Consequences Matrix for the Town of Hull

Title	Utility Business Impacts	Utility Equipment Damage (Custom Values from Town of Hull)	Source/ Receiving Water Impacts	Environmental Impacts
Description	Operating revenue loss evaluated in terms of the magnitude and recurrence of service interruptions. Consequences range from long-term loss of expected operating revenue to minimal potential for any loss.	Costs of replacing the service equivalent provided by a utility or piece of equipment evaluated in terms of the magnitude of damage and financial impacts. Consequences range from complete loss of the asset to minimal damage to the equipment.	Evaluated in terms of environmental damage or loss, aside from water resources, and compliance with environmental regulations. Consequences range from significant environmental damage to minimal impact or damage.	Degradation or loss of source or receiving water quality or quantity evaluated in terms of recurrence. Consequences range from long-term compromise to no more than minimal changes to water quality or quantity.
Very High	**Long-term and/or significant loss of expected revenue or operating income** **$901,000+**	**Complete loss of asset** **$20,000,000+**	**Long-term compromise of source water quality or quantity** **N/A**	**Significant environmental damage** **$57,300+**
High	**Seasonal or episodic compromise of expected revenue or operating income** **$601,800 - $901,000**	**Significant damage to equipment** **$5,000,000 - $10,000,000**	**Seasonal or episodic compromise of source water quality or quantity** **N/A**	**Persistent environmental damage** **$23,900 - $57,300**
Medium	**Minor and short-term reductions in expected revenue** **$300,900 - $601,800**	**Minor damage to equipment** **$2,500,000 - $5,000,000**	**Temporary impact on source water quality or quantity** **N/A**	**Short-term environmental damage, compliance can be quickly restored** **$9,500 - $23,900**
Low	**Minimal potential for loss of revenue or operating income** **$0 - $300,900**	**Minimal damage to equipment** **$0 - $2,500,000**	**No more than minimal changes to water quality** **N/A**	**No impact or environmental damage** **$0 - $9,500**

CREAT risk assessments are conducted on pairs of utility assets and climate change threats. For this assessment, the Town of Hull assessed the consequences from one climate-related threat to two critical assets. The pairs of critical assets and threats are listed in **Table 4**. Using CREAT, the Town of Hull was able to assess the consequences that they expected to experience if these climate threats occurred, considering their current capabilities and the capabilities of different adaptation plans that could be implemented in the future.

Table 4. Town of Hull Asset/Threat Pairs for Critical Assets

CRITICAL ASSET	PAIRED THREATS
Water Pollution Control Facility	Floods
Collection and Treated Water Conveyance Systems	Floods

The Town of Hull developed three adaptation plans in CREAT, which are listed in **Table 5**. Given the vulnerable location of the WPCF and the age of the facility, the Town of Hull has considered building a wall made of concrete masonry around the WPCF as a potential flood mitigation solution to protect the facility. Given site constraints and the existing high walls of the chlorine contact basin, the basin would not need to be inside the wall's perimeter. The investment in making the sea wall fully protective after the blizzard of 1978 was deferred in order to pay for repairs to the facility.

The Town of Hull has also considered converting the facility from a secondary treatment facility to a headworks facility for pumping sewage approximately four miles across Boston Harbor to the Deer Island Sewage Treatment Plant operated by MWRA. The converted headworks facility would likely include existing screening and new pumps to a force main. Existing tanks may be converted to storage tanks to store excess wet weather volumes for eventual pumping to Deer Island. Elevated structures and other flood protection measures would still be needed to protect a converted facility.

The Town of Hull's existing adaptation options are grouped into a "Current Measures" adaptation plan in CREAT and represent the Town of Hull's current capabilities to respond to and recover from climate change threats. The other adaptation plans, "Sea Wall Around Plant Plus Bypass," "New Plant Plus Sea Wall Around Plant," and "Deer Island Connection" contain potential adaptation options that would provide additional protection to the Town of Hull's assets from climate change threats in the future.

- The Sea Wall Around Plant Plus Bypass adaptation plan includes building a 6- to 8-foot concrete block wall around the perimeter of the entire WPCF, excluding the chlorine contact basin. In addition, a permanent bypass would be constructed that would include a screening chamber, bypass pump and discharge conveyance. These measures would provide additional protection to the WPCF and mitigate flooding the WPCF from within.
- The New Plant Plus Sea Wall Around Plant adaptation plan includes constructing a new WPCF that would include flood protection measures and relocate critical infrastructure to a higher elevation. In addition, a 6- to 8-foot concrete block wall would be constructed around the perimeter of the plant. These measures would provide protection, specifically for the WPCF, and associated infrastructure that would be vulnerable to future coastal storm surge from coastal storms and sea level rise.
- The Deer Island Connection adaptation plan includes regionalization of the wastewater services by connecting the Town of Hull to MWRA's Deer Island Sewage Treatment Plant and converting the existing WPCF into a headworks. The Town of Hull would build a 4-four mile force main across Boston Harbor. Flood-proofing the converted facility would still be required, since its low lying location would be difficult to access during heavy rain events and coastal storms.

Table 5. Town of Hull Adaptation Plans

ADAPTATION PLAN	ADAPTATION OPTIONS	ADAPTATION PLAN COST*
Current Measures	Portable Bypass Pump	$111,000
	Storm Doors at the WPCF	
Sea Wall Around Plant Plus Bypass	Build Permanent Bypass	$4,500,00 - $6,000,000
	Wall to Protect WPCF	
New Plant Plus Sea Wall Around Plant	New WPCF plus Sea Wall	$20,000,000 - $30,000,000
Deer Island Connection	Convert WPCF to a headworks (screening and pumping), flood proof facility, force main to Deer Island	$5,000,000 - $15,000,000

*Conceptual costs provided by the Town of Hull.

CREAT Assessment Results

CREAT guides users through a risk assessment for each asset/threat pair across all the defined scenarios. Each assessment considers the implementation of a specific adaptation plan. These results can be compared to the results from the Current Measures plan to show the benefits of adaptation. During the risk assessment, the Town of Hull considered the capabilities offered by their adaptation plans to reduce consequences from the climate change threat occurring in the Baseline Scenario and the Warmer and Wetter Conditions Scenario. For each scenario, the Town of Hull selected a level of consequence for each category in the matrix. The monetary values were summed across all categories to calculate total consequences of the threat occurring to the asset.

The Current Measures assessment for the Baseline Scenario represents the consequences that the Town of Hull may have experienced in damages to the WPCF from flooding with only their existing capabilities to respond to and recover from the event. The Current Measures assessments for the Warmer and Wetter Conditions Scenario represents the consequences that the Town of Hull would experience if the climate changed, but the Town of Hull did not implement any additional adaptation options to protect the WPCF from flooding. This represents the worst-case scenario for the assessment. The remaining assessments show the total consequences the Town of Hull may experience after implementing adaptation options to protect their assets, both for the historical events as defined in the Baseline Scenario, as well as the climate change threats defined in the Warmer and Wetter Conditions scenario.

CREAT calculates a monetized risk reduction from the asset/threat pair assessment to characterize current and potential future risk to utility assets and resources, with and without adaptation. Monetized risk reduction is the change in total consequences considering the increased capabilities of assets to withstand the impacts from threats following the implementation of an adaptation plan. Results indicated that implementing all of the adaptation options in that plan, the Town of Hull could avoid over $5,659,100 in consequences to the WPCF per event if the climate-related threat were to occur. The monetized risk reduction can be compared to the cost to implement the measures included in the adaptation plan, which, in this case, is $5,000,000 to $15,000,000. By comparing the cost of implementation with the associated benefits, the Town of Hull can determine the cost effectiveness of implementing adaptation plans. The total consequences calculated for the asset/threat pair assessments of the WPCF, resulting monetized risk reduction through the implementation of the Town of Hull's adaptation plans and the cost of the plans are shown in **Table 6**.

Using the data from the current assessment, the adaptation plans may be cost effective when comparing the range of monetized risk reduction with the plan costs for the Warmer and Wetter Conditions future climate change scenario. Future refinement of the CREAT assessment data to ensure that all consequences and benefits from implementing the adaptation options are captured could enhance the cost effectiveness of these plans.

Table 6. Results from the Town of Hull Water Pollution Control Facility Assessments

ADAPTATION PLAN	ADAPTATION PLAN COST	BASELINE SCENARIO		WARMER AND WETTER CONDITIONS SCENARIO	
		TOTAL CONSEQUENCES	RISK REDUCTION	TOTAL CONSEQUENCES	RISK REDUCTION
Current Measures	$111,000	$2,523,900 - $5,125,300	N/A	$5,659,100+	N/A
Sea Wall Around Plant Plus Bypass	$4,500,000 - $6,000,000	$9,500 - $2,824,800	$0 - $5,047,800	$2,523,900 - $5,358,200	>$300,900
New Plant Plus Sea Wall Around Plant	$20,000,000 - $30,000,000	$0 - $2,810,400	$14,400 - $5,057,300	$2,523,900 - $5,358,200	>$300,900
Deer Island Connection	$5,000,000 - $15,000,000	$9,500 - $2,824,800	$0 - $5,047,800	$9,500 - $2,824,800	>$2,834,300

Focusing on the Deer Island Connection adaptation plan,

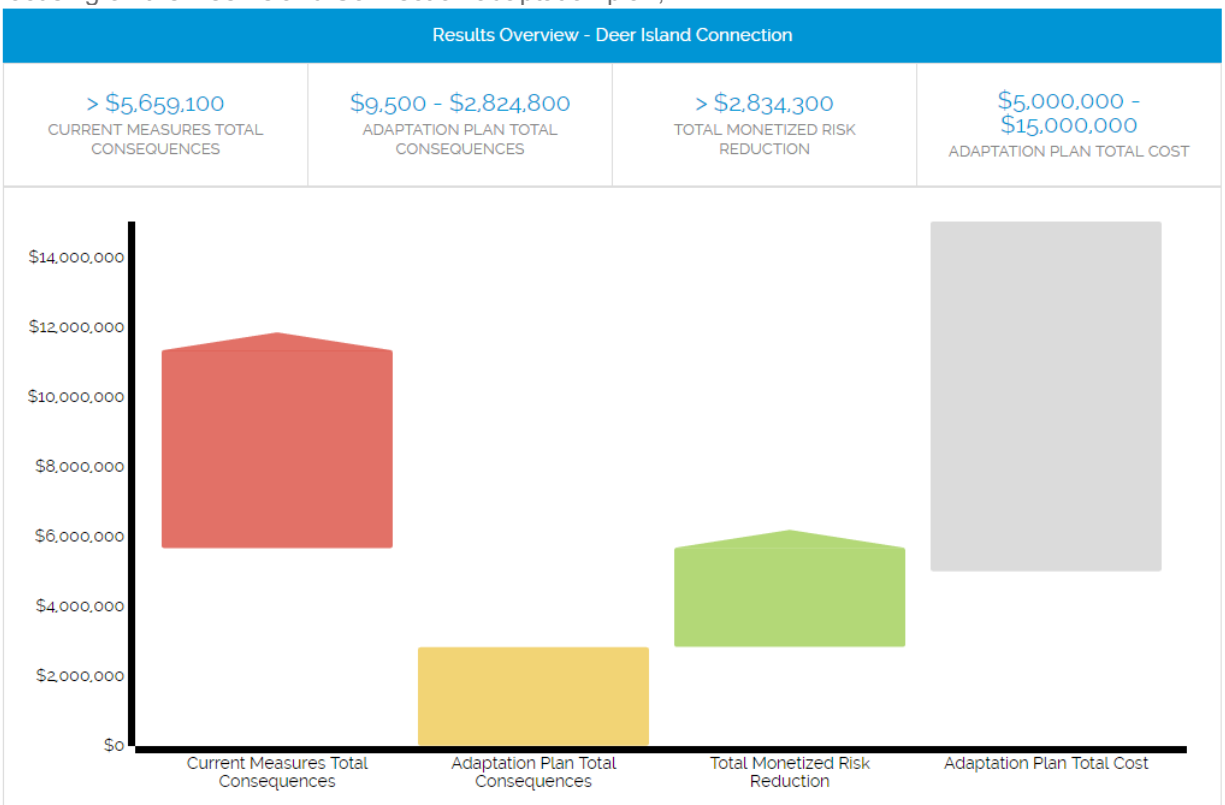

Figure 4 shows the overview of the CREAT assessment results for the Warmer and Wetter Conditions Scenario and this adaptation plan for the WPCF assessment. The range of values for total consequences for the Current Measures and Deer Island Connection adaptation plan, total monetized risk reduction and adaptation plan cost are shown. For example, the monetized risk reduction for the Deer Island Connection adaptation plan for the Warmer and Wetter scenario is greater than $2,834,300.

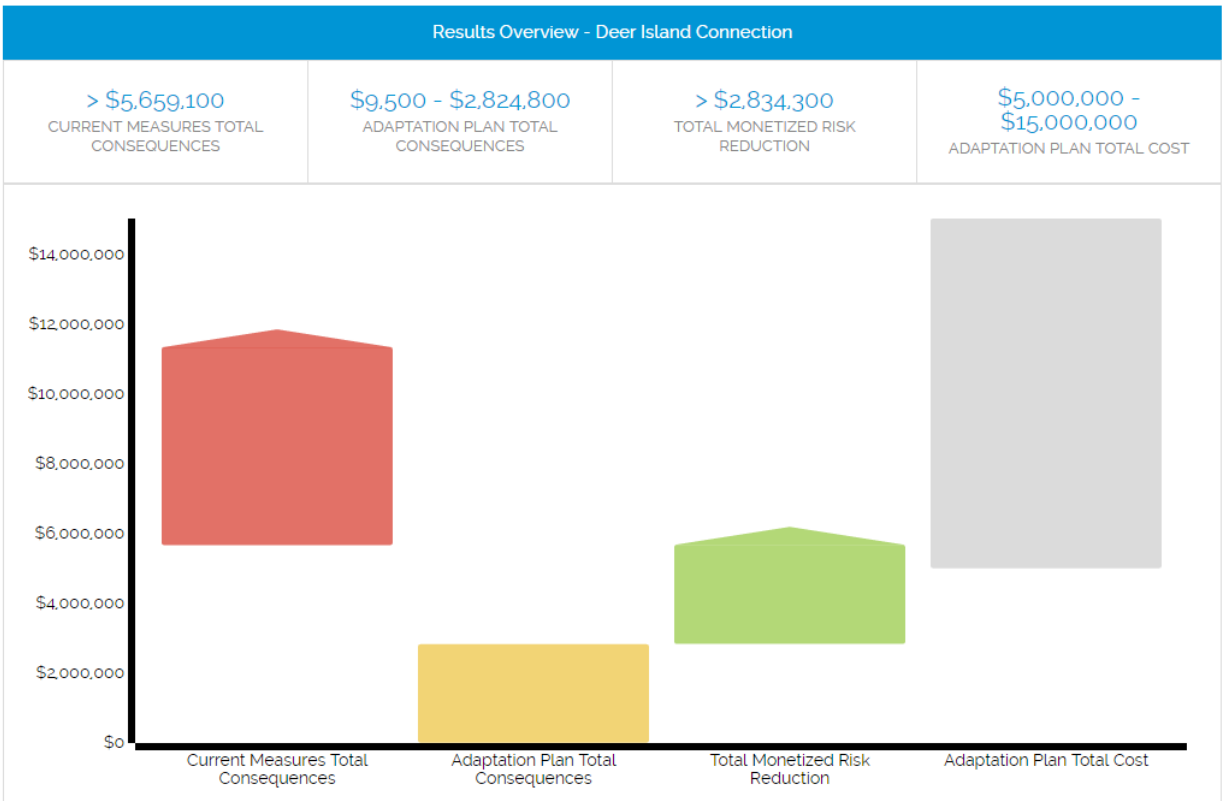

Figure 4. *CREAT Results Overview for the Water Pollution Control Facility for the Scenario 1 – Warmer an d Wetter Scenario Conditions and Deer Island Plus BypassConnection Plan*

CREAT enables users to consider additional results of their analysis to support decision making, including how the likelihood of a climate change scenario occurring will impact the cost effectiveness of implementing an adaptation plan. In CREAT, scenarios and threats are considered "conditional," where likelihood is assumed to be 100%. **Figure 5** shows how scenario likelihood can alter the cost effectiveness of the Deer Island Connection plan for the Warmer and Wetter Conditions scenario. The figure shows that for all scenario likelihood values, implementing the adaptation plan may be cost effective for Town of Hull, considering only the comparison of the adaptation plan cost to the monetized risk reduction achieved from implementing the plan. Additional work in defining the consequences scale for the Environmental Impacts category would better define the upper bound of the overall consequences for the Current Measures and the monetized risk reduction. With a defined upper bound, it is possible that more information related to the effects of likelihood could be provided by CREAT.

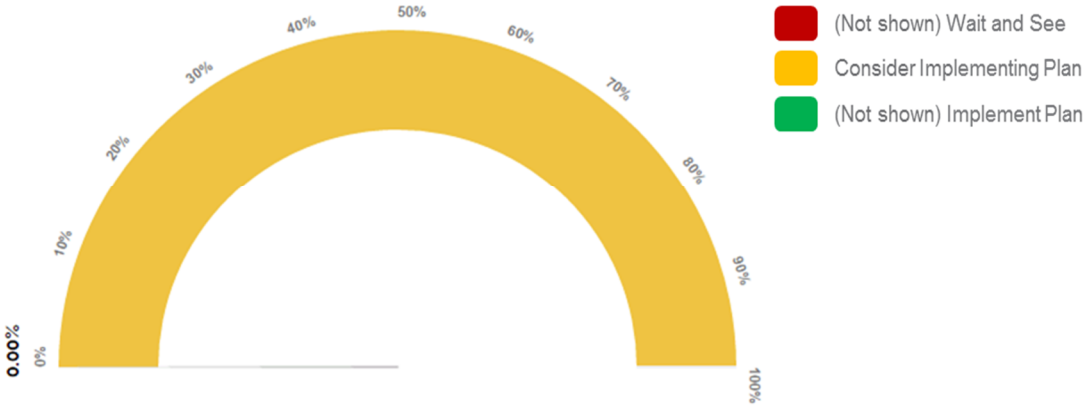

Figure 5. *CREAT Likelihood Sensitivity Results for the Warmer and Wetter Conditions Scenario and Deer Island Connection Plan*

A "Wait and See" section of the likelihood figure will appear for a range where the cost to implement the selected plan exceeds the entire range of possible risk reduction for the threats in the selected scenario. If considering only the comparison between adaptation plan cost and the magnitude of risk reduction, the utility must achieve at least $5,000,000 in risk reduction for the adaptation plan to begin to be cost effective for the current assessment. Even for low likelihoods of the scenario occurring, the adaptation plan does appear to be cost effective, since this section does not appear in Figure 5**.**

The "Consider Implementing Plan" portion of Figure 5 represents the range where the cost to implement the selected plan overlaps with the range of possible risk reduction for the threats in this scenario. For the Town of Hull, all percentages of likelihood of the Warmer and Wetter Conditions scenario occurring are within this range. In this range, there would be an uncertain return on investment to implement the adaptation options in the Deer Island Connection adaptation plan based on the current assessment. Additional benefits from implementing these adaptation options should be considered before implementing this adaptation plan. Additional assessments, with potential increases in risk reduction, could also support the decision regarding implementation.

An "Implement Plan" portion of the likelihood figure will appear for a range of scenario likelihood where the costs to implement the selected plan are below the entire range of possible risk reduction for the threats in this scenario. In this range of likelihood, the adaptation plan is cost effective to implement, since there would be a positive return on investment. The monetized risk reduction alone provides adequate benefit to support the decision to implement this plan.

While cost effectiveness of an adaptation plan is an important consideration for utility planning, some adaptation plans may provide additional benefits outside of the risk reduction the plan provides. Other metrics, such as energy savings, socio-economic benefits and community public health benefits of adaptation plans, can be important factors to take into account when considering implementation. The Town of Hull will review their Deer Island Connection adaptation plan and determine if there any additional impacts to capture in considering implementation.

NEXT STEPS

The Town of Hull met with MWRA in early March 2017 to present three proposed strategies for regionalization of wastewater services and to gauge the feasibility of these strategies. MWRA currently has sufficient treatment capacity at the Deer Island Sewage Treatment Plant to accept additional flow from Hull. MWRA currently uses closed diffusers on the outfall that could be opened to increase discharge capacity. MWRA also has strategies in place to protect the Deer Island plant and associated infrastructure from coastal storm surge flooding for at least the next 20 years. The Town of Hull will continue these discussions with MWRA to fine tune its regionalization strategies ensuring they are economically viable and present increased resilience against future climate impacts to both entities.

The Town of Hull plans to continue refining their CREAT assessment by re-evaluating sea level rise values included in the first assessment as additional information on sea level projections emerges, evaluating the climate-related impacts to additional critical assets, including the collection system and low lying pump stations and comparing the performance of other adaptation strategies. After further review of the consequences data, the Town of Hull may include an additional category to include those consequences to the community during extreme events, including flooding of local homes. Consequence data related to Environmental Impacts will also be reviewed to better define the upper threshold of expected utility damages or losses.

In addition, the Town of Hull may use CREAT to inform their application for a hazard mitigation grant for improvements to their WPCF. Applying CREAT risk reduction and cost-benefit analyses may help the Town of Hull determine which elevation standard to employ in their sea wall designs. The Town of Hull will continue their ongoing efforts to conduct climate change and watershed planning to ensure reliable and sustainable service for their customers.

APPENDIX A: EXERCISE PARTICIPANTS

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William McMillin, PE	William.McMillin@CH2M.com	CH2M

APPENDIX B: MODELS USED IN DEVELOPING CLIMATE DATA

MODEL NAME	STORM SCALARS	SOURCE / INSTITUTION
ACCESS1_0		Australia, Commonwealth Scientific and Industrial Research Organization (CSIRO) and Bureau of Meteorology (BOM)
ACCESS1-3	X	
BCC-CSM1_1		China, Beijing Climate Center, China Meteorological Administration
BCC_CSM1_1_M		
BNU_ESM		China, College of Global Change and Earth System Science, Beijing Normal University
CANESM2	X	Canada, Canadian Centre for Climate Modelling and Analysis
CCSM4	X	USA, National Center for Atmospheric Research (NCAR)
CESM1_BGC	X	USA, Community Earth System Model Contributors
CESM1_CAM5		
CMCC_CM	X	Italy, Centro Euro-Mediterraneo per i Cambiamenti Climatici
CMCC_CMS	X	
CNRM_CM5	X	France, Centre National de Recherches Météorologiques / Centre Européen de Recherche et Formation Avancée en Calcul Scientifique
CSIRO_Mk_3_6	X	Australia, Commonwealth Scientific and Industrial Research Organization in collaboration with Queensland Climate Change Centre of Excellence
EC_EARTH		EC-EARTH consortium
FGOALS_G2		China, LASC, Institute of Atmospheric Physics, Chinese Academy of Sciences and CESS, Tsinghua University
FGOALS_S2		China, LASC, Institute of Atmospheric Physics, Chinese Academy of Sciences
GFDL_CM3		USA, NOAA General Fluid Dynamics Lab
GFDL_ESM2G	X	
GFDL_ESM2M	X	
GISS_E2_H		USA, NASA Goddard Institute for Space Studies
GISS_E2_H_CC		
GISS_E2_R		
GISS_E2_R_CC		
HADGEM2_AO		Korea, National Institute of Meteorological research/Korea Meteorological Administration
HADGEM2_CC		UK, Met Office Hadley Centre (additional HadGEM2-ES realizations contributed by Instituto Nacional de Pesquisas Espaciais)
HadGEM2_ES	X	
INMCM4	X	Russia, Institute for Numerical Mathematics
IPSL_CM5A_LR	X	France, Institute Pierre Simon Laplace
IPSL_CM5A_MR	X	
IPSL_CM5B_LR	X	
MIROC_ESM	X	Japan, Japan Agency for Marine-Earth Science and Technology, Atmosphere and Ocean Research Institute (The University of Tokyo), and National Institute for Environmental Studies
MIROC_ESM_CHEM	X	
MIROC5	X	
MPI_ESM_LR	X	Germany, Max-Planck-Institut für Meteorologie (Max Planck Institute for Meteorology)
MPI_ESM_MR	X	

MODEL NAME	STORM SCALARS	SOURCE / INSTITUTION
MRI_CGCM3	X	Japan, Meteorological Research Institute
NorESM1_M	X	Norway, Norwegian Climate Center
NORESM1_ME		

APPENDIX C: METHODOLOGY FOR PROJECTED CLIMATE DATA IN CREAT[6]

The climate information available in CREAT provides a snapshot of how changes in climate might exacerbate current concerns. In addition to the national and international assessments synthesized in CREAT, historical observations and model projections are organized for users to review and select as part of their scenarios.

Historical Climate Conditions

CREAT provides historical climate data for temperature and precipitation to help users assess current risk as part of their Baseline Scenario. Average annual and monthly conditions are sourced from the Parameter-elevation Regressions on Independent Slopes Model[7] (PRISM) dataset based on observations from 1981 to 2010. Data available from the Climate Research Unit[8] are used in places where PRISM data were unavailable, such as in Alaska, Hawaii and Puerto Rico. The resultant dataset covers all U.S. states and Puerto Rico at a 0.5-degree resolution in latitude and longitude.

Historical Extreme Events

Historical data on extreme events, including both temperature and precipitation, are based on time-series analysis of the data available from the National Oceanic and Atmospheric Administration (NOAA) National Climate Data Center climate stations.[9] Data for historical extreme precipitation events are representative of each station.

For intense precipitation events, time series of historical daily precipitation data from 11,010 stations were reviewed and converted into annual maxima time series for 24-hour precipitation. Any station with data available during 1981 through 2010 was included.

Historical hot days, those days with daily maximum temperature over 90 and 100°F, were calculated using historical daily maximum temperature data from 8,150 stations. These stations were selected from the same stations used for intense precipitation based on a minimum of 95% completeness for April through October daily observations from at least one calendar year in the period of observation.

Projected Climate Conditions

CREAT provides projected changes from Global Climate Models (GCMs) as available from the Coupled Model Intercomparison Project, Phase 5 (CMIP5)[10] which is the same data used to support the IPCC Fifth Assessment Report.[11] Data provided in CREAT were from model simulations employing Representative Concentration Pathway 8.5, a higher trajectory for projected greenhouse gas concentrations to support assessments looking at higher potential risk futures.

CREAT uses an ensemble-informed approach to derive meaningful choices from the results of 38 model runs[12] for each 0.5 by 0.5 degree location. This approach involves generating a scatter plot of normalized, projected changes in annual temperature and precipitation by 2060 for all models. Statistical targets were calculated based on the distribution of these model results and the five models closest to those targets were averaged to generate each projection (**Figure 6**). The

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[6] Adapted from the CREAT Methodology Guide, available at https://creat.epa.gov.
[7] PRISM Climate Group, Oregon State University. Available online at: http://www.prism.oregonstate.edu/.
[8] Data set available at: http://catalogue.ceda.ac.uk/uuid/2949a8a25b375c9e323c53f6b6cb2a3a.
[9] For more information on NOAA climate stations, see: http://www.ncdc.noaa.gov/data-access/land-based-station-data.
[10] World Climate Research Programme Coupled Model Intercomparison Project available at: http://cmip-pcmdi.llnl.gov/cmip5/.
[11] IPPC Fifth Assessment report available at: https://www.ipcc.ch/report/ar5/.
[12] List of models used in analyses provided in Appendix B: Models Used in Developing Climate Data.

targets were designed to capture a majority of the range in model projections of changes in annual temperature and precipitation, as follows:

- Warmer and wetter future conditions: average of five individual models that are nearest to the 95th percentile of precipitation and 5th percentile of temperature projections;
- Moderate future conditions: average of five individual models that are nearest to the median (50th percentile) of both precipitation and temperature projections and
- Hotter and drier future conditions: average of five individual models that are nearest to the 5th percentile of precipitation and 95th percentile of temperature projections.

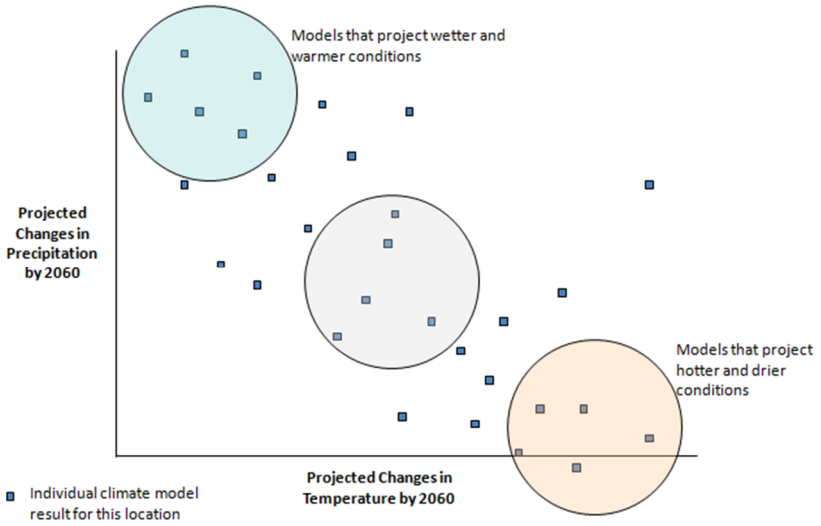


Figure 6. *Illustration of Ensemble-informed Selection of Model Projections to Define Potential Future Conditions*

Once the models for each projection were selected, these models were ensemble-averaged to calculate annual and monthly changes for temperature and precipitation. CREAT selects the most appropriate data to match the defined planning horizon from two available data sets – one for 2035, which is based on projection data for 2025-2045, and one for 2060, which is based on projection data for 2050-2070. The selection of the appropriate CREAT-provided time period is based on the End Year defined by the user during the time period selection. If the End Year is 2049 or earlier, the 2035 data are selected; otherwise, CREAT selects the 2060 data set.

Projected Extreme Events

CREAT also provides projections of extreme heat in terms of the new total number of hot days following the projected shift in temperature. The projected changes in hot days were linked to the models selected for projected changes in average temperature and precipitation. The change in monthly average temperature for April through October for the analysis location was added to the daily time series from that station to generate a new time series for each projection. The number of hot days was then calculated using the same method employed for historical hot days to generate projected number of hot days.

Similar to the development of model projections of changes in average temperatures and precipitation, CREAT uses an ensemble-based approach to identify a range of possible changes in total storm precipitation. A subset of the GCMs used earlier (22 of the 38 models) provide scalars or changes in precipitation per degree of

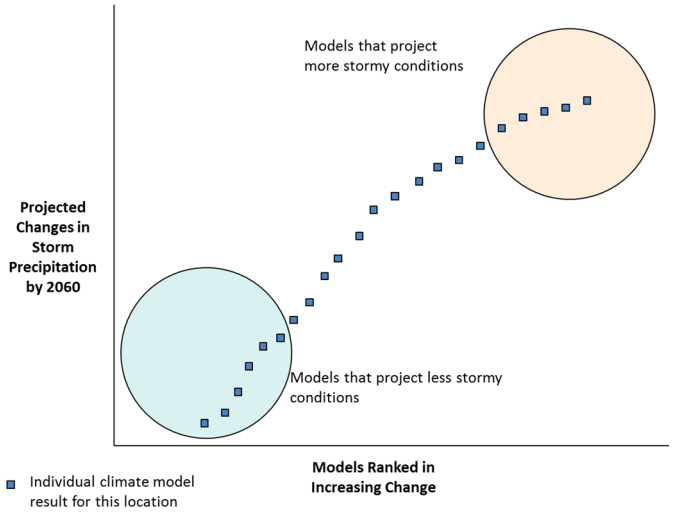


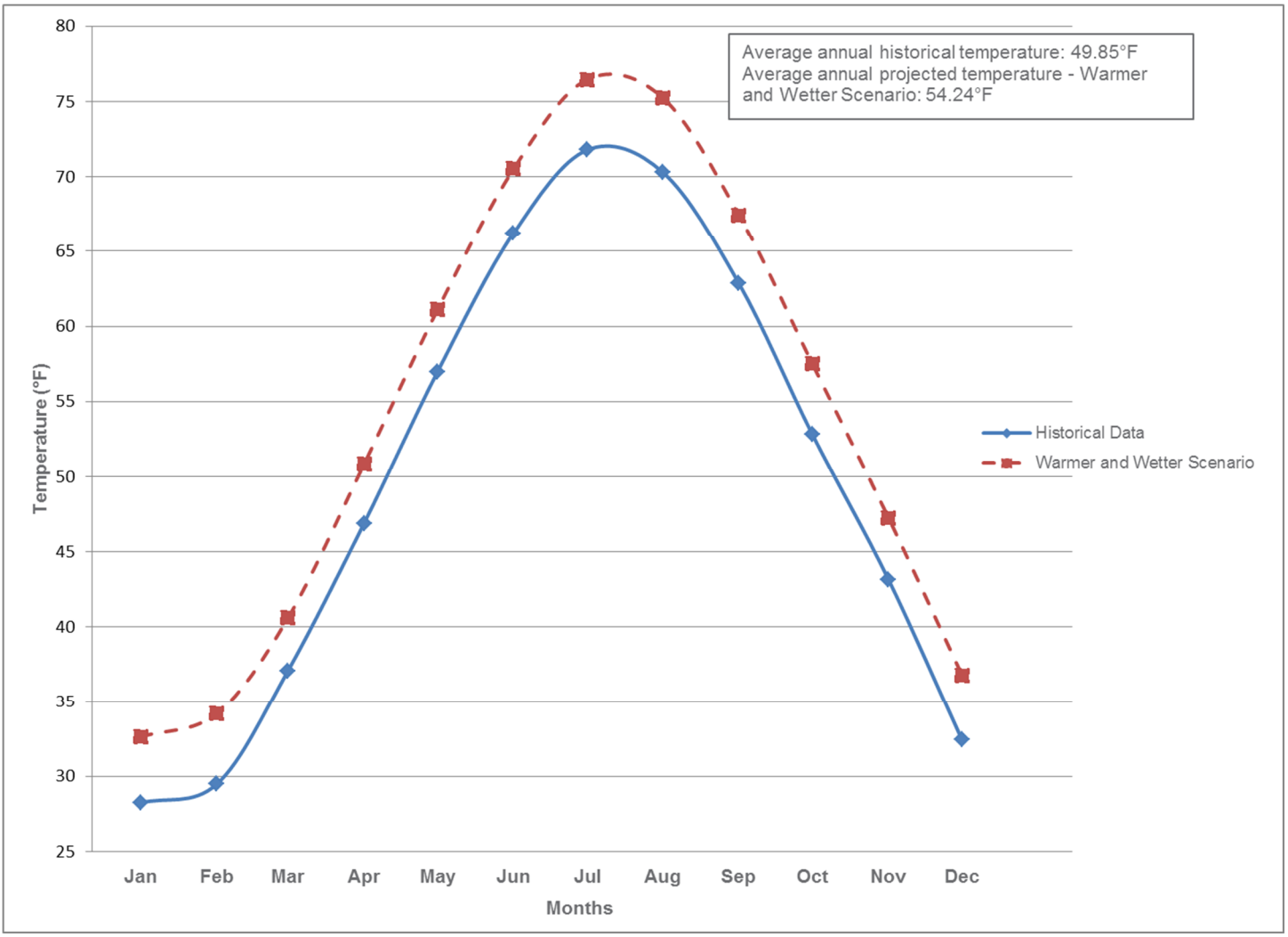
Figure 7. *Illustration of Ensemble-informed Selection of Model Projections to Define Potential Future Storm Conditions*

warming, for storm events of the same return intervals as the historical storms provided in CREAT. Each model provides a different scalar for each return interval based on model-projected daily precipitation patterns.

The scalars from these models were ranked based on the scalars for the storm events with a 5-year return interval. The use of 5-year storm events to rank the models was based on the assumption that water sector utilities dealing with intense storm events are often more concerned with more frequent storm events. Ensembles of five models were selected as describing a “Stormy Future,” which are the highest models and a “Not as Stormy Future,” which are the lowest models. In each case, these models were averaged to provide two model projections available to users, as shown in **Figure 7**.

Historical and Projected Temperature Data for the Town of Hull

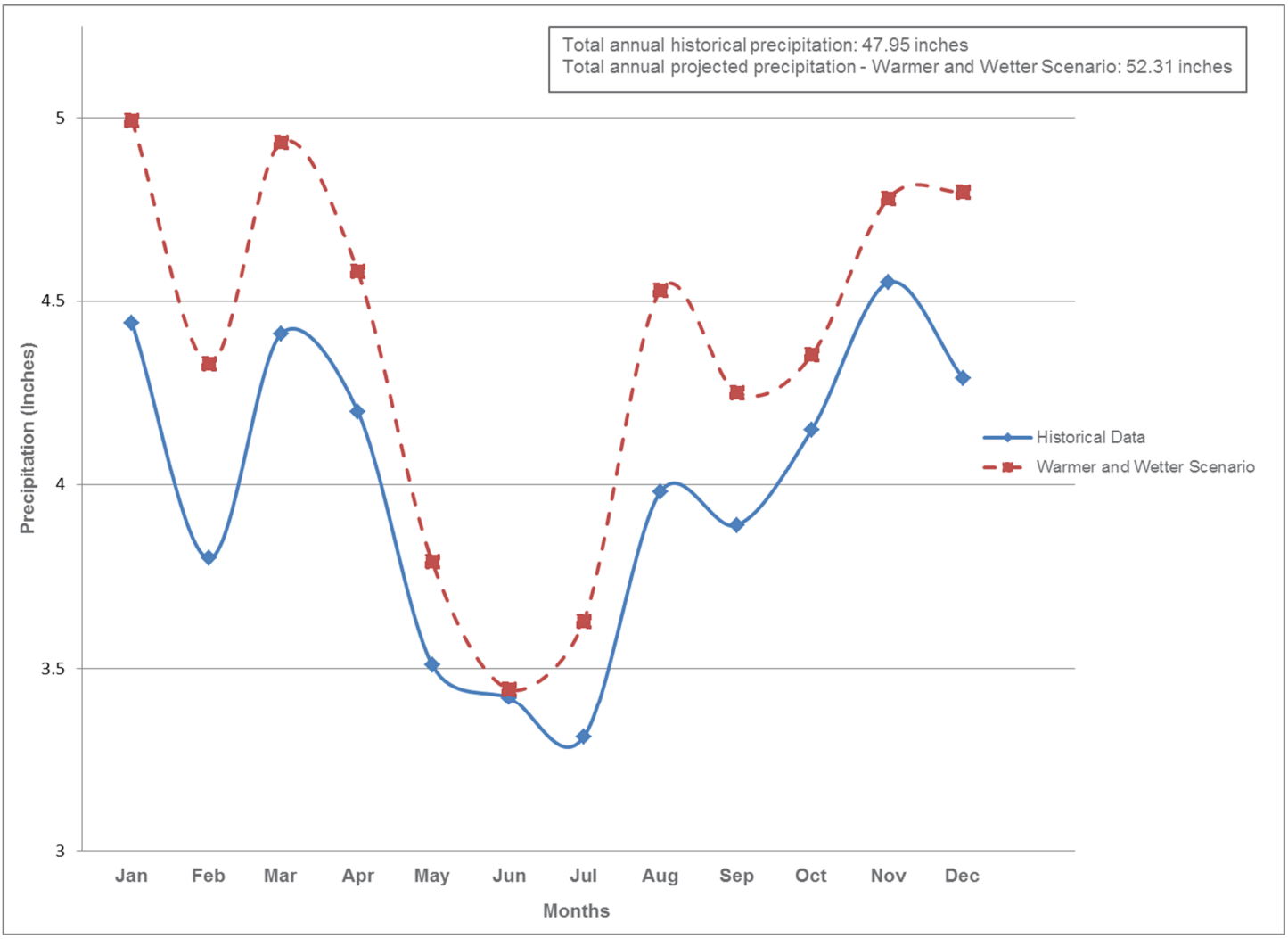
AVERAGE TEMPERATURE (°F)	HISTORICAL DATA – BASELINE SCENARIO (°F)	PROJECTED DATA – WARMER AND WETTER CONDITIONS SCENARIO (°F INCREASE)
ANNUAL	49.85	4.36
JANUARY	28.24	4.39
FEBRUARY	29.49	4.72
MARCH	37.1	3.51
APRIL	46.88	3.94
MAY	56.98	4.12
JUNE	66.22	4.3
JULY	71.78	4.67
AUGUST	70.29	4.94
SEPTEMBER	62.83	4.6
OCTOBER	52.79	4.69
NOVEMBER	43.15	4.1
DECEMBER	32.42	4.38



Historical and Projected Temperature Data for Town of Hull

Historical and Projected Precipitation Data for the Town of Hull

AVERAGE PRECIPITATION (INCHES)	HISTORICAL DATA – BASELINE SCENARIO (INCHES)	PROJECTED DATA – WARMER AND WETTER CONDITIONS SCENARIO (% CHANGE)
ANNUAL	47.95	9.09
JANUARY	4.44	12.47
FEBRUARY	3.8	13.93
MARCH	4.41	11.87
APRIL	42	9.03
MAY	3.51	7.97
JUNE	3.42	0.69
JULY	3.31	9.58
AUGUST	3.98	13.8
SEPTEMBER	3.89	9.27
OCTOBER	4.15	4.89
NOVEMBER	4.55	5.12
DECEMBER	4.29	11.89



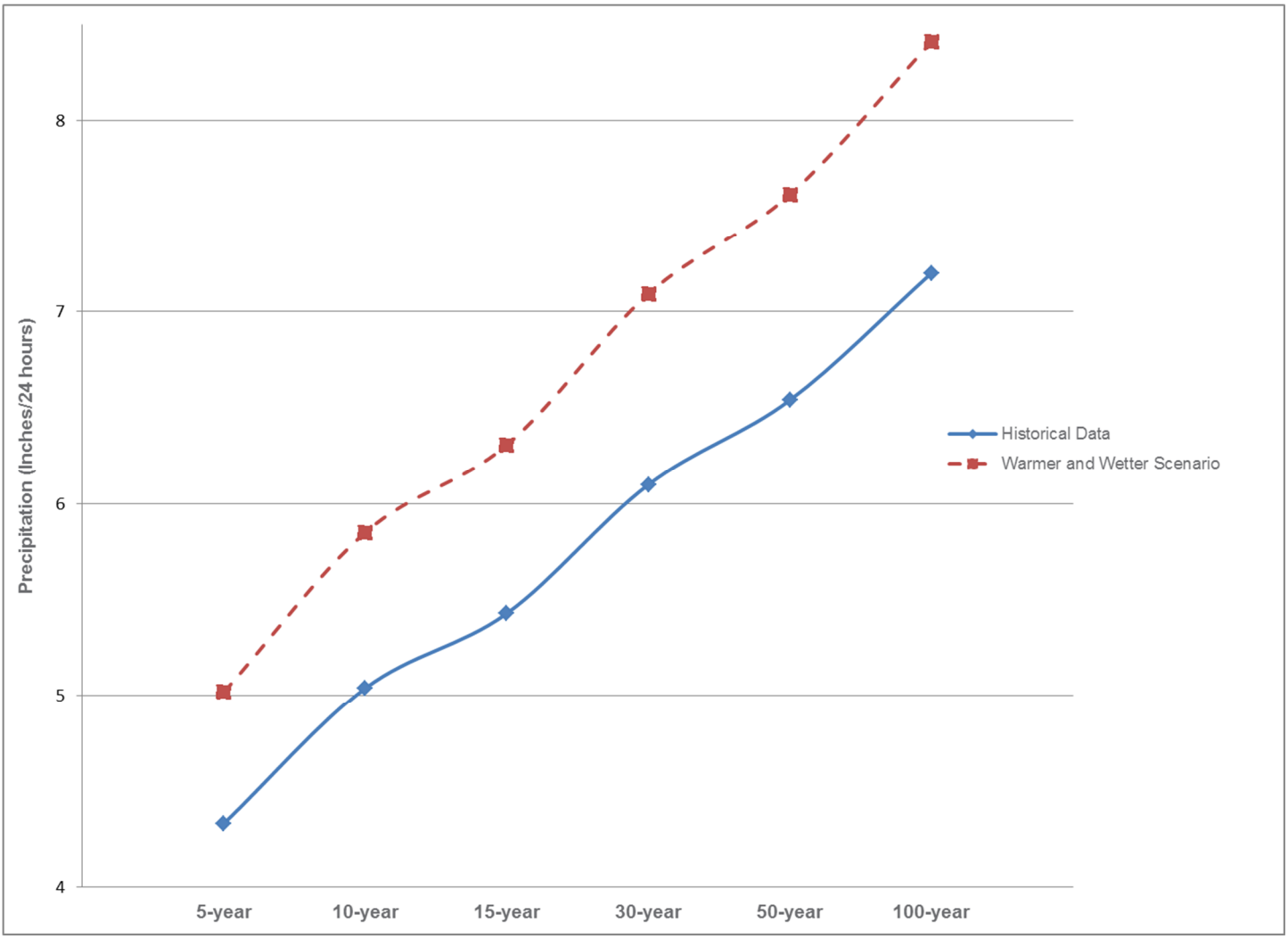
Historical and Projected Precipitation Data for Town of Hull

Historical and Projected Hot Day Data for the Town of Hull Climate Station

CLIMATE VARIABLE	HISTORICAL DATA – BASELINE SCENARIO (DAYS)	PROJECTED DATA – WARMER AND WETTER FUTURE CONDITIONS SCENARIO (DAYS)
DAYS OVER 100°F	0.02	1

Historical and Projected Intense Precipitation Data for the Town of Hull

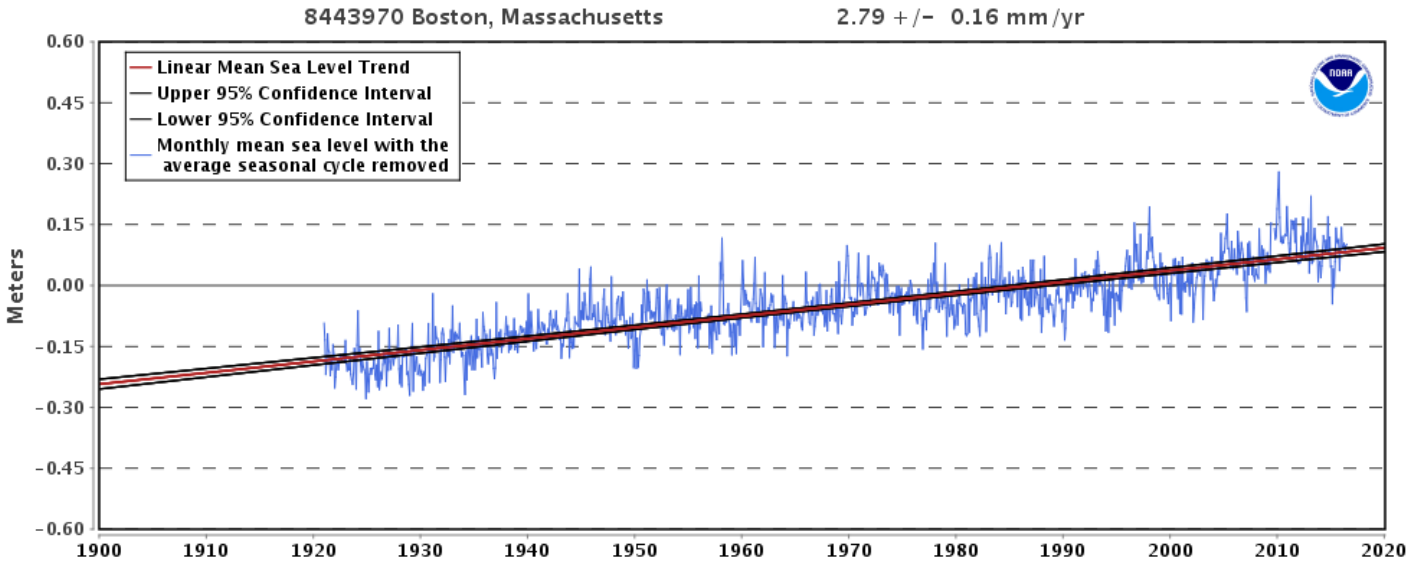
RETURN PERIOD	HISTORICAL DATA – BASELINE SCENARIO (INCHES PER 24 HOURS)	PROJECTED DATA – WARMER AND WETTER CONDITIONS SCENARIO (% CHANGE IN INCHES PER 24 HOURS)
5-YEAR	3.98	15.93
10-YEAR	4.53	16.09
15-YEAR	4.8	16.15
30-YEAR	5.31	16.28
50-YEAR	5.63	16.43
100-YEAR	6.1	16.77



Historical and Projected Intense Precipitation Data for Town of Hull

Historical Sea Level Rise Data

Historcal sea level trend data was obtained from NOAA for tide recording station number 8443970 at Boston, MA. The mean sea level trend is 2.79 millimeters/year (0.11 inches/year) with a 95% confidence interval of +/- 0.16 mm/year (0.006 inches/year) based on monthly mean sea level data from 1921 to 2015 which is equivalent to a change of 0.92 feet in 100 years. The following figure from NOAA shows the sea level rise trend.[13]



Mean Sea Level Trend at Tide Station 8443970 Boston, Massachusetts

[13] Access at https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=8443970.

APPENDIX G: FUNDING PLAN TOOL

COMMITMENT & INTEGRITY
DRIVE RESULTS

40 Shattuck Road | Suite 110
Andover, Massachusetts 01810
www.woodardcurran.com

T 866.702.6371
T 978.557.8150
F 978.557.7948

MEMORANDUM

TO: John Struzziery, P.E.
Director – Wastewater Operations

FROM: Toby Fedder, P.E. and Jessica Richard

DATE: June 7, 2017

RE: Draft Funding Plan Tool Memo
Town of Hull, MA Wastewater Utility

Introduction

This memo documents the functionality of the Funding Plan Development tool developed for the Town of Hull Wastewater Utility as part of the completion of the larger Asset Management Plan development. There are two primary functions of the tool:

1) The tool in intended to serve as a integrated tool whereby Hull can look at various Capital Investment Plan options and gain an informed understanding of the need for capital funding over the current capital planning period of FY2018-FY2027; and
2) The tool allows for the assessment of needed rate structures / rate increases over the planning period to inform the Town's decisions on timing and funding methods for the various projects within its wastewater Capital Improvement Plan.

Funding Tool Properties

The tool is broken up into several modules, all of which are powered by actual budgetary and billing records provided by the Town during the completion of this project. The various modules and the degree to which each can be modified is described in the following sections of this memo. As a note, many of the screen captures later in this memo are not legible due to scaling and are only intended to help Hull staff find the appropriate modules within the model once it have been loaded onto their computers.

Due to the ease of accidental changes to data, algorithms, and equations which power the tool (and the extreme difficulty in tracking down changes entered into the model), the tool has had the vast majority of the calculations and data search algorithms locked from alteration. The cells which remain open from locking are specifically cells to which additional data can be added in the future to ensure the planning tool and the funding plan guidance it provides remain updated with the Town's most recent data.

<u>Color coding</u>

To clarify which portions of the tool contain assumptions which will modify the calculations throughout the entire model, which cells can have data entered or modified and which cells have pull-down menus to drive the various search option, we have introduced a standardized color coding system for the modules. The properties of the various color-coded cells are outlined on the table on the following page.

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Standard color coding of cells within the Funding Plan Tool

COLOR	DESCRIPTION	CHANGE ?
	ORANGE CELLS ARE REFERENCE (LOOK LIKE YOU CAN CHANGE THEM - BUT DON'T)	NO
	PURPLE CELLS ARE ASSUMPTIONS WHICH WILL MODIFY ALL SHEETS ACCORDINGLY	YES
	GREEN CELLS OFFER CHECK BOXES WHICH DRIVE BOOLEAN LOGIC	YES
	BLUE CELLS PROVIDE PULL DOWN MENUS WHICH ALTER DATA ASSUMPTIONS	YES
	HATCHED CELLS ARE INPUT TABLES WHICH POWER MENUS AND LOGIC	NO
	YELLOW CELLS NEED DATA FOR SPECIFIC COMMUNITY	MUST

Interpretation of results

This tool should be used for planning purposes associated with ensuring that adequate funding is available in the amount and on the schedule necessary to support needed capital improvements and other upgrades identified through the use of the Town's Asset Management program. While there are projections of rates on several modules within this funding tool, these projections do not represent specific rate recommendations for any volumetric, monthly or fixed charges by Woodard & Curran. The values are shown only to help the Town understand the likely rate impacts associated with the funding plan indicated. The most critical of the results from the model are the Funding Plan Guidance tables and graphs included within the "CIP" module. These outputs will allow the Town to properly prepare for properly budgeting for both cash-financed and debt-financed capital improvement projects.

Statement of limitations

Woodard & Curran is not a Registered Municipal Financial Advisor, as defined in the Dodd-Frank Wall Street Reform and Consumer Protection Act and provides no services in that capacity. The projections included herein are made as the Town's engineering consultant only and Woodard & Curran provides no advice on the timing, terms, or other consideration for the issuance bonds or any other debt.

Funding Tool Modules

Modifiable Modules

To allow the Town to keep the funding plan as a "living" document, a number of data inputs within the modules have been left unlocked and can be modified as appropriate in the future. These cells will be one of three colors; yellow cells in instances which require a budgetary entry/modification, purple cells in instances which require escalation factors, interest rates or other economic considerations, and blue cells in instances where the available cell entries are provided via pull-down menu. Discussion of the modifiable portions in each module are provided below.

1. Preliminary

   The Preliminary module (shown in the screen capture below) outlines some of the system information and financial assumptions which power calculations throughout the remainder of the funding plan tool modules. Within the file provided, the modifiable cells are limited to the purple cells on the left and the yellow cells on the right hand side of the screen capture.

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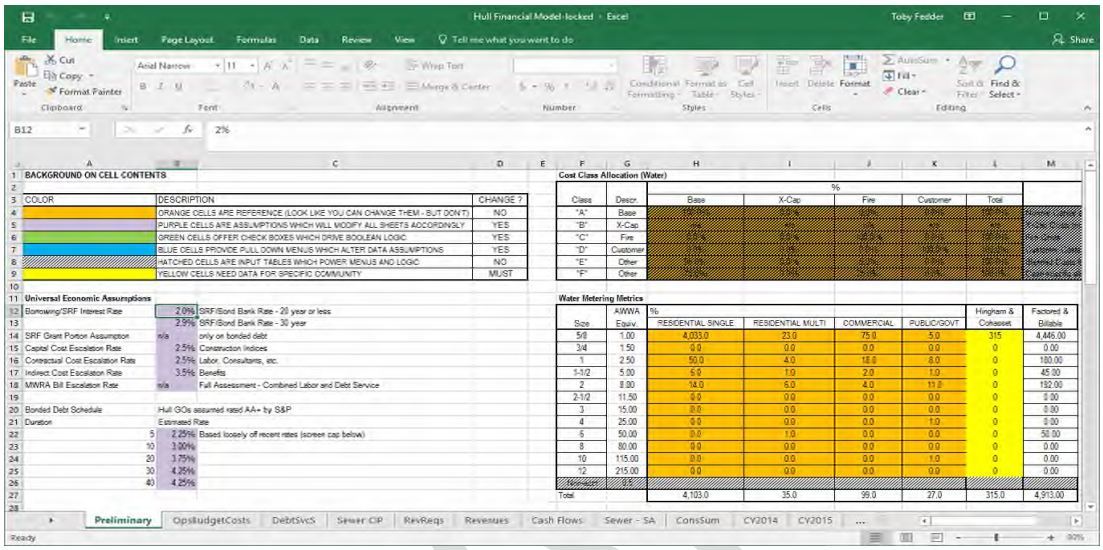
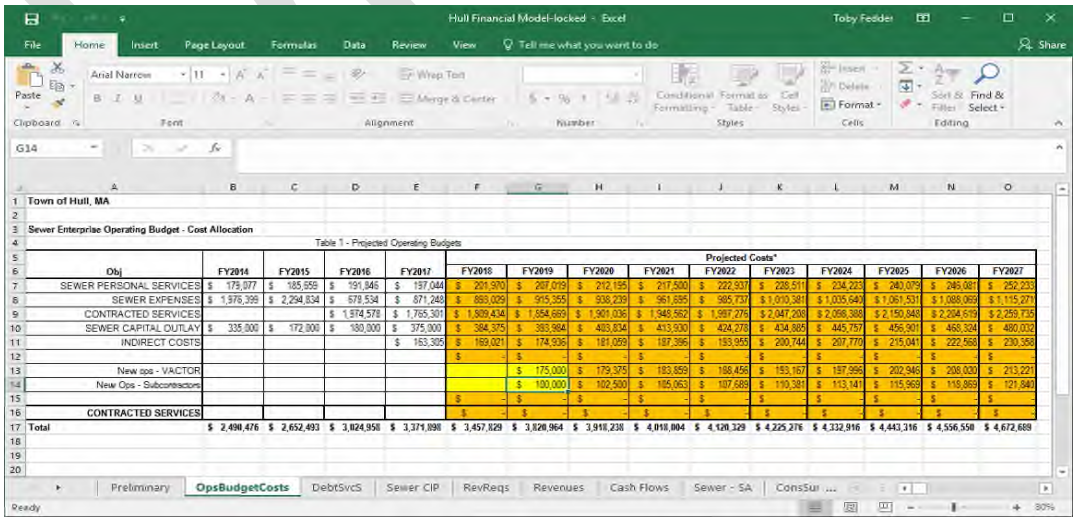
The purple files provides the economic assumptions on escalation rates, and debt financing rates for several debt issuance options. The yellow cells provide meter counts by connection size for Town resident customers and a bulk number of customers connected from Hingham and Cohasset. As some of the options for alternate rate structures have the ability to assess fixed monthly charges based upon connection size, these values should be updated as new customers or improved customer counts become available.



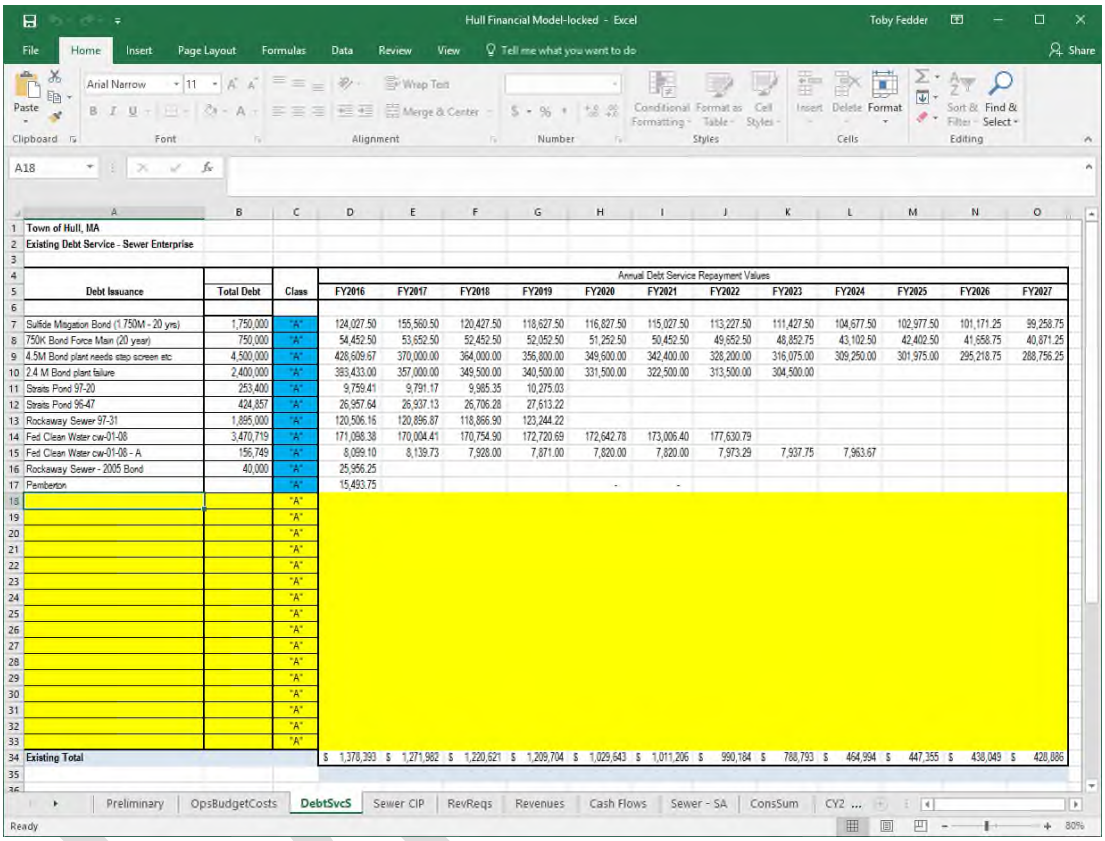
2. <u>Operational Costs</u>

Currently, the utility's operational costs are escalated using industry-standard escalation factors (see the "Preliminary" module) with the exception of new operational costs associated with operating a new VACTOR truck and hiring additional consultants for work within the collection system. As these costs were still under consideration at the time this project was completed we have left the amounts for FY2018 & FY2019 modifiable, after which these values escalate similarly to the other operational costs in the model.



3. Existing Debt Service Costs

The debt service module provides a location for the entry of bonded debt service payments into the funding tool. As shown in the screen capture, existing debt service obligations of the utility (as of 6/1/2017) are included and the cells in the bottom section of the module have been left unlocked. As new debt issuances occur, the actual repayment schedules from the Town's bond counsel should be entered into this module and any projects funded by that debt issuance should be removed from the "Sewer CIP" module.



Town of Hull, MA
Existing Debt Service - Sewer Enterprise

Debt Issuance	Total Debt	Class	Annual Debt Service Repayment Values											
			FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027
Sulfide Mitigation Bond (1.750M - 20 yrs)	1,750,000	"A"	124,027.50	155,560.50	120,427.50	118,627.50	116,827.50	115,027.50	113,227.50	111,427.50	104,677.50	102,977.50	101,171.25	99,258.75
750K Bond Force Main (20 year)	750,000	"A"	54,452.50	53,652.50	52,452.50	52,052.50	51,252.50	50,452.50	49,652.50	48,852.75	43,102.50	42,402.50	41,658.75	40,871.25
4.5M Bond plant needs step screen etc	4,500,000	"A"	428,609.67	370,000.00	364,000.00	356,800.00	349,600.00	342,400.00	328,200.00	316,075.00	309,250.00	301,975.00	295,218.75	288,756.25
2.4 M Bond plant failure	2,400,000	"A"	383,433.00	357,000.00	349,500.00	340,500.00	331,500.00	322,500.00	313,500.00	304,500.00				
Straits Pond 97-20	253,400	"A"	9,759.41	9,791.17	9,985.35	10,275.03								
Straits Pond 96-47	424,857	"A"	26,957.64	26,937.13	26,706.28	27,613.22								
Rocksway Sewer 97-31	1,895,000	"A"	120,506.16	120,896.87	118,866.90	123,244.22								
Fed Clean Water cw-01-08	3,470,719	"A"	171,098.38	170,004.41	170,754.90	172,720.69	172,642.78	173,006.40	177,630.79					
Fed Clean Water cw-01-08 - A	156,749	"A"	8,099.10	8,139.73	7,928.00	7,871.00	7,820.00	7,820.00	7,973.29	7,937.75	7,963.67			
Rocksway Sewer - 2005 Bond	40,000	"A"	25,956.25											
Pemberton		"A"	15,493.75				-	-						
		"A"												
		"A"												
		"A"												
		"A"												
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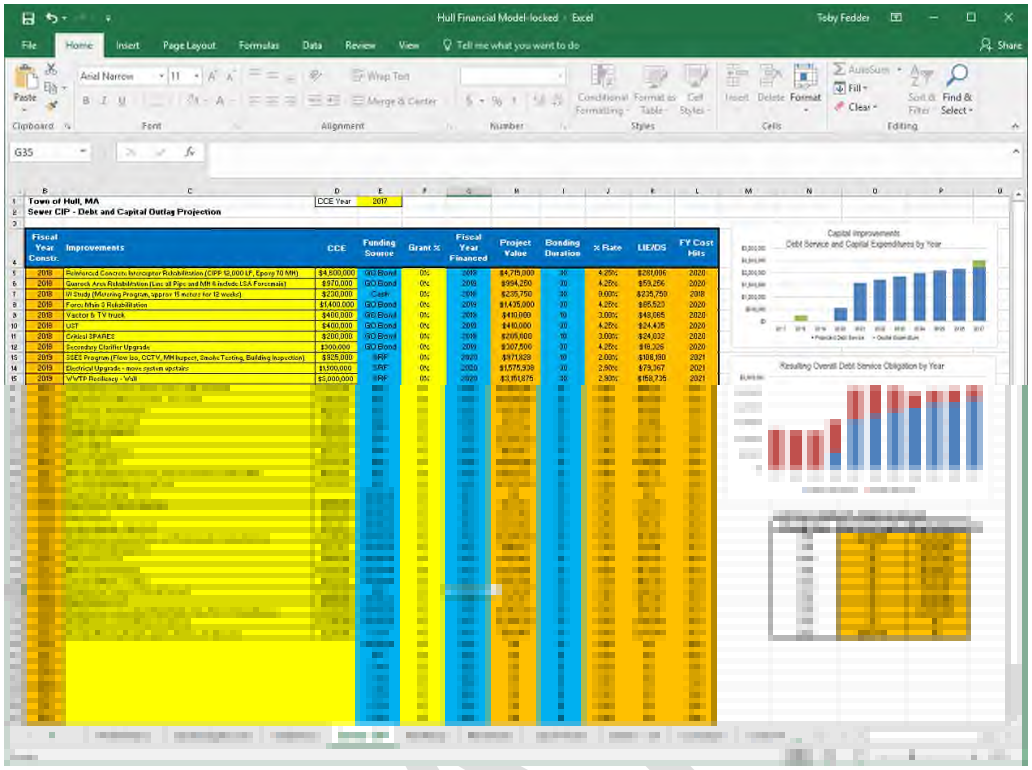
		"A"												
Existing Total			$ 1,378,393	$ 1,271,982	$ 1,220,621	$ 1,209,704	$ 1,029,643	$ 1,011,206	$ 990,184	$ 788,793	$ 464,994	$ 447,355	$ 438,049	$ 428,886

4. Sewer CIP Costs

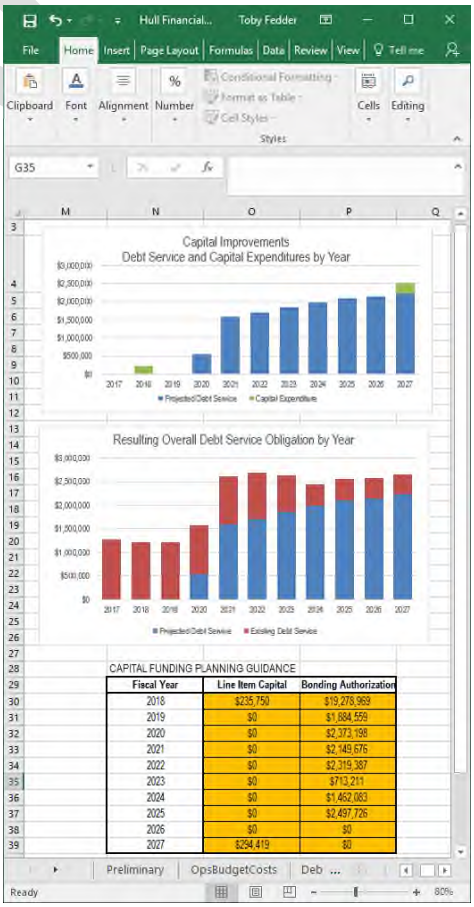
The Sewer CIP module provides a method of projecting the future cash flow implication of capital projects which are expected to be completed in the planning period. While the project list included in the module is developed to the extent possible as of the date of this memo, it is likely that some of the existing plan will need to be modified and additional projects may be added to the plan in the future. To accommodate this, the "Sewer CIP" retains a large percentage of unlocked cells.

Within the module (which is shown below), there are three column of yellow cells and three, blue pull-down menu columns, the data in which generates the Funding Plan which consists of the expected cash flows, debt service, and bond authorization schedule which will be required to support completion of the CIP laid out in the table.

As the CIP plan develops, the Town should be sure to align the Construction Cost Estimate Year at the top of the sheet to ensure capital costs escalation is calculated correctly.



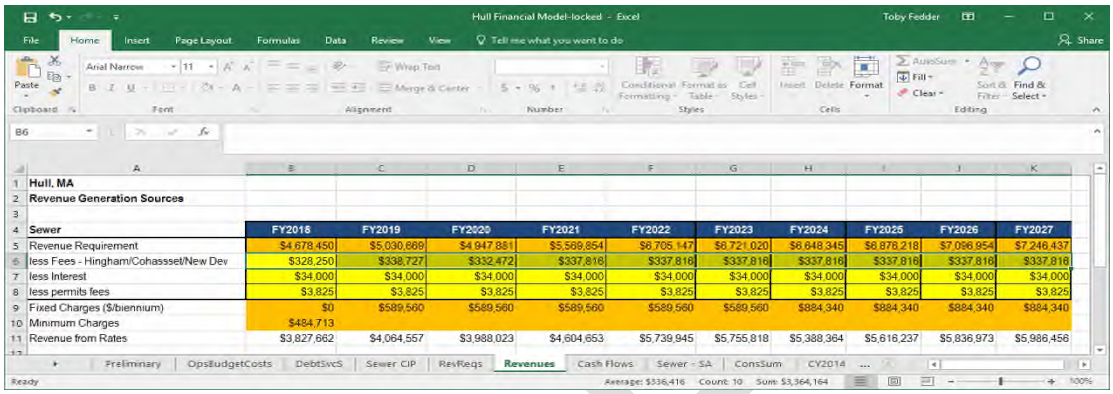
The figure to the right provides a close-up of the three primary outputs of the module; (1) a chart showing the line item appropriations and new debt service associated with the CIP list, (2) a chart showing the resulting overall debt service which the utility can expect based upon the CIP list, and (3) a "Capital Funding Planning Guidance" table laying out the line item appropriations and bonding authorizations which must occur in each fiscal cycle to support completion of the projects in the CIP list.



To provide context from the figure to the right, the chart at the bottom indicates that for the CIP list currently in the module, the Town should expect to appropriate $235,750 into the Sewer Enterprise funds operating budget to support cash funded items in the CIP list. Additionally, the same chart indicates that the Town needs to approve a bonding authorization for $19.28 Million to support construction projects which will begin in the following fiscal cycle. By keeping this module updated, the Town will always have a good guide available to ensure that cash and binding authorizations are approved on time to support the needed capital projects.

5. Revenues Module

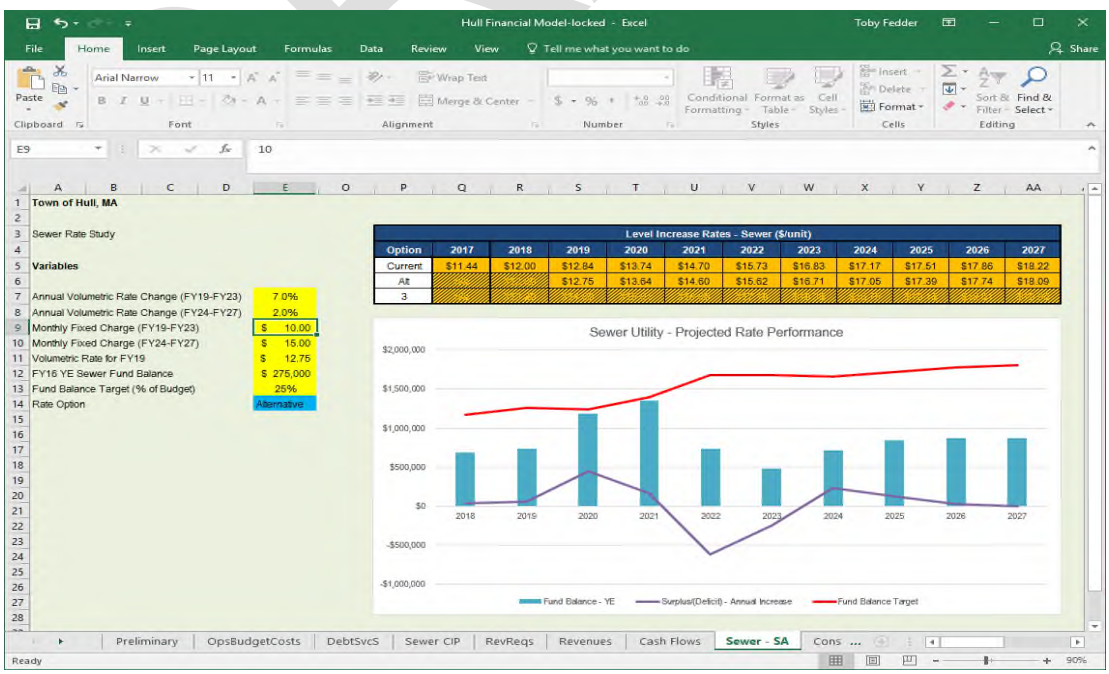
Within the Revenues module, three rows of inputs have been left unlocked. This is due to the fact that there is consideration of supporting an expansion of service areas leading to a potential increase in the revenues streams from the non-Hull customers. To ensure the financial projections in other portions of the model remain accurate, these figures should be updated over time as better information becomes available.



Hull, MA										
Revenue Generation Sources										
Sewer	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027
Revenue Requirement	$4,678,450	$5,030,669	$4,947,881	$5,569,854	$6,705,147	$6,721,020	$6,848,345	$6,878,218	$7,096,954	$7,246,437
less Fees - Hingham/Cohassset/New Dev	$328,250	$338,727	$332,472	$337,818	$337,818	$337,818	$337,818	$337,818	$337,818	$337,818
less Interest	$34,000	$34,000	$34,000	$34,000	$34,000	$34,000	$34,000	$34,000	$34,000	$34,000
less permits fees	$3,825	$3,825	$3,825	$3,825	$3,825	$3,825	$3,825	$3,825	$3,825	$3,825
Fixed Charges ($/biennium)	$0	$589,560	$589,560	$589,560	$589,560	$589,560	$884,340	$884,340	$884,340	$884,340
Minimum Charges	$484,713									
Revenue from Rates	$3,827,662	$4,064,557	$3,988,023	$4,604,653	$5,739,945	$5,755,818	$5,388,364	$5,818,237	$5,836,973	$5,986,458

6. Sewer – Rate Sensitivity Analysis

The final module which contains modifiable inputs is the Rate Sensitivity Analysis spreadsheet. This sheet makes projections of the sewer utility under varying fixed and volumetric charge increase combinations and is intended to help the Town understand the likely rate impacts which will be needed to support ongoing operations and investment on utility assets. As noted earlier in this memo, this module does not provide formal rate recommendations, it is a planning tool which projects the likely financial performance of the utility under various investment and rate scenarios. As with all other modules within the Funding Plan, this table auto-recalculates after changes are made to any cell entry.



Town of Hull, MA

Sewer Rate Study

Variables

Annual Volumetric Rate Change (FY19-FY23)	7.0%
Annual Volumetric Rate Change (FY24-FY27)	2.0%
Monthly Fixed Charge (FY19-FY23)	$ 10.00
Monthly Fixed Charge (FY24-FY27)	$ 15.00
Volumetric Rate for FY19	$ 12.75
FY16 YE Sewer Fund Balance	$ 275,000
Fund Balance Target (% of Budget)	25%
Rate Option	Alternative

Level Increase Rates - Sewer ($/unit)

Option	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Current	$11.44	$12.00	$12.84	$13.74	$14.70	$15.73	$16.83	$17.17	$17.51	$17.86	$18.22
Alt			$12.75	$13.64	$14.60	$15.62	$16.71	$17.05	$17.39	$17.74	$18.09
3											

Non-modifiable Modules

In addition to the modules which have entries which can be modified, the overall file has a number of other modules which were used in the completion of this project. Generally, these modules contain data that would never need to be changed, such as billed historical consumption data, historical budgetary data, the calculated annual revenue requirement of the utility over the projection period, etc.

As modification of the data within these modules has the potential to skew calculation made elsewhere within the Funding Plan, these have been fully locked.

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