



# **Sewer System Management Plan**

**Revised June 2017**

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Executive Director**



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## SYSTEM OVERVIEW

The Port of San Francisco (Port) is a public enterprise agency and department of the City and County of San Francisco. The Port is committed to promoting a balance of maritime, recreational, industrial, transportation, public access and commercial activities on a self-supporting basis through management and development of the waterfront for the benefit of the public. The Port is organized into seven divisions: Executive, Administration and Finance, Engineering, Maintenance, Maritime, Planning & Environment, Real Estate.

The service area of the Port wastewater collection system extends from Hyde Street Harbor along the San Francisco northeast waterfront south to Pier 98 along the San Francisco southern waterfront. This system is mostly comprised of individual, independent, and discreet collection subsystems, each serving an individual Pier building. In the southern waterfront a portion of the system serves multiple buildings, some of which are separated by public right of ways, The Port's sewer system is considered a satellite system to the larger City sewer system managed by the San Francisco Public Utilities Commission. The Port service area is 1.56 square miles and includes about 10 miles of sewer, which is comprised of about 7.5 miles of gravity lines and 2.5 miles of forced mains. The system includes 42 active pump stations. Average annual rainfall is about 23 inches from October to May. The majority of the collection system was built after 1960. The pipes are primarily cast iron. The average age of the collection system is 44 years.

The Port collection system is subject to the State Water Resources Control Board Order No. 2006-003-DWQ, and the Monitoring and Reporting Program Orders WQ 2008-002-EXEC and WQ-2013-0058-EXEC, collectively referred to as 'the Order'.

## NOTE ON FORMATTING

This SSMP is formatted to reflect the requirements as outlined in the Order. Each section name is set in 16 point upper case and bold Calibri font. The requirements are set in bold 12 point Calibri font, in italics and placed within lines. This is followed by the Port content of the SSMP in normal 12 point Calibri font and additional formatting as needed. See example below.

### [SECTION NAME]

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*[The text in this area summarizes the content requirements of each section, as described in the Order.]*

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[This text begins the content for this section of the SSMP.]



## GOALS

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***The goal of the SSMP is to provide a plan and schedule to properly manage, operate, and maintain all parts of the sanitary sewer system owned by the Permittee. This will help reduce and prevent sanitary sewer overflows (SSOs), as well as mitigate any SSOs that do occur.***

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This Sanitary Sewer Management Plan has been developed and is implemented with the intent of properly managing, operating, and maintaining all parts of the Port's sanitary sewer collection system. With this SSMP, this Port establishes the following goals:

- 1. Minimize the frequency of SSOs.**
- 2. Mitigate the impact of SSOs.**
- 3. Provide notifications and reports to all required regulatory agencies in a timely manner.**
- 4. Properly manage, operate, maintain, and improve the wastewater collection system.**
- 5. Provide adequate capacity to convey peak flows.**

The Port will use this SSMP to fund, manage, operate, and maintain all parts of the sanitary sewer system. This will include providing adequate training to staff, coordination of maintenance responsibilities with tenants, and adequate maintenance planning. This will help reduce and prevent SSOs, as well as mitigate any SSOs that do occur. It will also protect the public health, the health and safety of Port employees, and the aquatic environment.

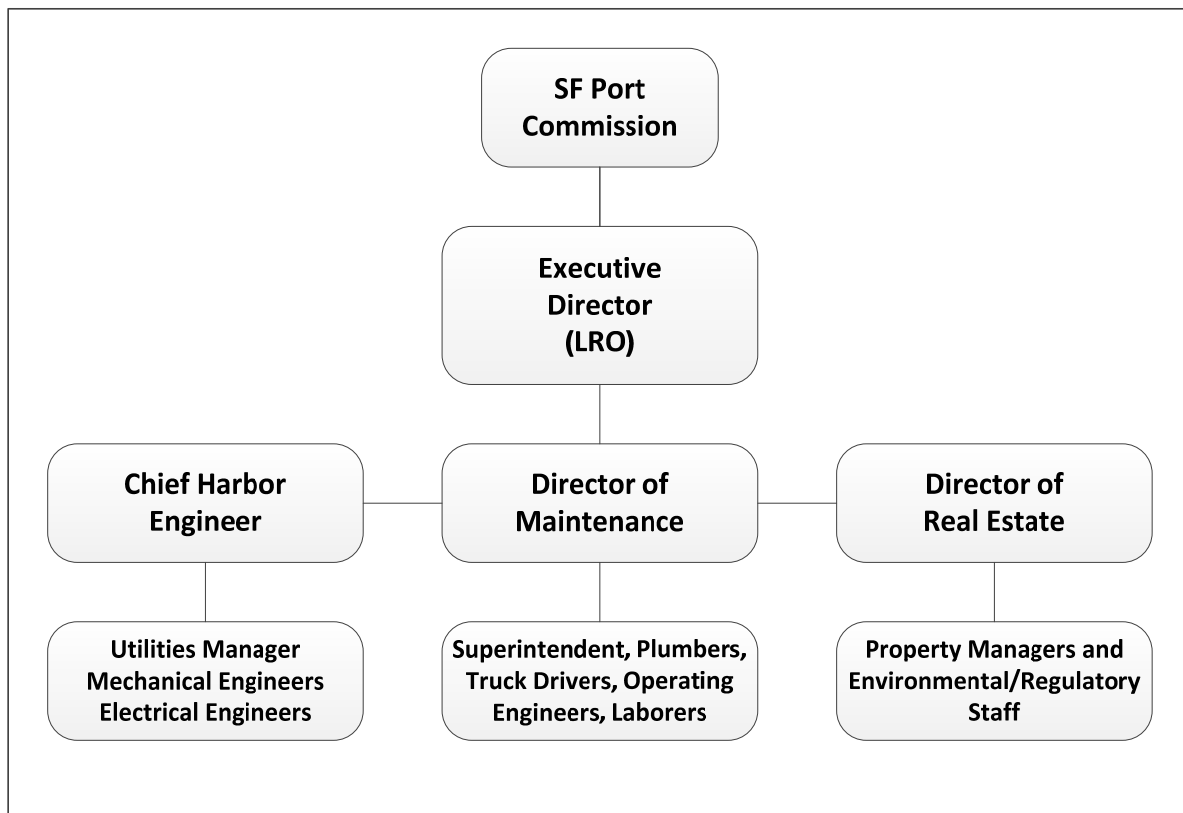


## ORGANIZATION

*The SSMP must identify:*

- a) The name of the responsible and authorized representative as described in Section J of Order No. 2006-0003-DWQ – Statewide General WDR for Wastewater Collection Agencies.*
- b) The names and telephone numbers for management, administrative and maintenance positions that are responsible for implementing specific measures in the SSMP program. The SSMP must identify lines of authority through an organization chart or similar document with a narrative explanation; and*
- c) The chain of communication for reporting SSOs, from receipt of a complaint or other information, including the person responsible for reporting SSOs to the State and Regional Water Board and other agencies, if applicable (such as County Health Officer, County Environmental Health Agency, Regional Water Quality Control Board, and/or State Office of Emergency Services (OES)).*

FIGURE 1: Organizational Structure





The Port of San Francisco is a public enterprise agency and department of the City and County of San Francisco committed to promoting a balance of maritime, recreational, industrial, transportation, public access and commercial activities on a self-supporting basis through management and development of the waterfront for the benefit of the public. The Port is organized into seven divisions which are responsible for real estate management, maritime operations, maintenance, engineering, planning and finance. The Port is responsible for the operation and maintenance of the wastewater collection system that serves the San Francisco Waterfront extending from Hyde Street Harbor along the San Francisco northeast waterfront south to Pier 98 along the San Francisco southern waterfront. The Port’s sewer system is considered a satellite system to the larger City sewer system managed by the San Francisco Public Utilities Commission. The Port’s SSMP organization structure is shown in Figure 1. The Port Executive Director is the responsible and authorized representative as identified on SWRCB Order No. 2006-0003-DWQ.

**FIGURE 2a: Port SSMP Staff**

POSITION	NAME	PHONE NUMBER	EMAIL
Port Executive Director	Elaine Forbes	(415) 274-0400	<a href="mailto:elaine.forbes@sfport.com">elaine.forbes@sfport.com</a>
Chief Harbor Engineer	Rod Iwashita	(415) 274-0570	<a href="mailto:rod.iwashita@sfport.com">rod.iwashita@sfport.com</a>
Principal Engineer	Uday Prasad	(415) 274-0541	<a href="mailto:uday.prasad@sfport.com">uday.prasad@sfport.com</a>
Utilities Manager	Vacant		
Mechanical Engineer	David Hu	(415) 274-0463	<a href="mailto:david.hu@sfport.com">david.hu@sfport.com</a>
Mechanical Engineer	Jose Herrera	(415) 274-0555	<a href="mailto:jose.herrera@sfport.com">jose.herrera@sfport.com</a>
Deputy Director - Maintenance	Tom Carter	(415) 597-7904	<a href="mailto:tom.carter@sfport.com">tom.carter@sfport.com</a>
Maintenance Superintendent	Oscar Wallace	(415) 597-7908	<a href="mailto:Oscar.wallace@sfport.com">Oscar.wallace@sfport.com</a>
Maintenance Supervisor	Alex Chong	(415) 819-4210	<a href="mailto:alex.chong@sfport.com">alex.chong@sfport.com</a>
Maintenance Planner	Patricia Marquez-Ramirez	(415) 357-3911	<a href="mailto:patricia.marquez-ramirez@sfport.com">patricia.marquez-ramirez@sfport.com</a>
Plumbing Supervisor	Dave Rauenbuehler	(415) 597-7918	<a href="mailto:dave.rauenbuehler@sfport.com">dave.rauenbuehler@sfport.com</a>
Plumbing Crew			
Truck Drivers			
Operating Engineers			
Laborers			
Utility Specialist	Richard Berman	(415) 274-0276	<a href="mailto:Richard.berman@sfport.com">Richard.berman@sfport.com</a>
Regulatory Specialist	Anna Wallace	(415) 274-0558	<a href="mailto:anna.wallace@sfport.com">anna.wallace@sfport.com</a>
Deputy Director – Real Estate	Michael Martin		<a href="mailto:Michael.martin@sfport.com">Michael.martin@sfport.com</a>
Asst. Deputy Director – RE	Mark Lozovoy	(415) 274-0575	<a href="mailto:mark.lozovoy@sfport.com">mark.lozovoy@sfport.com</a>



**FIGURE 2b: SF PUC Sewer Operations Staff**

<b>POSITION</b>	<b>NAME</b>	<b>PHONE NUMBER</b>	<b>EMAIL</b>
Sewer Operations	Mike Patolo	(415) 641-2305	
Sewer Operations	Kevin Roche	(415) 641-2348	
Sewer Operations	Brian Goe	(415) 238-1477	bgoe@sewater.org



## LEGAL AUTHORITY

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***The SSMP must demonstrate, through sanitary sewer system use ordinances, service agreements, or other legally binding procedures, that the Port possesses the necessary legal authority to:***

- a) Prevent illicit discharges into its sanitary sewer system;***
  - b) Require that sewers and connections be properly designed and constructed;***
  - c) Ensure access for maintenance, inspection, or repairs for portions of the lateral owned or maintained by the Public Agency;***
  - d) Limit the discharge of fats, oils, and grease and other debris that may cause blockages, and***
  - e) Enforce any violation of its sewer ordinances.***
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The Port's legal authority is comprised of several documents and codes that enable the City to protect its sewer system from harmful discharges and activities. Among the documents and codes used are the following:

- Port Regulatory – Port Building and Plumbing Codes
- CCSF Regulatory – Municipal Codes, DPW Design and Construction Standards
- State Regulatory – California Building and Plumbing Codes
- Other Regulatory – International Building Code and Uniform Plumbing Code





## OPERATION AND MAINTENANCE PROGRAM

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*The SSMP must include operation and maintenance elements as applicable.*

- a) Maintain an up-to-date map of the sanitary sewer system, showing all gravity line segments and manholes, pumping facilities, pressure pipes and valves, and applicable stormwater conveyance facilities;*
  - b) Describe routine preventive operation and maintenance activities by staff and contractors, including a system for scheduling regular maintenance and cleaning of the sanitary sewer system with more frequent cleaning and maintenance targeted at known problem areas. The Preventative Maintenance (PM) program should have a system to document scheduled and conducted activities, such as work orders;*
  - c) Develop a rehabilitation and replacement plan to identify and prioritize system deficiencies and implement short-term and long-term rehabilitation actions to address each deficiency. The program should include regular visual and TV inspections of manholes and sewer pipes, and a system for ranking the condition of sewer pipes and scheduling rehabilitation. Rehabilitation and replacement should focus on sewer pipes that are at risk of collapse or prone to more frequent blockages due to pipe defects. Finally, the rehabilitation and replacement plan should include a capital improvement plan that addresses proper management and protection of the infrastructure assets. The plan shall include a time schedule for implementing the short and long term plans plus a schedule for developing the funds needed for the capital improvement plan;*
  - d) Provide training on a regular basis for staff in sanitary sewer system operations and maintenance, and require contractors to be appropriately trained; and*
  - e) Provide equipment and replacement part inventories, including identification of critical replacement parts.*
-



## Collection System Sewer Maps

Port property is mapped with a geographic information system (GIS) that utilizes an Oracle spatial database. The data is software-neutral. The Engineering staff uses the Autodesk software, AutoCAD Map 3-D, while the Planning staff prefers the ESRI product Arc GIS.

Port staff updates these maps continuously. Data from projects and new developments are incorporated and when possible, data from paper maps are field verified or corrected. The system has the functionality to access all information related to sewer assets and to make printed maps as necessary. Older maps, including architectural, construction and engineering drawings are stored electronically on a central computer system for easy retrieval.

## Preventive Maintenance

### UNDER-PIER INSPECTIONS

The vast majority of the Port sewer collection system is comprised of gravity lines and force mains that run underneath piers and connect to adjoining pump stations. Most of the under-pier piping is cast iron. The Port Plumbing Code requires that the supporting hangers be stainless steel. The maintenance challenges correspond to the harshness of the under-pier environment and the difficulty of working overhead with cast iron pipe from a pitching boat. The two most common sources of failure are:

- Corrosion from San Francisco Bay water;
- Damage from floating debris.

In 2010, the Port of San Francisco commissioned a Condition Assessment of the under-pier utilities for all facilities. This work was completed in February 2011 and is the basis for a key feature of the current preventive maintenance program. There are three objectives of the program:

1. Ensure that the under pier utilities (water and sewer) are inspected annually;
2. Identify active leaks or highly vulnerable conditions (i.e., imminent failure); and
3. Take corrective action to stop leaks and prevent imminent failures which could result in an illegal discharge into San Francisco bay.

The Maintenance Division is responsible, and has the independent authority, for addressing any leaks or imminent failures detected during an inspection, except where a Port tenant has an obligation under the terms of its lease (see Tenant Notification, below). An imminent failure is considered to be a condition that will likely result within the next year, i.e., before the next annual inspection. All other conditions noted by the inspection team (i.e., not leaking, not at risk of imminent failure) will be recorded in an inspection report, and shared with other



divisions for appropriate follow-up (e.g., notify tenants, add to capital maintenance program for more extensive repairs and/or replacement).

The inspection team includes the Maintenance Planner, Superintendent and the Plumbers and each year they assemble to plan the annual inspections. Inspection opportunities are dependent upon the coincidence of favorable tides with the work day and sufficient daylight hours. Tide books are utilized to identify these windows of opportunity. The inspections observations are included for all wet-utilities underneath the piers, i.e., sewer gravity lines, sewer force mains, sump pump stations, and potable water lines. Details include condition, type of material, and urgency of repair if any. Inspection resources include the 'Under-Pier Observation Guide' and a sample inspection form [see Attachments 1-4].

### **ENTERPRISE ASSET MANAGEMENT SYSTEM (EAM)**

Inspection results are entered into the Port's Enterprise Asset Management system (Oracle EAM), which will be used to generate work orders (e.g., for immediate repairs), schedule additional preventive maintenance, and track and report on the overall condition of the Port's assets.

### **VIDEO INSPECTION**

The Port has a video camera that is used for sewer inspections. This technology is most effective with pipes that have a diameter of 6 inches or less. The Port is purchasing additional video equipment that will be more effective in pipes with larger diameters.

### **TENANT MAINTENANCE**

Pursuant to the terms and conditions of some leases, the Port requires the tenant to undertake regular maintenance and repair of the leased facility and its utility services. The Real Estate and Maritime Divisions are responsible for identifying and maintaining a list of tenants and the associated facilities where these terms and conditions are in effect. Property managers are responsible for notifying tenants of the results of the inspections, and of ensuring that problems are remedied. If necessary, invoke other terms and conditions to ensure corrective action is taken in a timely manner.

### **PUMP STATIONS**

The Port has 42 pump stations. By the end of the FY 17/18 all pump stations should be equipped with the monitoring and alarm features of a 'supervisory control and data acquisition' (SCADA) system. Key staff will carry mobile phones that are connected to the SCADA system to facilitate timely response to warnings and alarms.

- The capacity of the pump stations varies from 50 gallons per minute (gpm) to 1,500 gpm. The average is 190 gpm, the median is 190 gpm.



- The size of the sump at each pump station varies from 450 gallons to 11,500 gallons. The average is about 2,100 gallons, the median is 1,300 gallons.
- Each pump station has two pumps. These operate in lead-lag mode.
- Some of the pump stations have local visual and audio alarms that are triggered when a high-level threshold is reached.
- Ten pump stations are equipped with SCADA technology. By the end of FY 17/18, all pump stations should be equipped with SCADA systems.

## Rehabilitation and Replacement Plan

The recent focus of the Port's Rehabilitation and Replacement Plan has been the under-pier inspections, described above. This portion of the collection system is in the most hazardous area and these pipes are most at risk for damage and releases of wastewater. The Port has also initiated a more permanent solution, which is to re-route wastewater infrastructure above pier decks. Current examples include renovation projects at Pier 19 and 31. Work at each pier connects to a 12 inch sewer stub-out and the installation of a sewer standpipe which will service new runs of above-deck wastewater lines. This will eliminate the vulnerabilities inherent in under-pier infrastructure.

## Training

The Port does not operate a wastewater treatment plant and does not have traditional wastewater operators on staff. Several members of the plumbing staff are certified Backflow Testers with state of California. As a routine part of any field work, plumbers look for cross connections and illegal connections. The Port has three full-time building code inspectors who inspect new construction and repairs to ensure compliance with the standards set forth in the Building Code and approved permit.

## Equipment and Replacement Inventories

The Port utilizes several vehicles and equipment to maintain the sewer system. Among the vehicles and equipment in operation are:

- Vactor Truck
- Spare pumps for pump stations
- Hydro-jetter (x2)
- Various snakes (Spartan)
- Boat and truck with boom to launch (2<sup>nd</sup> boat on order)
- 4" and 6" duraplus pipe with dresslers and bands (60' in stock ea.)
- Water Meters



- Pipe (various sizes)
- Connectors (fittings, elbows, couplings, flanges, etc.)
- Video Camera (purchasing a second)

## DESIGN AND PERFORMANCE PROVISIONS

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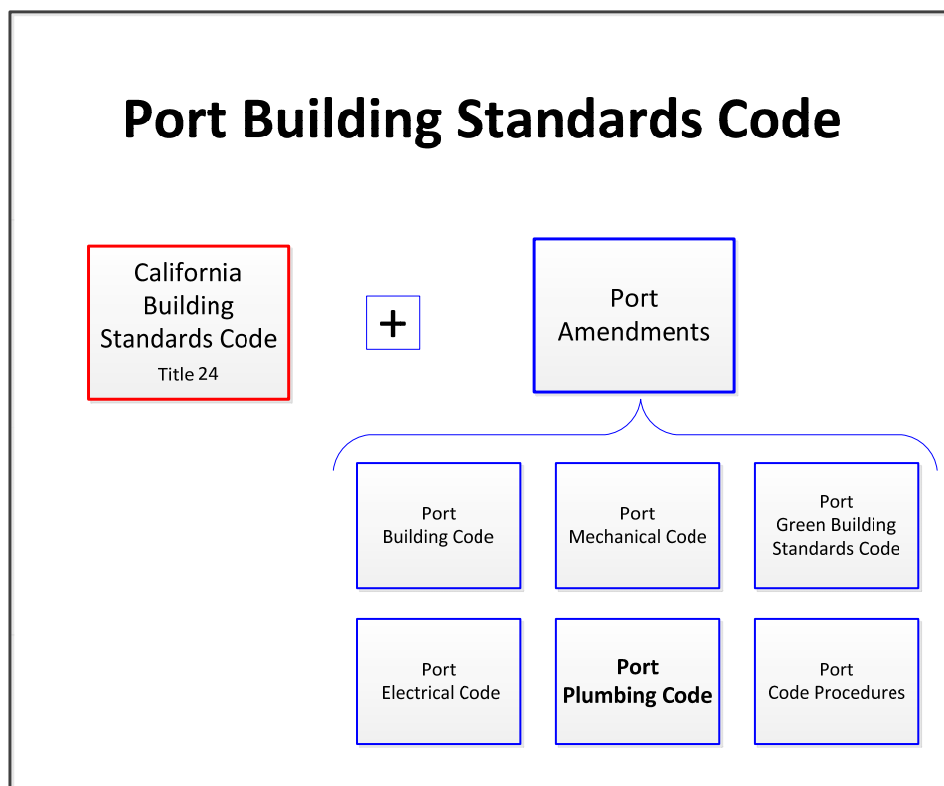
*The SSMP must maintain:*

- a) Design and construction standards and specifications for the installation of new sanitary sewer systems, pump stations and other appurtenances; and for the rehabilitation and repair of existing sanitary sewer systems; and*
  - b) Procedures and standards for inspecting and testing the installation of new sewers, pumps, and other appurtenances and for rehabilitation and repair projects.*
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### Design and Construction

The Port’s Engineering Division maintains its own Building Code that specifies sewer system installation and design standards.

**FIGURE 3: Port Building Code**



These codes apply to new installations, repairs, and replacements. They are available to the public on the Port website: <http://sfport.com/codes-guidelines-regulations>.



## Inspection and Testing

The Port has three full-time building code inspectors who inspect new construction and repairs to ensure compliance with the standards set forth in the Building Code and approved permit. The Port Maintenance Division includes a crew of six journey level plumbers and one plumber supervisor who are specifically trained on the Port's wastewater collection system such as under-pier piping. The Port does not operate a wastewater treatment plant and does not have traditional operators on staff.



## OVERFLOW EMERGENCY RESPONSE PLAN – CONTINGENCY PLAN

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The SSMP will guide staff to account for the following:

- a) Proper notification procedures to the primary responders and regulatory agencies are informed of all SSOs in a timely manner*
  - b) A program to ensure an appropriate response to all overflows*
  - c) Procedures to ensure prompt notification to appropriate regulatory agencies and other potentially affected entities (e.g., health agencies, Regional Water Board, water suppliers, etc.) of all SSOs that potentially affect public health or reach the waters of the State in accordance with the Monitoring and Reporting Program. All SSOs shall be reported in accordance with this MRP, the California Water Code, other State Law, and other applicable Regional Water Board WDRs or NPDES permit requirements. The SSMP should identify the officials who will receive immediate notification;*
  - d) Procedures to ensure that appropriate staff and contractor personnel are aware of and follow the Emergency Response Plan and are appropriately trained;*
  - e) Procedures to address emergency operations, such as traffic and crowd control and other necessary response activities; and*
  - f) A program to ensure that all reasonable steps are taken to contain and prevent the discharge of untreated and partially treated wastewater to waters of the United States and to minimize or correct any adverse impact on the environment resulting from the SSOs, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the discharge.*
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This section of the SSMP provides an overview and summary of the Port's emergency response documents and procedures for sewer overflows. This section fulfills the Overflow Emergency Response Plan requirement of both the RWQCB and the SWRCB SSMP requirements. The most common cause of sanitary sewer overflows (SSOs) at the Port is damage to under-pier piping. There have been few SSOs related to FOG.





## Receiving a Call / Recording Essential Information

*(Administration/Real Estate)*

Reports of a possible SSO by non-Port staff are usually received at the Main Desk or by the property manager for the property. Calls to the front desk after hours are answered by the Marine Exchange of the San Francisco Bay Region. The Marine Exchange is a non-profit membership organization that supports marine transportation in the Bay Area.

**FIGURE 4: Receiving Reports of SSOs**

CALLER	RECEIVING CONTACT	BUSINESS HOURS PHONE	AFTER HOURS PHONE
Tenant	Property Manager (PM) OR Main Desk	Varies by PM <b>(415) 274-0400</b>	Varies by PM <b>(415) 274-0400</b>
General Public	Main Desk	<b>(415) 274-0400</b>	<b>(415) 274-0400</b>

## Responding to a Service Call

*(Real Estate, Maintenance, Environmental)*

Once a report is received by Port staff, it is disseminated to three key staff persons: Maintenance Superintendent, Property Manager (PM), Environmental Staff. This team will assess the report and determine the best strategy. The primary goal is to stop the discharge safely.

### **REAL ESTATE**

Port Property is managed as a series of real estate portfolios, each with a dedicated property manager. The Port has more than 500 tenants, which vary considerably in type and location. With some leases the Port assigns maintenance responsibilities to the tenant. Upon receiving a report of a possible SSO, the Property Manager will refer to the appropriate lease to determine if the tenant is responsible for the waste water utilities or if it is the responsibility of the Port's Maintenance Division.

### **MAINTENANCE**

When the maintenance superintendent receives a report of a possible SSO, he will notify the plumbing supervisor. Together they will review the report and make recommendations about how to proceed. If SF PUC infrastructure is involved, they will contact the SF PUC Sewer Operations Team.



## ENVIRONMENTAL

Environmental staff is responsible for notifying other regulatory agencies, but may also help to coordinate with tenants and the SF PUC. When environmental staff receives a report of a possible SSO, they will create a record in the Port Incident Tracking Database (Attachment 5). They will track the development of the incident and report to regulatory agencies as required.

**FIGURE 5: SSO - Categories**

CATEGORY	DEFINITION
1	Discharges of untreated or partially treated wastewater of <b>any volume</b> resulting from the failure of the Port's sanitary sewer system that: <ul style="list-style-type: none"> <li>Reach surface water and/or reach a drainage channel tributary to a surface water; or</li> <li>Reach a MS4 and are not fully captured and returned to the sewer system or not otherwise captured and disposed of properly.</li> </ul>
2	Discharges of untreated or partially treated wastewater of <b>1,000 gallons or greater</b> resulting from the failure of the Port's sanitary sewer system, and that <b>do not</b> reach surface water, a drainage channel or MS4, unless the entire discharged volume is recovered and disposed of properly.
3	All other discharges of untreated or partially treated wastewater resulting from the failure of the Port's sanitary sewer system.

**FIGURE 6: SSO – Notifications, Reporting, Monitoring**

SSO TYPE	REQUIREMENT	METHOD
<ul style="list-style-type: none"> <li>Category 1</li> <li>Any Size</li> <li>Any Location</li> </ul>	<ol style="list-style-type: none"> <li>1. <b>Submit draft report</b> within 3 business days of becoming aware of the SSO;</li> <li>2. <b>Certify</b> within 15 calendar days of SSO End Date.</li> </ol>	CIWQS Online SSO Database
<ul style="list-style-type: none"> <li>Category 1</li> <li>≥ 1,000 gal</li> <li>Surface Water</li> </ul>	<ol style="list-style-type: none"> <li>1. <b>Notify OES</b> within 2 hrs. of awareness of probability of discharge to surface;</li> <li>2. <b>Submit draft report</b> within 3 business days of becoming aware of the SSO</li> <li>3. <b>Certify</b> within 15 calendar days of SSO End Date</li> </ol>	OES (800) 852-7550  CIWQS Online SSO Database
<ul style="list-style-type: none"> <li>Category 1</li> <li>≥ 50,000 gal</li> <li>Any Location</li> </ul>	<ol style="list-style-type: none"> <li>1. <b>Notify OES</b> within 2 hrs. of awareness of probability of discharge to surface;</li> <li>2. <b>Submit draft report</b> within 3 business days of becoming aware of the SSO;</li> <li>3. <b>Certify</b> within 15 calendar days of SSO End Date;</li> <li>4. <b>Submit Technical Report</b> within 45 calendar days of the end of the month;</li> <li>5. <b>Conduct water quality sampling</b> within 48 hours after SSO notification.</li> </ol>	OES (800) 852-7550  CIWQS Online SSO Database
<ul style="list-style-type: none"> <li>Category 2</li> <li>Any Size</li> <li>Any Location</li> </ul>	<ol style="list-style-type: none"> <li>1. <b>Submit draft report</b> within 3 business days of becoming aware of the SSO;</li> <li>2. <b>Certify</b> within 15 calendar days of SSO End Date</li> </ol>	CIWQS Online SSO Database
<ul style="list-style-type: none"> <li>Category 3</li> <li>Any Size</li> <li>Any Location</li> </ul>	<ol style="list-style-type: none"> <li>1. <b>Submit certified report</b> within 30 calendar days of the end of the month in which the SSO occurred;</li> </ol>	CIWQS Online SSO Database



## Overflow Response – Quick Reference

*(Maintenance, Real Estate, Environmental)*

### **STOP THE DISCHARGE**

The immediate goals of the response team are:

- Stop the discharge as soon as safely possible;
- Maintain safety of Port staff and the public;

#### Under-Pier SSO

If the SSO originates under a pier structure, use the following strategies to stop the discharge:

- Identify contributing sources and discontinue use;
- Turn off the water;
- Order portable toilets for tenants

#### Street Catch Basin or Manhole

If the SSO originates in the street or a manhole, use the following strategies to stop the discharge:

- Relieve the stoppage;
- Identify contributing sources and discontinue use;
- Turn off the water;
- Prevent flow to drainage channel tributary to a surface water.

#### SF PUC Infrastructure

If the SSO involves SF PUC infrastructure that requires SF PUC resources, call the SF PUC Sewer Operations Team (see Figure 2b).

If the cause of the problem is believed to be from sewer lines owned by the SF PUC, then Port staff will contact SF PUC – Sewer Operations staff to request the dispatch of a team to investigate.

### **SPILL CONTAINMENT / RECOVERY**

When at all possible, contain the spill for recovery.

#### Under-Pier SSO

If the SSO originates under a pier structure, then the spill will be directly to the bay. Make a visual assessment to determine whether the spill is recoverable using boom and absorbent materials.



### Street Catch Basin or Manhole

If the SSO originates in the street or a manhole, use the following strategies to stop contain and recover the spill:

- Protect storm drains with sand bags, plugs, covers, etc.
- Divert the spill with small dams or berms using sand bags or other resources;
- Allow spill to collect in naturally low areas and recover when time allows;
- Use vector truck to remove spilled material

### **CLEAN UP / DISINFECTION**

Ensure that residual material is removed and area is safe.

- Flush the area with potable water;
- Use small amounts of bleach, if necessary;
- Recover sewage and wash water with a vector truck and return to the sanitary sewer.

### **SIGN POSTING / BARRICADING**

Where contamination is significant in areas that are accessible to the public, the Port will take steps to protect public health.

- Block off the area with yellow caution tape or barricades;
- Post signs indicating a warning or a spill;
- Do not remove barriers or signs until the risk to the public has been mitigated. If samples have been taken, await lab results before removing barriers and signs.

### **SAMPLING / LAB TESTS**

In addition to Port environmental staff and a Port Senior Industrial Hygienist, the Port maintains several as-needed environmental consulting contracts. These contracts effectively allow the Port to expand its skill set and expertise. Sampling and laboratory resources are always available.



## FOG CONTROL PLAN (Fats, Oils, and Grease)

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Each Enrollee shall evaluate its service area to determine whether a FOG control program is needed. If an Enrollee determines that a FOG program is not needed, the Enrollee must provide justification for why it is not needed. If FOG is found to be a problem, the Enrollee must prepare and implement a FOG source control program to reduce the amount of these substances discharged to the sanitary sewer system. This plan shall include the following as appropriate:

- a) An implementation plan and schedule for a public education outreach program that promotes proper disposal of FOG;*
- b) A plan and schedule for the disposal of FOG generated within the sanitary sewer system service area. This may include a list of acceptable disposal facilities and/or additional facilities needed to adequately dispose of FOG generated within a sanitary sewer system service area;*
- c) The legal authority to prohibit discharges to the system and identify measures to prevent SSOs and blockages caused by FOG;*
- d) Requirements to install grease removal devices (such as traps or interceptors), design standards for the removal devices, maintenance requirements, BMP requirements, record keeping and reporting requirements;*
- e) Authority to inspect grease producing facilities, enforcement authorities, and whether the Enrollee has sufficient staff to inspect and enforce the FOG ordinance;*
- f) An identification of sanitary sewer system sections subject to FOG blockages and establishment of a cleaning maintenance schedule for each section; and*
- g) Development and implementation of source control measures for all sources of FOG discharged to the sanitary sewer system for each section identified in (f) above.*

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The Port partners with the San Francisco Public Utilities Commission (SF PUC) Wastewater Enterprise to implement the FOG source control program. All food service establishments at the Port are subject to the City's Fog Control Ordinance that was adopted in 2011.

When a building permit application includes sinks as part of a food service establishment, Port staff will forward this to the SF PUC for review. Port approval of such a building permit is contingent upon SF PUC confirmation of compliance with the FOG ordinance.



Once the building permit is issued, SF PUC staff implements the program (see the following link) <http://www.sfwater.org/index.aspx?page=480>. This includes regular inspections of restaurants and other businesses to ensure that grease traps, interceptors, and other pre-treatment are working properly. SF PUC also provides public education and support. In 2007 the SF PUC launched SFGreasecycle, a citywide effort that diverts FOG away from the sewers and turns it into biofuel. SF PUC collects used cooking oil from City restaurants for FREE and recycles it into biodiesel ([www.sfgreasecycle.org](http://www.sfgreasecycle.org)).

The Port owns a vactor truck and cleans sewers to eliminate FOG before it causes an SSO. Staff will modify these sewer cleaning schedules as necessary. Port staff also works with SF PUC sewer operations staff to ensure that sewer lines are maintained. Port staff supports SF PUC staff during enforcement of the FOG ordinance on Port property.



## SYSTEM EVALUATION AND CAPACITY ASSURANCE PLAN

---

The Enrollee shall prepare and implement a capital improvement plan (CIP) that will provide hydraulic capacity of key sanitary sewer system elements for dry weather peak flow conditions, as well as the appropriate design storm or wet weather event. At a minimum, the plan must include:

- a) Evaluation: Actions needed to evaluate those portions of the sanitary sewer system that are experiencing or contributing to an SSO discharge caused by hydraulic deficiency. The evaluation must provide estimates of peak flows (including flows from SSOs that escape from the system) associated with conditions similar to those causing overflow events, estimates of the capacity of key system components, hydraulic deficiencies (including components of the system with limiting capacity) and the major sources that contribute to the peak flows associated with overflow events;*
  - b) Design Criteria: Where design criteria do not exist or are deficient, undertake the evaluation identified in (a) above to establish appropriate design criteria; and*
  - c) Capacity Enhancement Measures: The steps needed to establish a short- and long-term CIP to address identified hydraulic deficiencies, including prioritization, alternatives analysis, and schedules. The CIP may include increases in pipe size, I/I reduction programs, increases and redundancy in pumping capacity, and storage facilities. The CIP shall include an implementation schedule and shall identify sources of funding.*
  - d) Schedule: The Enrollee shall develop a schedule of completion dates for all portions of the capital improvement program developed in (a)-(c) above. This schedule shall be reviewed and updated consistent with the SSMP review and update requirements as described in Section D. 14.*
- 

The Port's system evaluation is currently determined through three activities: building permits, maintenance annual inspections, and maintenance service calls. Building permit applications require the engineering staff to review capacity and performance when proposed improvements are made. Annual inspections and maintenance service calls provide field assessment data on the system performance and capacity. With the installation of the SCADA monitoring system, the Port will have an additional evaluation tool. These will be supplemented by an annual strategic meeting with staff from engineering, maintenance and environmental to identify facilities that might present a hydraulic deficiency and a risk of an SSO.



The Port plans and funds capital projects on a two year cycle. Through this process the Port funds sewer improvement projects. These projects are tracked in a database that includes staff assignments and regulatory entitlements, as well as capital schedules and budgets.

**FIGURE 7a: Annual Maintenance Projects – Operating Budget**

<b>PROJECT NAME</b>	<b>Average Annual Expenditures</b>	<b>Project Expenditures</b>
<b>Sewer Repairs/Preventative Maintenance</b>	\$560,000	
<b>Pier 50 Restroom</b>		\$90,151
<b>Pier 40 Docks</b>		\$43,079
<b>Hyde St. Harbor Pump-Out</b>		\$104,954

**FIGURE 7b: Capital Project – Capital Budget**

<b>PROJECT NAME</b>	<b>CURRENT BUDGET</b>	<b>EXPENDITURES TO DATE</b>
Amador Street Sewer Main Improvement	\$4,414,000	\$862,763
Pier 49/Wharf J1 Sewer Line Replacement	\$1,206,674	\$1,206,674
Pier 80 Sewer Upgrades	\$1,200,000	\$162,174
Pier 23 Public Restroom w/Sewer Wye	\$280,000	\$1,054
Restrooms For Port Tenants	\$879,000	\$180,090
Public Restrooms	\$1,157,500	\$337,510
Pier 7 ½ Under-Pier Sewer Replacement	\$400,000	\$10,962
Programmable Logic Controls Sump Pumps	\$500,000	\$160,921
<b>TOTAL</b>	<b>\$10,037,174</b>	<b>\$2,922,148</b>





## MONITORING, MEASUREMENT, AND PROGRAM MODIFICATIONS

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The Enrollee shall:

- a) Maintain relevant information that can be used to establish and prioritize appropriate SSMP activities;*
  - b) Monitor the implementation and, where appropriate, measure the effectiveness of each element of the SSMP;*
  - c) Assess the success of the preventative maintenance program;*
  - d) Update program elements, as appropriate, based on monitoring or performance evaluations; and*
  - e) Identify and illustrate SSO trends, including: frequency, location, and volume.*
- 

### Maintain Information

To monitor the effectiveness of the SSMP, the Port maintains detailed records of the sewer system and its maintenance. The Port's Enterprise Asset Management (EAM) database tracks the Port's physical assets including components of the sewer collection system. EAM records include repair, labor, parts, preventative maintenance program, and costs to maintain the system in working order. The Port's Enterprise Geographic Information System (GIS) includes several utility layers that comprise sewer collection system. The Port's Incident Tracking Database registers a variety of environmental incidents at the Port; these include sanitary sewer overflows (SSOs).

### Information To Prioritize SSMP Activities

These systems facilitate the process by which each element of the SSMP is measured for its effectiveness. The Port can identify patterns that inform decisions about how and where to deploy its resources. Port staff continuously works to improve the reporting capability from these systems and the incorporation of this information into the workflow.

### Assessment of Preventive Maintenance Program

As outlined in the Operations and Maintenance Program Element, the preventive maintenance program is critical to ensure the effectiveness of the SSMP. Data can be used to assess the program and make adjustments. Portions of this data are reviewed annually, but will also be used in conjunction with the biannual program audit, described in the subsequent program element. Recent analysis indicates the Port's preventive inspection and maintenance of under-pier utilities reduced the annual number of sanitary sewer overflows from a high of nineteen (19) incidents in FY12/13 to two (2) in FY 15/16.



## Program Element Updates

The Port will update the program elements to reflect changes in personnel, regulations, development, and other factors. Changes will also be implemented to improve deficiencies and to build on strengths. These improvements will be reflected in the program audit.

## SSO Trends

Port staff reviews and analyzes data to identify changes and trends in SSOs. There has been a recent decline in the number of SSOs at the Port that is attributable to three factors. Recent analysis indicates the Port's preventive inspection and maintenance of under-pier utilities reduced the annual number of sanitary sewer overflows from a high of nineteen (19) incidents in FY12/13 to two (2) in FY 15/16. Additional reductions are attributable to the 2015 closure of the restaurant, Sinbad's, at Pier 2. Sinbad's had been a tenant for many years, and in recent years its failure to maintain its infrastructure had resulted in several SSOs. Finally, the Port completed a capital rehabilitation project of all the wastewater laterals and main lines that serve several restaurants on Taylor Street.

## Enhanced Monitoring for TMDL Bacteria

Several public beaches in the Bay Area have been identified as impaired for fecal indicator bacteria (FIB), based on exceedances of water quality objectives for water contact recreation beneficial use. To protect the health of those engaging in water contact recreational at beaches, the San Francisco Regional Water Quality Control Board (Water Board) adopted Resolution No. R2-2016-0021, which amended the San Francisco Bay Beaches Bacteria total maximum daily load (TMDL) in the San Francisco Bay Basin Water Quality Control Plan (Basin Plan). The TMDL was approved by the State Water Resources Control Board and the United States Environmental Protection Agency (EPA) in February of 2017. This amendment requires municipalities that have jurisdiction over areas within ¼ a mile from an impaired beach to submit to the Water Board an Enhanced SSMP and Illicit Connection Protocol by August 2017 (See Attachment 7). The purpose of this document is to provide guidance for prioritizing sewer inspections and repairs, and correcting illicit sanitary sewer connections to storm drains.

Aquatic Park, a beach and cove in San Francisco, has been identified as impaired with FIB. Most of Aquatic Park is under the jurisdiction of the San Francisco Public Utilities Commission (SFPUC), however the Port has authority over the north-east corner.

In accordance with the TMDL Bacteria Basin Plan Amendment, in August of 2022, the Port will determine the effectiveness of implementing the Enhanced SSMP and Illicit Connection Protocol. The beach monitoring data collected by the SFPUC at Aquatic Park will be assessed to determine if targets are met. If targets have not been met, then Port staff will determine if further actions are needed. These actions, along with a supplemental monitoring plan, will be summarized in reports submitted to the water board in February of 2023.



## SSMP PROGRAM AUDITS

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***The Enrollee shall conduct periodic internal audits, appropriate to the size of the system and the number of SSOs. At a minimum, these audits must occur every two years and a report must be prepared and kept on file. This audit shall focus on evaluating the effectiveness of the SSMP and the Enrollee's compliance with the SSMP requirements identified in this subsection (D.13), including identification of any deficiencies in the SSMP and steps to correct them.***

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The Port will conduct regular audits that focus on compliance with the SSMP requirements (see Attachment 8). A written summary will be prepared and kept on file. The audits shall include review of analytic data to identify areas that need improvement. Specifically, the Port will examine the performance targets in the SSMP to determine whether they are sufficient to fulfill the provisions and prohibitions of the waste discharge requirements (WDRs).

At a minimum, the Port shall review the program elements once every two years during the program audit. To facilitate adequate capital investment in the sanitary sewer infrastructure the audits schedule has been prepared to coincide with the Port's capital budget process (see Figure 8). The Port uses a two-year capital budget cycle to solicit and prioritize capital projects, and to allocate funds. The fiscal year runs from July 1 through June 30. The project solicitation process usually begins during the first or second quarter (summer to early fall) in the second year of the capital budget cycle. The audits are scheduled for the fourth quarter (spring) of the first year of the capital budget cycle. This will enable staff to complete the audit, identify areas that require capital investment and to define capital projects for submittal.



**Figure 8: Schedule for SSMP Audits and Capital Budget Process**

Fiscal Year	Fiscal Year Quarter	2 Year Capital Budget	Capital Project Solicitation	SSMP AUDIT	SSMP UPDATE / RECERTIFICATION
FY 17/18	1st	Year 2	Project solicitations		UPDATE / RECERTIFICATION
	2nd				
	3rd				
	4th				
FY 18/19	1st	Year 1			
	2nd				
	3rd				
	4th				
FY 19/20	1st	Year 2	Project solicitations		
	2nd				
	3rd				
	4th				
FY 20/21	1st	Year 1			
	2nd				
	3rd				
	4th				
FY 21/22	1st	Year 2	Project solicitations		
	2nd				
	3rd				
	4th				
FY 22/23	1st	Year 1			UPDATE / RECERTIFICATION
	2nd				
	3rd				
	4th				AUDIT
FY 23/24	1st	Year 2	Project solicitations		
	2nd				
	3rd				
	4th				
FY 24/25	1st	Year 1			
	2nd				
	3rd				
	4th				
FY 25/26	1st	Year 2	Project solicitations		
	2nd				
	3rd				
	4th				
FY 26/27	1st	Year 1			
	2nd				
	3rd				
	4th				
FY 27/28	1st	Year 2	Project solicitations		UPDATE / RECERTIFICATION
	2nd				
	3rd				
	4th				



## COMMUNICATION PROGRAM

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***The Enrollee shall communicate on a regular basis with the public on the development, implementation, and performance of its SSMP. The communication system shall provide the public the opportunity to provide input to the Enrollee as the program is developed and implemented. The Enrollee shall also create a plan of communication with systems that are tributary and/or satellite to the Enrollee's sanitary sewer system.***

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The Port of San Francisco is not a traditional utility district and this affects the approach to the communication program element. The entire system is public and there are no public rate payers or private laterals. The Port owns all wastewater lines on Port property with the exception of those features that currently are owned and operated by the San Francisco Public Utilities Commission (SF PUC). There are no tributary systems to the Port's sanitary sewer system.

The Port's communication program focuses on relationships with the SF PUC and Port tenants. The Port communicates regularly with the SF PUC on a range of sewer system issues. Port and SF PUC coordinate to ensure compliance by food service establishments with the FOG requirements; for the cleaning of sewer lines such as those in Fisherman's Wharf that the prevent SSOs related to the numerous restaurants in the area; and for compliance with regional water quality issues such as TMDL requirements for bacteria.

Tenant responsibilities regarding the sanitary sewer collection system vary by lease and by property and Port communication with tenants reflects this. Through the lease agreement the Port assigns maintenance responsibilities for the wastewater collection system to many tenants. The Port requires these tenants to complete an annual inspection of their wastewater system and submit an inspection report signed by either a licensed plumbing contractor or engineer. If there is a suspected discharge at one of these locations, the Port will direct the tenant to make immediate repairs (see Attachment 6.)



## RE-CERTIFICATION AND AVAILABILITY

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***The Enrollee shall update the SSMP every five (5) years, and must include significant program changes. Re-certification by governing board is required.***

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The Port will maintain an SSO Database account with the California Integrated Water Quality System (CIWQS). This includes the Port's publicly available internet web site address. The Port will also include a downloadable copy of the SSMP with proof of approval by the San Francisco Port Commission.



## **ATTACHMENTS**

- 1. Under-Pier Observation Guide**
- 2. Utility Inspection Worksheet**
- 3. Spill Volume Tables**
- 4. Spill Estimation Guidelines**
- 5. Incident Tracking Database**
- 6. Immediate Notice To Repair Wastewater System**
- 7. Enhanced SSMP and Illicit Connection Protocol**
  - a. Aquatic Park Sewer System Map**
- 8. Map of Port of San Francisco Sewer System**
- 9. Port of SF – Sewer System Audit Checklist**

## **UNDER-PIER OBSERVATION GUIDE**

The following photos are common examples of pipe conditions as found underneath the piers. Damage often results from corrosion due to the marine environment. Deterioration of the system is usually progressive, although catastrophic damage can be caused by floating debris. While deterioration of piping can result in a break and discharge, the supporting hangars can also be a primary cause of system failure. After the photos is an example of the inspection form that is used.

### **PHOTO 1 – Pipe in Good Condition**





**PHOTO 2 – Pitted Pipe**



**PHOTO 3 – Cast Iron Pipe – Pipe Diameter Is Larger than Band**



**PHOTO 4 – Cast Iron Pipe - Flaking**





**PHOTO 5 – Pipe Hanger Failure**



**PHOTO 6 – Pipe with Barnacles**



## UTILITY INSPECTION WORKSHEET

Pier #:	
Inspection Date:	
Inspected By:	
Tide at arrival	Time
Tide at departure	Time

Utility: <b>Sewer (Gravity)</b>				
Observation Number	1	2	3	4
Quadrant				
Location				
Active? (Y/N/Unknown)				
Pipe Material				
Pipe Size (inches)				
Observed Length (feet)				
Pipe Condition (Corrosion, pitted....)				
Leaking Pipe Observed?				
Hangers Observed (#)				
Hanger Material				
Hanger Condition				
Hangers Placing Pipe at risk?				
Joints Observed (#)				
Joint Material				
Joint Condition				
Repair Needed < 1Year? (Y/N)				
Urgency of Repair				

ATTACHMENT 2

Comments:				
<b>Utility: Sewer (Force Main)</b>				
Observation Number	1	2	3	4
Quadrant				
Location				
Active? (Y/N/Unknown)				
Pipe Material				
Pipe Size (inches)				
Observed Length (feet)				
Pipe Condition (Corrosion, pitted....)				
Leaking Pipe Observed?				
Hangers Observed (#)				
Hanger Material				
Hanger Condition				
Hangers Placing Pipe at risk?				
Joints Observed (#)				
Joint Material				
Joint Condition				
Repair Needed < 1Year? (Y/N)				
Urgency of Repair				
Comments:				
<b>Utility: Sump Pump Station</b>				
Observation Number	1	2	3	4
Quadrant				
Location				
Active?				

ATTACHMENT 2

(Y/N/Unknown)				
Seals Condition				
Repair Needed < 1Year? (Y/N)				
Steel / Concrete?				
Utility: <b>Water</b>				
Observation Number	1	2	3	4
Quadrant				
Location				
Active? (Y/N/Unknown)				
Pipe Material				
Pipe Size (inches)				
Observed Length (feet)				
Pipe Condition (Corrosion, pitted....)				
Leaking Pipe Observed?				
Hangers Observed (#)				
Hanger Material				
Hanger Condition				
Hangers Placing Pipe at risk?				
Joints Observed (#)				
Joint Material				
Joint Condition				
Repair Needed < 1Year? (Y/N)				
Urgency of Repair				
Comments:				



**SPILL VOLUME TABLES**

<b>TABLE 1</b>		
<b>Gal/Min</b>	<b>Gal/Hr</b>	<b>Gal/Day</b>
0.5	30	720
1	60	1,440
2	120	2,800
3	180	4,320
4	240	5,760
5	300	7,200
6	360	8,640
7	420	10,080
8	480	11,520
9	540	12,960
10	600	14,400
12	720	17,280
24	1,440	34,560
25	1,500	36,000
50	3,000	72,000
66.7	4,000	96,000
83.3	5,000	120,000
100	6,000	144,000
200	12,000	288,000
300	18,000	432,000

<b>TABLE 2</b>			
<b># Hours</b>	<b>0.5 gal/min</b>	<b>1 gal/min</b>	<b>2 gal/min</b>
1	30	60	120
2	60	120	240
3	90	180	360
4	120	240	480
5	150	300	600
6	180	360	720
7	210	420	840
8	240	480	960
9	270	540	1,080
10	300	600	1,200
11	330	660	1,320
12	360	720	1,440
13	390	780	1,560
14	420	840	1,680
15	450	900	1,800
16	480	960	1,920
17	510	1,020	2,040
18	540	1,080	2,160
19	570	1,140	2,280
20	600	1,200	2,400
21	630	1,260	2,520
22	660	1,320	2,640
23	690	1,380	2,760
24	720	1,440	2,880
48	1,440	2,880	5,760

**SPILL ESTIMATION GUIDELINES**

# Areas and Volumes

## Spill Estimation Guide

### PURPOSE

The purpose of this guide is to assist with the estimation of the Volume of a Sewage Spill. It has limited application, as it can be used on dry surfaces where the limits of the spill footprint can be determined and in instances when the spill is contained. It does not require that the Spill Duration and Spill Flow Rate be known. However, any and all information available should be used if it helps to make a more accurate estimate.

### HOW IT WORKS

This guide contains formulas for determining the volume of some basic geometric shapes and some simple conversions that are necessary to determine volume (in gallons.) Any sewage spill will leave a 'wetted footprint' on the surfaces affected. This guide will help you to determine the area of the wetted footprint of the spill. The wetted footprint will not likely be a geometric shape that is easy to determine the area. You will have to be creative and find the familiar shapes within the shape. This will be demonstrated later in the guide. After determining the area contacted by the spill, the depth of the spilled sewage must be determined, which, combined with the area, will lead to the volume spilled.

### CONVERSIONS

\*\* To convert inches into feet: Divide the inches by 12.

Example:  $27'' / 12 = 2.25'$

Or Use Chart A

Example:  $1 \frac{3}{4}'' = ?$

$1'' (0.08') + \frac{3}{4}'' (0.06') = \underline{0.14'}$

\*\* One Cubic Foot can contain 7.48 gallons of liquid.

**Chart A**

Conversion:

<u>Inches</u>	to	<u>Feet</u>
1/8"	=	0.01'
1/4"	=	0.02'
3/8"	=	0.03'
1/2"	=	0.04'
5/8"	=	0.05'
3/4"	=	0.06'
7/8"	=	0.07'
1"	=	0.08'
2"	=	0.17'
3"	=	0.25'
4"	=	0.33'
5"	=	0.42'
6"	=	0.50'
7"	=	0.58'
8"	=	0.67'
9"	=	0.75'
10"	=	0.83'
11"	=	0.92'
12"	=	1.00'

# Areas and Volumes

## Spill Estimation Guide

### GEOMETRY

For the purposes of this guide, the unit of measurement will be in feet for formula examples.

Area is two-dimensional - represented in square feet. (Length x Width)

Volume is three-dimensional - represented in cubic feet. (Length x Width x depth) or (Diameter Squared)  $D^2 \times 0.785 \times \text{depth}$ .

#### A Note about Depth

Wet Stain on a Concrete Surface - For a stain on concrete, use 0.0026'. This number is 1/32" converted to feet. For a stain on asphalt use 0.0013' (1/64"). These were determined to be a reasonable depth to use on the respective surfaces through a process of trial and error. A known amount of water (one gallon) was poured onto both asphalt and concrete surfaces. Once the Area was determined as accurately as possible, different depths were used to determine the volume of the wetted footprint until the formula produced a result that (closely) matched the one gallon spilled. 1/32" was the most consistently accurate depth on concrete and 1/64" for asphalt. This process was repeated several times.

Sewage "Ponding" or Contained - Measure actual depth of standing sewage whenever possible. When depth varies, measure several (representative) points, determine the average and use that number in your formula to determine volume.

#### Area/Volume Formulas

Area is two dimensional and is represented as Square Feet (SQ/FT)

Volume is three dimensional and is represented as Cubic Feet (CU/FT)

One Cubic Foot can hold 7.48 gallons

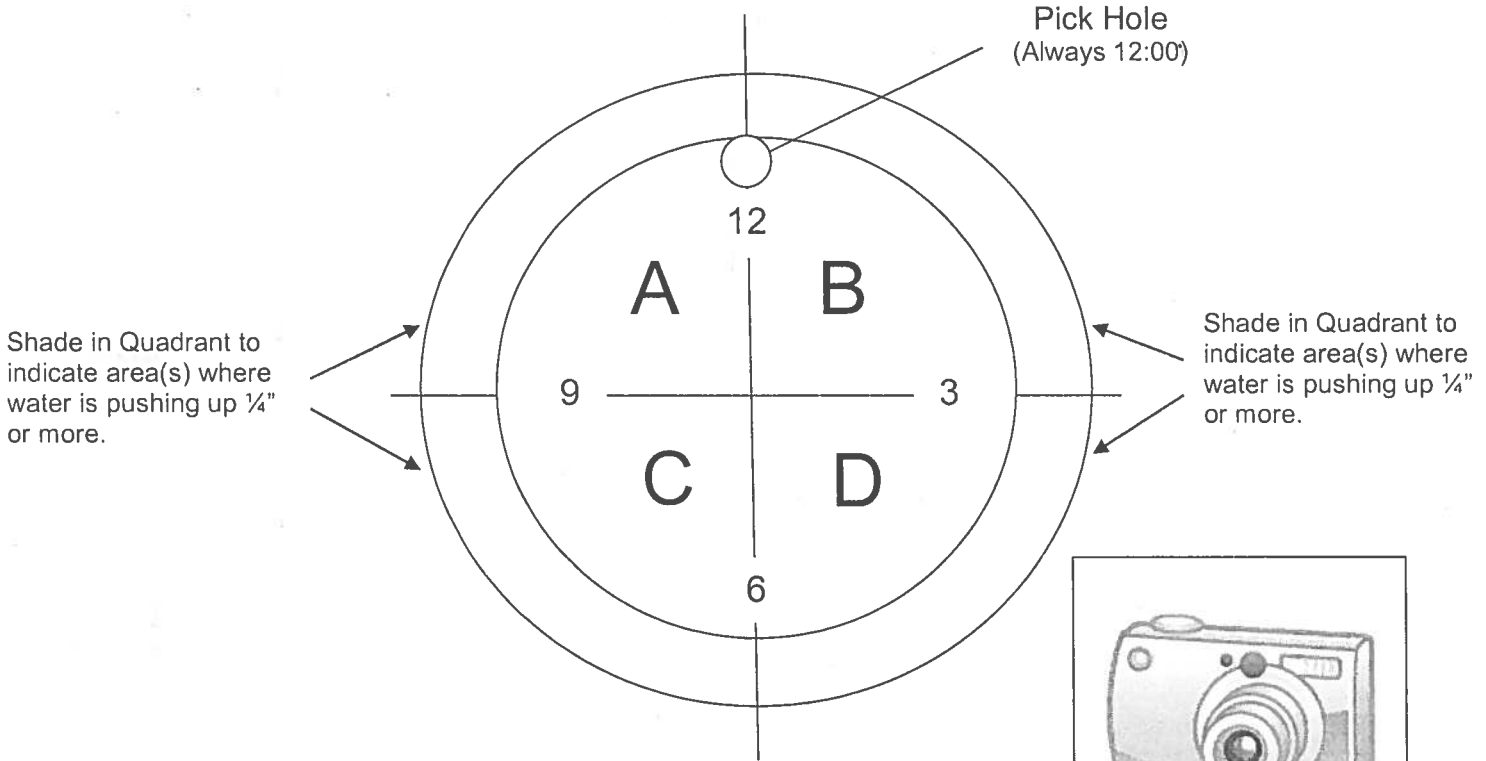
# “Active” Spill Estimation Work Sheet

Manhole ID: \_\_\_\_\_ Cleanout Address: \_\_\_\_\_

Casting: D & L Supply A-1021  XYZ  Other: \_\_\_\_\_

Photo(s) of Casting  Opening: 24-inch  36-inch Other: \_\_\_\_\_

Time Measurements were taken: \_\_\_\_\_:\_\_\_\_\_  AM  PM



**Attach Photos**

Pick Hole Measured Height: \_\_\_\_\_ inches

Quadrant **A** Highest Measure: \_\_\_\_\_ inches. % of Quadrant Spilling \_\_\_\_\_

Quadrant **B** Highest Measure: \_\_\_\_\_ inches. % of Quadrant Spilling \_\_\_\_\_

Quadrant **C** Highest Measure: \_\_\_\_\_ inches. % of Quadrant Spilling \_\_\_\_\_

Quadrant **D** Highest Measure: \_\_\_\_\_ inches. % of Quadrant Spilling \_\_\_\_\_

-----  
or

Measured Height from Clean Out: \_\_\_\_\_ inches (top of stack to top of water)

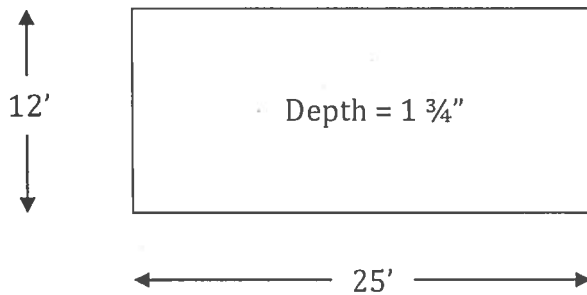
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# Areas and Volumes

## Spill Estimation Guide

### AREA/VOLUME OF A RECTANGLE OR SQUARE

Formula: **Length x Width x Depth = Volume in Cubic Feet**



Length (25') x Width (12') x Depth (0.14')

$$25' \times 12' \times 0.14' = 42 \text{ Cubic Feet.}$$

Now the Volume in Cubic Feet is known.

There are 7.48 Gallons in one Cubic Foot

So, 42 Cubic Feet x 7.48 gallons/cubic feet = **314 Gallons**

**Chart A**

Conversion:

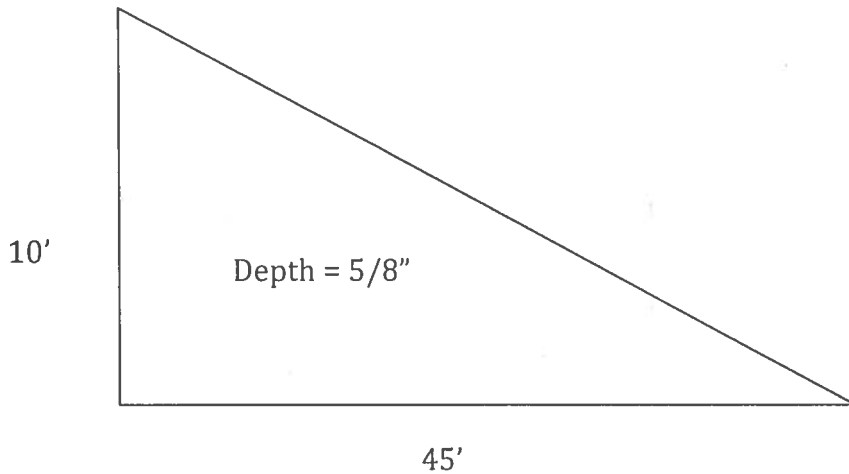
<u>Inches</u>	to	<u>Feet</u>
1/8"	=	0.01'
1/4"	=	0.02'
3/8"	=	0.03'
1/2"	=	0.04'
5/8"	=	0.05'
3/4"	=	0.06'
7/8"	=	0.07'
1"	=	0.08'
2"	=	0.17'
3"	=	0.25'
4"	=	0.33'
5"	=	0.42'
6"	=	0.50'
7"	=	0.58'
8"	=	0.67'
9"	=	0.75'
10"	=	0.83'
11"	=	0.92'
12"	=	1.00'

# Areas and Volumes

## Spill Estimation Guide

### AREA/VOLUME OF A RIGHT TRIANGLE

Base x Height x 0.5 x Depth = Volume in Cubic Feet



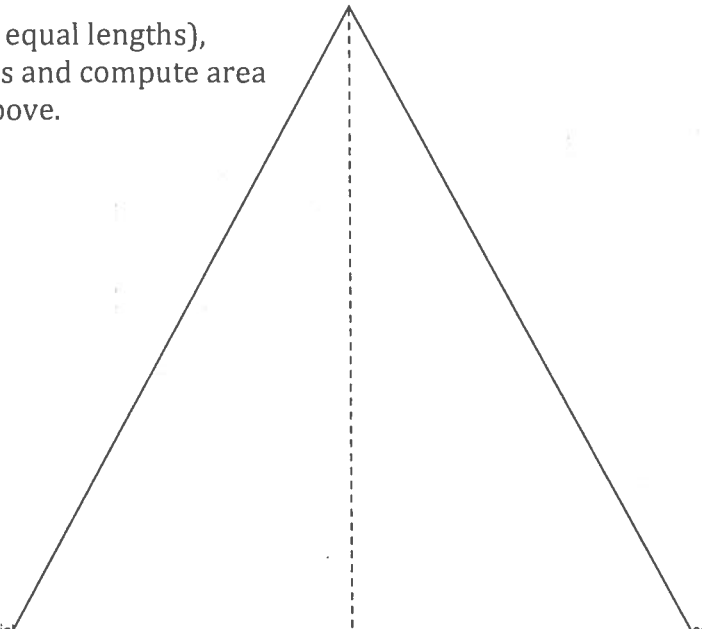
#### Chart A

Conversion:

Inches	to	Feet
1/8"	=	0.01'
1/4"	=	0.02'
3/8"	=	0.03'
1/2"	=	0.04'
5/8"	=	0.05'
3/4"	=	0.06'
7/8"	=	0.07'
1"	=	0.08'
2"	=	0.17'
3"	=	0.25'
4"	=	0.33'
5"	=	0.42'
6"	=	0.50'
7"	=	0.58'
8"	=	0.67'
9"	=	0.75'
10"	=	0.83'
11"	=	0.92'
12"	=	1.00'

Base (45') x Height (10') x 0.5 x Depth (.05') x 7.48 gallons/cubic foot = **84 gallons**

For Isosceles Triangles (two sides are equal lengths),  
Break it down into two Right Triangles and compute area  
as you would for the Right Triangle above.



# Areas and Volumes

## Spill Estimation Guide

### AREA/VOLUME OF A CIRCLE/CYLINDER

$$D^2 \times 0.785 \times d$$

Diameter Squared x 0.785 x Depth = Volume in cubic feet.

Diameter = Any straight line segment that passes through the center of a circle.

For our purposes, it is the measurement across the widest part of a circle.

$$D^2 \times 0.785 \times \text{depth} = \text{Volume in cubic feet}$$

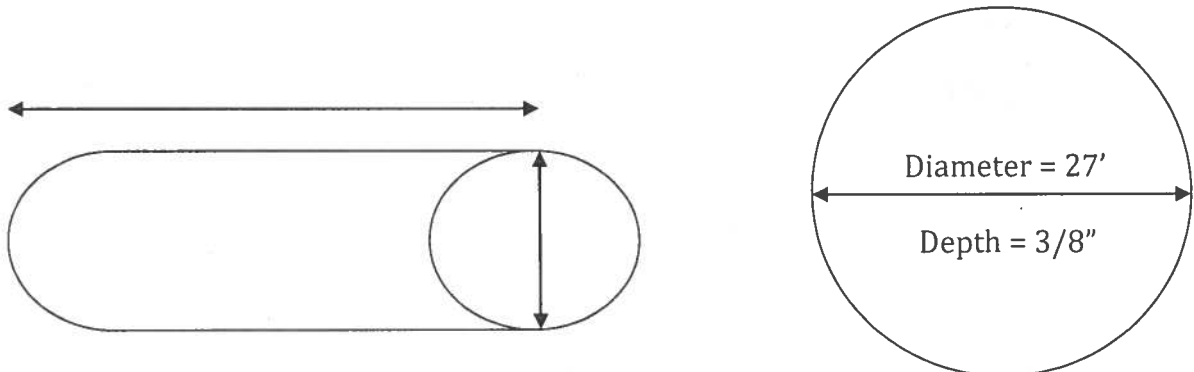
Example:

$$27' \times 27' \times 0.785 \times 0.03 = 17.17 \text{ cubic feet}$$

$$17.17 \text{ cubic feet} \times 7.48 \text{ gallons/cubic foot} = \underline{\underline{128 \text{ gallons}}}$$

#### Chart - A

Conversion: Inches to Feet	
1/8"	= 0.01'
1/4"	= 0.02'
3/8"	= 0.03'
1/2"	= 0.04'
5/8"	= 0.05'
3/4"	= 0.06'
7/8"	= 0.07'
1"	= 0.08'
2"	= 0.17'
3"	= 0.25'
4"	= 0.33'
5"	= 0.42'
6"	= 0.50'
7"	= 0.58'
8"	= 0.67'
9"	= 0.75'
10"	= 0.83'
11"	= 0.92'
12"	= 1.00'

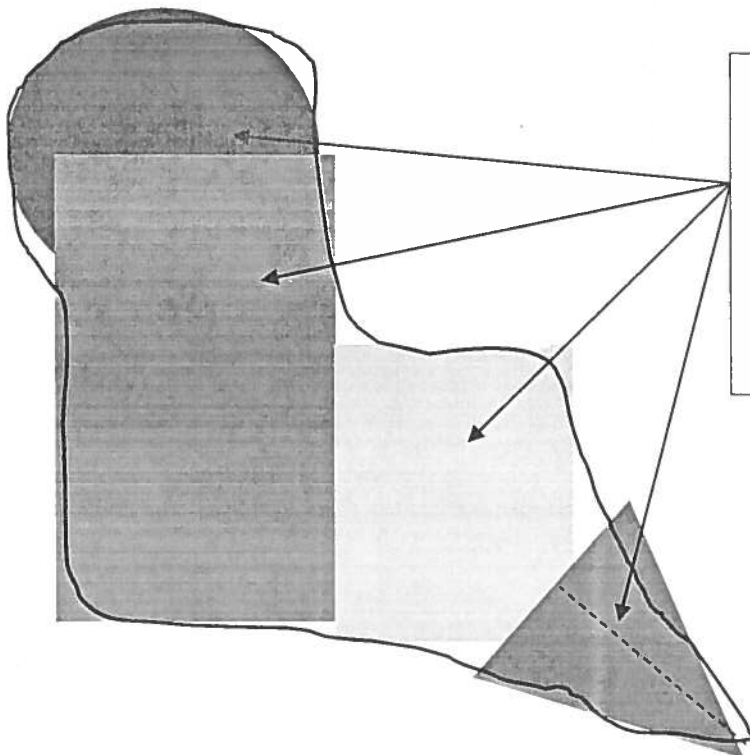
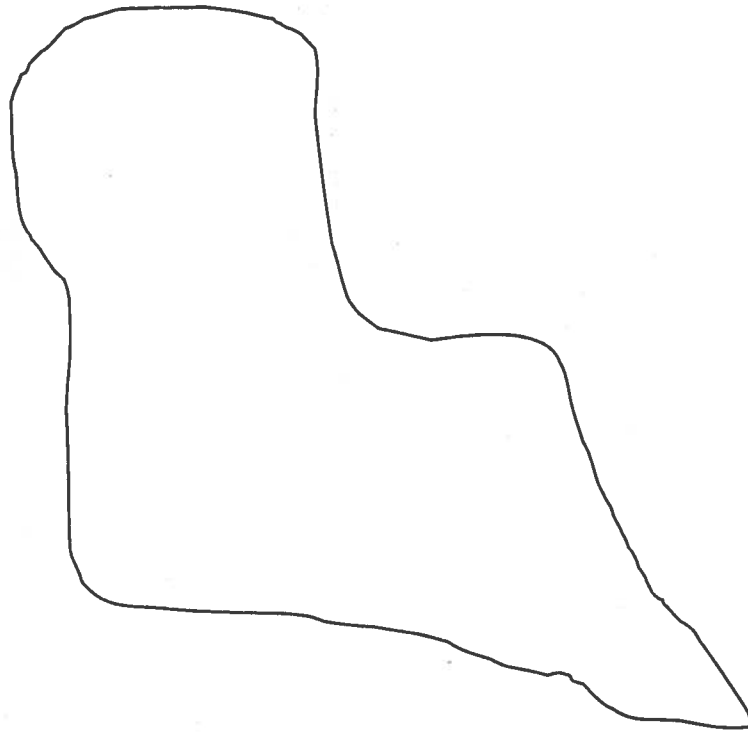




# Areas and Volumes

## Spill Estimation Guide

Find the geometric shapes within the shape. If this was the shape of your spill, break it down, as best you can, with the shapes we know.



1. Determine the volumes of each shape.

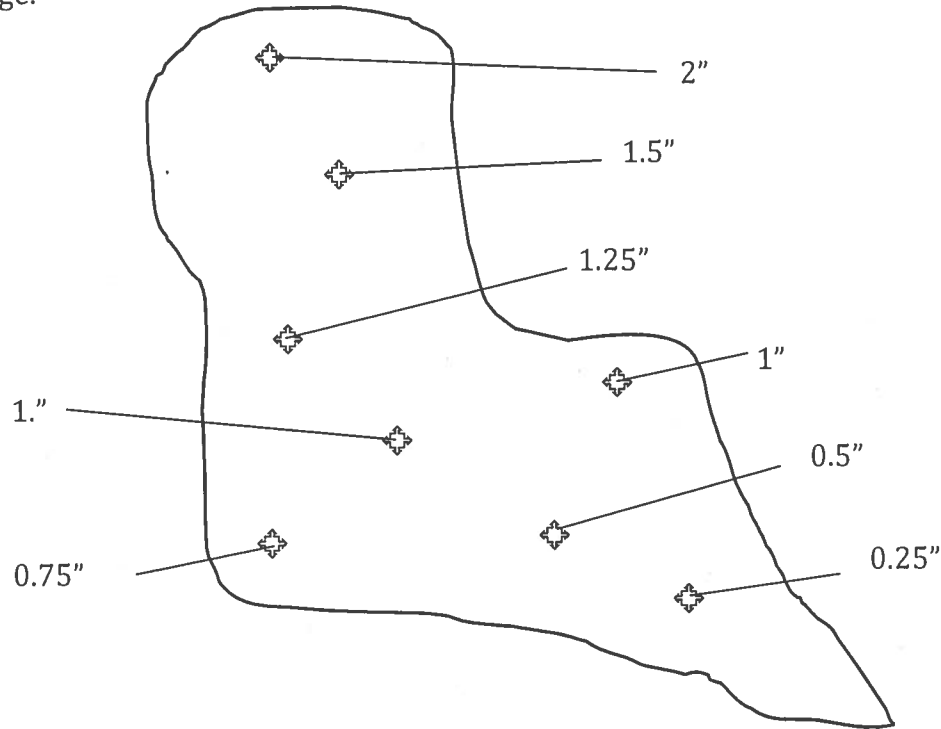
*In this example, after the volume of the circle is determined, multiply it by 55% (+/-) so that the overlap area won't be counted twice.*

2. Add all the volumes to determine total spill volume.

# Areas and Volumes

## Spill Estimation Guide

If the spill depth is of varying depths, take several measurements at different depths and find the average.



$$2" + 1.5" + 1.25" + 1" + 1" + 0.75" + 0.5" + 0.25" = 8.25"$$

$$8.25" / 8 \text{ measurements} = 1.03"$$

Average Depth = 1.03"

# Areas and Volumes

## Spill Estimation Guide

### Step 1

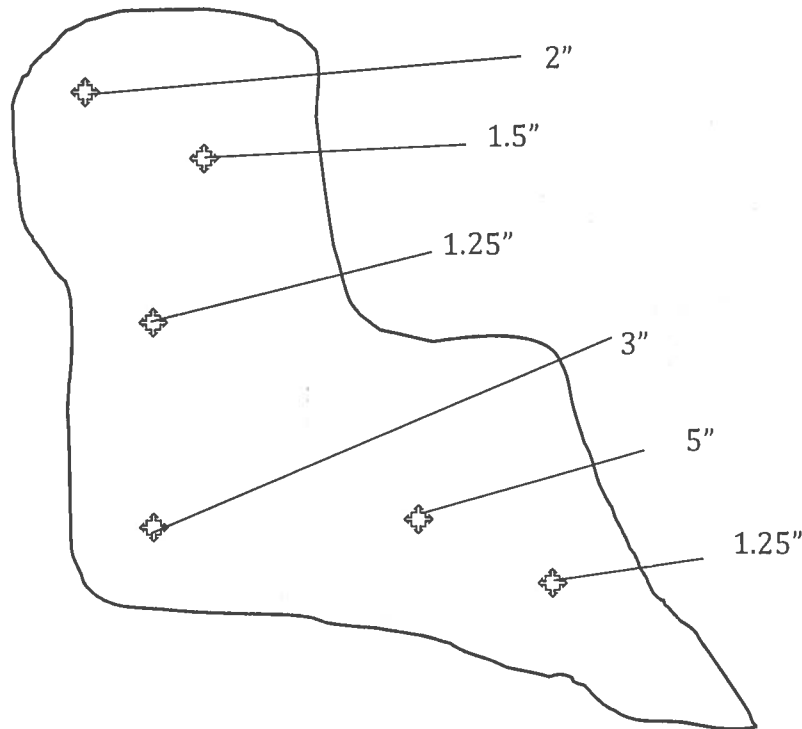
If the spill affects a dry, unimproved area such as a field or dirt parking lot, determine the Area of the wetted ground in the same manner as you would on a hard surface. Using a round-point shovel, dig down into the soil until you find dry soil. Do this in several locations within the wetted area and measure the depth of the wet soil. Average the measurement/thickness of the wet soil and determine the average depth of the wet soil.

### Step 2

**Take a Test Sample**  
( See Next Page)

**NOTE:** This can be used in a (Dry) dirt or grassy area that is not regularly irrigated like a field or a dirt parking lot.

Wet weather would make this method ineffective.



$$2'' + 1.5'' + 1.25'' + 3'' + 5'' + 1.25'' = \underline{14.0''}$$

$$14.0'' / 6 \text{ measurements} = 2.33''$$

$$\text{Average Depth} = 2.33'' (0.194')$$

### EXAMPLE:

If the Area of the spill was determined to be 128 Sq/Ft and the average depth of the wet soil is 2.33 inches:

$$128 \text{ Sq/Ft} \times 0.194' = 24.83 \text{ Cu/Ft}$$

$$24.83 \text{ Cu/Ft} \times 7.48 \text{ Gals/Cu/Ft} = 185.74 \text{ gallons}$$

$$185.74 \times 18\% = \underline{33 \text{ Gallons}} \text{ (water in soil)}$$

# Areas and Volumes

## Spill Estimation Guide

### (Test) SAMPLING SOIL FOR WATER CONTENT

Once you have determined the wetted footprint of the spill, you will want to determine the water (sewage) content in the soil.

1. Select an area of dry soil (near the wetted footprint of the spill) to sample.
2. Pour a known amount of water onto the soil and let it soak in for an adequate amount of time. If possible, use a form to keep the water contained to a geometric shape (circle, square, rectangle, etc.).
3. Determine the Area of the wetted footprint.
4. Using a small hand tool, dig down into the soil until dry soil is reached. Measure the depth of the wet soil. Do this in multiple locations and average the measurements.
5. Multiply the Area by the Average Depth of the wet soil to determine the volume of the wet soil.
6. Determine the water content in the soil
  - a. Since you started with a known amount, you know how much water is in the soil.
  - b. Divide that known amount by the volume determined in step 5 to arrive at the percent of water content in the soil.
  - c. Arrive at the water content of the soil (percent)

Example:

1. Place a 2-foot diameter form onto an area of dry soil.
2. Pour one gallon of water into the form and let it soak in for 15 minutes.
3. Pull the form and measure the Area of the wetted soil (it will likely be larger than the form). Let's say 26" diameter.
4. Dig into the soil in 3 locations and measure the depth of the wetted soil.
5. Average the 3 measurements. (Let's say 2.5", 1.5" & 3.75" = 7.75". divide by 3 = 2.58" or 0.215')
6. Determine the Area of the Circle ( $D^2 \times 0.785$ )  $2.16' \times 2.16' \times 0.785 = 3.66 \text{ Sq/Ft}$
7. Multiply the Area by the Average Depth to get the Volume ( $3.66 \times 0.215' = 0.79 \text{ Cu/Ft}$ )
8. Multiply 0.79 cubic feet by 7.48 gallons/Cu/ft = 5.9 gallons.
9. Divide 1 Gallon (known Amount) by 5.9 gallons = .17 or 17% is the water content in the soil.
10. Now you have determined that the water content in the soil is 17%. Apply this to your actual spill area.

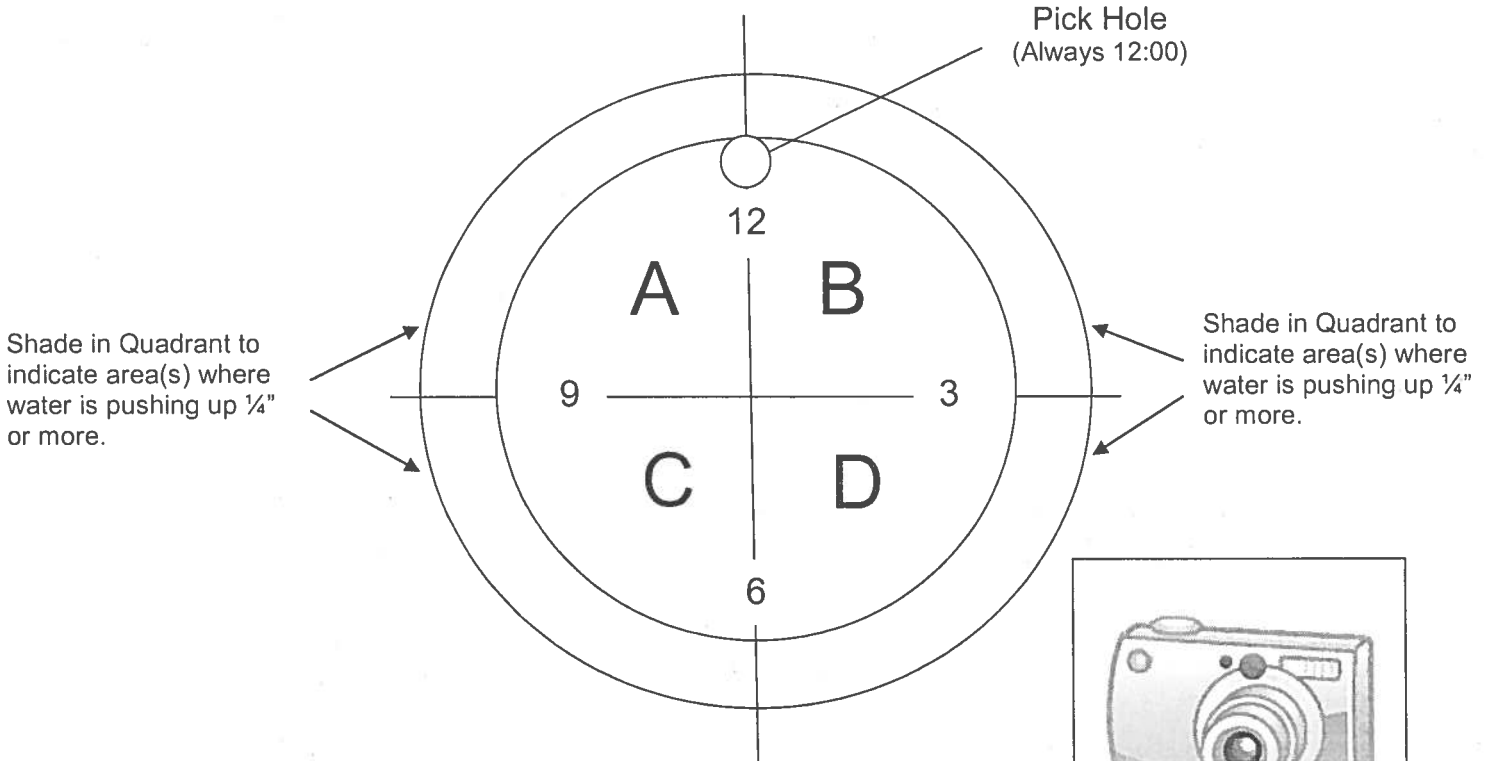
# “Active” Spill Estimation Work Sheet

Manhole ID: \_\_\_\_\_ Cleanout Address: \_\_\_\_\_

Casting: D & L Supply A-1021  XYZ  Other: \_\_\_\_\_

Photo(s) of Casting  Opening: 24-inch  36-inch Other: \_\_\_\_\_

Time Measurements were taken: \_\_\_\_\_:\_\_\_\_\_  AM  PM



Shade in Quadrant to indicate area(s) where water is pushing up 1/4" or more.

Shade in Quadrant to indicate area(s) where water is pushing up 1/4" or more.



**Attach Photos**

Pick Hole Measured Height: \_\_\_\_\_ inches

Quadrant **A** Highest Measure: \_\_\_\_\_ inches. % of Quadrant Spilling \_\_\_\_\_

Quadrant **B** Highest Measure: \_\_\_\_\_ inches. % of Quadrant Spilling \_\_\_\_\_

Quadrant **C** Highest Measure: \_\_\_\_\_ inches. % of Quadrant Spilling \_\_\_\_\_

Quadrant **D** Highest Measure: \_\_\_\_\_ inches. % of Quadrant Spilling \_\_\_\_\_

-----

or

Measured Height from Clean Out: \_\_\_\_\_ inches (top of stack to top of water)

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**Spill Estimations**  
**Flow Rate Method - Worksheet**

Completed By: \_\_\_\_\_

Measuring Manhole: \_\_\_\_\_

How was Flow Rate Determined?

(Attach worksheets, reports, etc. used in determination)

- Flow Calculation Work Sheet; Determined Flow Rate: \_\_\_\_\_ GPM
- Active Spill Estimation Worksheet; Determined Flow Rate \_\_\_\_\_ GPM
- Flow Monitoring Equipment;

If Flow Monitoring Equipment:

Measuring Period: From \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ at \_\_\_\_\_ : \_\_\_\_\_  
To \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ at \_\_\_\_\_ : \_\_\_\_\_

Average Flow Rate During Same Time of Day as Spill Occurred: \_\_\_\_\_ GPM

Flow Measured - Downstream Manhole ID: \_\_\_\_\_; Flow \_\_\_\_\_ GPM

(See SSO Response Field Check List for Downstream flow information)  
(Attach Flow Calculation Worksheet)

Diurnal Flow Pattern applied: \_\_\_\_\_

---

---

---

Comments: \_\_\_\_\_

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Duration: \_\_\_\_\_ + Flow Rate (GPM) \_\_\_\_\_ = Spill Volume \_\_\_\_\_ Gals

# Spill Estimation – Upstream Connections

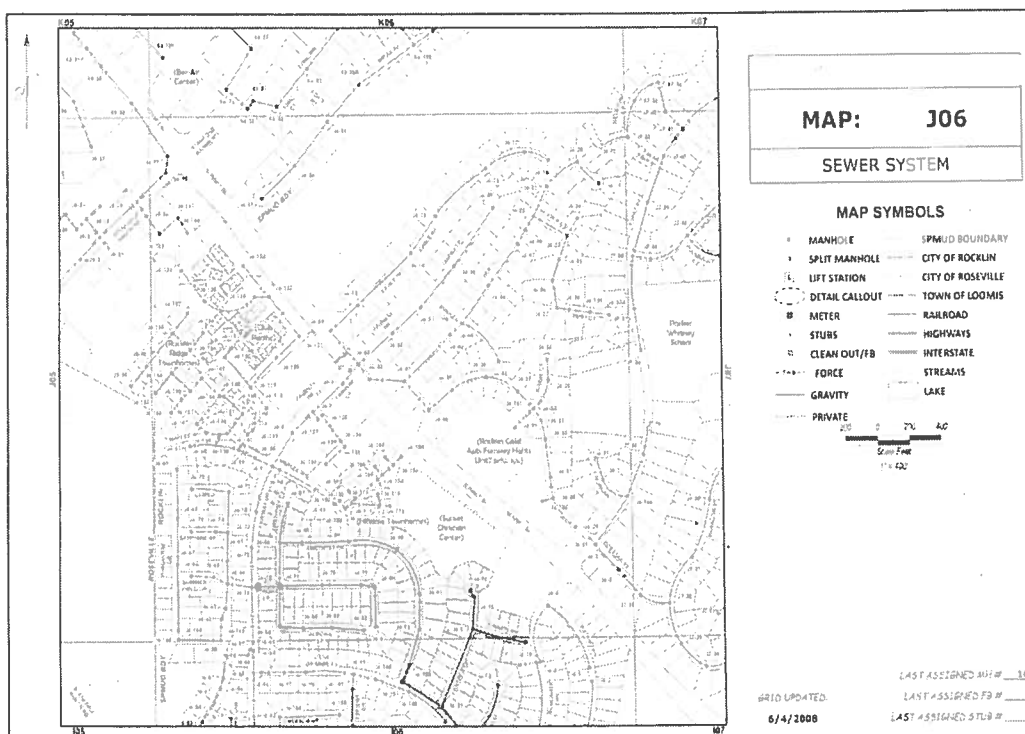
This method assumes the District average (Dry Weather) flow from a building to be 180 gallons per Equivalent Dwelling Unit (EDU). During Wet Weather conditions consult the Technical Services Department (TSD) for flow characteristics based on current conditions. A residential building is typically one EDU.

For commercial buildings:

- Refer to Service Line in the CMMS database for actual EDU's, or
- Contact the District's Administration office.
  - Provide the Administration personnel with the address and they will provide the information.

For small portions of the collection system such as a residential neighborhood the District's Grid Map Book can be used.

1. Locate the portion of the system in the Grid Map Book
2. Determine the limits of the collection system that flows through the overflowing manhole
3. Count the number of lots that are served by that portion of the collection system.



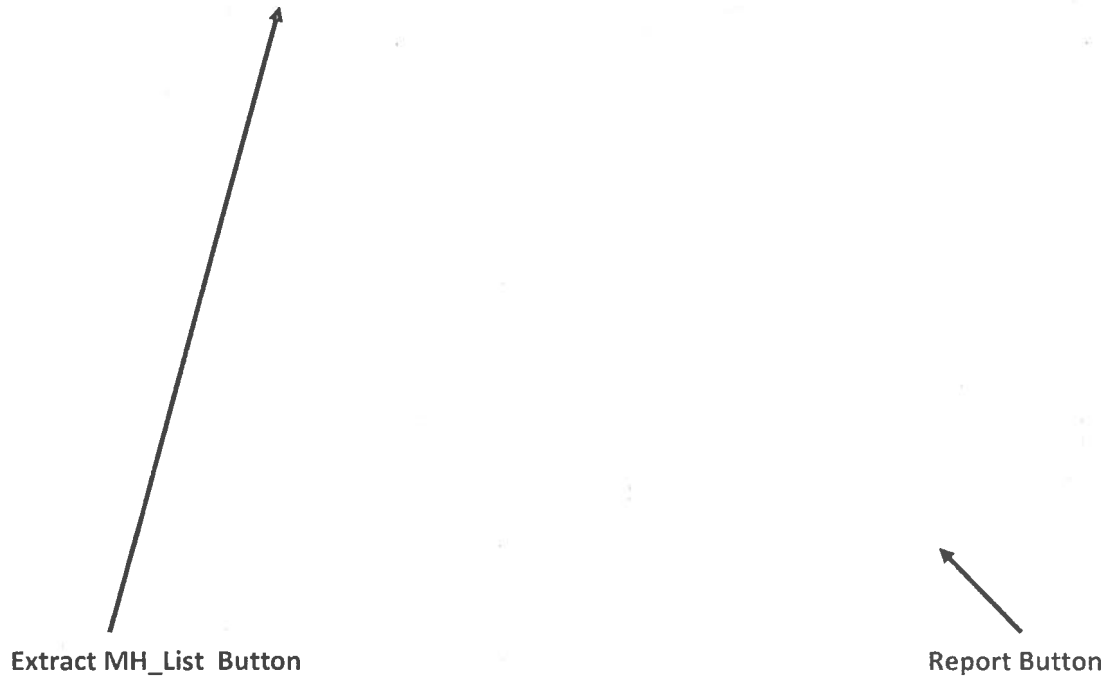
Multiply the number of lots by the appropriate Gallon/EDU and arrive at the flow rate (in GPM)

For larger portions of the collection system this method is not practical.

**\*\* Always measure the flow through the Downstream manhole, as many times it is a partial blockage \*\***

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## Spill Estimation – Upstream Connections



**\*\* Always measure the flow through the Downstream manhole, as many times it is a partial blockage \*\***

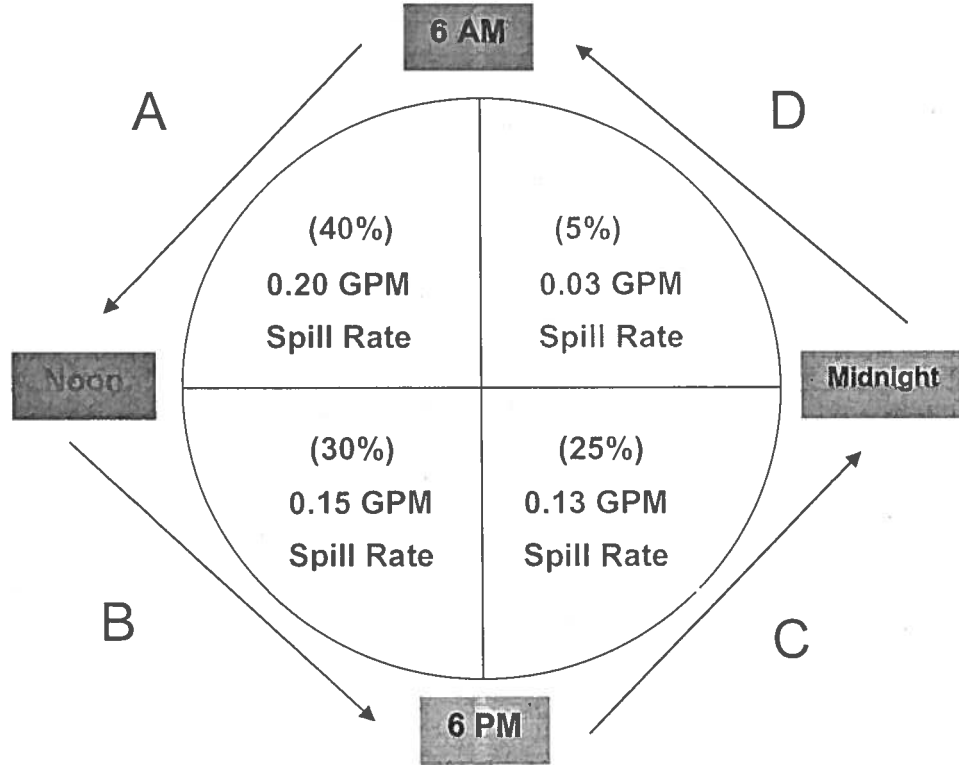
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# Spill Estimation Single Home

## 180 GPD per Household

(District-wide diurnal flow patterns are applied to estimate usage during each period)



Time Period	Gals per Minute	Gals per Hour	Gals per Period
A - 6 AM to Noon	0.20	12.0	72
B - Noon to 6 PM	0.15	9	54
C - 6PM to 9 PM	0.13	7.5	45
D - 9 PM - Midnight	0.03	1.5	9

Spill Start Time \_\_\_\_\_ - Spill End Time \_\_\_\_\_ = Spill Duration \_\_\_\_\_

Spill Duration \_\_\_\_\_ x Spill Rate \_\_\_\_\_ x EDUs \_\_\_\_\_ = Spill Volume \_\_\_\_\_

*This is to be used as a guide for spill estimation for lower lateral blockages. Each six-hour period flow rate assumes a constant flow, which would not be typical in a home or business. In the absence of any other information or in conjunction with other information, this is intended to assist with spill estimations.*

# Spill Estimation

## Single Home

Here's how it works...

This estimation method works only for spills where the blockage is in the lower lateral. It assumes 180 gallons per EDU, which is based on the District-wide average as of June 2010. Single-Family Residential homes = One EDU. For Commercial buildings, the EDUs can be found in WWMS, on the 'Service Line' screen.

When a spill affects landscaped areas, dirt, fields or any surface that tends to absorb the spill, it is often difficult to use the 'eyeball method' to make a valid estimation. This method will be useful in these cases.

Once the Spill Start Time and End Time are determined, this method can be applied. Example:

It is determined that the spill start time was 9:45 AM and the Spill End time was 1:30 (3 hours and 45 minutes)

From 9:45 to Noon (2 Hrs, 15 Minutes would be calculated using 0.20 GPM (135 minutes x 0.20 = **27.0 gallons**).

From Noon to 1:30 PM (1 Hr, 30 Minutes would be calculated using 0.15 GPM (90 minutes x 0.15 = **13.5 gallons**).

Total would be 27.0 gallons + 13.5 gallons = **40.5 gallons**.

This information alone likely does not tell the whole story. Typically, sewage does not run continuously from a home. If at all possible the resident should be interviewed. Be respectful and ask the resident if they would mind if you asked them a few questions to help determine the volume of the spill.

Example:

Since the time you noticed the spill:

How many people have been home?

Have you done any laundry (30 gallons/load) or ran the dish washer (9 gallons/load) or taken a shower (25 gallons)

Next, put all of the information you have gathered:

The size of the stain or water mark on the ground + any tissue, etc.

The answers to the questions about use.

The volume the Spill Estimation Method suggested

Does the information gathered suggest that the volume determined by the estimation tool be adjusted, up, down or the left as is?

Use the following and consider it to be Typical Use for each activity. The amounts listed below consider the water use difference of newer appliances and older appliances. It appears that around 1994 was watershed year. The amounts listed below assume that more appliances are newer than older.

Washing Machine	30 gallons/load
Dish Washer	9 gallons/load
Shower (10 Min.)	25 gallons/shower

## INCIDENT TRACKING DATABASE

This database was developed to facilitate documentation and regulatory reporting of a variety of incidents that occur at the Port including SSOs. The following screen shots provide a general indication of the capability.

### Opening / Main Menu

F-MainMenu

### Incident Tracking - MASTER

User Information Admin EXIT

Pointing to: Live Site Unlocked

---

**FORMS**

- Report An Incident
- No Spill Form (Sewer Program)
- Contacts for Incident Response

**REPORTS**

- Sanitary Sewer Spills
- Potable Water Spills
- Petroleum Sheens/Spills
- All Incidents Report
- Spill Ranking Report
- Guide to Reporting Incidents
- Contacts

---

Start Date  End Date  FacilityNumber

**Incident Type**

- Wastewater
- Potable Water
- Petroleum
- Vessel in Distress
- Other
- SSO

Report An Incident – Form: Agency Notification Tab

INCIDENT TRACKING

**BASIC INCIDENT INFORMATION** Incident Name:  Find by Location

<p><b>FACILITY / LOCATION INFO</b></p> <p>Facility # <input type="text" value="1230"/></p> <p>Name <input type="text" value="Pier 23"/></p> <p>Location <input type="text" value="AC34 Shed"/></p> <p>Zip Code <input type="text"/></p> <p>Latitude <input type="text" value="37.803291"/></p> <p>Longitude <input type="text" value="-122.400454"/></p>	<p><b>TYPE OF INCIDENT</b></p> <p><input checked="" type="checkbox"/> Wastewater Amount (gal.) <input type="text"/></p> <p><input checked="" type="checkbox"/> SSO Bay Affected? <input type="checkbox"/></p> <p><input type="checkbox"/> Potable Water Start Date <input type="text" value="8/1/2012"/></p> <p><input type="checkbox"/> Petroleum</p> <p><input type="checkbox"/> Vessel in Distress</p> <p><input type="checkbox"/> Other Describe: <input type="text"/></p> <p>Confirmed? <input type="text" value="No Discharge"/></p>	<p><b>REPORTING PARTY INFO</b></p> <p>Name <input type="text" value="Port Maintenance"/></p> <p>Contact Info <input type="text"/></p> <p>Date Reported <input type="text" value="8/1/2012"/> Time <input type="text"/></p>	<p>Find by Start Date <input type="text"/></p> <p>Staff Name <input type="text" value="Richard Berman"/></p>
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Agency Notifications

**AGENCY NOTIFICATIONS**

[Guidance on when an incident is reportable.](#)
[Sewer Overflow Emergency Response Plan](#)

<p><b>REPORTABLE TO AGENCIES</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Cal OES</td> <td style="width: 15%;">Not Reportable</td> <td style="width: 20%;">(800) 852-7550</td> <td style="width: 50%;"><input type="checkbox"/> Cal OES Cal OES Control # <input type="text"/></td> </tr> <tr> <td>SF DPH</td> <td>Not Reportable</td> <td>(415) 215-0805</td> <td><input type="checkbox"/> DPH DPH Note <input type="text"/></td> </tr> <tr> <td>HMUPA</td> <td>Not Reportable</td> <td></td> <td><input type="checkbox"/> HMUPA HMUPA Note <input type="text"/></td> </tr> <tr> <td>CIWQS</td> <td>Not Reportable</td> <td><a href="https://ciwqs.waterboards.ca.gov/">https://ciwqs.waterboards.ca.gov/</a></td> <td><input type="checkbox"/> CIWQS CIWQS Event ID# <input type="text"/> SSO Category <input type="text" value="n/a"/> Certified <input type="checkbox"/> Date <input type="text"/></td> </tr> <tr> <td>NRC</td> <td>Not Reportable</td> <td>(800) 424-8802 <a href="http://www.nrc.uscg.mil/">http://www.nrc.uscg.mil/</a></td> <td><input type="checkbox"/> NRC NRC Report# <input type="text"/></td> </tr> <tr> <td>USCG</td> <td>Not Reportable</td> <td>(415) 399-3547 - Sector Command Center</td> <td><input type="checkbox"/> COAST GUARD USCG Note <input type="text"/></td> </tr> <tr> <td>BPermit</td> <td><input checked="" type="text" value="Reportable"/></td> <td></td> <td><input type="checkbox"/> Building Permit Permit # <input type="text"/></td> </tr> </table> <p>(or Encroachment Permit)</p>	Cal OES	Not Reportable	(800) 852-7550	<input type="checkbox"/> Cal OES Cal OES Control # <input type="text"/>	SF DPH	Not Reportable	(415) 215-0805	<input type="checkbox"/> DPH DPH Note <input type="text"/>	HMUPA	Not Reportable		<input type="checkbox"/> HMUPA HMUPA Note <input type="text"/>	CIWQS	Not Reportable	<a href="https://ciwqs.waterboards.ca.gov/">https://ciwqs.waterboards.ca.gov/</a>	<input type="checkbox"/> CIWQS CIWQS Event ID# <input type="text"/> SSO Category <input type="text" value="n/a"/> Certified <input type="checkbox"/> Date <input type="text"/>	NRC	Not Reportable	(800) 424-8802 <a href="http://www.nrc.uscg.mil/">http://www.nrc.uscg.mil/</a>	<input type="checkbox"/> NRC NRC Report# <input type="text"/>	USCG	Not Reportable	(415) 399-3547 - Sector Command Center	<input type="checkbox"/> COAST GUARD USCG Note <input type="text"/>	BPermit	<input checked="" type="text" value="Reportable"/>		<input type="checkbox"/> Building Permit Permit # <input type="text"/>	<p><b>AGENCY NOTIFICATIONS COMPLETED</b></p>
Cal OES	Not Reportable	(800) 852-7550	<input type="checkbox"/> Cal OES Cal OES Control # <input type="text"/>																										
SF DPH	Not Reportable	(415) 215-0805	<input type="checkbox"/> DPH DPH Note <input type="text"/>																										
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SW Annual Report <input type="text" value="tbd"/>	24 Hr. Dispatch (916) 358-1312	Emergency Management Agency.																											

Record: 14 of 150  Search

Report An Incident – Form: Incident Details Tab

frmIncident

Incident Report New Incident Save Close

<b>FACILITY / LOCATION INFO</b> Facility # <input type="text"/> Name <input type="text"/> Location <input type="text"/> Zip Code <input type="text"/> Latitude <input type="text"/> Longitude <input type="text"/>	<b>TYPE OF INCIDENT</b> <input type="checkbox"/> Wastewater    Amount (gal.) <input type="text"/> <input type="checkbox"/> SSO    Bay Affected? <input type="checkbox"/> <input type="checkbox"/> Potable Water    Start Date <input type="text"/> <input type="checkbox"/> Petroleum <input type="checkbox"/> Vessel in Distress <input type="checkbox"/> Other Describe: <input type="text"/> Confirmed? <input type="text"/>	<b>REPORTING PARTY INFO</b> Name <input type="text"/> Contact Info <input type="text"/> Date Reported <input type="text"/> Time <input type="text"/> Staff Name <input type="text"/>	<input type="text"/> Find by Start Date <input type="text"/> Staff Name <input type="text"/>
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Agency Notifications
Incident Details
Responsible Party

<b>INCIDENT DETAILS</b> <b>START OF INCIDENT</b> Start Date <input type="text"/> <input type="text"/> Start Time <input type="text"/> Date Confirmed <input type="text"/> <b>MATERIAL DISCHARGED</b> <input type="checkbox"/> Wastewater <input type="checkbox"/> GrayWater <input type="checkbox"/> Black Water <input type="checkbox"/> Potable Water <input type="checkbox"/> Petroleum <input type="checkbox"/> Vessel <input type="checkbox"/> Other Other Describe: <input type="text"/> Amount (gal.) <input type="text"/> Description of Flow (continuous, intermittent, clear, w/solids ... etc.) Rate (gal/min) <input type="text"/> General Description <input style="width: 100%; height: 40px;" type="text"/>	<b>General Note</b> <input style="width: 100%; height: 150px;" type="text"/>
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**STOP DISCHARGE**  
 Discharge Stopped?     Date Stopped   
 How was discharge stopped?

[Spill Estimation Resources](#)  
[Spill Estimation Guidelines](#)  
[Spill Volume Tables](#)

Records: 14 of 149 of 149    Filtered    Search



**IMMEDIATE NOTICE TO REPAIR WASTEWATER SYSTEM**

**VIA HAND DELIVERY, U.S. CERTIFIED Mail & REGULAR U.S. MAIL**

**Tenant Name:** \_\_\_\_\_

**Tenant Address:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Incident Location:** \_\_\_\_\_

**Description / Observations**

[The Port of San Francisco has observed ..... description of Sanitary Sewer Overflow (SSO).]

**PLEASE TAKE NOTICE** that you must immediately:

- Stop discharge of wastewater
- Make emergency repairs to the system
- Apply for a Port building permit for the permanent repairs
- Obtain closure of the building permit as evidenced by sign-off by Port Building Inspector.

**THIS NOTICE IS ISSUED UNDER TO** Paragraph (Section) 9 of the Lease agreement with the Port of San Francisco \_\_\_\_\_ (the “Lease”) dated \_\_\_\_\_ for reference purposes only, under which you now hold possession of certain premises located at \_\_\_\_\_, San Francisco, CA \_\_\_\_ as more fully described in the Lease (the “Premises”).

**THIS NOTICE IS ISSUED PURSUANT TO THE FOLLOWING** federal and state codes:

- 33 USC Clean Water Act (Federal Water Pollution Control Act) §1311(b)(1)(B) and (C)
- California Water Code Division 7, Chapter 4, Article 4, §13271

The Port of San Francisco also wishes to inform you that the Port is required by law to notify regulatory agencies, including the San Francisco Department of Public Health, of this leak, and intends to do so.

[Type name of addressee(s)]

[Type date]

Page 2

**IN THE EVENT THAT** you fail to comply with this Notice and effect repairs immediately, the Port may commence legal proceedings against you pursuant to your lease.

DATED:

LESSOR,

CITY AND COUNTY OF SAN FRANCISCO  
ACTING BY AND THROUGH THE SAN  
FRANCISCO PORT COMMISSION

**MICHAEL MARTIN**

Deputy Director of Real Estate

cc: \_\_\_\_\_ Property Manager  
\_\_\_\_\_, Senior Property Manager  
Rona Sandler, Deputy City Attorney  
Richard Berman, Utility Specialist  
Rod Iwashita, Chief Harbor Engineer  
Neil Friedman, Chief Building Inspector



# **AQUATIC PARK ENHANCED SEWER SYSTEM MANAGEMENT PLAN AND ILLICIT CONNECTION PROTOCOL June 2017**

## **Introduction**

Aquatic Park, a beach and cove in San Francisco, has been identified as impaired with fecal indicator bacteria (FIB) based on water contact recreation (REC-1) beneficial use. In order to deal with bacteria issues at beaches in the Bay Area, a Total Maximum Daily Load (TMDL) for bacteria amendment has been approved for the San Francisco Basin Water Quality Control Plan (Basin Plan). This amendment requires that the Port of San Francisco (Port) prepare this document to prioritize sewer inspections and repairs, identify illicit sanitary sewer connections to storm drains, and repair and correct misaligned sewer and storm water lines areas within  $\frac{1}{4}$  miles from the shore and within Port jurisdiction.

Aquatic Park is mostly under the jurisdiction of the San Francisco Public Utilities Commission (SFPUC), however the Port has authority over the north-east corner. For a map delineating Aquatic Park, the sewage systems, and jurisdictional authorities, please refer to the figure included in Attachment A.

## **Current Situation**

Aquatic Park is located in the neighborhood of Fisherman's Wharf in San Francisco. Those portions of the sewer system that are within Port jurisdiction and  $\frac{1}{4}$  a mile from the shore at Aquatic Park are mostly located underneath piers 45 and 47, and Hyde Street Harbor. Also, there are sewer lines near Hyde Street Pier that are within Port jurisdiction but are not owed by the Port; these are owned by the San Francisco Parks PUC or the San Francisco Parks and Recreation Department.

The sewer system in this area is comprised of gravity lines and force mains, which carry storm water, waste water, and a combination of both storm water and waste water. Force mains are connected to adjoining pump stations. The Port is responsible for the sewer lines within Port jurisdiction, except where a Port tenant has maintenance obligations under the terms of the lease, or where the lines are owned by another city department.



### **Current Inspection and Maintenance Activities**

Presently, the under-pier sewer system is inspected yearly by Port plumbers for active leaks or highly vulnerable conditions. Also, as a routine part of any field work, plumbers look for cross connections and illegal connections. However, the storm water lines that discharge to the San Francisco Bay are not typically inspected.

Additionally, there are four pump stations in the area which are inspected weekly. Pump stations are inspected for any anomalies that would indicate a leak in the connected sewer system. After inspections, repairs are completed as-needed, depending on the severity of the issue.

### **Enhanced Current Activities**

Beginning in January of 2018, and over the next 5 years, the Port commits to doubling the number of under-pier sewer system inspections in the area near Aquatic Park. Consequently, under-pier sewer systems will be inspected twice a year. Additionally, Port staff will begin looking at storm water lines and discharge points during the under pier-inspections, to look for any indications of an illicit connection. In order to determine if discharges from storm discharge points are illicit, under-pier inspections will occur at least 72 hours after the previous rain event, as possible. Non-storm water discharges suspected of being sanitary sewage and/or significantly contaminated will be investigated within 24 hours. Port staff will be trained on how to properly deal with a suspected illicit connection, and in accordance with the State Water Resources Control Board Water Quality Order No. 2013-001-DWQ National Pollutant Discharge Elimination System (NPDES) General Permit NO. CAS000004 Waste Discharge Requirements (WDRs) for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s). However, it will not be possible to inspect all of the storm water discharge locations because some of these points are under water. Copies of the inspection forms are included in **Attachment B**.

### **New Activities**

Beginning in January of 2018, and over the next 5 years, the Port will determine an effective way to inspect the sewerage system on-land and north of Jefferson Street (as possible). This may occur using a closed circuit television (CCTV) camera, dye tests, pressure testing, or similar method.

### **Resources**

Increasing the inspection frequency in the area near Aquatic Park will require Port staff time and equipment use. Also, additional inspections will likely lead to more repairs. These activities will be funded by the Port operating budget.

#### *Under-Pier Inspections*

Increasing the under-pier inspection program to twice a year will cost an additional \$3,600 per year, approximately.

#### *On-land Sewer Inspections*

## ATTACHMENT 7

It is not possible to determine how much this will cost until the appropriate method is determined.

### Repair Costs

Currently, average sewer maintenance and repairs costs approximately ¼ mile from Aquatic Park average \$19,000 annually. Because there will be an increase in inspections, this amount is expected to increase.

### **Staff**

Below is a list of Port staff who will be working on implementation of this Enhanced BMP and Illicit Connection Protocol.

#### *Maintenance Staff*

- Tim Felton, Superintendent, [tim.felton@sfport.com](mailto:tim.felton@sfport.com), 415-819-7560
- Oscar Wallace, Superintendent, [oscar.wallace@sfport.com](mailto:oscar.wallace@sfport.com), 415-919-7723
- Dave Rauenbuehler, Plumbing Supervisor, [david.rauenbuehler@sfport.com](mailto:david.rauenbuehler@sfport.com), 415-597-7918
- Alex Chong, Maintenance Supervisor, [alex.chong@sfport.com](mailto:alex.chong@sfport.com), 415-819-4219

#### *Environmental Staff*

- Anna Wallace, Regulatory Specialist, [anna.wallace@sfport.com](mailto:anna.wallace@sfport.com), 415-274-0558
- Richard Berman, Utility Specialist, [richard.berman@sfport.com](mailto:richard.berman@sfport.com), 415-274-0276

#### *Property Managers*

- Rip Malloy, Property Manager, [rip.malloy@sfport.com](mailto:rip.malloy@sfport.com), 415-274-0267

### **Next Steps**







In accordance with the TMDL Bacteria Basin Plan Amendment, in 5 years, the Port will determine the effectiveness the sewer system inspection and repairs summarized in this report. The beach monitoring data collected by the SFPUC will be assessed to determine if targets are met. If targets have not been met, then Port staff will determine if further sewer and stormwater inspections and repairs are needed. These actions, along with a supplemental monitoring plan, will be summarized in an updated Enhanced Sewer System Management Plan and Illicit Connection Protocol, which will be submitted to the water board in 5.5 years.

The Port values environmental protection and regulatory compliance, and looks forward to working to improve the water quality at Aquatic Park.






# Aquatic Park Sewer System




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-  QUARTER MILE BUFFER
-  PORT JURISDICTION LINE
-  PUMP
-  INLET
-  DISCHARGE POINT




## STORM PIPES

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-  PUC
-  FORCE MAIN

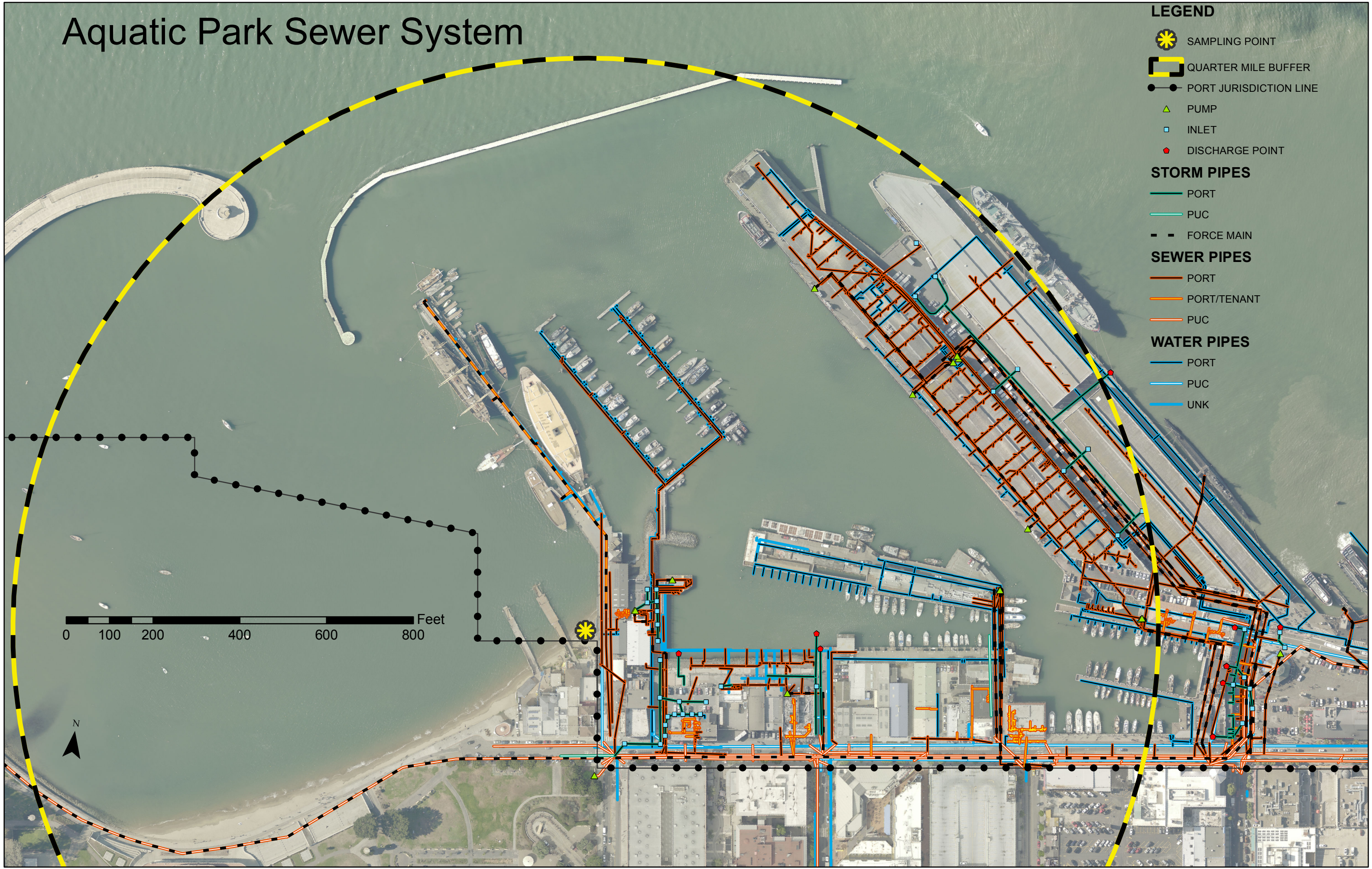
## SEWER PIPES

-  PORT
-  PORT/TENANT
-  PUC

## WATER PIPES

-  PORT
-  PUC
-  UNK

0 100 200 400 600 800 Feet

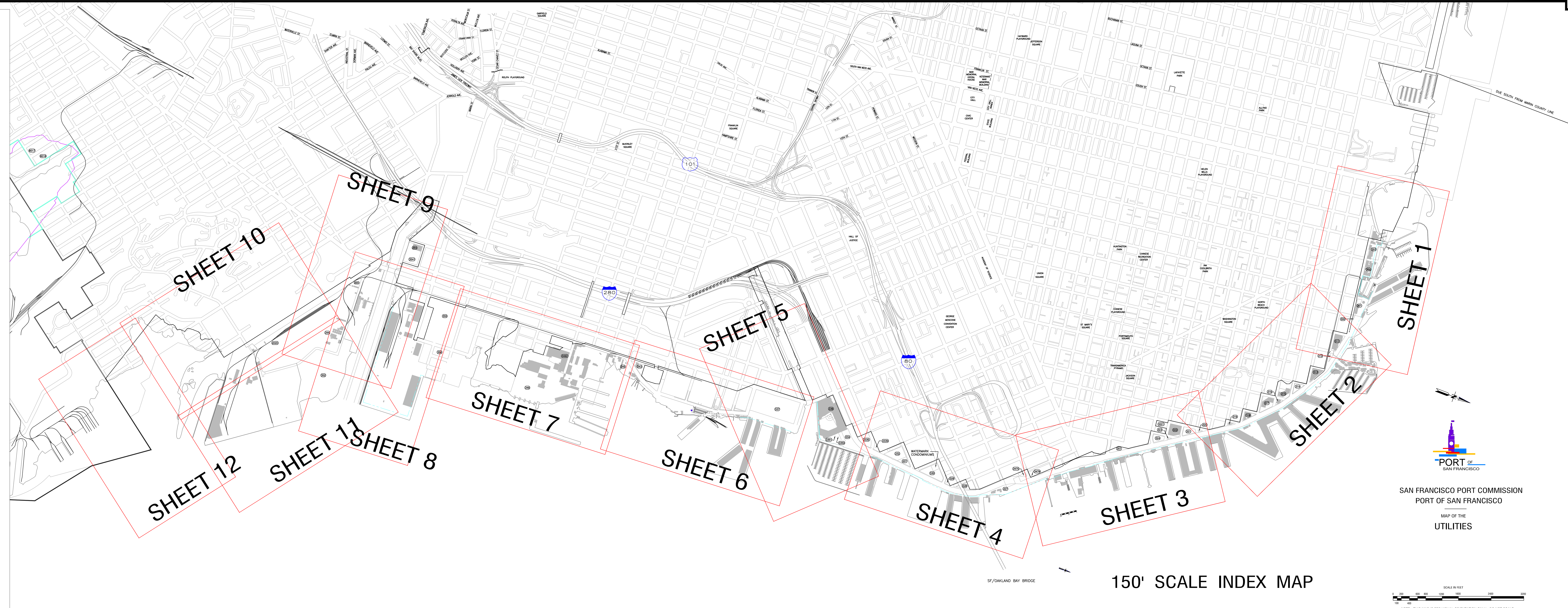








LEGEND	
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	COMMUNICATION_NODES
	ELECTRICAL_LINES
	ELECTRICAL_NODES
<b>FUEL_NODES</b>	
	Meter
	Valve
<b>FUEL_PIPES</b>	
<b>SEWER_NODES</b>	
	MH
	CatchBasin
	Trenchdrain
	CleanOut
	EndCap
	Junction
	Pump
	Outfall
	SSSC
	Valve
	BFP
	Dther
<b>SEWER_PIPES</b>	
	FM
	Gravity
<b>STORM_NODES</b>	
	Dther
	Pump
	Junction
	EndCap
	CleanOut
	Trenchdrain
	MH
	CDS
	Outfall
	WaterInlet
<b>STORM_PIPES</b>	
<b>WATER_NODES</b>	
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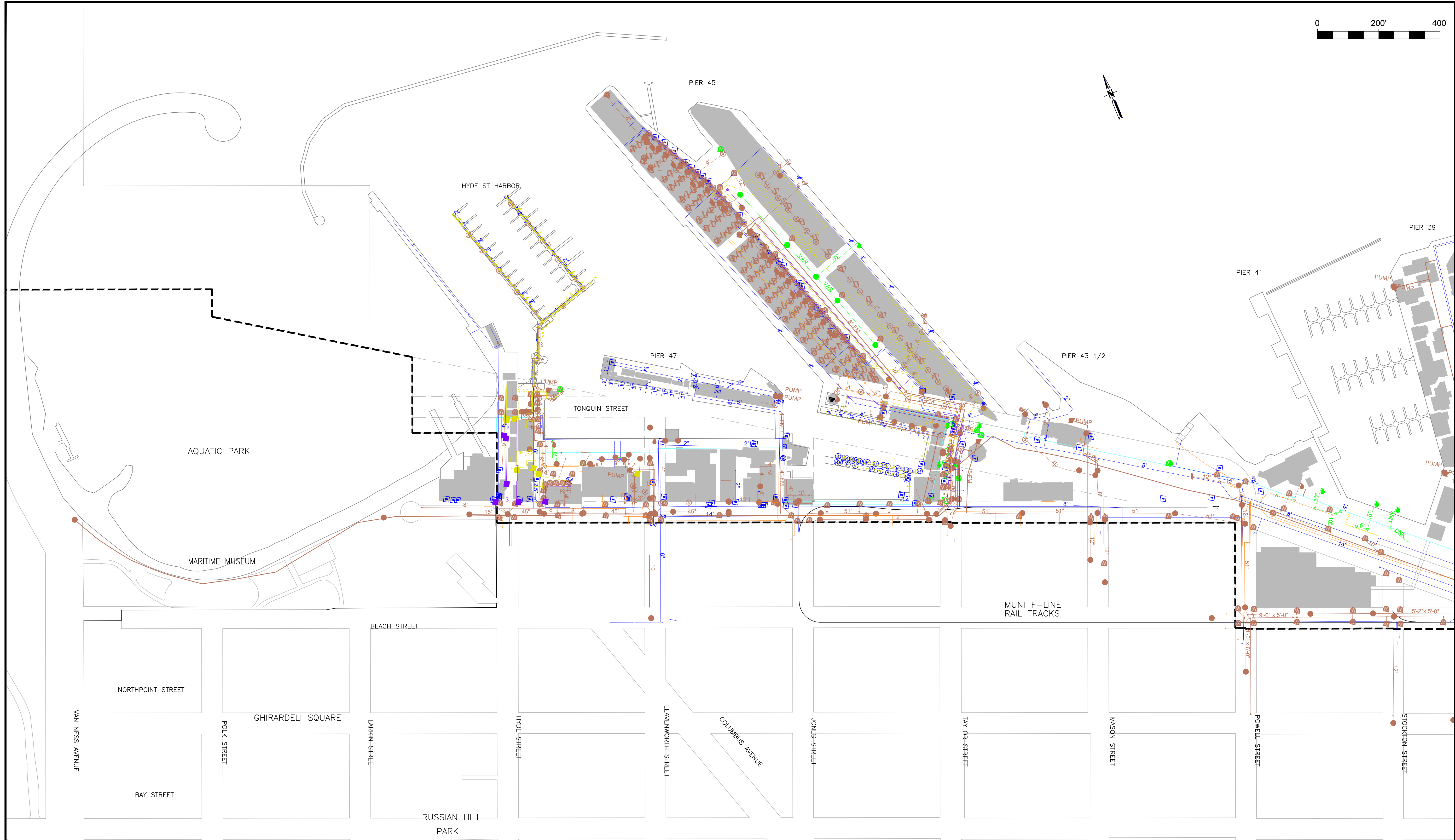
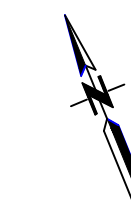


150' SCALE INDEX MAP

  
 SAN FRANCISCO PORT COMMISSION  
 PORT OF SAN FRANCISCO  
 MAP OF THE  
 UTILITIES

SCALE IN FEET  
 0 100 200 300 400 500  
 NOTE - THIS MAP IS FOR VISUAL ORIENTATION ONLY - DO NOT SCALE






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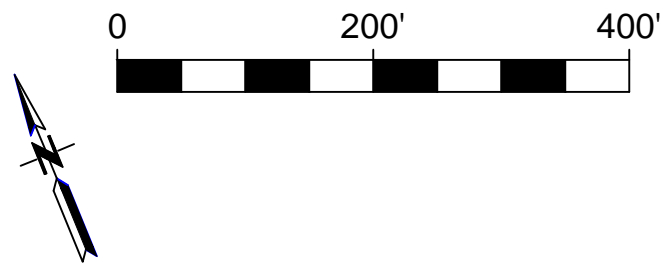

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**PORT OF SAN FRANCISCO**  
**DEPARTMENT OF ENGINEERING**

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PORT OF SAN FRANCISCO		CONTRACT NO.
UTILITIES		DRAWING NO.
		SPECIFICATION NO.



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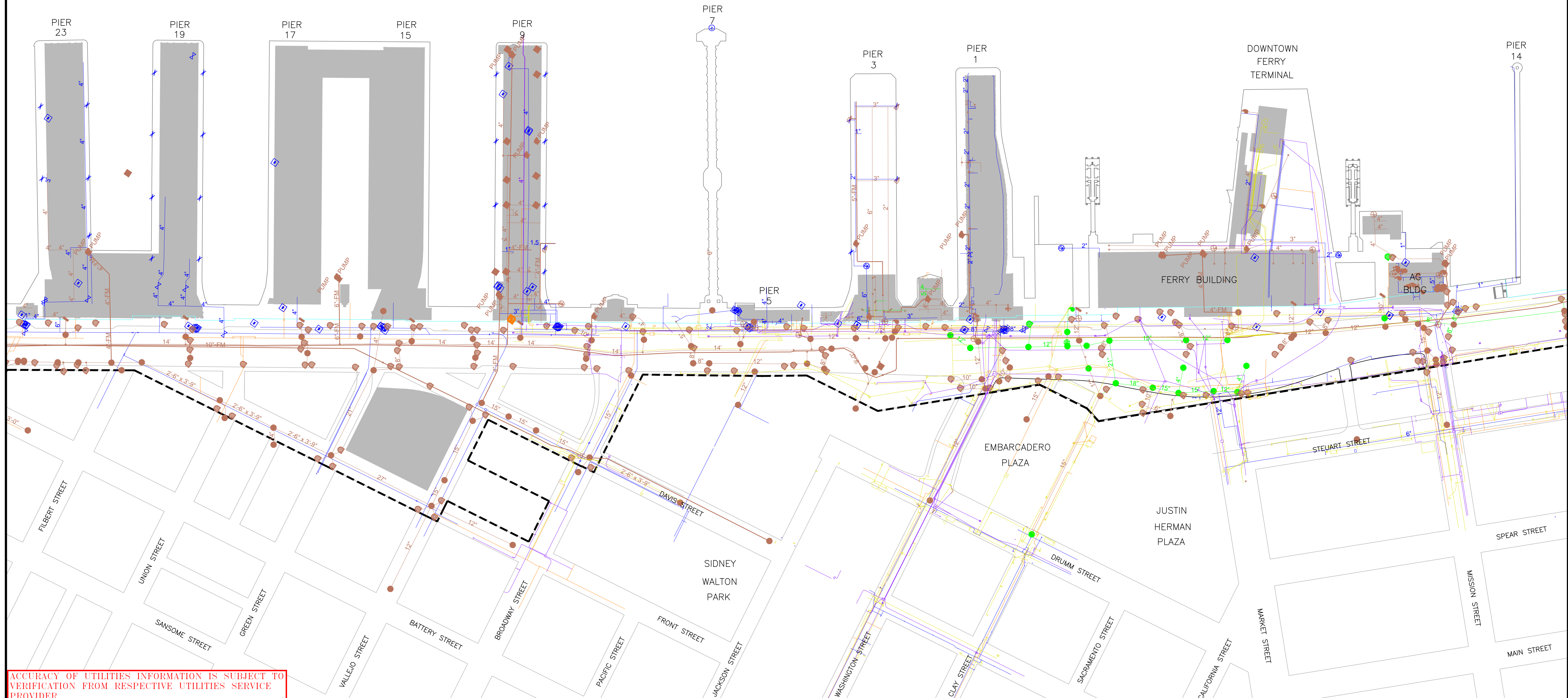
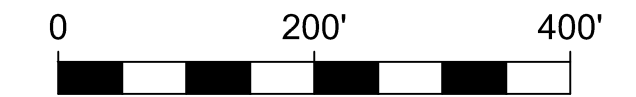
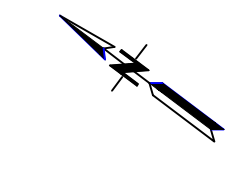
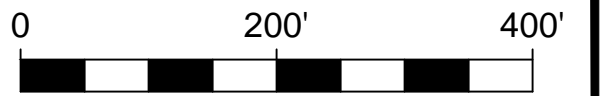
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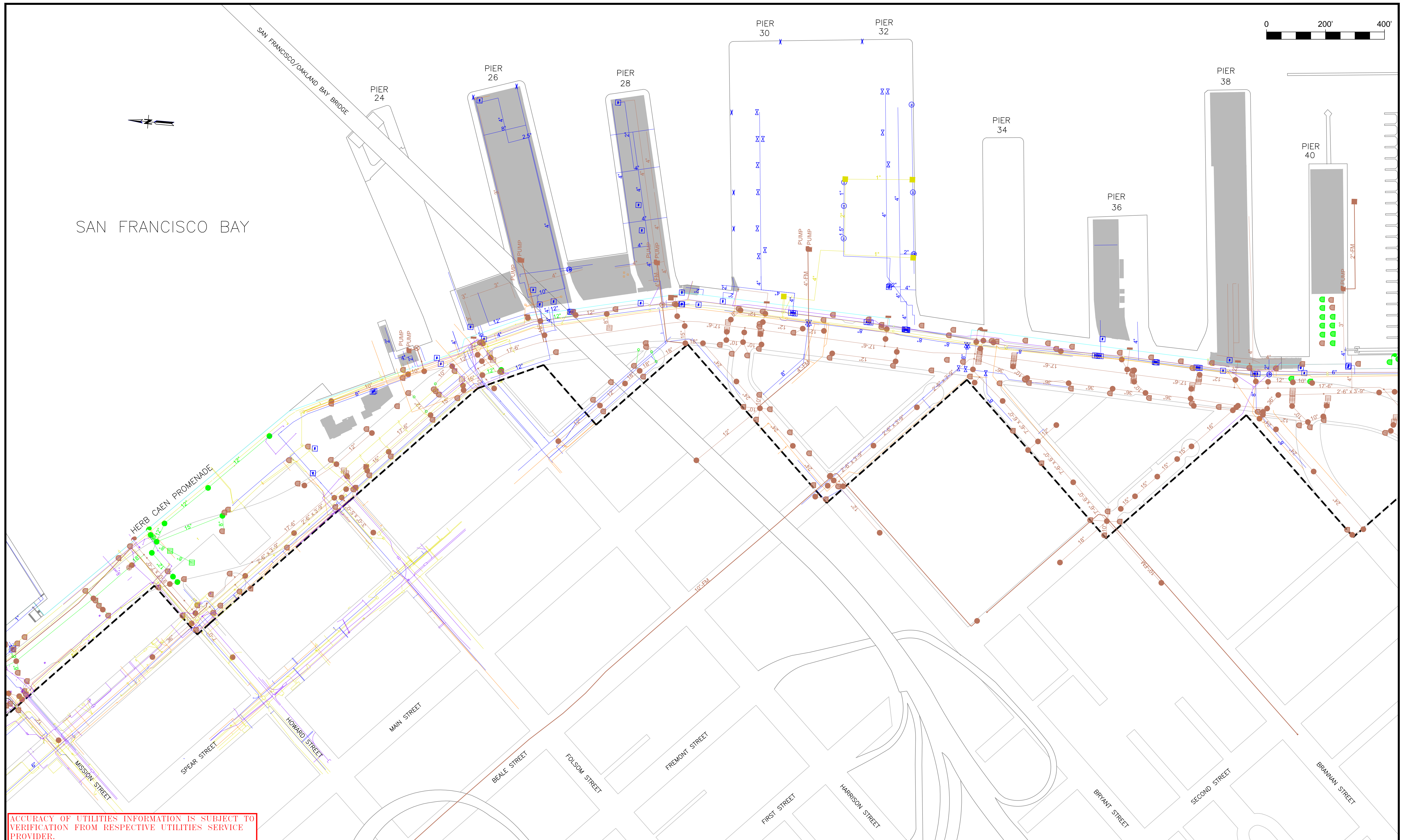
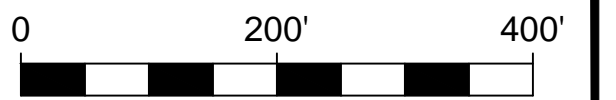
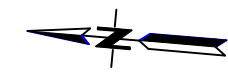
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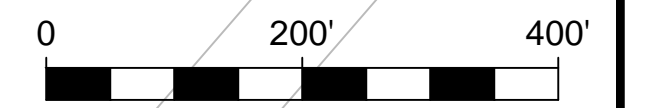
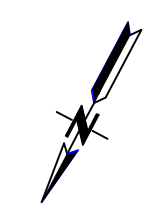
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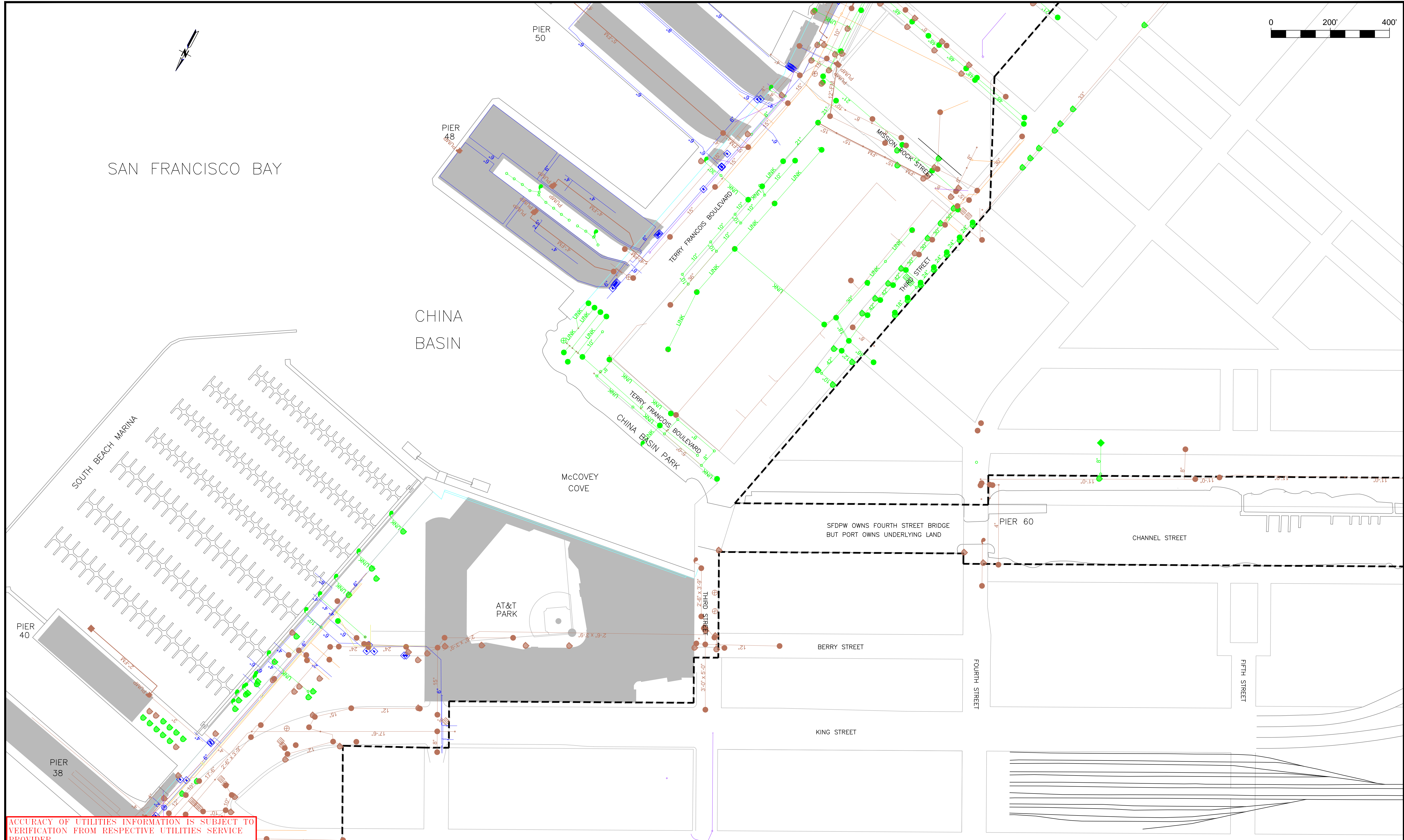
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CHINA BASIN




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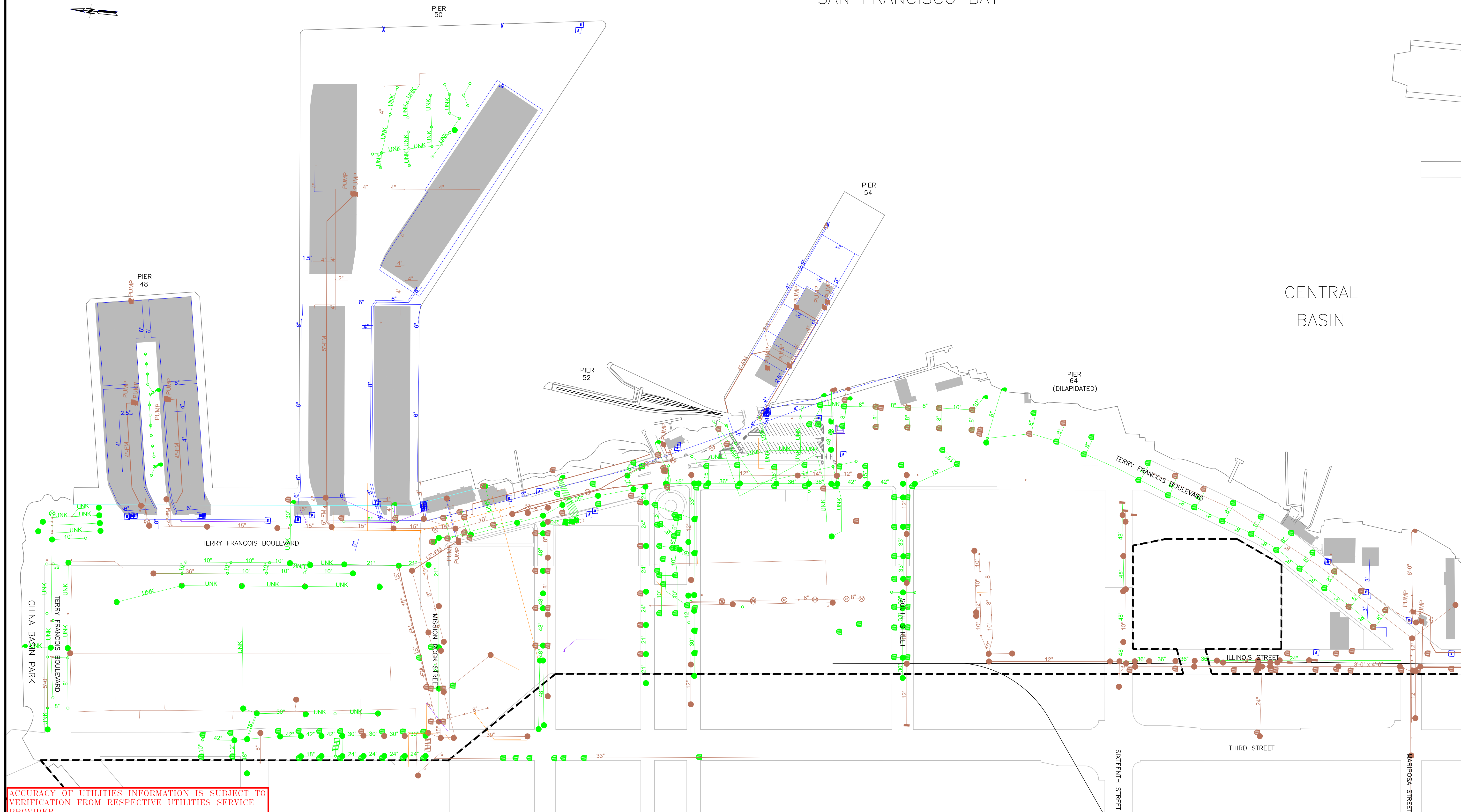
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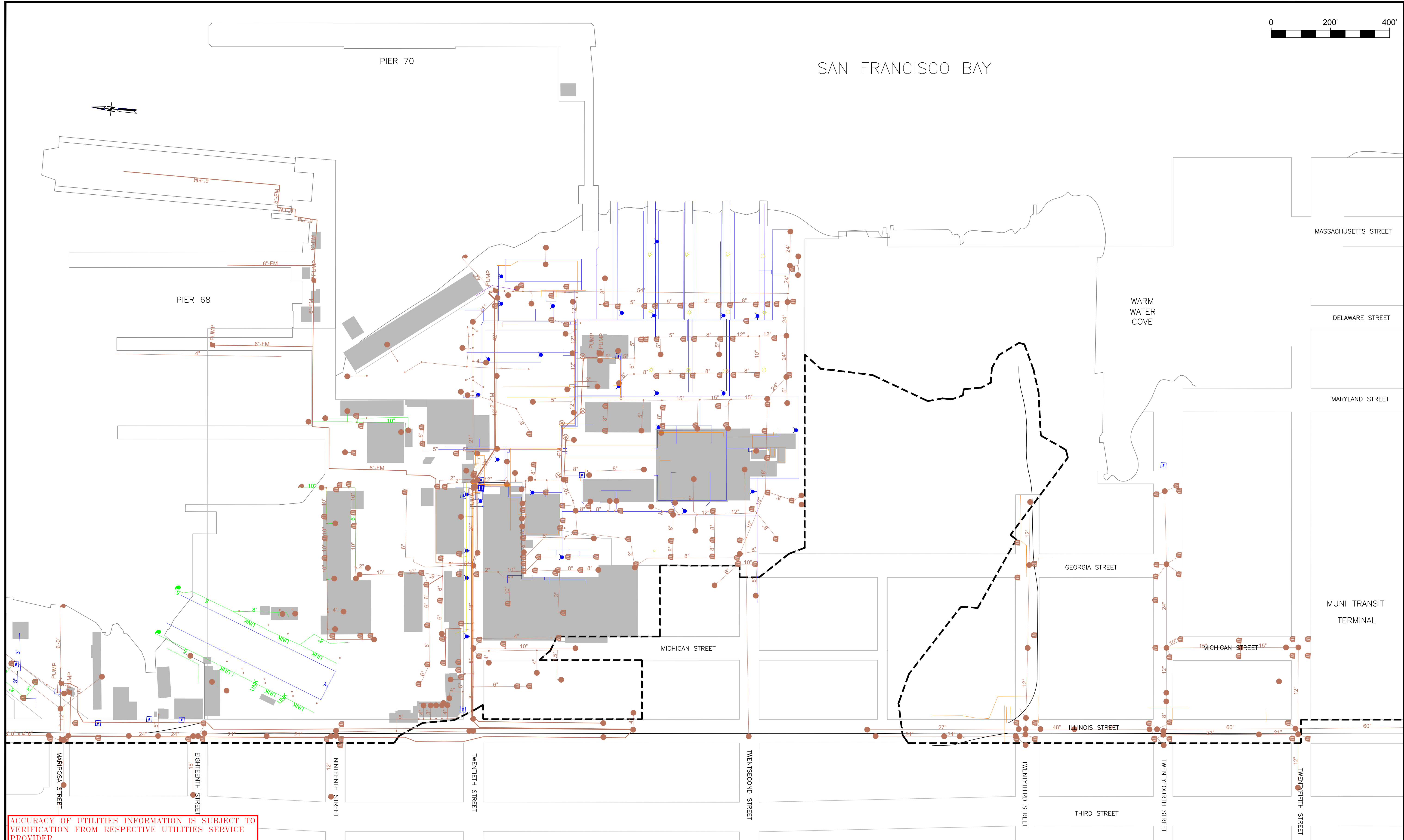


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PORT OF SAN FRANCISCO  
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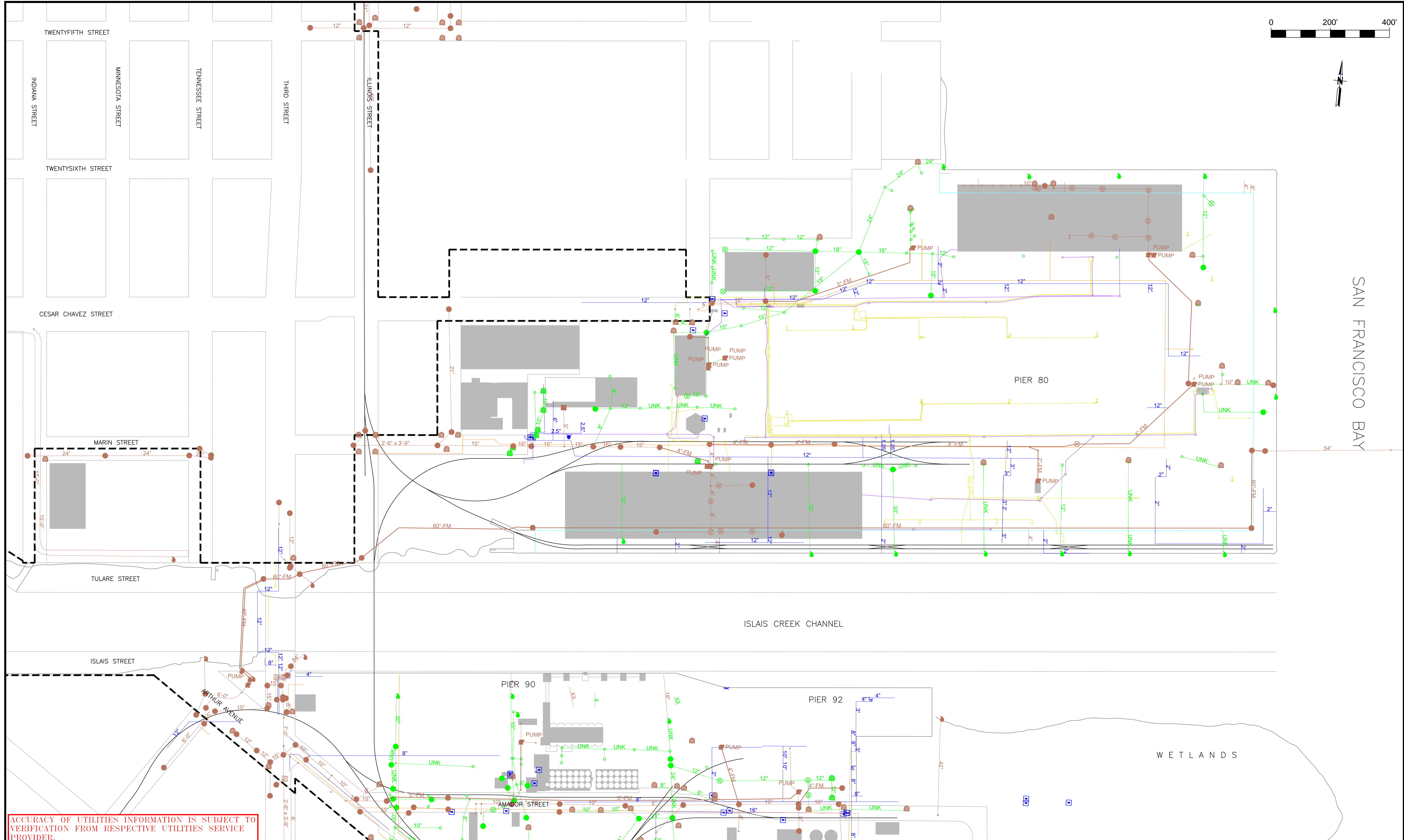
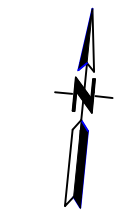
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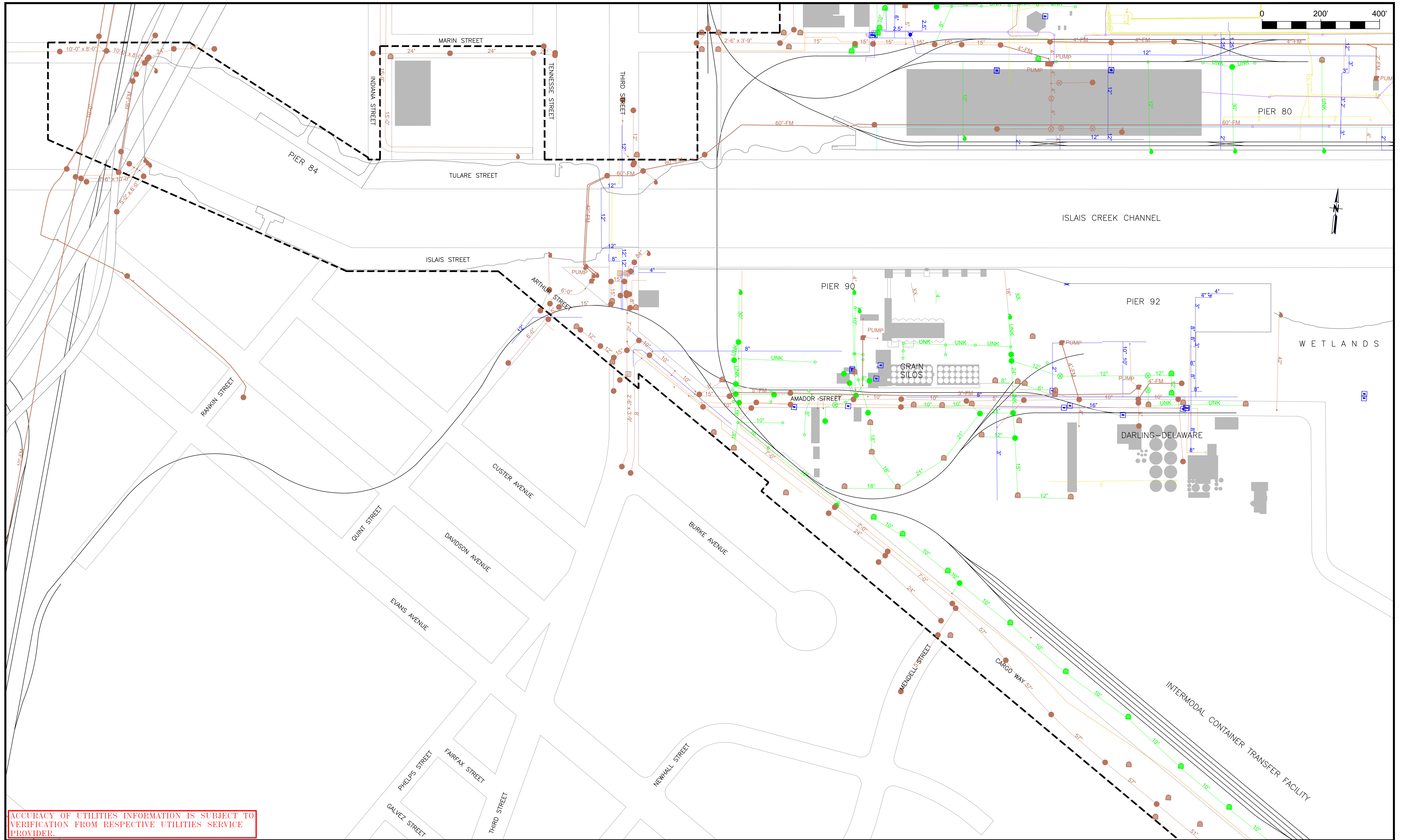
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PORT OF SAN FRANCISCO  
**UTILITIES**

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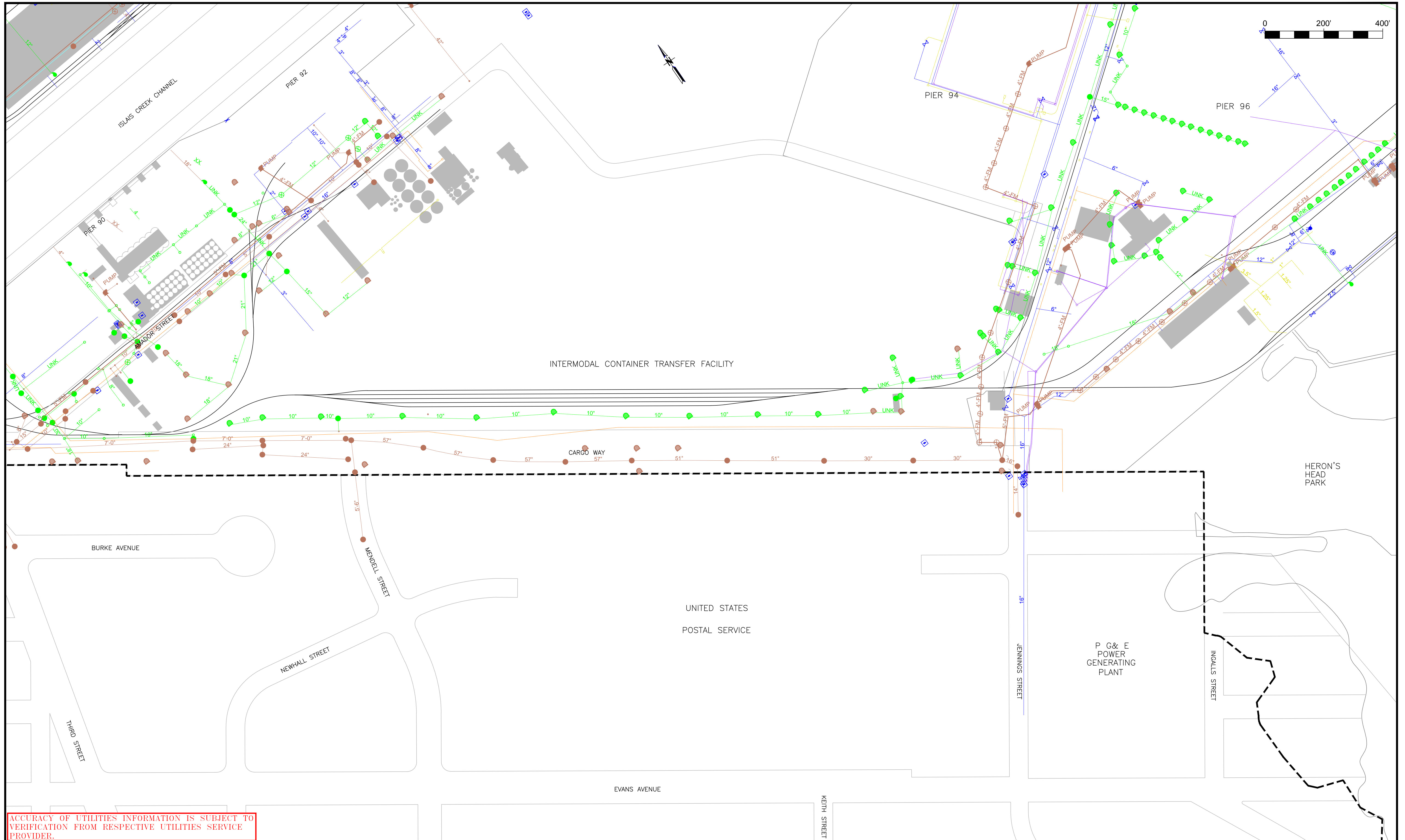
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**PORT OF SAN FRANCISCO**  
**UTILITIES**

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**SAN FRANCISCO PORT COMMISSION**  
**PORT OF SAN FRANCISCO**  
**DEPARTMENT OF ENGINEERING**

DESIGNED: DATE: \_\_\_\_\_  
 DRAWN: DATE: 7/12/2012  
 JAH  
 CHECKED: DATE: \_\_\_\_\_

APPROVED BY  
 SAN FRANCISCO PORT COMMISSION  
 DATE: \_\_\_\_\_  
 \_\_\_\_\_  
 CHIEF HARBOR ENGINEER

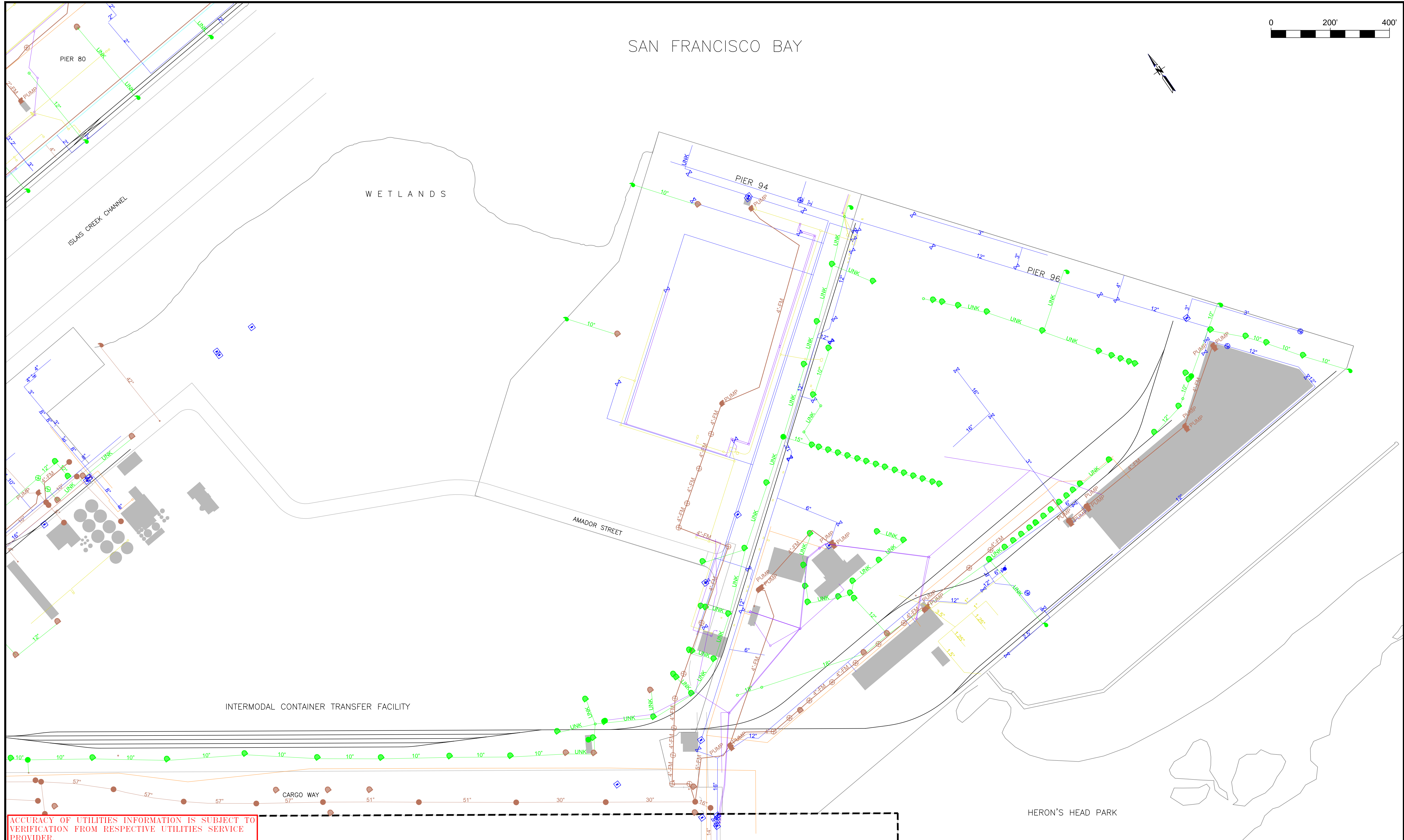
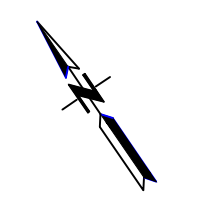
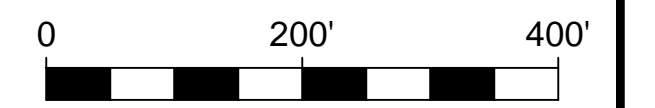
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 1"=150'  
 SHEET OF SHEETS  
 10 of 12

**PORT OF SAN FRANCISCO**  
**UTILITIES**

CONTRACT NO.  
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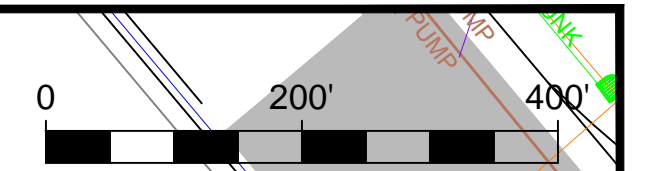
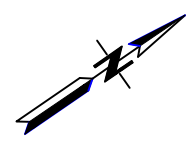
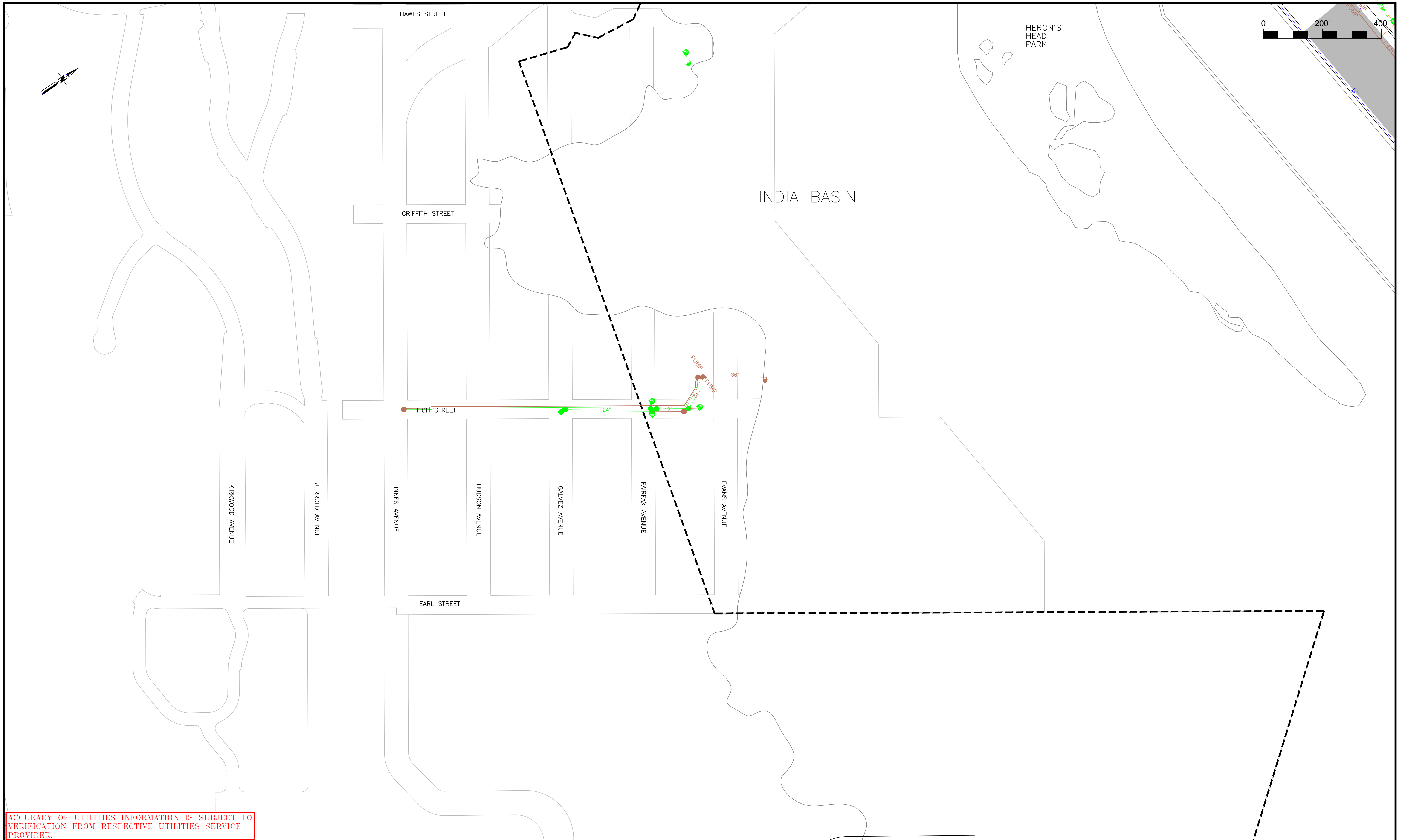

**SAN FRANCISCO PORT COMMISSION**  
**PORT OF SAN FRANCISCO**  
**DEPARTMENT OF ENGINEERING**

DESIGNED:	DATE:	APPROVED BY:
DRAWN:	DATE:	SAN FRANCISCO PORT COMMISSION
CHECKED:	DATE:	DATE: _____
		CHIEF HARBOR ENGINEER

SCALE:  
1" = 150'  
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11 of 12

PORT OF SAN FRANCISCO		CONTRACT NO.
UTILITIES		DRAWING NO.
		SPECIFICATION NO.





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 CHIEF HARBOR ENGINEER

SCALE:  
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 12 of 12

PORT OF SAN FRANCISCO  
 UTILITIES

CONTRACT NO.  
 DRAWING NO.  
 SPECIFICATION NO.

**PORT OF SF - SEWER SYSTEM AUDIT CHECKLIST**

DATE: \_\_\_\_\_

ELEMENT	TITLE	REQUIREMENT	COMPLIANT	CURRENT	COMMENTS
1.	<b>Goals</b>	Minimize the frequency of SSOs.			
		Mitigate the impact of SSOs.			
		Provide notifications and reports to all required regulatory agencies in a timely manner.			
		Properly manage, operate, maintain, and improve the wastewater collection system.			
		Provide adequate capacity to convey peak flows.			
2.	<b>Organization</b>	Designate Legally Responsible Official (LRO)			
		Organization chart			
		Chain of communication			
3.	<b>Legal</b>	Prevent illicit discharges into sewer system			
		Require sewer connections be properly designed and constructed			
		Ensure access for maintenance/inspection			
		Limit discharge of FOG			
		Enforce violations			
4.	<b>O&amp;M Program</b>	Maintain up-to-date maps			
		Describe routine preventive O&M program			
		Rehabilitation and replacement plan			
		Training			
		Equipment & parts inventory			

ATTACHMENT 9

ELEMENT	TITLE	REQUIREMENT	COMPLIANT	CURRENT	COMMENTS
5.	<b>Design &amp; Performance Provisions</b>	Design & construction standards			
		Inspection & testing standards			
6.	<b>Overflow ER Plan/Contingency Plan</b>	Procedures to properly notify primary responders			
		Response program for all SSOs			
		Procedures to notify regulatory agencies and protect public health			
		Response procedures for staff and contractors			
		Emergency response procedures			
		Program to contain and prevent discharges			
7.	<b>FOG Control Plan</b>	Public outreach program that promotes proper disposal of FOG			
		Plan for disposal of FOG generated within the service area			
		Legal authority to prohibit SSOs caused by FOG			
		Requirements to install grease removal devices			
		Authority to inspect grease producing facilities			

ATTACHMENT 9

ELEMENT	TITLE	REQUIREMENT	COMPLIANT	CURRENT	COMMENTS
		Identification of 'hot spots' with FOG-related problems			
		Source control measures for 'hot spots'			
8.	<b>System Evaluation / Capacity Assurance Plan</b>	Evaluation system to identify portions where hydraulic deficiency contributes to SSOs			
		Design criteria where needed to undertake evaluation			
		Undertake capacity enhancement measures			
		Develop schedule of completion dates			
9.	<b>Monitoring, Measurement, and Program Modifications</b>	Maintain relevant information for SSMP activities			
		Monitor implementation and effectiveness of SSMP			
		Assess preventative maintenance program			
		Update program elements based on evaluations			
		Identify SSO trends			
10.	<b>SSM Program Audits</b>	Conduct periodic audits			
		Record results of audit in a report			
		Record changes and corrective actions			

