Section E

Pollution Prevention and Good Housekeeping Program

Stormwater Management Plan
Honolulu Harbor
and Kalaeloa Barbers Point Harbor

Prepared for:
State of Hawaii
Department of Transportation
Harbors Division

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TABLES

APPENDICES

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1.0 STORM SEWER SYSTEM OPERATION AND MAINTENANCE PROGRAM

Harbors has developed an SSS O&M Program that covers inspection and cleaning procedures for the small MS4s at Honolulu Harbor and KBPH. The SSS O&M Program is included as Attachment 1 and is summarized in this section.

Following the initial cleaning back in 2015, HAR-O has been conducting recurring cleaning of all inlets, pipes (as necessary), drainage features, and outfalls (as necessary) by removing accumulated debris, trash, and sediment, at Honolulu Harbor and KBPH since.

The goal of the program is to identify structural defects, trash, debris, and other issues that have the potential to limit the flow of stormwater. Harbors will inspect drains concurrently with cleaning activities and track results of the inspections in an AMS. A storm drain is determined in need of cleaning when a visual inspection or "stick test" determines accumulated soil, wet organic material, and debris have accumulated to certain threshold measurements. If debris has accumulated beyond 6 inches but less than 12 inches, then the drain will be cleaned within 30 working days. If debris has accumulated beyond 12 inches, then the drain will be cleaned within 10 working days.

Harbors identifies "hot spots" where there is a greater risk for potential discharges of pollutants to the storm sewer system. In terms of small MS4 O&M, a hot spot is defined as: *a storm drain where more than 12 inches of accumulated soil, wet organic material, or debris were observed within two consecutive inspection cycles.*

Appropriate BMPs, including more frequent cleaning and maintenance to minimize potential discharges of pollutants will be implemented at or near hot spot locations. If an illicit discharge is observed due to accumulated sediment, trash or other pollutant related to drainage system cleaning, response will be conducted as detailed in the SSS O&M Program document.

2.0 MAINTENANCE AND HOUSEKEEPING PRACTICES

Maintenance is ongoing at both tenant and Harbors facilities. The following maintenance activities will be conducted:

- ✓ Emptying dumpsters, removing and disposing of discarded objects, machinery or equipment;
- ✓ Prompt repair/replacement of malfunctioning dumpsters;
- ✓ General maintenance and repair of public facilities will be conducted in-house, while a contractor will be used for most large-scale projects;
- ✓ Personnel will use fertilizer or herbicides following the manufacturer's instructions and in a manner that eliminates potential for runoff into the gutters, or storm drain system;
- ✓ Pier apron and common area are swept regular, and their cleanliness is assessed for debris and staining, and responsible parties will be required to keep these areas clean;
- ✓ Tenants having rail tracks are required to conduct routine maintaining and cleaning;
- ✓ Operators with leaking vehicles are required to park vehicles and equipment indoors/under cover, provide drip pans and repair leaks;
- ✓ Vehicle and equipment washing under Harbors jurisdiction is generally prohibited unless performed in an approved wash facility and properly contained; and
- ✓ Clean up stains, spills, oil spots using dry cleanup methods.

2.1 SWEEPING COMMON AREAS AND SELECT TENANT FACILITIES

Sweeping prevents microscopic pollutants from entering the harbors by removing them before they flow into the storm drainage system. Regular sweeping will be performed by HAR-OC. HAR-OC has four sweepers dedicated to Honolulu Harbor and KBPH. Sweeping will included all common areas and certain areas on tenant facilities where cleaning is requested. Sweeping will be performed according to the following schedule presented in Table 2-1.

Table 2-1 Grounds Maintenance Sweeping Schedule

Location	Frequency	Duration (Hours)
Young Brothers	M, Th	2.5
Matson	Tu, F	2.75
Horizon Lines Terminal	W	3
Aloha Cargo Pier 1	Once per month	2.5
Piers 10, 11	M, F	1
Sand Island Base Yard	T, W	1
Fishing Village Parking Lot and Road Ways, Pier 35	Once per week	1.5
Piers 30, 31, 32 and Shed Areas	Twice per week	1.5
Piers 27, 28, 29	Twice per week	1.5
Piers 18, 19, 23, 24	Twice per week	1.5
Channel Street, Pier 2 Outside and Inside of Shed Areas	M, F	3
Pier 1 Entrance	Twice per week	1
Piers 1, 2 Common Roadways	Twice per week	1
KBPH Common Roadways & Apron	Twice per month	4

All waste from Honolulu Harbor and KBPH will be combined and disposed of through the appropriate disposal contractors.

2.2 WASTE COLLECTION

HAR-OC picks up and disposes of other potential pollutants left in drop off areas or discarded illegally by the public in order to minimize and/or prevent pollution to the environment. This includes automobile, boat, and motorcycle lead acid batteries, scrap steel, discarded used tires, and construction debris. Waste from drop off areas, illegal dumping, and sweeping activities are disposed of with the appropriate waste contractors. The destination of each type of waste will be reported in the ACR.

3.0 REVIEW OF WASH AREAS, DRY WELLS, AND INFILTRATION SINKS

3.1 WASH AREAS

Washing activities are crucial to the business operations of some tenants. Washing practices that are improperly performed can generate illicit discharges and are prohibited. All washing wastewater needs to be properly contained and properly disposed of. Harbors requires tenants to formally submit applications to perform permitted washing activities with the goal of minimizing potential pollutants from being discharged into MS4 or adjacent harbor water.

Harbors will require that applications for washing include at least the following information:

- ✓ What the tenant intends to wash;
- ✓ Equipment used (such as pressure sprayer, hose, etc.) and flow rate;
- ✓ What type of detergent the tenant intends to use (biodegradable detergent is prefered)
- ✓ Wash water containment method (permanent wash rack, temporary berm, etc.);
- ✓ Wash water capture method (vacuum truck, evaporation, etc.);
- ✓ Wash water collection container capacity; and
- ✓ Wash water disposal method.

Tenants are prohibited from washing equipment and vehicles without obtaining prior consent from Harbors. Following the acceptance of the washing application, Harbors will issue a formal letter of approval once these conditions are met. The application and review process are tracked on an annual basis and reported in the ACR.

If the washing facility discharges to the CCH sanitary sewer, an Industrial Wastewater Discharge Permit (IWDP) will be required. It is the tenant's responsibility to apply for and meet the requirements of the CCH IWDP permit.

3.2 DRY WELLS AND INFILTRATION SINKS

Harbors will require that applications for sinks or drains that are not connected to the sanitary sewer include the following information:

- ✓ The intended use of the sink;
- ✓ A list of substances that may be washed into the sink (e.g. bio-degradable soaps and dirt);
- ✓ Construction drawings for the sink;
- ✓ Proposed treatment of the water (filtration fabric, sand, carbon filters, oil-absorbent material, etc.);
- ✓ Final destination of wash water; and
- ✓ Routine maintenance schedule for the sink (replacement of filtration material).

Tenants are prohibited from using unapproved sinks until Harbors verifies that the sinks do not create a potential hazard to receiving waters. Harbors may issue a formal letter of approval once these conditions are met. The application and review process will be tracked on an annual basis and reported in the ACR.

4.0 TENANT EDUCATION AND EMPLOYEE TRAINING

Tenants will be educated regarding pollution prevention and good housekeeping practices at the Annual Tenant Stormwater Pollution Prevention Awareness Training. Meanwhile, Harbors will provide information to all employees about its stormwater management program on an annual basis. In addition, Harbors will provide annual IDDE and awareness training to employees including Harbor Police, Marine Cargo Specialists, and Grounds Supervisors. Slides depicting examples of proper and improper BMPs will be presented to illustrate acceptable procedures.

ATTACHMENT 1
STORM SEWER SYSTEM OPERATION & MAINTENANCE PROGRAM

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Storm Sewer System Operations & Maintenance Program Manual

PROTECT
OUR HARBOR WATERS

MĀLAMA I KE KAI
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION

State of Hawaii Department of Transportation, Harbors Division
Honolulu Harbor Small MS4 NPDES Permit No. HI 03KB482
Kalaeloa Barbers Point Harbor Small MS4 NPDES Permit No. HI 03KB488
February 2017

STORM SEWER SYSTEM OPERATIONS AND MAINTENANCE PROGRAM MANUAL
Volumes I and II

Honolulu Harbor Small MS4 NPDES Permit No. HI 03KB482

Kalaeloa Barbers Point Harbor Small MS4 NPDES Permit No. HI 03KB488

PROTECT
OUR HARBOR WATERS
MĀLAMA I KE KAI
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION

State of Hawaii Department of Transportation
Harbors Division
79 South Nimitz Highway
Honolulu, Hawaii 96813

February 2017

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LIST OF ACRONYMS AND ABBREVIATIONS

AMS	Asset Management System
ArcGIS	GIS maps and geographic information developed by ESRI
BMP	Best Management Practice
CCH	City & County of Honolulu
CCTV	Closed circuit television
CD	Consent Decree
CFR	Code of Federal Regulations
CM	Curb Marker (stencil)
Config	Configuration
COTS	Commercial Off the Shelf
CWA	Clean Water Act
CWB	Clean Water Branch
DIR	Office of Director, HDOT
DepH	Deputy Director for Harbors
DMR	Discharge Monitoring Report
ELM	Equipment, Labor & Materials
ENV	Office of Environmental Compliance, HDOT
EPA or USEPA	US Environmental Protection Agency
ESRI	Environmental Systems Research Institute
FTE	Full Time Equivalent
GIS	Geographical Information System
HA	Harbor Agent
HAR	Harbors Division; also Harbors Administrator; also Hawaii Administrative Rules
HAR-E	Engineering Branch, Harbors Division
HAR-EE	Environmental Section, Engineering Branch, Harbors Division
HAR-EM	Maintenance Engineering Section, Engineering Branch, Harbors Division
HAR-EP	Planning Section, Engineering Branch, Harbors Division
HAR-O	Oahu District, Harbors Division
HAR-OC	Operations Section, Oahu District
HAR-OCB	Kalaeloa Barbers Point Unit, Operations Section, Oahu District
HAR-OCG	Sanitations & Grounds Unit, Operations Section, Oahu District

HAR-OCM	Pier Utilization Unit, Operations Section, Oahu District
HAR-OCT	Harbor Traffic Control Unit, Operations Section, Oahu District
HAR-OE	Security & Enforcement Unit, Operations Section, Oahu District
HAR-OM	Maintenance Section, Oahu District
HC	Harbors Construction project prefix
HDOH	Hawaii Department of Health
HDOT	Hawaii Department of Transportation
HOS	Harbor Operations Supervisor
IDDE	Illicit Discharge and Detection Elimination
Illct Dsch Oil Notf	Illicit Oil Discharge Notification
Illct Dsch Misc Notf	Illicit Discharge Notification Miscellaneous
INSP	Inspection
KBPH	Kalaeloa Barbers Point Harbor
MCS	Marine Cargo Specialist
MEP	Maximum Extent Practicable
MM	Metal Marker (stencil bolted to grate)
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System
NGPC	Notice of General Permit Coverage
NPDES	National Pollutant Discharge Elimination System
NOTI	Notify
O&M	Operations and Maintenance
PBMP	Permanent BMP
QC	Quality Control
RO/RO	Terminal Forklift Trucks
SR	Service Request
SSS	Storm Sewer System
SSS OMP	Storm Sewer System Operation & Maintenance Plan
SSS O&M Manual	Storm Sewer System Operation & Maintenance Program Manual
SWMP	Stormwater Management Plan
US	United States
USACE	United States Army Corps of Engineers, Pacific Ocean Division
USEPA	United States Environmental Protection Agency
USCG	United States Coast Guard
WO	Work Order

Volume I Foundational Data Resources

CHAPTER 1

INTRODUCTION

The State of Hawaii Department of Transportation (HDOT), Harbors Division (hereinafter "Harbors") owns and operates a Small Municipal Separate Storm Sewer System (MS4) at Honolulu Harbor and Kalaeloa Barbers Point Harbor (KBPH). Storm water flowing over Harbors property into the drainage network of inlets, manholes, open channels and trench drains enters the Small MS4 at each harbor and discharges into receiving waters.

Honolulu Harbor and KBPH are subject to the United States Environmental Protection Agency (USEPA) National Pollutant Discharge Elimination System (NPDES) regulations, and requirements of Title 40 Code of Federal Regulations (CFR) Part 122, because the harbors are located in urban areas based on the *U.S. Census* and *U.S. Census Urban Area Maps*, on the Island of Oahu. Locally, the State of Hawaii Department of Health (HDOH) Clean Water Branch (CWB) oversees Hawaii's NPDES program in accordance with Chapter 342D of the Hawaii Revised Statute (HRS) and Chapter 11-55 of the Hawaii Administrative Rules (HAR).

The HDOH CWB issued the Notice of General Permit Coverage (NGPC) NPDES Permit No. HI 03KB482 to Honolulu Harbor, and the NGPC NPDES Permit No. HI 03KB488 to Kalaeloa Barbers Point Harbor, which authorizes storm water and certain non-storm water discharges to enter receiving State Waters. The NGPC NPDES Permits required Harbors to develop a *Storm Water Management Plan (SWMP)* in 2009 and revise the SWMP in 2015 (hereinafter "*SWMP"*). The *SWMP* identifies the control measures and Best Management Practices (BMP) to reduce, to the Maximum Extent Practicable (MEP), the amount of pollutants from the Small MS4s that enter the receiving State Waters. The *SWMP* control measures for Pollution Prevention and Good Housekeeping Program include the Storm Sewer System Operations & Maintenance Program (SSS O&M Program).

On November 5, 2014, the USEPA enjoined HDOH to enter into a Consent Decree (CD) with HDOT Harbors Division in order to increase awareness, to improve the storm water program, and to ensure compliance. The CD requires Harbors to comply with specific requirements of the Clean Water Act (CWA), as amended, along with the provisions set forth in the NGPC NPDES Permits.

The 2014 CD Section 20.a through d, requires Harbors to develop the *Storm Sewer System Operations & Maintenance Plan.* This Storm Sewer System Operations & Maintenance Program Manual (hereinafter "*SSS O&M Manual"*) contains information about the storm sewer system Geographical Information System (GIS) mapping; the Asset Management System (AMS); and identifies the specific tasks, schedules, and requirements of Harbors personnel who conduct inspections and cleaning in the operations and maintenance of the storm sewer system (SSS).

This *SSS O&M Manual* provides the schedules of inspection and cleaning of storm drains; creates the Standard for inspection; details the operation and maintenance activities performance; details the documentation and record keeping procedures; and describes the supervision and management of the SSS OMP.

The *SSS O&M Manual* is prepared in accordance with the 2014 Consent Decree Civil Case 1:14-cv-00408-JMS-KSC, the NPDES NGPC Permits for Honolulu and Kalaeloa Barber's Point Harbors, and relevant sections of the Federal and State laws, rules, and regulations.

1.1 Requirements

The Consent Decree requirements for this *SSS O&M Manual* are provided in Table 1.

Table 1. Consent Decree Requirements for the *SSS O&M Manual.*

CONSENT DECREE REQUIREMENTS	CHAPTERS
20. Storm Sewer System Operations and Maintenance. *. . .The SSS O&M Plan shall establish recurring schedules for inspection and cleaning of the entire storm sewer system as described below. The SSS O&M Plan shall describe: 1) the range of operation and maintenance activities to be performed, 2) timelines and recurring schedules for each activity, 3) departments and personnel responsible for activity implementation, and 4) dates and timelines for procurement of necessary equipment. The SSS O&M Plan shall address the provisions in Paragraphs 20.a. through d.*	Chapter 1
a. Storm Sewer System Mapping. *. . . HDOT-Harbors shall create and submit a comprehensive storm sewer system map that identifies all HDOT-Harbors assets including inlets, manhole, pipes, above-ground drainage features, post-construction control measures, and outfalls. HDOT-Harbors shall include areas where Harbor Property discharges directly to the Harbors or their tributaries and are at risk of flooding. The map shall be developed in GIS format and shall include relevant information for each asset class. For pipes, drainage features and outfalls, this shall include the type of material, size, condition, and date of installation, if known. Data for inlets shall include type, condition and presence of stencil. The map shall allow for the determination of outfall drainage basins including the identification of up-gradient*	Chapter 2

CONSENT DECREE REQUIREMENTS	CHAPTERS
tributaries both within the HDOT-Harbors storm sewer system and where the system is connected to offsite tributary storm drain systems to the extent that information is included in the geodatabase delivered by the Army Corps of Engineers under the Army Corps of Engineers Scope of Work. . . . The map and associated GIS shall provide foundation data for the Asset Management System described below.	
b. Asset Management System. *HDOT-Harbors shall develop and maintain an Asset Management System, which shall include and inventory of HDOT-Harbors' assets and a schedule for recurring inspection, cleaning, other maintenance, and renewal. The Asset Management System shall be capable of generating and tracking work orders for inspection, cleaning, and other maintenance and shall be capable of assisting HDOT-Harbors with prioritization of capital improvement projects. The Asset Management System shall be fully implemented not later than December 31, 2015 or within 180 days of completion of Storm Sewer Mapping described in Paragraph 20.a.*	Chapter 3 Chapter 4
c. Storm Sewer System Inspections. *As described in the SSS O&M Plan, and in accordance with the schedule described in the SSS O&M Plan, HDOT-Harbors shall conduct physical inspections of the storm sewer system to identify structural defects, trash and debris accumulation, and other constraints that limit the flow of stormwater. HDOT-Harbors shall also inspect areas where Harbor Property discharges directly to the Harbors or their tributaries and are at risk for flooding. The inspection of the storm sewer system can occur concurrently with the cleaning program required in Paragraph 20.d.*	Chapter 5 Chapter 6
d. Storm Sewer System Cleaning. *The SSS O&M Plan shall include a cleaning schedule for the storm sewer system, and shall include an initial cleaning of all inlets, pipes (as necessary), drainage features and outfalls (as necessary) by 270 days after the entry of the Consent Decree, or another date agreed upon by EPA and DOH. Cleaning shall be accomplished by removing accumulated debris, trash, and sediment. HDOT-Harbors shall develop a recurring cleaning cycle that ensures that each inlet and drainage feature are cleaned no less than once every five years following the initial cleaning. Outfalls will be cleaned as necessary.* *i. In the cleaning schedule, HDOT-Harbors shall identify "hotspots" where there is a greater risk for potential discharges of pollutants to the storm sewer system, and describe the process for defining hotspots in the SSS O&M Plan. HDOT-Harbors shall implement appropriate BMPs, including more frequent cleaning and maintenance to minimize potential discharges of pollutants to the storm sewer system. . . .* *ii. HDOT-Harbors shall require the tenant to develop and implement a schedule for routine cleaning of rail tracks at Kalaeloa Barbers Point Harbor to prevent discharge of pollutants to the receiving water.*	Chapter 5 Chapter 7 Chapter 8

1.2 Port Hawaii Commercial Harbors System

Pursuant to HRS Chapter 266, HDOT is responsible for the care and control of the commercial harbors and roadsteads in Hawaii. The Harbors controls properties at Honolulu and Kalaeloa Barbers Point Harbors, along with the nine commercial harbors serving Island of Hawaii, Kauai, Maui, Molokai and Lanai. The Port Hawaii Commercial Harbors System (hereinafter "Port Hawaii") delivers passengers and goods via ocean transportation, and supports every facet of Hawaii's economy—tourism, construction, national defense, agriculture, and industries.

Hawaii imports 80% of all consumer goods, including food and fuel, and 98% of these goods are received and processed through the ten commercial ports on six islands.

1.2.1 Honolulu Harbor

Honolulu Harbor is one of the largest container handling ports in the United States and the busiest harbor in Hawaii with over 11 million short tons of cargo handled annually, and serves as the primary commercial and transportation center in the Port Hawaii system. Honolulu Harbor provides facilities for passenger, excursion, research and fishing vessels and supports numerous tenants engaged in shipping, commercial fishing, and other maritime-related activities.

Honolulu Harbor is a natural harbor created through the restriction of coral growth by the fresh water pouring into it from Nuuanu Stream, and is well protected from wind and surge action. Located on the southern coast of Oahu, Honolulu Harbor receives most of the State's containerized cargo where it is unloaded and distributed to its final destination.

Honolulu Harbor offers over 200 acres of container yard and over 30 major berth facilities with over 5 linear miles of mooring space. Honolulu Harbor is 40-feet deep and contains five components: Main Channel, Main Harbor Basin, Kapalama Channel, Kapalama Channel Basin, and Kalihi Channel.

Figure 1 shows a rendering of the Honolulu Harbor Piers.

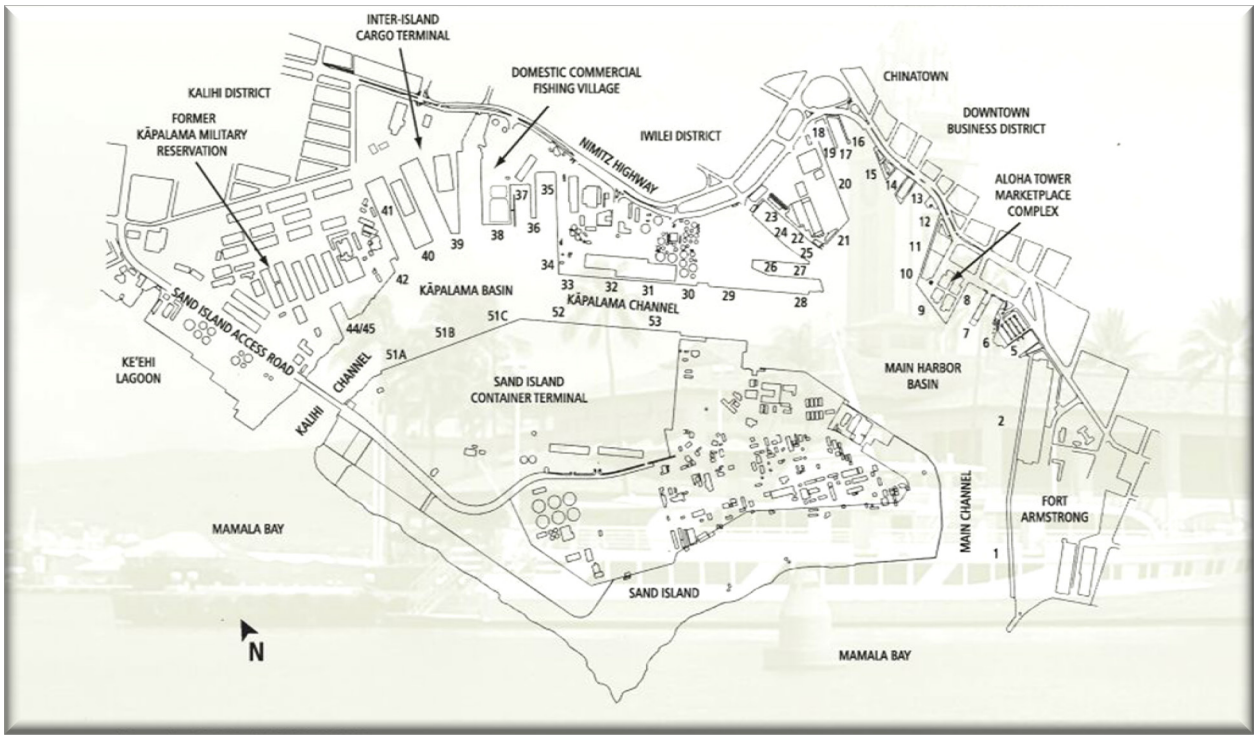

Figure 1. Honolulu Harbor Piers. (Courtesy *Port Hawaii Commercial Harbors System Handbook 2012.)*

Figure 2 shows Honolulu Harbor aerial view with ocean receiving waters.

Figure 2. Honolulu Harbor aerial view shows the surrounding ocean, channels, and basins.

The Main Channel, often referred to as the Fort Armstrong Channel, is Honolulu Harbor's entry and exit point. It is located at the harbor's east end and has a depth of 45 feet. The Kalihi Channel is located west of Sand Island but is not used because the Sand Island Access Road drawbridge over the channel is permanently fixed in place to allow for uninterrupted flow of containers to and from the container terminals on Sand Island.

The types of cargo handled at Honolulu Harbor include the following:

- Liquid-bulk cargo, e.g., petroleum products.
- Dry-bulk cargo, e.g., aggregates.
- Neo-bulk cargo, e.g., construction materials such as lumber.
- Break-bulk cargo, e.g., miscellaneous general cargo.

Linking Honolulu Harbor to the Honolulu International Airport is Nimitz Highway.

1.2.2 Kalaeloa Barbers Point Harbor

Kalaeloa Barbers Point Harbor is the second busiest port in Hawaii and enables business to ship their products directly to the Neighbor Islands. It is the newest commercial harbor constructed in 1990, and is located 19 nautical miles west of Honolulu Harbor near the south-western tip of Oahu.

Figure 3 shows the Kalaeloa Barbers Point Harbor that contains specialized cargo handling facilities, e.g., the pneumonic cement pump system.

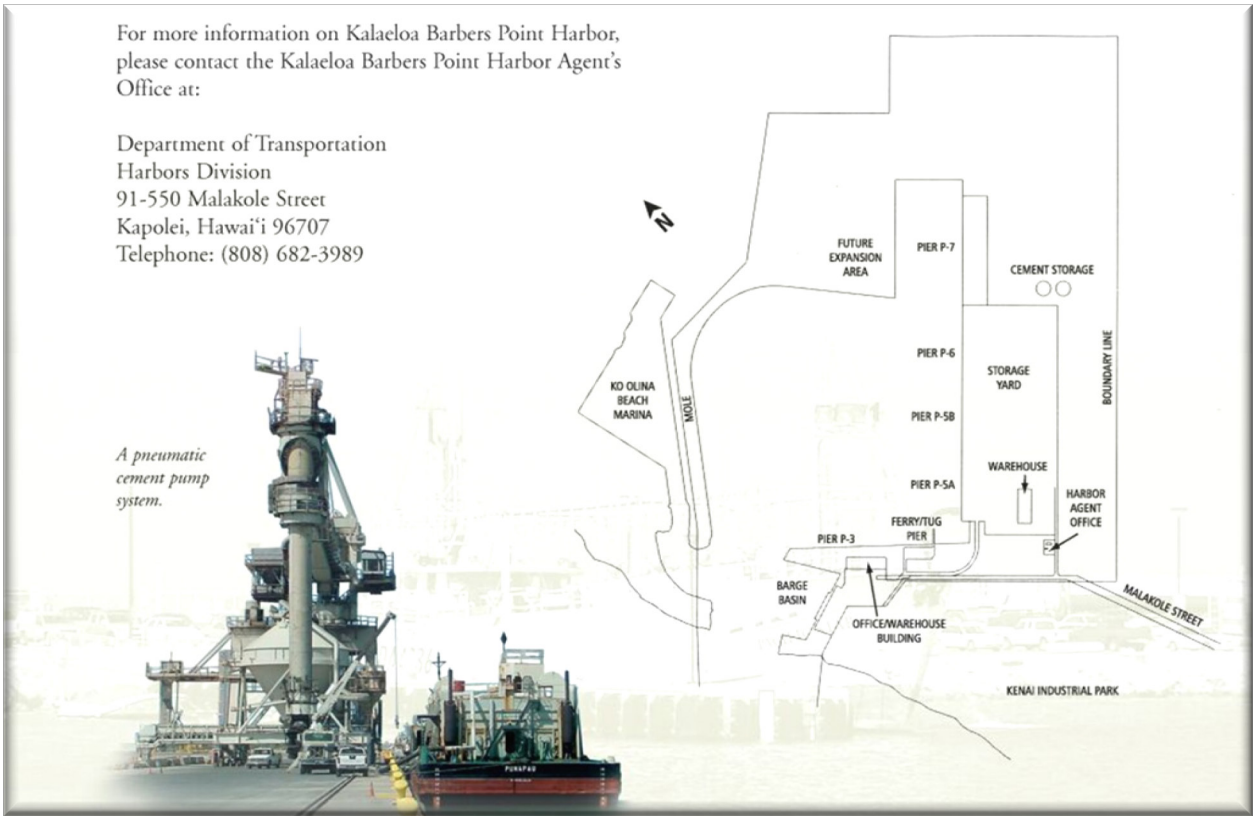

Figure 3. Kalaeloa Barbers Point Harbor contains specialized cargo handling facilities. (Courtesy *Port Hawaii Commercial Harbors System Handbook 2012.)*

Kalaeloa Barbers Point Harbor services a niche market; and contains specialized cargo handling facilities not found at Honolulu Harbor such as a coal bulk off-loader system and pneumatic cement pump station.

The main channel entrance measures 3,100-feet long and 38-feet deep. The recently expanded main basin is approximately 2,300-feet long by 1,800-feet wide.

The commodities primarily handled at Kalaeloa Barbers Point Harbor include the following types of cargo:

- Liquid-bulk cargo, e.g., petroleum products.
- Dry-bulk cargo, e.g., coal, sand, cement, gravel, and scrap metal.

In addition to commodities and lesser amounts of miscellaneous general cargo and containers, Kalaeloa Barbers Point Harbor provides space for commercial ship maintenance and repair facilities.

Kalaleloa Barbers Point Harbor is served by Interstate Highway H-1 and Farrington Highway, and is connected to Honolulu International Airport and downtown Honolulu by about 20 miles of high capacity roadway.

1.3 Storm Sewer System Operations and Maintenance Program

Honolulu Harbor and Kalaeloa Barbers Point Harbor are working harbors, busy with industrial activity that includes the use and maintenance of heavy diesel equipment, delivery vehicles, construction projects, container operations, fresh fish operations, and various tenant operations. Storm water flows over and through harbor lands and is captured into storm drains of the storm sewer system, and empties into receiving ocean waters. Storm water flows can transport pollutants from the land into the ocean through storm drains, swales, or other uncontrolled access points across the piers. This storm water flow requires the adoption and implementation of BMPs to mitigate and prevent oil, debris, silt, and other potential pollutants from entering our ocean waters.

The SWMP Pollution Prevention /Good Housekeeping Program includes the SSS OMP; general maintenance and housekeeping activities for sweeping and refuse collection; reviews and on-site inspections of wash areas, dry wells, and infiltration sinks; and storm water awareness training.

The SSS OMP defines the implementation of BMPs for storm drain inspection, cleaning, and preventive maintenance. The SSS OMP goals are to inspect storm drains to identify structural defects; clean accumulated trash, debris, and sediment; and investigate issues that have the potential to limit the storm drain flow of storm water.

1.4 Organization of the *SSS O&M Manual*

This *SSS O&M Manual* provides resource GIS maps, storm drain asset data tables, and the Operations and Maintenance (O&M) procedures documentation for Harbors personnel. This document serves to facilitate compliance performance; establish timelines and recurring schedules, routes, and routine frequencies; identify Harbors personnel responsible for specific tasks; and discuss future procurement requirements. The *SSS O&M Manual* is organized as set forth in the CD Section 20.a through d.

The Harbors GIS maps and the AMS serve as reference materials for implementation of the environmental compliance activities. The O&M procedures documentation serve as user guides for personnel who perform the Harbors storm sewer system activities and

tasks utilizing the Citiworks® AMS generated workflow processes. For ease of use, the *SSS O&M Manual* is divided into the following two volumes.

1.4.1 Volume I Foundational Data Resources – Chapters 1 to 4

- GIS maps of the Harbors storm sewer system in Pier functional areas, with data tables of storm drain assets inventories (e.g., inlets and manholes, pipes, open channels and trench drains, and outfalls).
- Citiworks® AMS management of compliance activities for performance of storm sewer system inspection, cleaning, and maintenance activities and tasks.

1.4.2 Volume II User Guides for Storm Sewer System O&M Activities – Chapters 5 to 8

- Inspection activities utilizing Citiworks® AMS with screen prints of workflow processes that manage Harbors personnel tasks from initiation to reporting.
- Cleaning activities with Harbors O&M personnel responsible to perform tasks.

1.5 *SSS O&M Manual* Audience and Intended Uses

This *SSS O&M Manual* is written for Harbors personnel, and describes the necessary activities and tasks performed to ensure proper operations and maintenance of the storm sewer system. The target audience includes Managers, Superintendents, and Supervisors with programmatic responsibilities for manpower and funding resources.

The *SSS O&M Manual* integrates the Cityworks® AMS storm drain asset maps with predefined schedules and work assignments to inspect, clean, and maintain the storm drain system; and provides O&M user guides for Harbors Inspectors and Subunit personnel.

The comprehensive Oahu District storm drain asset maps and data tables are supplemented with Harbors organizational charts, and may be useful for training personnel and new employee orientation.

The *SSS O&M Manual* may serve as a reference document for the HDOT, all Harbors personnel, environmental consultants, and regulatory agencies.

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CHAPTER 2
HARBORS STORM SEWER SYSTEM AND GIS MAPPING

Harbors personnel performs the storm sewer system O&M for the storm drain infrastructure that currently includes 529 inlets, 114 manholes, 124 outfalls, 84 fittings, 720 lines, 107 open lines, 43 Permanent BMPs, 82 signage, and 14 sweeping routes at Honolulu Harbor and Kalaeloa Barbers Point Harbor.

The storm sewer system captures storm water flows at the Honolulu Harbor's 5 linear miles of mooring space for 30 major berth facilities on 48 piers, and over 232 acres of container yard and 842,362 square feet of shed areas. At Kalaeloa Barbers Point Harbor, storm water flows over and through the Barge Basin, five commercial piers, and the Ferry Terminal/Tug Pier.

During 2015, Harbors implemented a geodatabase containing an inventory of storm sewer system assets and GIS mapping with the assistance of the US Army Corps of Engineers (USACE). An environmental engineering consultant conducted GIS data gap surveys using closed-circuit television crews on land, and kayak and scuba diving teams for discharge outfall reconnaissance to investigate unknown storm sewer system connections and to assess the condition of subsurface features associated with the data gaps.

The storm sewer system geodatabase data gathered by the USACE and consultant are currently hosted by ESRI ArcGIS server feature map services and managed in ArcGIS Desktop. These web-based services are available to authorized users with Internet access.

The GIS mapping of the Harbors storm sewer system was integrated into the AMS, which provides the information needed to monitor and manage the storm sewer system, and supports the preparation of *Annual Compliance Reports*. The GIS mapping locates storm drain features and ties other structures into a map. The GIS mapping allows for accurate accumulation of data for each feature.

2.1 Honolulu Harbor Pier Use Areas

The principal cargo and pier use areas for Honolulu Harbor structure the routes for the storm sewer system inspection and cleaning tasks, and Harbors personnel are assigned as the inspectors for specific pier areas.

The *SSS O&M Manual* presents storm drain assets inventoried with GIS mapping and data tables for each pier use area.

Table 2 lists the Honolulu Harbor Piers, area name, principal cargo/pier use, container yard area, and shed areas.

Table 2. Honolulu Harbor Piers and name, principal cargo/pier use, container yard area, and shed area.

PIER	NAME	PRINCIPAL CARGO/PIER USE	YARD AREA (ACRES)	SHED AREA (SQ. FT.)
1	Fort Armstrong	Foreign containers and neo-bulk cargo.	20.1	11,337
2		Commercial ship terminal, Foreign-Trade Zone No. 9, and neo-bulk cargo.	8.9	169,355
5	Aloha Tower Market Place Complex	Small passenger vessels.		
6		Small passenger vessels and vehicle parking.		
7		Falls of Clyde and the Hawaii Maritime Center.		
8		Small passenger vessels and retail space.		
9		Miscellaneous vessels and retail space.		
10		Cruise ship terminal and vehicle parking.		
11		Cruise ships and Harbors Division Administrative Office.		
12	Piers 12 – 18	Vehicle parking, Clean Island Council (oil spill response vessel), Equipment storage.		
13		Tugboats, office space, and vehicle parking.		13,824
14		Tugboats, office space, and vehicle parking.		13,825
15		Marine Spill Response Center, Oil Spill response vessel(s).	0.4	5,498
16		Commercial fishing boats.		
17		Commercial fishing boats.		
18		Pilot boats, loading dock, storage, and repair sheds.		
19	Piers 19 – 29	Tugboats, barges, cruise ships, ferry terminal, general cargo, and storage shed.	0.3	87,845
20		Tugboats, barges, cruise ships, general cargo.	3.0	
21		Tugboats, barges, and office space.	0.4	

PIER	NAME	PRINCIPAL CARGO/PIER USE	YARD AREA (ACRES)	SHED AREA (SQ. FT.)
22		Tugboats and water taxis.	0.8	
23		Barges and other big berth vessels.	2.9	
24		Pacific Shipyards.	3.4	
25		Pacific Shipyards.	0.5	
26		Tugboats, barges, and work boats.	3.9	
27		Work boats, dinner cruise ship, and submarine maintenance facility.	2.4	
28		Tugboats, barges, and maintenance operation.	0.9	
29		Tugboats, barges, general cargo, and RO/RO (terminal forklift trucks).	7.8	
30	Piers 31 – 35	*Privately owned.*		
31		General cargo, RO/RO, office space, and storage sheds.	0.2	74,130
32		Bunkering, pipelines, general cargo, and RO/RO.	3.3	99,400
33		General cargo, dry bulk, cargo, and RO/RO.	4.1	67,228
34		Bunkering, pipelines, and general cargo.	2.0	
35		University of Hawaii Marine Center research vessel(s).	1.9	
36	Domestic Commercial Fishing Village	Commercial fishing boats.		32,400
37		Commercial fishing boats, ice plant, retail, food restaurants, fish brokerage, and sales.		
38		Commercial fishing boats, fish auction, and propane barge.		
39		Barges and tugboats, break-bulk and container cargos, and RO/RO.	16.1	98,239
40		Barges and tugboats, break-bulk and container cargos, and RO/RO.	10.8	67,500
41		Dry-dock and ship repair facility.		
42		Container freight station.		
44	Snug Harbor			
45				
51A	Sand Island	Domestic containers, autos, RO/RO, and petroleum.	26.3	

PIER	NAME	PRINCIPAL CARGO/PIER USE	YARD AREA (ACRES)	SHED AREA (SQ. FT.)
51B		Domestic containers and autos, maintenance facility.	31.1	
51C		Domestic containers and autos, maintenance facility.	11.9	
52		Domestic containers and autos.	31.5	50,300
53		Domestic containers and autos.	37.4	51,481
60	KIPA	Bulk Cargo, user has own permit.		
		TOTALS	**232.3**	**842,362**

2.1.1 Pier 1 and Pier 2 – Fort Armstrong GIS Map of Storm Drain Assets

Figure 4. Piers 1 and 2 – Fort Armstrong GIS map of storm drain assets.

Table 3 shows **Piers 1 and 2** with 71 storm drain inlet, manhole, and catch basin assets; and identification number, location, and stencil type.

Table 3. Piers 1 and 2 storm drain inlet, manhole, and catch basin assets; and ID number, location, and stencil type.

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE*.
Drain Inlet	SDIHO010102	HO01	SP
Drain Inlet	SDIHO010152	HO01	SP
Drain Inlet	SDIHO010202	HO01	SP
Drain Inlet	SDIHO010208	HO01	SP
Drain Inlet	SDIHO010212	HO01	SP
Drain Inlet	SDIHO010214	HO01	SP
Drain Inlet	SDIHO010112	HO01	SP
Drain Inlet	SDIHO010122	HO01	SP
Drain Inlet	SDIHO010224	HO01	SP
Drain Inlet	SDIHO010252	HO01	SP
Drain Inlet	SDIHO010254	HO01	SP
Drain Inlet	SDIHO010162	HO01	SP
Drain Inlet	SDIHO010210	HO01	SP
Manhole	SDJHO010220	HO01	N/A
Manhole	SDJHO010222	HO01	N/A
Manhole	SDJHO010204	HO01	N/A
Manhole	SDJHO020802	HO01	N/A
Manhole	SDJHO010206	HO01	N/A
Manhole	SDJHO020208	HO02	N/A
Drain Inlet	SDIHO010172	HO02	SP
Drain Inlet	SDIHO020178	HO02	SP
Drain Inlet	SDIHO020176	HO02	SP
Drain Inlet	SDIHO020174	HO02	SP
Drain Inlet	SDIHO020810	HO02	SP
Drain Inlet	SDIHO020804	HO02	SP
Drain Inlet	SDIHO020806	HO02	SP
Drain Inlet	SDIHO020808	HO02	SP
Drain Inlet	SDIHO020520	HO02	SP
Drain Inlet	SDIHO020512	HO02	SP

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE*.
Drain Inlet	SDIHO020812	HO02	SP
Drain Inlet	SDIHO020814	HO02	SP
Drain Inlet	SDIHO010256	HO02	SP
Drain Inlet	SDIHO010258	HO02	SP
Drain Inlet	SDIHO010260	HO02	SP
Drain Inlet	SDIHO010262	HO02	SP
Drain Inlet	SDIHO010264	HO02	SP
Drain Inlet	SDIHO010266	HO02	SP
Drain Inlet	SDIHO010268	HO02	SP
Drain Inlet	SDIHO010270	HO02	SP
Drain Inlet	SDIHO010272	HO02	SP
Drain Inlet	SDIHO010274	HO02	SP
Drain Inlet	SDIHO010276	HO02	SP
Drain Inlet	SDIHO010278	HO02	SP
Drain Inlet	SDIHO010280	HO02	SP
Drain Inlet	SDIHO010282	HO02	SP
Drain Inlet	SDIHO010284	HO02	SP
Drain Inlet	SDIHO010286	HO02	SP
Drain Inlet	SDIHO010288	HO02	SP
Drain Inlet	SDIHO010290	HO02	SP
Drain Inlet	SDIHO010292	HO02	SP
Catch Basin	SDIHO020650	HO02	SP
Catch Basin	SDIHO020640	HO02	SP
Catch Basin	SDIHO020642	HO02	SP
Catch Basin	SDIHO020644	HO02	SP
Catch Basin	SDIHO020522	HO02	SP
Catch Basin	SDIHO020508	HO02	SP
Catch Basin	SDIHO020510	HO02	SP
Manhole	SDJHO020604	HO02	N/A
Manhole	SDJHO020606	HO02	N/A
Manhole	SDJHO020602	HO02	N/A
Manhole	SDJHO020638	HO02	N/A
Manhole	SDJHO020636	HO02	N/A
Manhole	SDJHO020722	HO02	N/A

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE*.
Manhole	SDJHO020634	HO02	N/A
Manhole	SDJHO020632	HO02	N/A
Manhole	SDJHO020702	HO02	N/A
Manhole	SDJHO020704	HO02	N/A
Manhole	SDJHO020706	HO02	N/A
Manhole	SDJHO020506	HO02	N/A
Manhole	SDJHO020502	HO02	N/A
Manhole	SDJHO020504	HO02	N/A

** SP = spray paint; MM = metal marker (bolted to grate); CM = curb marker (durable plastic requires special adhesive); and N/A = not applicable.*

2.1.2 Piers 5 through 11 – Aloha Tower Market Place Complex GIS Map of Storm Drain Assets

Figure 5. Piers 5 through 11 – Aloha Tower Market Place Complex GIS map of storm drain assets.

Table 4 shows **Piers 5 through 11** with 106 storm drain inlet, manhole, and catch basin assets; and identification number, location, and stencil type.

Table 4. Piers 5 through 11 storm drain inlet, manhole, and catch basin assets; and ID number, location, and stencil type.

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE*
Drain Inlet	SDIHO051012	HO05	SP
Drain Inlet	SDIHO051002	HO05	SP
Drain Inlet	SDIHO0519427	HO05	SP
Drain Inlet	SDIHO0519429	HO05	MM
Drain Inlet	SDIHO0528874	HO05	MM
Drain Inlet	SDIHO0519423	HO05	SP
Drain Inlet	SDIHO061042	HO06	SP
Catch Basin	SDIHO061162	HO06	SP
Drain Inlet	SDIHO061098	HO06	SP
Drain Inlet	SDIHO061102	HO06	SP
Drain Inlet	SDIHO061100	HO06	SP
Manhole	SDJHO061110	HO06	N/A
Manhole	SDJHO061096	HO06	N/A
Drain Inlet	SDIHO081504	HO08	SP
Catch Basin	SDIHO081506	HO08	SP
Catch Basin	SDIHO081242	HO08	SP
Catch Basin	SDIHO081288	HO08	SP
Catch Basin	SDIHO081286	HO08	SP
Catch Basin	SDIHO081284	HO08	SP
Catch Basin	SDIHO081282	HO08	SP
Catch Basin	SDIHO081240	HO08	SP
Catch Basin	SDIHO081238	HO08	SP
Catch Basin	SDIHO081260	HO08	SP
Catch Basin	SDIHO081244	HO08	SP
Manhole	SDJHO081236	HO08	N/A
Manhole	SDJHO061112	HO08	N/A
Manhole	SDJHO081234	HO08	N/A
Manhole	SDJHO081232	HO08	N/A
Manhole	SDJHO081502	HO08	N/A

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE*
Manhole	SDJHO081280	HO08	N/A
Drain Inlet	SDIHO092030	HO09	SP/MM
Drain Inlet	SDIHO091292	HO09	SP
Drain Inlet	SDIHO091290	HO09	SP
Drain Inlet	SDIHO091486	HO09	MM
Drain Inlet	SDIHO091462	HO09	MM
Drain Inlet	SDIHO091464	HO09	MM
Drain Inlet	SDIHO091466	HO09	MM
Drain Inlet	SDIHO091456	HO09	MM
Drain Inlet	SDIHO091458	HO09	MM
Drain Inlet	SDIHO091470	HO09	MM
Drain Inlet	SDIHO091472	HO09	MM
Drain Inlet	SDIHO091474	HO09	MM
Drain Inlet	SDIHO091478	HO09	MM
Drain Inlet	SDIHO091480	HO09	MM
Drain Inlet	SDIHO091482	HO09	MM
Drain Inlet	SDIHO091488	HO09	MM
Drain Inlet	SDIHO091490	HO09	MM
Drain Inlet	SDIHO091434	HO09	MM
Drain Inlet	SDIHO091432	HO09	MM
Drain Inlet	SDIHO091430	HO09	MM
Drain Inlet	SDIHO091420	HO09	MM
Drain Inlet	SDIHO091422	HO09	MM
Drain Inlet	SDIHO091424	HO09	MM
Drain Inlet	SDIHO091384	HO09	MM
Drain Inlet	SDIHO091388	HO09	MM
Drain Inlet	SDIHO091390	HO09	MM
Drain Inlet	SDIHO091364	HO09	MM
Drain Inlet	SDIHO091392	HO09	MM
Drain Inlet	SDIHO091394	HO09	MM
Drain Inlet	SDIHO091396	HO09	MM
Drain Inlet	SDIHO091362	HO09	MM
Drain Inlet	SDIHO091360	HO09	MM
Drain Inlet	SDIHO091356	HO09	MM

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE*
Drain Inlet	SDIHO091352	HO09	MM
Drain Inlet	SDIHO091654	HO09	MM
Drain Inlet	SDIHO091652	HO09	MM
Drain Inlet	SDIHO091656	HO09	MM
Drain Inlet	SDIHO091650	HO09	MM
Drain Inlet	SDIHO091648	HO09	MM
Drain Inlet	SDIHO091630	HO09	MM
Drain Inlet	SDIHO091622	HO09	MM
Drain Inlet	SDIHO091620	HO09	MM
Drain Inlet	SDIHO091604	HO09	MM
Drain Inlet	SDIHO091608	HO09	MM
Drain Inlet	SDIHO091572	HO09	MM
Drain Inlet	SDIHO091610	HO09	MM
Catch Basin	SDIHO092022	HO09	SP/MM
Catch Basin	SDIHO091452	HO09	SP/CM
Catch Basin	SDIHO091296	HO09	SP
Catch Basin	SDIHO091310	HO09	SP
Catch Basin	SDIHO091308	HO09	SP
Catch Basin	SDIHO091294	HO09	SP
Drain Inlet	SDIHO091626	HO09	MM
Drain Inlet	SDIHO091624	HO09	MM
Manhole	SDJHO091454	HO09	N/A
Manhole	SDJHO092020	HO09	N/A
Manhole	SDJHO091350	HO09	N/A
Manhole	SDJHO091450	HO09	N/A
Manhole	SDJHO091386	HO09	N/A
Manhole	SDJHO091428	HO09	N/A
Manhole	SDJHO091380	HO09	N/A
Manhole	SDJHO091358	HO09	N/A
Manhole	SDJHO091354	HO09	N/A
Manhole	SDJHO091426	HO09	N/A
Manhole	SDJHO091382	HO09	N/A
Manhole	SDJHO101732	HO10	N/A
Drain Inlet	SDIHO111834	HO11	SP

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE*
Drain Inlet	SDIHO111796	HO11	SP
Drain Inlet	SDIHO111798	HO11	SP
Drain Inlet	SDIHO111764	HO11	SP
Drain Inlet	SDIHO111794	HO11	SP
Drain Inlet	SDIHO111854	HO11	SP
Drain Inlet	SDIHO111766	HO11	SP
Drain Inlet	SDIHO111836	HO11	SP
Drain Inlet	SDIHO111824	HO11	SP
Drain Inlet	SDIHO111744	HO11	SP

* *SP = spray paint; MM = metal marker (bolted to grate); CM = curb marker (durable plastic requires special adhesive); and N/A = not applicable.*

Table 5 shows **Piers 5 through 11** with 1 open channel asset, identification number, and location.

Table 5. Piers 5 through 11 storm drain open channel asset, ID number, and location.

ASSET TYPE	ID NUMBER	PIER LOCATION
Open Channel	SDOHO081515	HO08

2.1.3 Piers 12 through 18 GIS Map of Storm Drain Assets

Figure 6. Piers 12 through 18 GIS map of storm drain assets.

Table 6 shows **Piers 12 through 18** with 12 storm drain inlet assets, identification number, location, and stencil type.

Table 6. Piers 12 through 18 storm drain inlet assets, ID number, location, and stencil type.

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE *
Drain Inlet	SDIHO152202	HO15	SP
Drain Inlet	SDIHO182310	HO18	SP
Drain Inlet	SDIHO182308	HO18	SP
Drain Inlet	SDIHO182304	HO18	SP
Drain Inlet	SDIHO182302	HO18	SP
Drain Inlet	SDIHO182320	HO18	SP
Drain Inlet	SDIHO182422	HO18	SP
Drain Inlet	SDIHO182432	HO18	SP
Drain Inlet	SDIHO182420	HO18	SP
Drain Inlet	SDIHO182430	HO18	SP
Drain Inlet	SDIHO182434	HO18	SP
Drain Inlet	SDIHO182306	HO18	SP

* *SP = spray paint; MM = metal marker (bolted to grate); CM = curb marker (durable plastic requires special adhesive); and N/A = not applicable.*

2.1.4 Piers 19 through 29 GIS Map of Storm Drain Assets

Figure 7. Piers 19 through 29 GIS map of storm drain assets.

Table 7 shows **Piers 19 through 29** with 74 storm drain inlet and manhole assets, identification number, location, and stencil type.

Table 7. Piers 19 through 29 storm drain inlet and manholes assets, ID number, location, and stencil type.

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE *
Drain Inlet	SDIHO192410	HO19	SP
Drain Inlet	SDIHO192544	HO19	SP
Drain Inlet	SDIHO192504	HO19	SP
Drain Inlet	SDIHO202502	HO19	SP
Drain Inlet	SDIHO192520	HO19	SP
Drain Inlet	SDIHO192484	HO19	CM
Manhole	SDJHO192482	HO19	N/A
Drain Inlet	SDIHO202662	HO20	SP
Drain Inlet	SDIHO202674	HO20	SP
Drain Inlet	SDIHO202580	HO20	SP
Drain Inlet	SDIHO202582	HO20	SP
Drain Inlet	SDIHO202704	HO20	SP
Drain Inlet	SDIHO202670	HO20	SP
Drain Inlet	SDIHO202666	HO20	SP
Drain Inlet	SDIHO202672	HO20	SP
Drain Inlet	SDIHO202664	HO20	SP
Drain Inlet	SDIHO202660	HO20	SP
Drain Inlet	SDIHO202658	HO20	SP
Drain Inlet	SDIHO202648	HO20	SP
Drain Inlet	SDIHO202650	HO20	SP
Drain Inlet	SDIHO202646	HO20	SP
Drain Inlet	SDIHO202642	HO20	SP
Drain Inlet	SDIHO202584	HO20	SP
Drain Inlet	SDIHO202656	HO20	SP
Drain Inlet	SDIHO202654	HO20	SP
Drain Inlet	SDIHO202652	HO20	SP
Drain Inlet	SDIHO212792	HO21	SP
Drain Inlet	SDIHO212612	HO21	SP
Drain Inlet	SDIHO212602	HO21	SP

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE *
Drain Inlet	SDIHO202700	HO21	SP
Drain Inlet	SDIHO222802	HO22	SP
Drain Inlet	SDIHO232678	HO23	MM
Drain Inlet	SDIHO232440	HO23	MM
Drain Inlet	SDIHO232438	HO23	MM
Drain Inlet	SDIHO232448	HO23	MM
Drain Inlet	SDIHO232682	HO23	MM
Drain Inlet	SDIHO232442	HO23	MM
Drain Inlet	SDIHO192554	HO23	SP
Drain Inlet	SDIHO192562	HO23	SP
Drain Inlet	SDIHO232680	HO23	MM
Drain Inlet	SDIHO232686	HO23	MM
Drain Inlet	SDIHO232812	HO23	SP
Drain Inlet	SDIHO232814	HO23	SP
Drain Inlet	SDIHO233030	HO23	SP
Drain Inlet	SDIHO233008	HO23	SP
Drain Inlet	SDIHO233006	HO23	SP
Drain Inlet	SDIHO233010	HO23	SP
Drain Inlet	SDIHO233002	HO23	SP
Drain Inlet	SDIHO222806	HO23	SP
Drain Inlet	SDIHO233004	HO23	SP
Manhole	SDJHO232810	HO23	N/A
Manhole	SDJHO232684	HO23	N/A
Drain Inlet	SDIHO243072	HO24	SP
Drain Inlet	SDIHO243074	HO24	SP
Drain Inlet	SDIHO243242	HO24	SP
Drain Inlet	SDIHO243202	HO24	SP
Drain Inlet	SDIHO243522	HO25	SP
Drain Inlet	SDIHO243502	HO25	SP
Drain Inlet	SDIHO263552	HO26	SP
Drain Inlet	SDIHO263556	HO26	SP
Drain Inlet	SDIHO263554	HO26	SP
Drain Inlet	SDIHO263572	HO26	SP
Drain Inlet	SDIHO263592	HO26	SP

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE *
Drain Inlet	SDIHO273632	HO27	SP
Drain Inlet	SDIHO293672	HO29	SP
Drain Inlet	SDIHO293224	HO29	SP
Drain Inlet	SDIHO293204	HO29	SP
Drain Inlet	SDIHO293222	HO29	SP
Drain Inlet	SDIHO293206	HO29	SP
Drain Inlet	SDIHO293620	HO29	SP
Drain Inlet	SDIHO293612	HO29	SP
Manhole	SDJHO293614	HO29	N/A
Manhole	SDJHO293616	HO29	N/A
Manhole	SDJHO293618	HO29	N/A

** SP = spray paint; MM = metal marker (bolted to grate);CM = curb marker (durable plastic requires special adhesive); and N/A = not applicable.*

Table 8 shows **Piers 19 through 29** with 25 storm open channel assets, identification number, and location.

Table 8. Piers 19 through 29 storm drain open channel assets, ID number, and location.

ASSET TYPE	ID NUMBER	LOCATION
Open Channel	SDOHO202703	HO20
Open Channel	SDOHO202701	HO20
Open Channel	SDOHO232815	HO23
Open Channel	SDOHO29550A	HO29
Open Channel	SDOHO29500B	HO29
Open Channel	SDOHO29050A	HO29
Open Channel	SDOHO29100A	HO29
Open Channel	SDOHO29150A	HO29
Open Channel	SDOHO29200A	HO29
Open Channel	SDOHO29250A	HO29
Open Channel	SDOHO29300A	HO29
Open Channel	SDOHO29350A	HO29
Open Channel	SDOHO29400A	HO29

ASSET TYPE	ID NUMBER	LOCATION
Open Channel	SDOHO29450A	HO29
Open Channel	SDOHO29500A	HO29
Open Channel	SDOHO29050B	HO29
Open Channel	SDOHO29100B	HO29
Open Channel	SDOHO29150B	HO29
Open Channel	SDOHO29200B	HO29
Open Channel	SDOHO29250B	HO29
Open Channel	SDOHO29300B	HO29
Open Channel	SDOHO29350B	HO29
Open Channel	SDOHO29400B	HO29
Open Channel	SDOHO29450B	HO29
Open Channel	SDOHO29530B	HO29

2.1.5 Piers 31 through 35 GIS Map of Storm Drain Assets

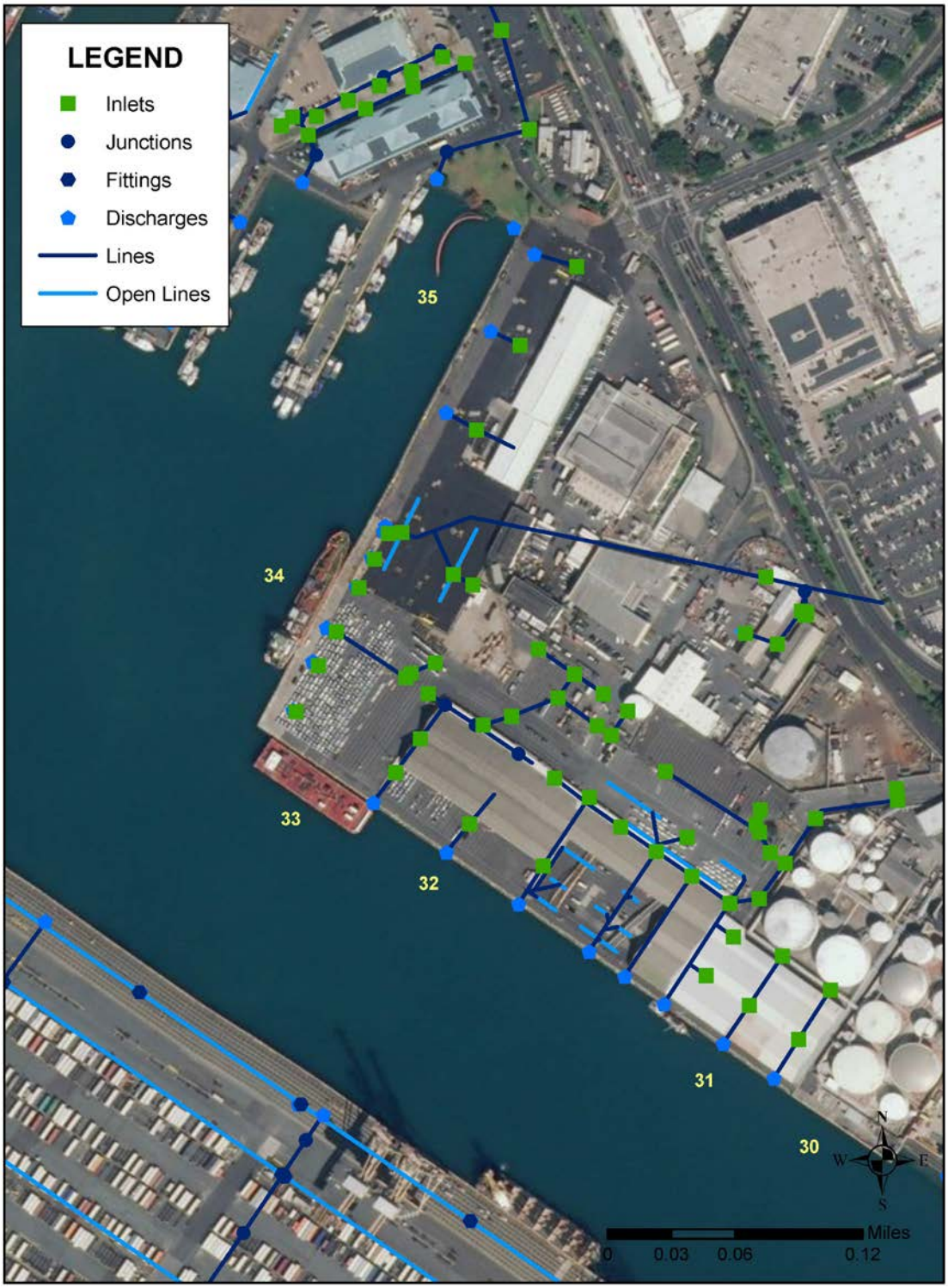

Figure 8. Piers 31 through 35 GIS map of storm drain assets.

Table 9 shows **Piers 31 through 35** with 58 storm drain inlet and manhole assets, identification number, location, and stencil type.

Table 9. Piers 31 through 35 storm drain inlet and manhole assets, ID number, location, and stencil type.

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE *
Drain Inlet	SDIHO313924	HO30	SP
Drain Inlet	SDIHO313904	HO30	SP
Drain Inlet	SDIHO313922	HO31	SP
Drain Inlet	SDIHO313902	HO31	SP
Drain Inlet	SDIHO314154	HO31	SP
Drain Inlet	SDIHO313970	HO31	SP
Drain Inlet	SDIHO314002	HO31	SP
Drain Inlet	SDIHO313968	HO31	SP
Drain Inlet	SDIHO313966	HO31	SP
Drain Inlet	SDIHO314134	HO31	SP
Drain Inlet	SDIHO314130	HO31	SP
Drain Inlet	SDIHO314012	HO31	SP
Drain Inlet	SDIHO314136	HO31	SP
Drain Inlet	SDIHO314132	HO31	SP
Drain Inlet	SDIHO314390	HO31	SP
Drain Inlet	SDIHO314392	HO31	SP
Drain Inlet	SDIHO314398	HO31	SP
Drain Inlet	SDIHO314402	HO31	SP
Drain Inlet	SDIHO314396	HO31	SP
Drain Inlet	SDIHO314400	HO31	SP
Drain Inlet	SDIHO313972	HO31	SP
Drain Inlet	SDIHO313964	HO31	SP
Drain Inlet	SDIHO313962	HO31	SP
Drain Inlet	SDIHO314160	HO31	SP
Drain Inlet	SDIHO314142	HO31	SP
Drain Inlet	SDIHO313958	HO31	SP
Drain Inlet	SDIHO313954	HO31	SP
Drain Inlet	SDIHO314152	HO31	SP
Drain Inlet	SDIHO314016	HO31	SP

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE *
Manhole	SDJHO314394	HO31	N/A
Drain Inlet	SDIHO324246	HO32	SP
Drain Inlet	SDIHO324242	HO32	SP
Drain Inlet	SDIHO324244	HO32	SP
Drain Inlet	SDIHO324262	HO32	SP
Drain Inlet	SDIHO324208	HO32	SP
Drain Inlet	SDIHO324236	HO32	SP
Drain Inlet	SDIHO324234	HO32	SP
Drain Inlet	SDIHO324260	HO32	SP
Drain Inlet	SDIHO324232	HO32	SP
Drain Inlet	SDIHO314162	HO32	SP
Drain Inlet	SDIHO324204	HO32	SP
Drain Inlet	SDIHO324202	HO32	SP
Drain Inlet	SDIHO324182	HO32	SP
Drain Inlet	SDIHO324264	HO32	SP
Manhole	SDJHO324206	HO32	N/A
Manhole	SDJHO324212	HO32	N/A
Manhole	SDJHO324230	HO32	N/A
Drain Inlet	SDIHO344328	HO33	SP
Drain Inlet	SDIHO344326	HO33	SP
Drain Inlet	SDIHO344324	HO33	SP
Drain Inlet	SDIHO344312	HO34	SP
Drain Inlet	SDIHO344352	HO34	SP
Drain Inlet	SDIHO344302	HO34	SP
Drain Inlet	SDIHO344322	HO34	SP
Drain Inlet	SDIHO344362	HO34	SP
Drain Inlet	SDIHO354462	HO35	SP
Drain Inlet	SDIHO354452	HO35	SP
Drain Inlet	SDIHO354472	HO35	SP

* *SP = spray paint; MM = metal marker (bolted to grate); CM = curb marker (durable plastic requires special adhesive); and N/A = not applicable.*

Table 10 shows **Piers 31 through 35** with 16 storm drain open channel assets, identification number, and location.

Table 10. Piers 31 through 35 storm drain open channel assets, ID number, and location.

ASSET TYPE	ID NUMBER	PIER LOCATION
Open Channel	SDOHO314049	HO31
Open Channel	SDOHO314109	HO31
Open Channel	SDOHO314071	HO31
Open Channel	SDOHO314395	HO31
Open Channel	SDOHO314397	HO31
Open Channel	SDOHO314399	HO31
Open Channel	SDOHO314401	HO31
Open Channel	SDOHO314403	HO31
Open Channel	SDOHO314393	HO31
Open Channel	SDOHO314405	HO31
Open Channel	SDOHO314073	HO31
Open Channel	SDOHO314391	HO32
Open Channel	SDOHO405403	HO32
Open Channel	SDOHO405401	HO32
Open Channel	SDOHO350001	HO35
Open Channel	SDOHO350003	HO35

2.1.6 Piers 36 through 38 – Domestic Commercial Fishing Village GIS Map of Storm Drain Assets

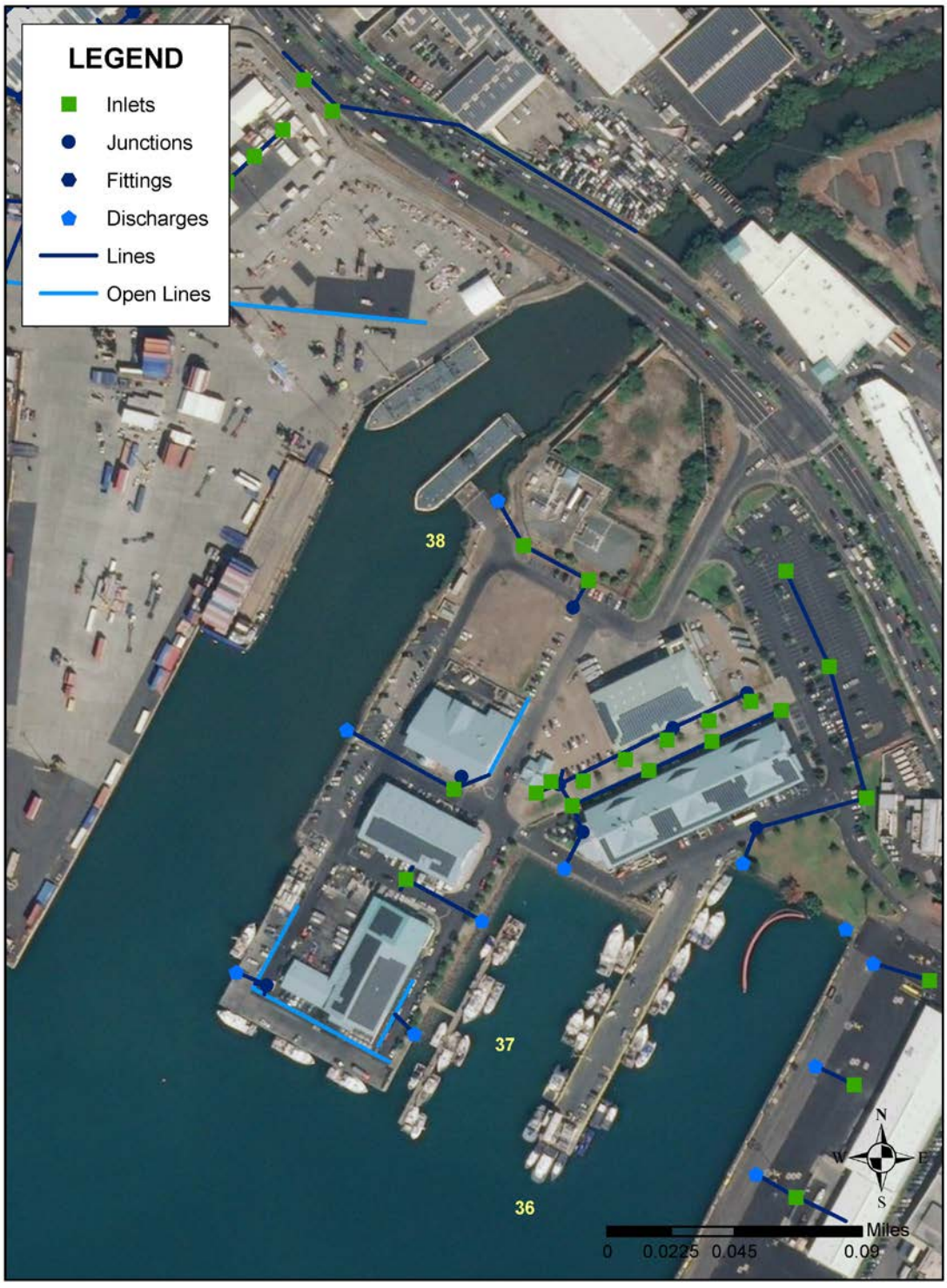

Figure 9. Piers 36 through 38 GIS map of storm drain assets.

Table 11 shows **Piers 36 through 38** with 26 storm drain inlet and manhole assets, identification number, location, and stencil type.

Table 11. Piers 36 through 38 storm drain inlet and manholes assets, ID number, location, and stencil type.

ASSET TYPE	ID NUMBER	LOCATION	STENCIL TYPE *
Drain Inlet	SDIHO364604	HO36	MM
Manhole	SDJHO364602	HO36	N/A
Drain Inlet	SDIHO384608	HO38	SP
Drain Inlet	SDIHO384606	HO38	SP
Drain Inlet	SDIHO384710	HO38	SP
Drain Inlet	SDIHO384822	HO38	CM
Drain Inlet	SDIHO384820	HO38	CM
Drain Inlet	SDIHO384816	HO38	CM
Drain Inlet	SDIHO384814	HO38	CM
Drain Inlet	SDIHO384812	HO38	CM
Drain Inlet	SDIHO384806	HO38	SP
Drain Inlet	SDIHO384808	HO38	SP
Drain Inlet	SDIHO384704	HO38	SP
Drain Inlet	SDIHO384706	HO38	SP
Drain Inlet	SDIHO384708	HO38	SP
Drain Inlet	SDIHO384902	HO38	SP
Drain Inlet	SDIHO385152	HO38	MM
Drain Inlet	SDIHO385154	HO38	MM
Manhole	SDJHO384818	HO38	N/A
Manhole	SDJHO384824	HO38	N/A
Manhole	SDJHO384810	HO38	N/A
Manhole	SDJHO384702	HO38	N/A
Manhole	SDJHO385156	HO38	N/A
Manhole	SDJHO395502	HO38	N/A
Manhole	SDJHO385052	HO38	N/A
Manhole	SDJHO385104	HO38	N/A

* *SP = spray paint; MM = metal marker (bolted to grate); CM = curb marker (durable plastic requires special adhesive); and N/A = not applicable.*

Table 12 shows **Piers 36 through 38** with 4 storm drain open channel assets, identification number, and location.

Table 12. Piers 36 through 38 storm drain open channel assets, ID number, and location.

ASSET TYPE	ID NUMBER	LOCATION
Open Channel	SDOHO385057	HO38
Open Channel	SDOHO385059	HO38
Open Channel	SDOHO385003	HO38
Open Channel	SDOHO385107	HO38

2.1.7 Piers 39 through 45 GIS Map of Storm Drain Assets

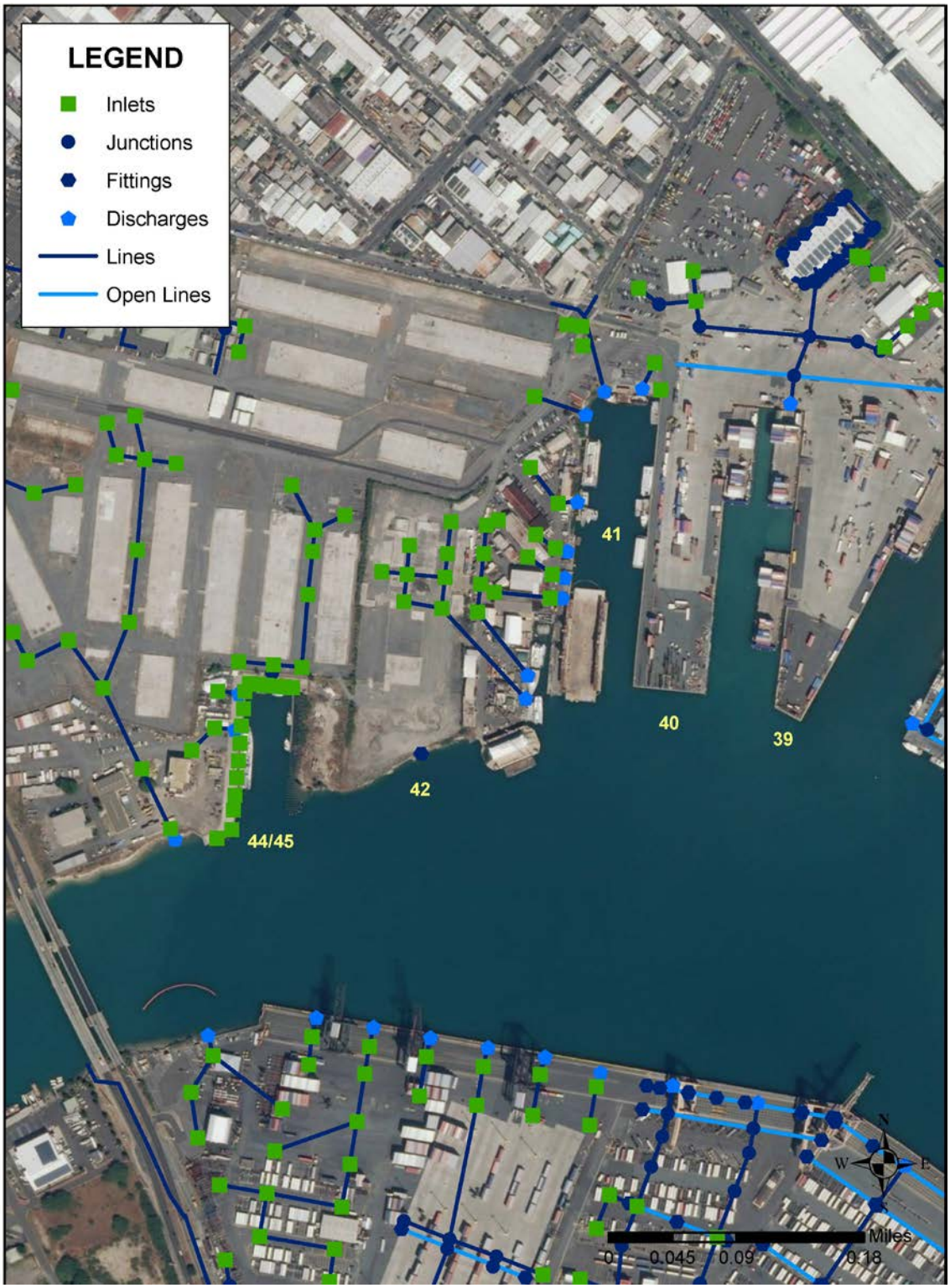

Figure 10. Piers 39 through 45 GIS map of storm drain assets.

Table 13 shows **Piers 39 through 45** with 110 storm drain inlet, manhole, and catch basin assets; and identification number, location, and stencil type.

Table 13. Piers 39 through 45 storm drain inlet, manhole, and catch basin assets; and ID number, location, and stencil type.

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE *
Drain Inlet	SDIHO395516	HO39	SP
Drain Inlet	SDIHO395514	HO39	SP
Drain Inlet	SDIHO395512	HO39	SP
Drain Inlet	SDIHO395510	HO39	SP
Drain Inlet	SDIHO395596	HO39	SP
Drain Inlet	SDIHO395592	HO39	SP
Catch Basin	SDIHO395612	HO39	SP
Manhole	SDJHO395506	HO39	N/A
Manhole	SDJHO395508	HO39	N/A
Drain Inlet	SDIHO405802	HO40	SP
Drain Inlet	SDIHO406562	HO40	SP
Drain Inlet	SDIHO405722	HO40	SP
Drain Inlet	SDIHO405708	HO40	SP
Drain Inlet	SDIHO405712	HO40	SP
Drain Inlet	SDIHO405790	HO40	SP
Catch Basin	SDIHO405610	HO40	SP
Drain Inlet	SDIHO405608	HO40	SP
Manhole	SDJHO395504	HO40	N/A
Manhole	SDJHO405650	HO40	N/A
Manhole	SDJHO405632	HO40	N/A
Manhole	SDJHO405634	HO40	N/A
Manhole	SDJHO405630	HO40	N/A
Manhole	SDJHO405606	HO40	N/A
Manhole	SDJHO405706	HO40	N/A
Manhole	SDJHO405710	HO40	N/A
Manhole	SDJHO405664	HO40	N/A
Manhole	SDJHO405652	HO40	N/A
Drain Inlet	SDIHO416994	HO41	SP
Drain Inlet	SDIHO416982	HO41	SP

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE *
Drain Inlet	SDIHO416992	HO41	SP
Drain Inlet	SDIHO417004	HO41	SP
Drain Inlet	SDIHO427040	HO41	SP
Drain Inlet	SDIHO417002	HO41	SP
Drain Inlet	SDIHO427038	HO41	SP
Drain Inlet	SDIHO427036	HO41	SP
Drain Inlet	SDIHO427034	HO41	SP
Drain Inlet	SDIHO427032	HO41	SP
Drain Inlet	SDIHO417012	HO41	SP
Drain Inlet	SDIHO417014	HO41	SP
Drain Inlet	SDIHO416984	HO41	SP
Catch Basin	SDIHO416572	HO41	SP
Catch Basin	SDIHO416574	HO41	SP
Drain Inlet	SDIHO427220	HO42	SP
Drain Inlet	SDIHO427206	HO42	SP
Drain Inlet	SDIHO427204	HO42	SP
Drain Inlet	SDIHO427222	HO42	SP
Drain Inlet	SDIHO427200	HO42	SP
Drain Inlet	SDIHO427226	HO42	SP
Drain Inlet	SDIHO427320	HO42	SP
Drain Inlet	SDIHO427202	HO42	SP
Drain Inlet	SDIHO427224	HO42	SP
Manhole	HDOA_Entry2	HO42	N/A
Manhole	HDOA_B-1	HO42	N/A
Manhole	SDJHO427302	HO42	N/A
Drain Inlet	SDIHO427352	HO42E	SP
Drain Inlet	SDIHO427708	HO42E	SP
Drain Inlet	SDIHO427350	HO42E	SP
Drain Inlet	SDIHO427710	HO42E	SP
Drain Inlet	SDIHO427318	HO42E	SP
Drain Inlet	SDIHO427642	HO42E	SP
Drain Inlet	SDIHO427630	HO42E	SP
Drain Inlet	SDIHO427310	HO42E	SP
Drain Inlet	SDIHO427606	HO42E	SP

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE *
Drain Inlet	SDIHO427312	HO42E	SP
Drain Inlet	SDIHO427604	HO42E	SP
Drain Inlet	SDIHO427626	HO42E	SP
Drain Inlet	SDIHO427624	HO42E	SP
Drain Inlet	SDIHO427622	HO42E	SP
Drain Inlet	SDIHO427620	HO42E	SP
Drain Inlet	SDIHO427306	HO42E	SP
Drain Inlet	SDIHO427308	HO42E	SP
Drain Inlet	SDIHO427314	HO42E	SP
Drain Inlet	SDIHO427316	HO42E	SP
Drain Inlet	SDIHO427700	HO42E	SP
Drain Inlet	SDIHO427722	HO42E	SP
Drain Inlet	SDIHO427726	HO42E	SP
Drain Inlet	SDIHO427724	HO42E	SP
Drain Inlet	SDIHO427640	HO42E	SP
Drain Inlet	SDIHO427610	HO42E	SP
Drain Inlet	SDIHO427608	HO42E	SP
Drain Inlet	SDIHO427602	HO42E	SP
Drain Inlet	SDIHO427584	HO42E	SP
Drain Inlet	SDIHO427582	HO42E	SP
Drain Inlet	SDIHO427562	HO42E	SP
Drain Inlet	SDIHO426972	HO42E	SP
Drain Inlet	SDIHO427728	HO42E	SP
Drain Inlet	SDIHO427730	HO42E	SP
Drain Inlet	SDIHO427732	HO42E	SP
Drain Inlet	SDIHO427734	HO42E	SP
Drain Inlet	SDIHO427736	HO42E	SP
Drain Inlet	SDIHO427738	HO42E	SP
Drain Inlet	SDIHO427740	HO42E	SP
Drain Inlet	SDIHO427742	HO42E	SP
Drain Inlet	SDIHO427744	HO42E	SP
Drain Inlet	SDIHO427746	HO42E	SP
Drain Inlet	SDIHO427748	HO42E	SP
Drain Inlet	SDIHO427750	HO42E	SP

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE *
Drain Inlet	SDIHO427752	HO42E	SP
Drain Inlet	SDIHO427754	HO42E	SP
Drain Inlet	SDIHO427756	HO42E	SP
Drain Inlet	SDIHO427758	HO42E	SP
Drain Inlet	SDIHO427760	HO42E	SP
Manhole	HDOA_B-3	HO42E	N/A
Manhole	HDOA_B-4A	HO42E	N/A
Manhole	HDOA_B-2	HO42E	N/A
Manhole	SDJHO427702	HO42E	N/A
Manhole	SDJHO427720	HO42E	N/A
Manhole	SDJHO427704	HO42E	N/A
Manhole	SDJHO427706	HO42E	N/A
Drain Inlet	SDIHO447751	HO44	SP

** SP = spray paint; MM = metal marker (bolted to grate); CM = curb marker (durable plastic requires special adhesive); and N/A = not applicable.*

2.1.8 Piers 51 through 53 – Sand Island GIS Map of Storm Drain Assets

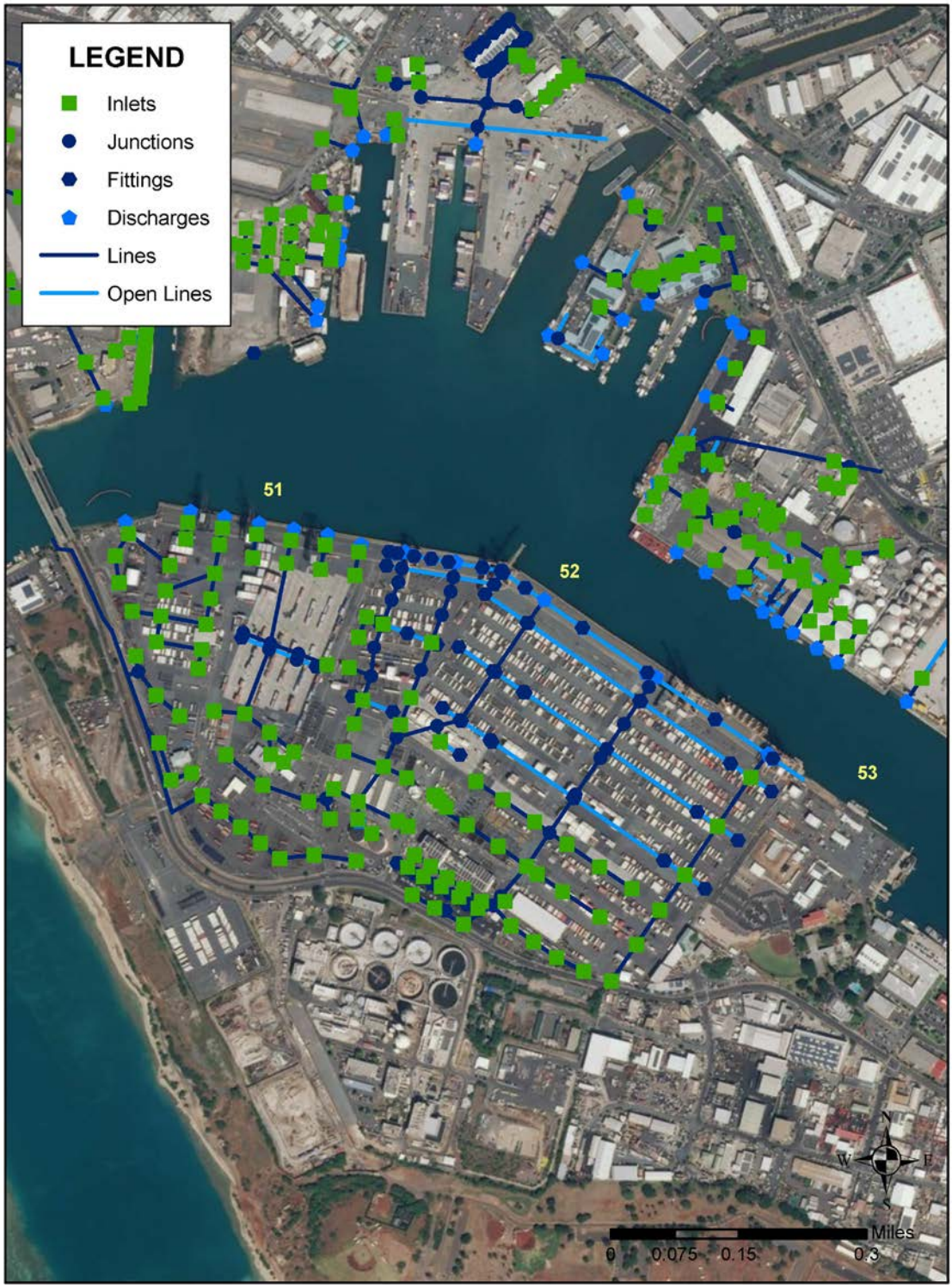

Figure 11. Piers 51 through 53 – Sand Island GIS map of storm drain assets.

Table 14 shows **Piers 51 through 53** storm drain inlet, manhole, and catch basin assets; and identification number, location, and stencil type.

Table 14. Piers 51 through 53 storm drain inlet, manhole, and catch basin assets; and ID number, location, and stencil type.

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE *
Drain Inlet	SDIHO517806	HO51	SP
Drain Inlet	SDIHO517804	HO51	SP
Drain Inlet	SDIHO517810	HO51	SP
Drain Inlet	SDIHO517854	HO51	SP
Drain Inlet	SDIHO517886	HO51	SP
Drain Inlet	SDIHO517892	HO51	SP
Drain Inlet	SDIHO517896	HO51	SP
Drain Inlet	SDIHO517902	HO51	SP
Drain Inlet	SDIHO517900	HO51	SP
Drain Inlet	SDIHO517894	HO51	SP
Drain Inlet	SDIHO517898	HO51	SP
Drain Inlet	SDIHO518012	HO51	SP
Drain Inlet	SDIHO518010	HO51	SP
Drain Inlet	SDIHO518464	HO51	SP
Drain Inlet	SDIHO518002	HO51	SP
Drain Inlet	SDIHO517964	HO51	SP
Drain Inlet	SDIHO518004	HO51	SP
Drain Inlet	SDIHO518052	HO51	SP
Drain Inlet	SDIHO518056	HO51	SP
Drain Inlet	SDIHO518152	HO51	SP
Drain Inlet	SDIHO518150	HO51	SP
Drain Inlet	SDIHO518372	HO51	SP
Drain Inlet	SDIHO518370	HO51	SP
Drain Inlet	SDIHO518410	HO51	SP
Drain Inlet	SDIHO518476	HO51	SP
Drain Inlet	SDIHO518376	HO51	SP
Drain Inlet	SDIHO518364	HO51	SP
Drain Inlet	SDIHO518414	HO51	SP
Drain Inlet	SDIHO518366	HO51	SP

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE *
Drain Inlet	SDIHO518140	HO51	SP
Drain Inlet	SDIHO518146	HO51	SP
Drain Inlet	SDIHO518466	HO51	SP
Drain Inlet	SDIHO518360	HO51	SP
Drain Inlet	SDIHO518026	HO51	SP
Drain Inlet	SDIHO518382	HO51	MM
Drain Inlet	SDIHO517888	HO51	SP
Drain Inlet	SDIHO518374	HO51	SP
Drain Inlet	SDIHO518260	HO51	SP
Drain Inlet	SDIHO518262	HO51	SP
Drain Inlet	SDIHO517930	HO51	SP
Drain Inlet	SDIHO517932	HO51	SP
Drain Inlet	SDIHO517940	HO51	SP
Drain Inlet	SDIHO517944	HO51	SP
Drain Inlet	SDIHO517942	HO51	SP
Drain Inlet	SDIHO518468	HO51	SP
Drain Inlet	SDIHO518402	HO51	SP
Drain Inlet	SDIHO518474	HO51	SP
Drain Inlet	SDIHO518472	HO51	SP
Drain Inlet	SDIHO518470	HO51	SP
Drain Inlet	SDIHO518408	HO51	SP
Drain Inlet	SDIHO518404	HO51	SP
Drain Inlet	SDIHO518400	HO51	SP
Drain Inlet	SDIHO517802	HO51	SP
Drain Inlet	SDIHO517890	HO51	SP
Drain Inlet	SDIHO518054	HO51	SP
Drain Inlet	SDIHO518378	HO51	MM
Catch Basin	SDIHO518416	HO51	SP
Drain Inlet	SDIHO518058	HO51	SP
Drain Inlet	SDIHO517926	HO51	SP
Manhole	SDJHO517928	HO51	N/A
Manhole	SDJHO518142	HO51	N/A
Manhole	SDJHO518406	HO51	N/A
Manhole	SDJHO518368	HO51	N/A

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE *
Manhole	SDJHO518362	HO51	N/A
Manhole	SDJHO518358	HO51	N/A
Manhole	SDJHO518138	HO51	N/A
Manhole	SDJHO518020	HO51	N/A
Manhole	SDJHO518356	HO51	N/A
Manhole	SDJHO518136	HO51	N/A
Manhole	SDJHO518144	HO51	N/A
Manhole	SDJHO518006	HO51	N/A
Manhole	SDJHO518024	HO51	N/A
Manhole	SDJHO518008	HO51	N/A
Manhole	SDJHO518028	HO51	N/A
Drain Inlet	SDIHO517852	HO51A	SP
Drain Inlet	SDIHO517882	HO51A	SP
Drain Inlet	SDIHO517962	HO51A	SP
Drain Inlet	SDIHO517884	HO51A	SP
Drain Inlet	SDIHO518074	HO51B	SP
Drain Inlet	SDIHO518084	HO51B	SP
Drain Inlet	SDIHO518082	HO51B	SP
Drain Inlet	SDIHO518072	HO51B	SP
Manhole	SDJHO518134	HO51C	N/A
Manhole	SDJHO518352	HO51C	N/A
Drain Inlet	SDIHO528874	HO52	SP
Drain Inlet	SDIHO528876	HO52	SP
Drain Inlet	SDIHO528880	HO52	MM
Drain Inlet	SDIHO528662	HO52	SP
Drain Inlet	SDIHO528664	HO52	SP
Drain Inlet	SDIHO528690	HO52	SP
Drain Inlet	SDIHO528692	HO52	SP
Drain Inlet	SDIHO528660	HO52	SP
Drain Inlet	SDIHO528734	HO52	SP
Drain Inlet	SDIHO528710	HO52	SP
Drain Inlet	SDIHO528712	HO52	SP
Drain Inlet	SDIHO528714	HO52	SP
Drain Inlet	SDIHO528716	HO52	SP

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE *
Drain Inlet	SDIHO528718	HO52	SP
Drain Inlet	SDIHO528730	HO52	SP
Drain Inlet	SDIHO528732	HO52	SP
Drain Inlet	SDIHO528738	HO52	SP
Drain Inlet	SDIHO528736	HO52	SP
Drain Inlet	SDIHO528680	HO52	SP
Drain Inlet	SDIHO528684	HO52	SP
Drain Inlet	SDIHO528510	HO52	SP
Drain Inlet	SDIHO528682	HO52	SP
Drain Inlet	SDIHO528688	HO52	SP
Manhole	SDJHO528760	HO52	N/A
Manhole	SDJHO528756	HO52	N/A
Manhole	SDJHO528752	HO52	N/A
Manhole	SDJHO528764	HO52	N/A
Manhole	SDJHO528770	HO52	N/A
Manhole	SDJHO528502	HO52	N/A
Manhole	SDJHO528504	HO52	N/A
Manhole	SDJHO528508	HO52	N/A
Manhole	SDJHO528506	HO52	N/A
Drain Inlet	SDIHO538902	HO53	SP
Drain Inlet	SDIHO538668	HO53	SP
Drain Inlet	SDIHO538696	HO53	SP
Drain Inlet	SDIHO538698	HO53	SP
Drain Inlet	SDIHO538670	HO53	SP
Drain Inlet	SDIHO538700	HO53	SP
Drain Inlet	SDIHO538672	HO53	SP
Drain Inlet	SDIHO538792	HO53	SP
Drain Inlet	SDIHO538794	HO53	SP
Drain Inlet	SDIHO538796	HO53	SP
Drain Inlet	SDIHO538798	HO53	SP
Drain Inlet	SDIHO538868	HO53	SP
Drain Inlet	SDIHO538910	HO53	SP
Drain Inlet	SDIHO538906	HO53	SP
Drain Inlet	SDIHO538904	HO53	SP

ASSET TYPE	ID NUMBER	PIER LOCATION	STENCIL TYPE *
Drain Inlet	SDIHO538908	HO53	SP
Drain Inlet	SDIHO538890	HO53	SP
Drain Inlet	SDIHO538912	HO53	SP
Manhole	SDJHO538866	HO53	N/A
Manhole	SDJHO538872	HO53	N/A
Manhole	SDJHO538860	HO53	N/A
Manhole	SDJHO538862	HO53	N/A
Manhole	SDJHO538852	HO53	N/A
Manhole	SDJHO538856	HO53	N/A
Manhole	SDJHO538870	HO53	N/A
Drain Inlet	SDIHO609156	HO60	SP
Drain Inlet	SDIHO609116	HO60	CM
Drain Inlet	SDIHO609158	HO60	SP
Drain Inlet	SDIHO609114	HO60	SP
Drain Inlet	SDIHO609118	HO60	SP

* *SP = spray paint; MM = metal marker (bolted to grate); CM = curb marker (durable plastic requires special adhesive); and N/A = not applicable.*

Table 15 shows the **Piers 51 through 53, and Pier 60** with 62 storm drain open channel, swale, and other assets; and identification number and location.

Table 15. Piers 51 through 53, and Pier 60 storm drain open channel, swale, and other assets; and ID number and location.

ASSET TYPE	ID NUMBER	PIER LOCATION
Open Channel	SDOHO518265	HO51
Open Channel	SDOHO518291	HO51
Open Channel	SDOHO518269	HO51
Open Channel	SDOHO518285	HO51
Open Channel	SDOHO518231	HO51
Open Channel	SDOHO518235	HO51
Open Channel	SDOHO518241	HO51
Open Channel	SDOHO518277	HO51
Open Channel	SDOHO518271	HO51

ASSET TYPE	ID NUMBER	PIER LOCATION
Open Channel	SDOHO518031	HO51C
Open Channel	SDOHO518205	HO51C
Open Channel	SDOHO518181	HO51C
Open Channel	SDOHO518185	HO51C
Open Channel	SDOHO518189	HO51C
Open Channel	SDOHO518193	HO51C
Open Channel	SDOHO518197	HO51C
Open Channel	SDOHO518201	HO51C
Open Channel	SDOHO518209	HO51C
Open Channel	SDOHO528213	HO51C
Open Channel	SDOHO528611	HO52
Open Channel	SDOHO528641	HO52
Open Channel	SDOHO528637	HO52
Open Channel	SDOHO528631	HO52
Open Channel	SDOHO528601	HO52
Open Channel	SDOHO528607	HO52
Open Channel	SDOHO528571	HO52
Open Channel	SDOHO528577	HO52
Open Channel	SDOHO528545	HO52
Concrete with metal grate	SDOHO528517	HO52
Open Channel	SDOHO528877	HO52
Open Channel	SDOHO528541	HO52
Open Channel	SDOHO528555	HO52
Open Channel	SDOHO528559	HO52
Open Channel	SDOHO538563	HO53
Open Channel	SDOHO538649	HO53
Open Channel	SDOHO538619	HO53
Open Channel	SDOHO538585	HO53
Open Channel	SDOHO538617	HO53
Open Channel	SDOHO538613	HO53
Open Channel	SDOHO538647	HO53
Open Channel	SDOHO538643	HO53
Open Channel	SDOHO538651	HO53

ASSET TYPE	ID NUMBER	PIER LOCATION
Open Channel	SDOHO538579	HO53
Open Channel	SDOHO538583	HO53
Open Channel	SDOHO528765	HO53
Open Channel	SDOHO528751	HO53
Open Channel	SDOHO528757	HO53
Open Channel	SDOHO528761	HO53
Open Channel	SDOHO528769	HO53
Open Channel	SDOHO528755	HO53
Open Channel	SDOHO528759	HO53
Open Channel	SDOHO528763	HO53
Open Channel	SDOHO528771	HO53
Open Channel	SDOHO528753	HO53
Open Channel	SDOHO609165	HO60
Open Channel	SDOHO609185	HO60
Open Channel	SDOHO609189	HO60
Other	SDOHO609190	HO60
Open Channel	SDOHO609181	HO60
Swale	SDOHO609191	HO60

2.2 Honolulu Harbor Post-Construction BMPs GIS Map

Harbors is responsible for inspection, cleaning, and maintenance of the 43 Post-Construction Permanent BMPs (PBMP) at Honolulu Harbor, specifically located at Pier 29 (23 BMPs), Pier 31 (8), Pier 35 (6), and Pier 60 (6).

Figure 12A shows GIS mapping of post construction BMP locations.

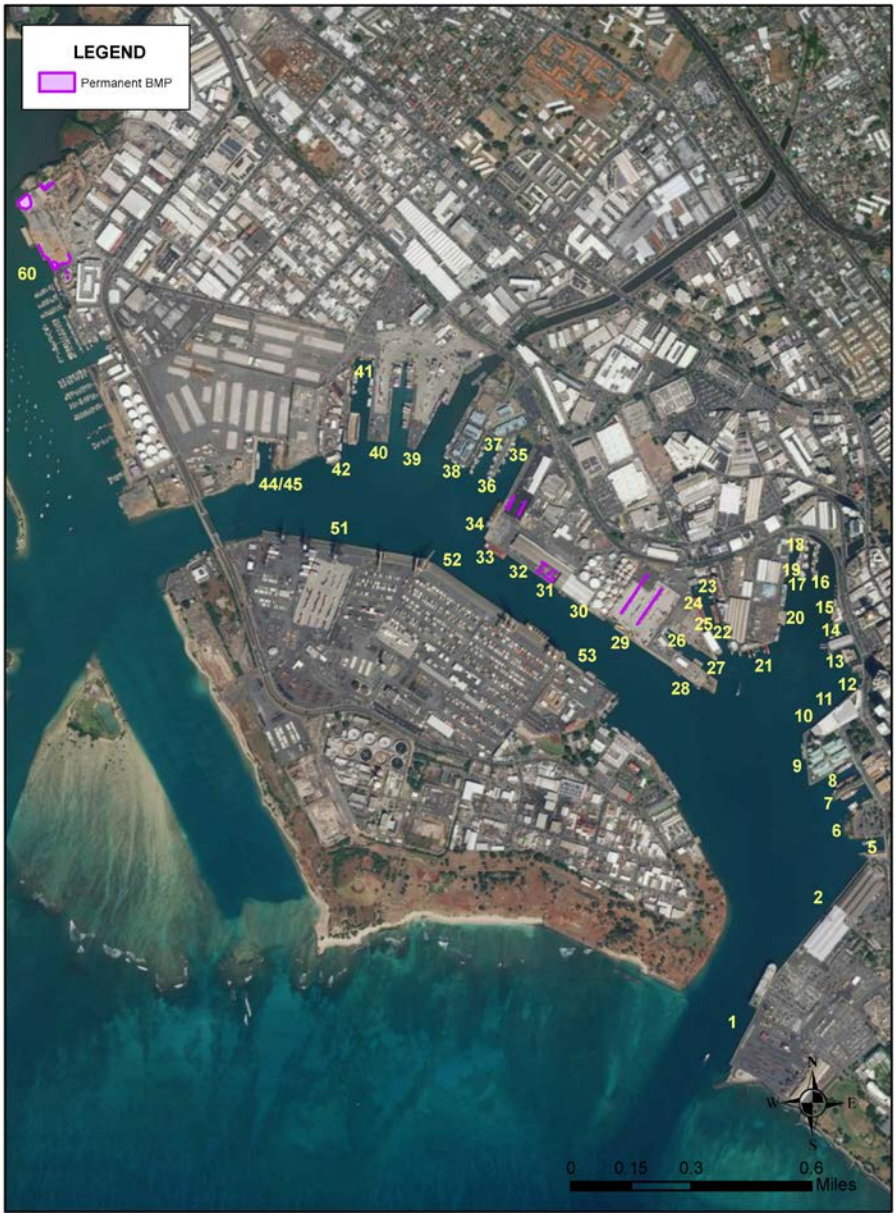

Figure 12A. Honolulu Harbor Post-Construction BMPs with GIS map of BMP locations.

Figure 12B shows post construction BMP locations at Piers 29 through 35.

Figure 12B. Honolulu Harbor Post-Construction BMPs with GIS map of BMP locations.

Figure 12C shows post construction BMP locations at Pier 60.

Figure 12C. Honolulu Harbor Post-Construction BMPs with GIS map of BMP locations.

Table 16 shows the Post-Construction BMP ID number, structural type, BMP type, BMP subtype, and location at Honolulu Harbor.

Table 16. Honolulu Harbor Post-Construction BMP ID number, structural type, BMP type, BMP subtype, and location.

PBMP ID	STRUCTURAL	BMP TYPE	BMP SUBTYPE	PIER
EHBMPHO29500B	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29550A	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29050A	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29100A	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29150A	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29200A	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29250A	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29050B	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29100B	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29150B	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29200B	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29250B	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29350B	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29300B	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29400B	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29450B	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29530B	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO293620	Yes	Treatment Control	Manufactured	HO29

PBMP ID	STRUCTURAL	BMP TYPE	BMP SUBTYPE	PIER
			Treatment Device	
EHBMPHO29450A	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29400A	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29500A	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29350A	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO29300A	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO293672	Yes	Treatment Control	Manufactured Treatment Device	HO29
EHBMPHO314152	Yes	Treatment Control	Manufactured Treatment Device	HO31
EHBMPHO314153	Yes	Treatment Control	Manufactured Treatment Device	HO31
EHBMPHO314154	Yes	Treatment Control	Manufactured Treatment Device	HO31
EHBMPHO314155	Yes	Treatment Control	Manufactured Treatment Device	HO31
EHBMPHO314156	Yes	Treatment Control	Manufactured Treatment Device	HO31
EHBMPHO314157	Yes	Treatment Control	Manufactured Treatment Device	HO31
EHBMPHO314158	Yes	Treatment Control	Manufactured Treatment Device	HO31
EHBMPHO350035	No	BioClean Filters		HO35
EHBMPHO350036	No	BioClean Filters		HO35
EHBMPHO350037	No	BioClean Filters		HO35
EHBMPHO350039	No	BioClean Filters		HO35
EHBMPHO350040	No	BioClean Filters		HO35
EHBMPHO350041	No	BioClean Filters		HO35
EHBMPHO609903	Yes	Treatment Control	Infiltration Basin	HO60
EHBMPHO609900	Yes	Treatment Control	Infiltration Basin	HO60
EHBMPHO609902	Yes	Treatment Control	Dry Swale	HO60
EHBMPHO609901	Yes	Source Control	Outdoor Process Equipment Operations	HO60

2.3 Honolulu Harbor Outfall Drainage Basin

Honolulu Harbor outfalls drain into areas at risk for flooding, as shown on the map from Hawaii Department of Land and Natural Resources (DLNR) *Flood Hazard Assessment Report 2014* (www.hawaiinfip.org).

Figure 13 shows the Honolulu Harbor flood hazard assessment map.

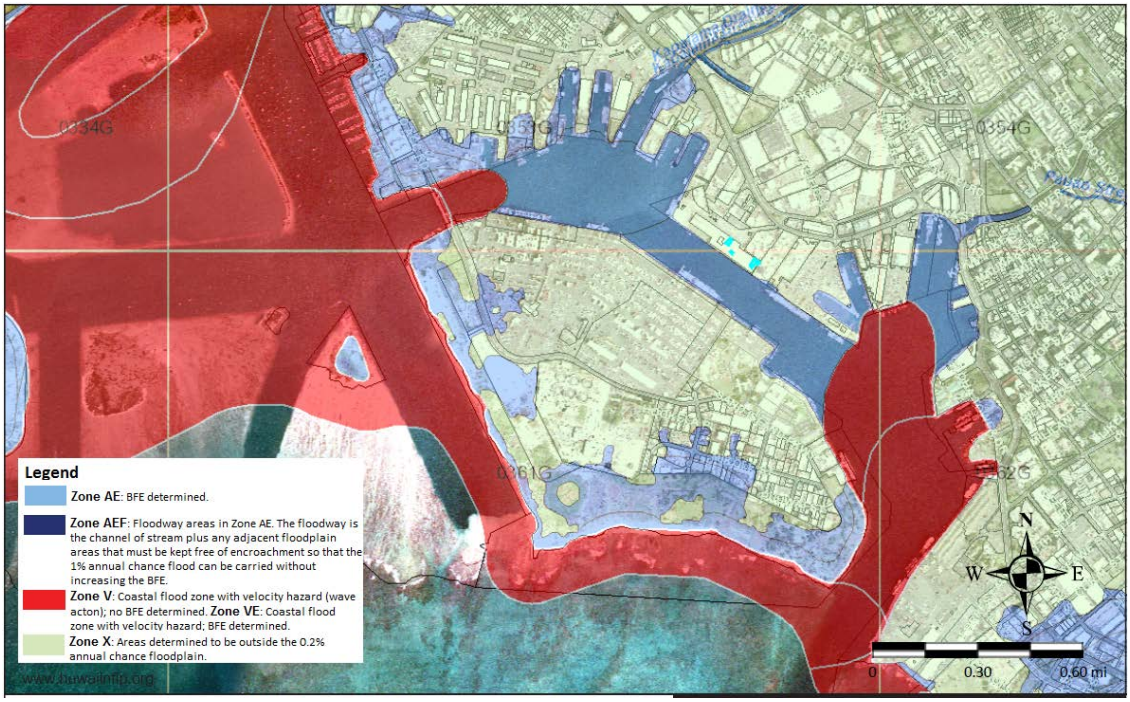

Figure 13. Honolulu Harbor flood hazard assessment map. *(Courtesy DLNR 2014.)*

2.4 Honolulu Harbor Signage and Stenciling GIS Mapping

Signage that prohibit dumping or discarding pollutants are installed at suitable locations on Harbor property. Suitable areas include visible public locations, high traffic tenant areas or areas with a history of illicit discharges, and locations at wharfs and piers. Future signs will include information about illicit discharges, Harbors storm water awareness message, and the storm water hotline for reporting storm water issues.

Harbors stencils or labels all inlets and open channels on Honolulu Harbor and Kalaeloa Barbers Point Harbor to promote storm water awareness and reduce non-storm water discharges into harbor waters. Every year, the legibility of the stencils or labels nearest each inlet will be evaluated prior to the wet season. If necessary, Harbors

will re-stencil or re-label the inlet. Three types of labels are available for installation depending on the surface conditions, as follows:

- Aluminum stencils are used to paint rough surfaces.
- Duracast hi-visibility placards are installed on curbs in public areas.
- Metal medallions are installed on grates or where the first two stencil types are not feasible.

Aluminum stencils are used to paint rough surfaces.

Duracast hi-visibility placards are installed on curbs in public areas

Metal medallions are installed on grates.

Figure 14. Harbors three types of stencils BMP installation.

The appropriate stencil type and installation location is determined by HAR-EE.

The Signage and Inlet Stenciling is assigned to HAR-OM Wharf Maintenance Unit for signage installation, repair, and replacement. There are currently 82 signs installed and maintained at Honolulu Harbor.

Figure 15 shows Honolulu Harbor map of storm drain signage currently installed and maintained.

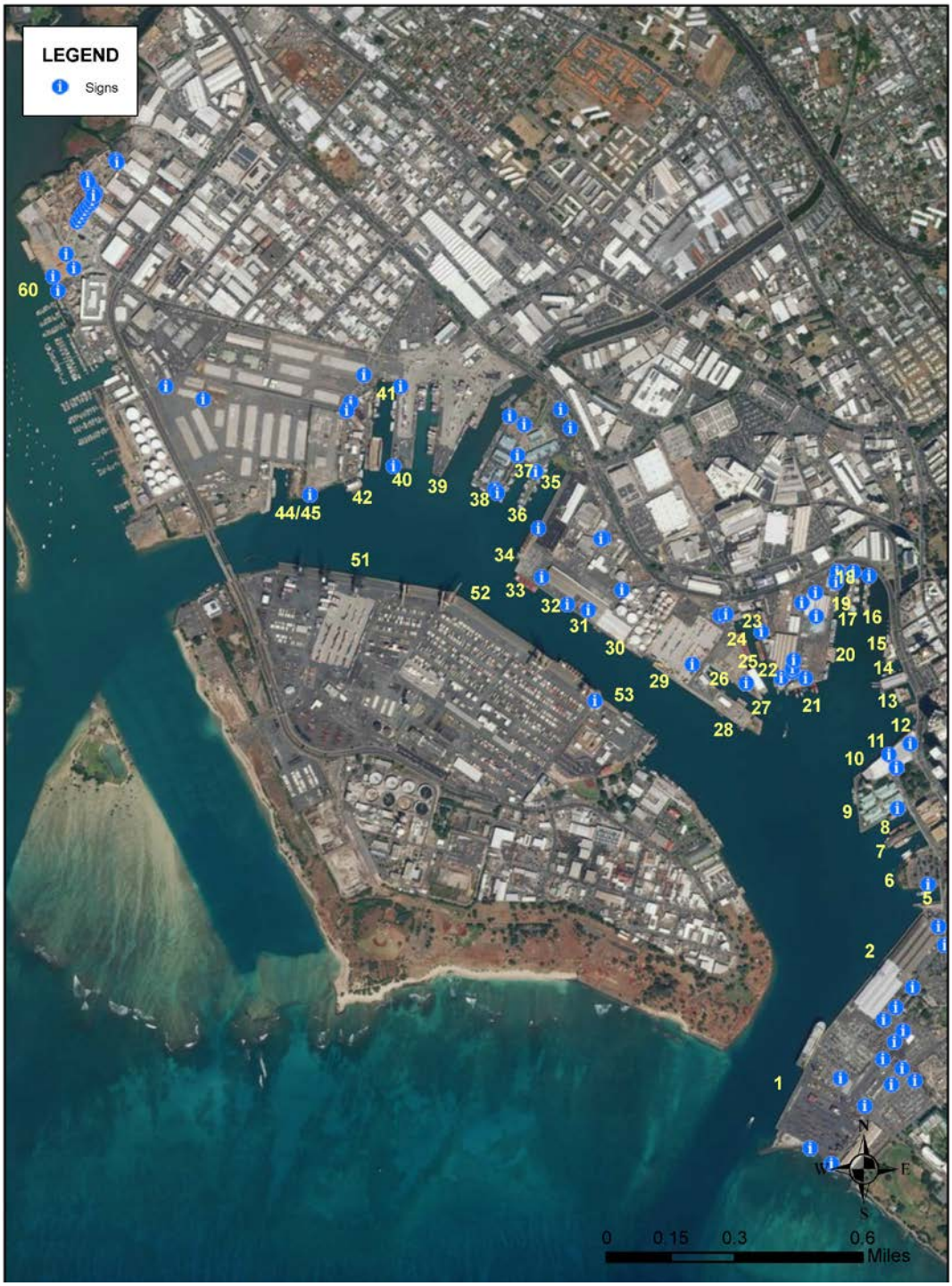

Figure 15. Honolulu Harbor storm drain signage GIS map.

Table 17 lists the signage ID and location at Honolulu Harbor.

Table 17. Honolulu Harbor signage ID and location.

ITEM	SIGN ID	PIER LOCATION
1	IMSHO010223	HO01
2	IMSHO010253	HO01
3	IMSHO010221	HO01
4	IMSHO010214	HO01
5	IMSHO010215	HO01
6	IMSHO020257	HO02
7	IMSHO020810	HO02
8	IMSHO020650	HO02
9	IMSHO020520	HO02
10	IMSHO020290	HO02
11	IMSHO020259	HO02
12	IMSHO020274	HO02
13	IMSHO020256	HO02
14	IMSHO020805	HO02
15	IMSHO020501	HO02
16	IMSHO051060	HO05
17	IMSHO081516	HO08
18	IMSHO101744	HO10
19	IMSHO102030	HO10
20	IMSHO111836	HO11
21	IMSHO162208	HO16
22	IMSHO172210	HO17
23	IMSHO182306	HO18
24	IMSHO182308	HO18
25	IMSHO182304	HO18
26	IMSHO192562	HO19
27	IMSHO182432	HO19
28	IMSHO202612	HO21
29	IMSHO232850	HO23
30	IMSHO232806	HO23
31	IMSHO232648	HO23
32	IMSHO232652	HO23
33	IMSHO232656	HO23
34	IMSHO232440	HO23
35	IMSHO243202	HO24

ITEM	SIGN ID	PIER LOCATION
36	IMSHO263509	HO26
37	IMSHO263511	HO26
38	IMSHO293641	HO29
39	IMSHO293222	HO29
40	IMSHO314135	HO31
41	IMSHO314060	HO31
42	IMSHO324389	HO32
43	IMSHO324387	HO32
44	IMSHO324151	HO32
45	IMSHO334202	HO33
46	IMSHO354415	HO35
47	IMSHO364680	HO36
48	IMSHO384608	HO38
49	IMSHO384806	HO38
50	IMSHO385014	HO38
51	IMSHO385012	HO38
52	IMSHO385140	HO38
53	IMSHO384606	HO38
54	IMSHO385153	HO38
55	IMSHO405781	HO40
56	IMSHO405701	HO40
57	IMSHO417061	HO41
58	IMSHO427041	HO42
59	IMSHO427200	HO42A
60	IMSHO427723	HO42E
61	IMSHO427701	HO42E
62	IMSHO426981	HO42E
63	IMSHO518901	HO51
64	IMSHO608905	HO60
65	IMSHO608900	HO60
66	IMSHO608908	HO60
67	IMSHO609008	HO60
68	IMSHO609183	HO60
69	IMSHO609181	HO60
70	IMSHO609131	HO60
71	IMSHO609123	HO60
72	IMSHO609125	HO60
73	IMSHO609127	HO60
74	IMSHO609129	HO60

ITEM	SIGN ID	PIER LOCATION
75	IMSHO609107	HO60
76	IMSHO609109	HO60
77	IMSHO609111	HO60
78	IMSHO609113	HO60
79	IMSHO609115	HO60
80	IMSHO609117	HO60
81	IMSHO609119	HO60
82	IMSHO609121	HO60

There are currently 8 signs installed and maintained at Kalaeloa Barbers Point Harbor. Table 18 lists the signage ID and location at Kalaeloa Barbers Point Harbor.

Table 18. Kalaeloa Barbers Point Harbor signage ID and location.

ITEM	SIGN ID	PIER LOCATION
1	IMSBP043660	BP04
2	IMSBP055250	BP05A
3	IMSBP077102	BP07
4	IMSBP077140	BP07
5	IMSBP077142	BP07
6	IMSBP077144	BP07
7	IMSBP097605	Area 9
8	IMSBP097603	Area 9

2.5 Kalaeloa Barbers Point Harbor Pier Use Area

Kalaeloa Barbers Point Harbor services a niche market with specialized cargo handling facilities, and Harbors Personnel are assigned for specific pier areas for the storm sewer system inspection and cleaning activities and tasks.

Table 19 lists the piers, principal cargo, container yard area, and shed area for Kalaeloa Barbers Point Harbor.

Table 19. Kalaeloa Barbers Point Harbor Piers, principal cargo, container yard area, and shed area.

PIER	PRINCIPAL CARGO/PIER USE	YARD AREA (ACRES)	SHED AREA (SQ. FT.)
Barge Basin	Liquid-bulk cargo and pipelines. Scrap metal and sand.	4.4	
P-3	Dry-dock.		
Ferry/Tug Pier	Ferry terminal.		
P-5A	Neo-bulk cargo, petroleum, and scrap metal.		
P-5B	Liquid-bulk cargo and pipelines. Neo-bulk cargo and scrap metal.	4.7	45,000
P-6	Liquid-bulk cargo and pipelines. DRY and neo-bulk cargos, and scrap metal. Dry-bulk unloader and storage.	30.0	
P-7	Dry-bulk cargo.	3.1	
	TOTALS	**42.4**	**45,000**

2.5.1 Kalaeloa Barbers Point Harbor Piers GIS Mapping of Storm Drain Assets

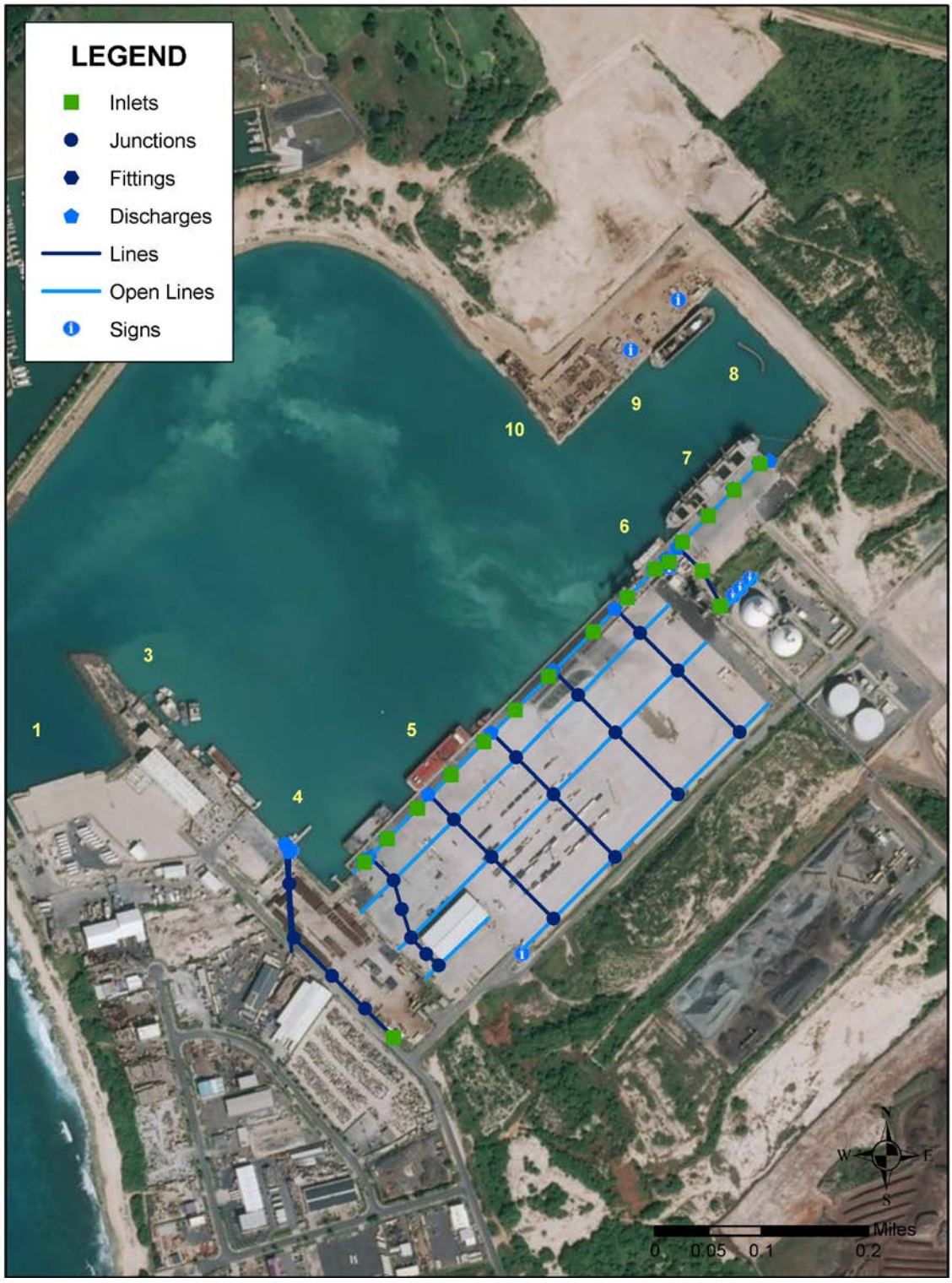

Figure 16. Kalaeloa Barbers Point Harbor Piers GIS map of storm drain assets.

Table 20 shows Kalaeloa Barbers Point Harbor storm drain inlet and manhole assets, identification number, location, and stencil type.

Table 20. Kalaeloa Barbers Point Harbor storm drain inlet and manhole assets, ID number, location, and stencil type.

ASSET TYPE	ID NUMBER	LOCATION	STENCIL TYPE *
Drain Inlet	SDIBP044102	BP04	MM
Manhole	SDJBP044072 (NR)	BP04	N/A
Manhole	SDJBP044042	BP04	N/A
Manhole	SDJBP044007	BP04	N/A
Manhole	SDJBP043865	BP04	N/A
Manhole	SDJBP055862	BP05	N/A
Manhole	SDJBP055832	BP05	N/A
Manhole	SDJBP055815	BP05	N/A
Manhole	SDJBP055462	BP05	N/A
Manhole	SDJBP055432	BP05	N/A
Manhole	SDJBP055415	BP05	N/A
Manhole	SDJBP055022	BP05A	N/A
Manhole	SDJBP054886	BP05A	N/A
Manhole	SDJBP054875	BP05A	N/A
Manhole	SDJBP054860	BP05A	N/A
Manhole	SDJBP055015	BP05A	N/A
Drain Inlet	SDIBP066202	BP06	SP
Drain Inlet	SDIBP066502	BP06	SP
Drain Inlet	SDIBP066802	BP06	SP
Manhole	SDJBP066715	BP06	N/A
Manhole	SDJBP066732	BP06	N/A
Manhole	SDJBP066762	BP06	N/A
Manhole	SDJBP066262	BP06	N/A
Manhole	SDJBP066215	BP06	N/A
Manhole	SDJBP066232	BP06	N/A

* *SP = spray paint; MM = metal marker (bolted to grate); CM = curb marker (durable plastic requires special adhesive); and N/A = not applicable.*

Table 21 shows Kalaeloa Barbers Point Harbor open channel, trench drain, and swale assets; and identification number, and location.

Table 21. Kalaeloa Barbers Point Harbor open channel, trench drain, and swale assets; and ID number and location.

ASSET TYPE	ID NUMBER	LOCATION
Open Channel	SDOBP05001A	BP05
Open Channel	SDOBP05002B	BP05
Open Channel	SDOBP05002C	BP05
Open Channel	SDOBP05002A	BP05
Open Channel	SDOBP05002D	BP05
Open Channel	SDOBP05002E	BP05
Open Channel	SDOBP05002F	BP05
Trench Drain	SDIBP055902	BP05
Trench Drain	SDIBP055702	BP05
Trench Drain	SDIBP055502	BP05
Trench Drain	SDIBP055302	BP05
Trench Drain	SDIBP055202	BP05A
Trench Drain	SDIBP055002	BP05A
Open Channel	SDOBP05002G	BP06
Open Channel	SDOBP05002H	BP06
Open Channel	SDOBP05002I	BP06
Open Channel	SDOBP05002J	BP06
Open Channel	SDOBP05002K	BP06
Open Channel	SDOBP05002L	BP06
Swale	SDOBP077135	BP07
Trench Drain	SDIBP077302	BP07
Trench Drain	SDIBP077402	BP07
Trench Drain	SDIBP077202	BP07
Trench Drain	SDIBP077002	BP07
Open Channel	SDOBP0502A1	BP05A
Open Channel	SDOBP0502C1	BP05A
Open Channel	SDOBP0502B1	BP05A

Table 22 shows the Post-Construction BMP ID number, structural type, BMP type, BMP subtype, and location at Kalaeloa Barbers Point Harbor.

Table 22. Post-Construction BMP ID number, structural type, BMP type, BMP subtype, and location.

PBMP ID	STRUCTURAL	BMP TYPE	BMP SUBTYPE	PIER
EHBMPBPGP7730	Yes	treatment control	infiltration basin	GLP
EHBMPBPGP7731	Yes	treatment control	downspout disconnection	GLP
EHBMPBP035010	Yes	treatment control	dry well	3
EHBMPBP035011	Yes	treatment control	dry well	3
EHBMPBP035022	Yes	source control	emergency valve	3
EHBMPBP035020	Yes	source control	emergency valve	3
EHBMPBP035021	Yes	source control	emergency valve	3

Figure 17 shows the Kalaeloa Barbers Point Harbor Post-Construction BMP map.

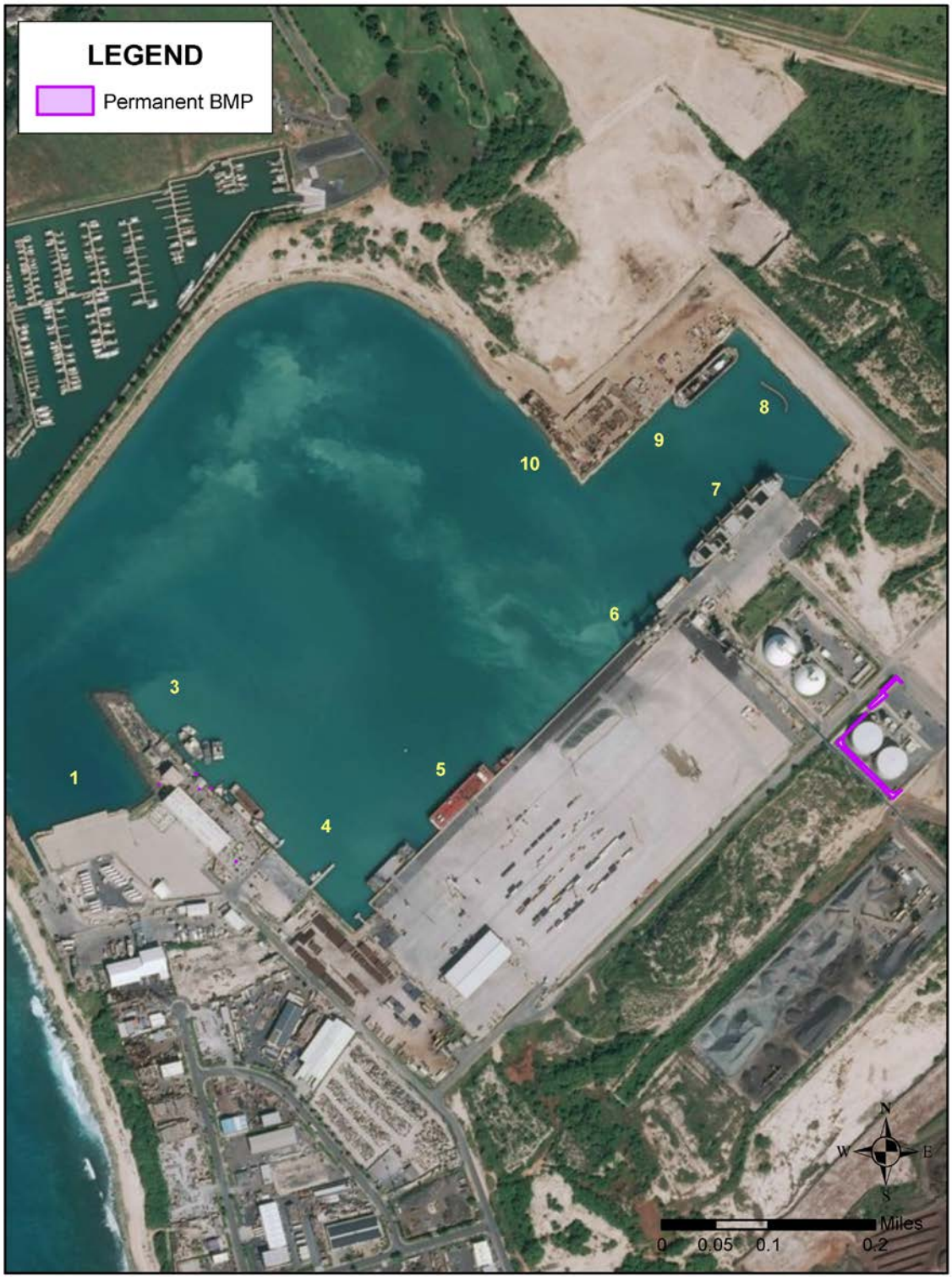

Figure 17. Kalaeloa Barbers Point Harbor Post-Construction BMP map.

2.5.2 Rail Tracks Location Map

The rail tracks at Kalaeloa Barbers Point Harbor are used for off-loading dry bulk cargo at Pier 6 and Pier 7. These lands are under leases to tenants and these tenants are required to clean the tracks after each off-loading event. The Harbor Agent then inspects the area.

Figure 18 shows the Kalaeloa Barbers Point Harbor rail tracks and storm trench drains.

Figure 18. Kalaeloa Barbers Point Harbor rail tracks at Pier 6 and Pier 7.

CHAPTER 3
HARBORS PERSONNEL AND STORM SEWER SYSTEM ACTIVITIES

The Hawaii Department of Transportation Director provides oversight for, and delegates authority and responsibility to, the Office of Environmental Compliance (ENV) to oversee compliance with all environmental requirements relating to Small MS4 compliance, including the storm water permits and storm water management plans for the Harbors, Airports, and Highways Divisions. The ENV staff reports to the Director.

The ENV staff coordinates with the Harbors Division to achieve and maintain compliance with Federal, State, and local environmental regulations, including the CD requirements for the SSS OMP.

The Director confers Program authority to the Deputy Director Harbors (DEP-H) who maintains direct oversight of all Harbors staff, leads the compliance effort for the division, and ensures that program focus and resources are assigned to personnel who perform the inspection, cleaning, and maintenance of the Harbors storm sewer system. The ENV supports the DEP-H who leads the compliance efforts to ensure sufficient resources are allocated for successful implementation of the SSS OMP. The DEP-H directs the development and execution of the SSS OMP through the Engineering Branch and the Harbors Administrator. Both the Engineering Branch and the Harbors Administrator ensures implementation of the Harbors SSS OMP.

Figure 19 shows the Harbors Division, Oahu District Storm Sewer System Organizational Chart with yellow highlighted boxes for the Departments, Divisions, Branches, Sections, Units and Subunits responsible for the implementation of SSS OMP activities and tasks.

Figure 20 shows Oahu District Position Titles and SSS OMP Tasks Organizational Chart.

3.1 Engineering Branch

The Engineering Branch (HAR-E) through the *Branch Head Engineering Program Manager* provides engineering management and storm water program oversight through the DEP-H to the Harbors Administrator (*see* Section 3.2), for the Harbors overall environmental compliance activities, including the CD requirements.

The HAR-E is responsible for ensuring implementation of the Construction Site Runoff Control Program and the Post-Construction Storm Water Management Program.

3.1.1 Environmental Section

The Engineering Environmental Section (HAR-EE) through the *Section Head Engineer* oversees permit compliance with all relevant environmental regulations, including the CD requirements. The HAR-EE administers the *SWMP* control measures for Harbors through the following program elements:

1. Public Education and Outreach Program – *Training, Signage and Inlet Stenciling*
2. Public Involvement/Participation Program
3. Illicit Discharge Detection and Elimination Program –*Tenant Inspection Program, Outfall Reconnaissance Inventory and Inspection Program, Site Assessment Program, Enforcement Response Program*
4. Construction Site Runoff Control Program
5. Post-Construction Storm Water Management Program
6. Pollution Prevention and Good Housekeeping Program – *Storm Sewer System Operations & Maintenance Program*

Note: Programs 1 and 6 are addressed herein; whereas, Programs 2, 3, 4, and 5 are outside the scope of this manual. Refer to current *SWMP* for program details.

The HAR-EE provides oversight on the implementation of the Harbors SSS OMP and tracks the overall environmental compliance progress; and is responsible for the Reporting requirements. The HAR-EE is the Project Coordinator and assists the HAR-EP who develops the AMS.

The HAR-EE and its environmental consultants perform tenant inspections and provide technical support to Harbors Property Management (HAR-PM) regarding enforcement of tenant violations, and applicable environmental issues (e.g., implementation of BMPs, leaking, etc.).

3.1.2 Planning Section

The Engineering Planning Section (HAR-EP) through the *Section Head Engineer* develops the Harbor Master Plans, six-year capital project budget plan, and capital project biennial budget for new development and redevelopment projects. The HAR-EP was assigned to develop GIS map layers for storm sewer, tenant, and projects at Honolulu Harbor and the Kalaeloa Barbers Point Harbor. Since the completion of the GIS mapping in 2015, HAR-EP personnel also serve as GIS and AMS technical Administrators.

HAWAII DEPARTMENT OF TRANSPORTATION, HARBORS DIVISION, OAHU DISTRICT, STORM SEWER SYSTEM ORGANIZATIONAL CHART

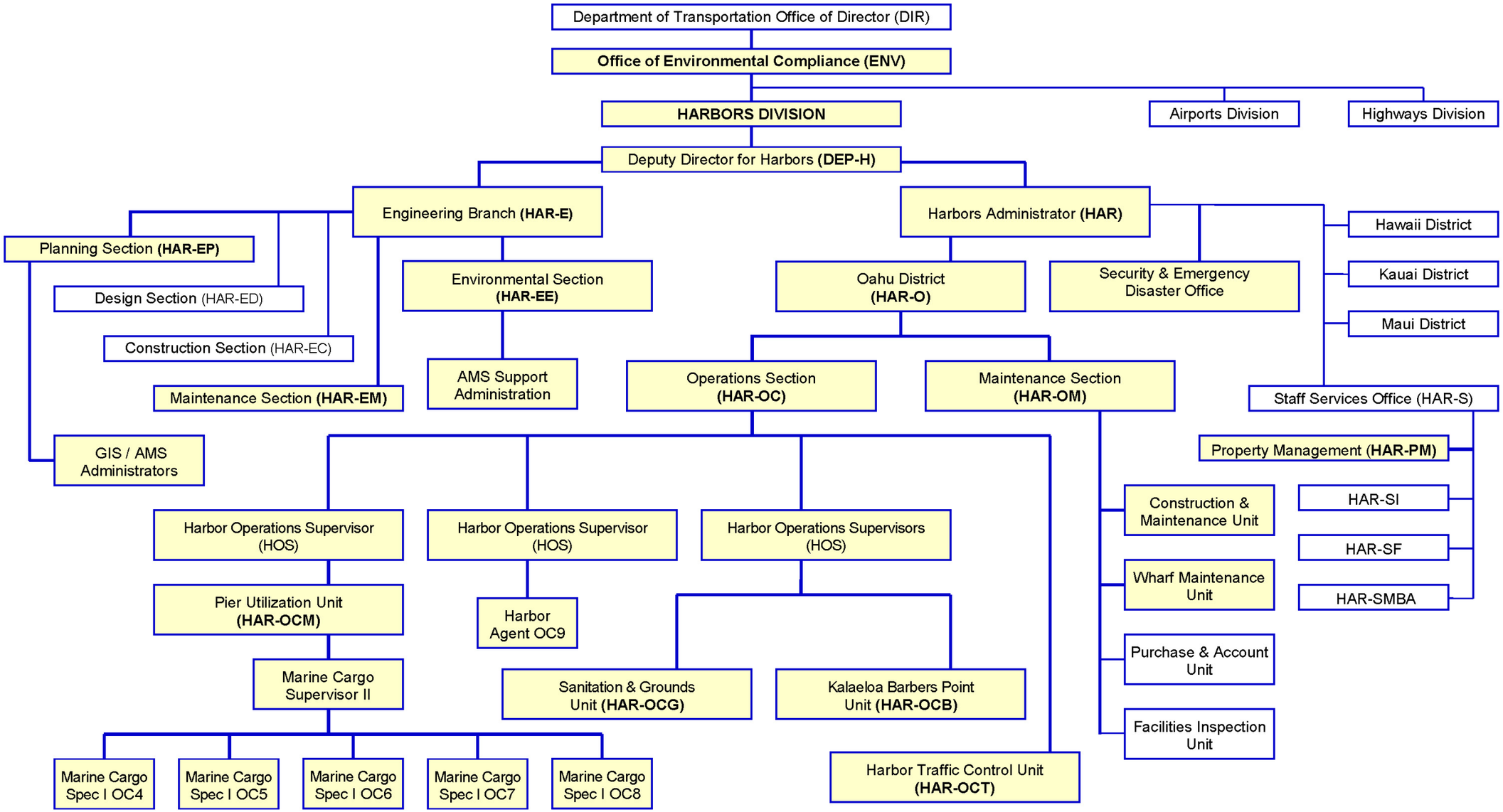

Figure 19. Harbors Division Organizational Chart with responsibilities for the SSS OMP activities highlighted in yellow.

OAHU DISTRICT POSITION TITLES AND STORM SEWER SYSTEM TASKS ORGANIZATIONAL CHART

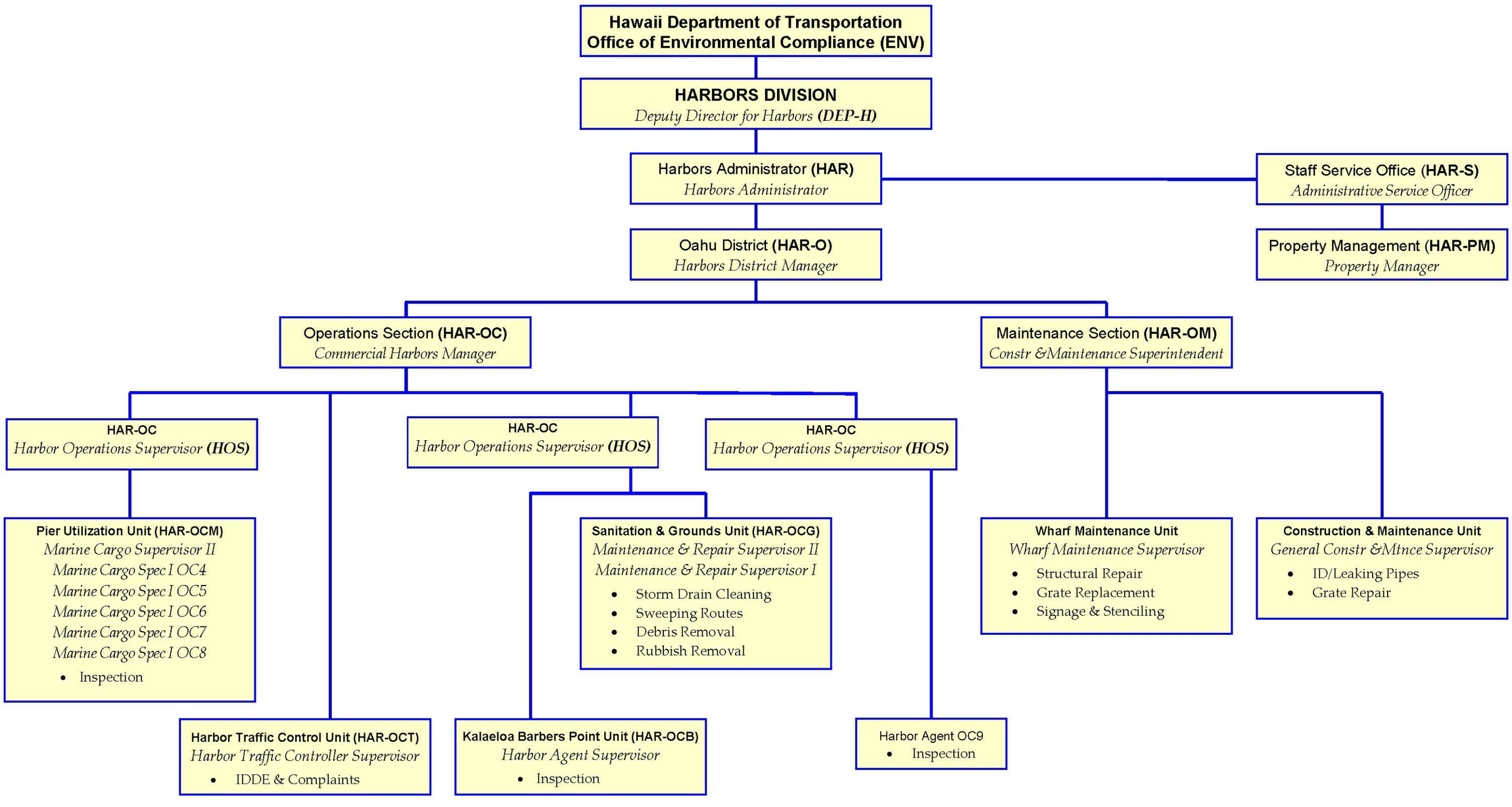

Figure 20. Harbors Oahu District Position Titles and SSS Activities Organizational Chart.

The AMS Administrators are responsible for the updates and enhancements of both database systems capabilities, and to ensure continued function as configured. Minor configuration and GIS changes may be made, as necessary; however, major changes may require a consultant. The AMS Administrators also serve as trainers to train and assist users as necessary.

3.1.3 Maintenance Section

The Engineering Maintenance Section (HAR-EM) through the *Section Head Engineer* is responsible for construction plans, specifications, and contract preparation and execution for special maintenance and repair projects. The HAR-EM regularly provides engineering maintenance support functions to Oahu District Maintenance Section (HAR-OM), to maintain and repair or replace the damaged and worn features of the Harbors storm sewer system.

3.2 Harbors Administrator

The Harbors Administrator (HAR) is responsible for the management of all properties for the Oahu District, as well as the Hawaii District, Kauai District, and Maui District harbors. The HAR procures the personnel, financial, equipment, and material resources needed to execute the environmental compliance efforts for the SSS OMP.

3.3 Harbors Oahu District

The Harbors Oahu District (HAR-O) through the *Harbors District Manager* is responsible to manage the day-to-day direction and assignments, manpower, requests and allocates resources for routine Operations and Maintenance procedures at the Honolulu and Kalaeloa Barbers Point Harbors. The HAR-O manages the staff resources and program budget for the Harbors Oahu District SSS OMP implementation; and evaluates data, conducts meetings and consultations for improvement.

The HAR-O Sections, Units, and Subunits play vital roles in the implementation of the SSS OMP inspections and cleaning of storm drains, placement of storm water signs, stenciling, noting illicit discharges, and maintenance of BMPs.

The Harbors Oahu District Operations Section (HAR-OC) and Maintenance Section (HAR-OM) assign key personnel in their Units and Subunits to conduct inspections, prepare and submit Work Orders / Service Requests into the AMS, and perform cleaning and preventive maintenance activities for the storm sewer system.

3.3.1 Operations Section

The Harbors Operations Section (HAR-OC) is led by the *Commercial Harbors Manager*, who oversees Harbor operations including vessel scheduling and berthing, monitoring of operations, street and yard sweeping, and trash collection and disposal. The Commercial Harbor Manager supervises three (3) *Harbor Operations Supervisors* (HOS) who are responsible for these Units:

- Pier Utilization Unit (HAR-OCM)
- Sanitation (HAR-OCG) & Kalaeloa Barbers Point Units (HAR-OCB)
- Harbor Agent (OC9) for Commercial Fishing Village

Oahu District personnel have primary responsibilities to observe, report, and enforce tenant activities in cargo yards surrounding a single tenant area, and common pier facilities with multi-cargo operators.

The HOS supervises Harbors staff who conduct the Routine Inspections, and reviews the Environmental Inspection Reports, Area Surveys (Service Requests), Work Orders (WO), and Illicit Discharge Reports submitted by the *Marine Cargo Specialist Supervisor* (OCM), *Harbor Agent Supervisor* (OCB), *Maintenance & Repair Supervisors* (OCG), and the *Harbor Traffic Controller Supervisor* (OCT). The HOS conducts follow-up to review or reconcile inspections with Work Orders for cleaning.

- The HOS and the Marine Cargo Supervisor II supervise Storm Sewer System inspection.
- The HOS and the HAR-OCG Maintenance & Repair Supervisors manage cleaning requirements of the CD Section 20.c and d.
- The HOS supervises the Harbor Agent (HA) who conducts daily inspections of the Domestic Commercial Fishing Village at Honolulu Harbor Piers 36 through 38. The HA at Kalaeloa Barbers Point Unit is responsible for day-to-day, on-scene supervision of the harbor.

3.3.1.1 Pier Utilization Unit

The HOS supervises the Harbors Pier Utilization Unit (HAR-OCM) which consists of *Marine Cargo Specialists* (MCS) staff that conduct Routine Inspections of pier areas.

- The MCS perform semiannual Screening Inspections of storm sewer system drain inlets and Hotspot Inspections of select storm sewer system drain inlets as required by the CD Section 20.c.

Based on inspection observations, MCS and HA may prepare the following reports to submit to the MCS Supervisor for review:

- Environmental Compliance Screening Inspections
- Service Requests (previously Area Surveys)
- Illicit Discharge Service Requests

Routine Inspections

The MCS are responsible for pier use and/or damage, and pier wharfs and cargo yards of the harbors based on pier assignments, to inspect activities in their assigned areas; and to inspect, monitor, observe, and advise cargo operators that have potential sources of illicit discharges.

Screening Inspections

The MCS and HA conduct semiannual Screening Inspections on 100% of the accessible drain inlets and open channels (trench drains) and quarterly Hotspot Inspections of select drain inlets and open channels. The physical inspections identify structural defects, trash and debris accumulation, drain guard presence, and illegible drain inlet stenciling.

3.3.1.2 Kalaeloa Barbers Point Harbor Unit

The Kalaeloa Barbers Point Harbor Unit (HAR-OCB) through the *Harbor Agent Supervisor* conducts Routine Inspection and Screening Inspections of the harbor and may prepare reports similar to MCS:

- Environmental Compliance Screening Inspections
- Service Requests (previously Area Surveys)
- Illicit Discharge Service Requests

3.3.1.3 Harbor Traffic Control Unit

The Harbor Traffic Control Unit (HAR-OCT) is also known as "Tower Operators" and through the *Harbor Traffic Controller Supervisor* is responsible for the potential reports coming into HAR-OCT. The Tower Operator assesses the report, and provides notifications depending on the assessment. Types of reports received are suspected illicit discharges/spills, leaking pipes, illegal dumping, clogged drains, damages and acts of vandalism, and other environmental concerns reported by employees or the general public. The 24/7 Tower Operators record and process the information received; and per relevant regulatory reporting requirements, provides notification to the regulatory agencies with jurisdiction, such as the US Coast Guard and HDOH.

The IDDE and Complaint reports may be initiated by the Tower Operator who faxes a copy to HAR-EE. HAR-EE generates the necessary and appropriate Service Request in the Citiworks® AMS.

3.3.1.4 Sanitation & Grounds Unit

The Sanitation & Grounds Unit (HAR-OCG) through the *Maintenance & Repair Supervisors* manage personnel who utilize heavy equipment to open the drain inlets to conduct follow-up work. HAR-OCG operates a vacuum truck that substantially increases the capabilities to clean drain inlets; and a rubbish truck for debris removal. HAR-OCB has a staging area for bulk pickup by HAR-OCG.

- The HAR-OCG Supervisors are responsible for managing the Subunit and data input to Citiworks® AMS, and the follow up Work Orders.
- The Kalaeloa Barbers Point Unit (HAR-OCB) Harbor Agent Supervisor uses Citiworks® AMS to create Service Requests as needed.
- HAR-OCG is responsible for storm drain cleaning and removal of accumulated debris, trash and sediment, and proper disposal with appropriate waste contractors.
- HAR-OCG performs sweeping of the pier common areas and select tenant facilities to prevent pollutants from entering the harbor by removing solids prior to flowing into the storm sewer system.
- HAR-OCG provides housekeeping practices for refuse collection and debris removal as an ongoing activity for Harbors facilities.
- HAR-OCG regularly conducts emptying of dumpsters for refuse collection; removal and disposal of discarded objects, machinery or equipment; and prompt repair/replacement of malfunctioning dumpsters.

3.3.2 Maintenance Section

The Harbors Maintenance Section (HAR-OM) through the *Construction & Maintenance Superintendent* is responsible for construction, maintenance, and routine repair for HAR-O, including the storm sewer system. The HAR-OM personnel perform daily maintenance functions at the piers and tenant areas in the cargo yards, and supervise the skilled labor and maintain mobile equipment resources for the Oahu District. The various skilled trade subunits are grouped under two primary units – Wharf Maintenance Unit and Construction & Maintenance Unit.

3.3.2.1 Wharf Maintenance Unit

The Wharf Maintenance Unit through the *Wharf Maintenance Supervisor* oversees the Building & Wharf Maintenance Subunit; Building, Paving & Grounds Subunit; Carpentry & Masonry Subunit; Equipment Operations Subunit; and Painting Subunit. The Wharf Maintenance Unit assists the storm water program with skilled trade subunits to support the following SSS O&M needs:

- Repair storm drain inlet boxes.
- Maintain legible stenciling and markers at storm drain inlets, and install required signage.

3.3.2.2 Construction & Maintenance Unit

The Construction & Maintenance Unit through the *General Construction & Maintenance Supervisor* oversees the Electrical Subunit, the Automotive Maintenance Subunit, the Plumbing Subunit, the Welding Subunit, the Equipment Maintenance Subunit, the Air Conditioning Subunit, and the Parking Meter Subunit. The Construction and Maintenance Unit assists the storm water program with skilled trade subunits to support the following SSS O&M needs:

- Regular maintenance to fix leaking pipes.
- Provide scheduled maintenance for vehicles.
- Repair and replace metal grates.

See Chapter 5 for details about the MCS/HA and HAR-OCG tasks workflow processes.

3.4 SSS OMP Implementation and BMPs

The SSS OMP implements BMPs that are effective, practical means of preventing or reducing pollution from storm water runoff. Storm water BMPs are defined as a schedule or schedules of operational inspection activities, prohibitions or designations of practices, maintenance procedures, and management practices to prevent or reduce the pollution to receiving water and/or Harbors storm water drainage system.

Figure 21 shows a prohibition practice BMP of signage informing the public that "Pollution is Prohibited by Law."

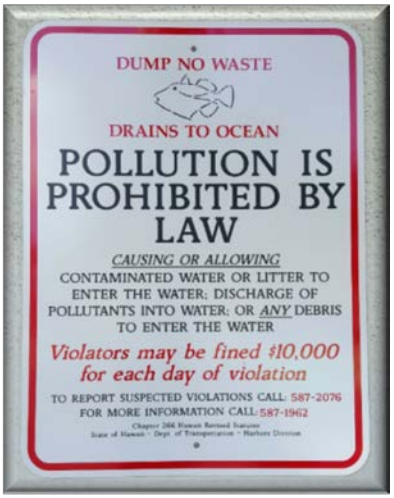

Figure 21. Prohibition practice BMP signage informs the public that "Pollution is Prohibited by Law."

BMPs include treatment control requirements; operating procedures; and practices to prevent illicit discharges and to control runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

BMPs related to treatment control utilize physical devices or systems that remove pollutants from storm water.

BMPs related to operational practices are intended to prevent pollutants from entering surface waters and/or Harbors storm water drainage system by altering activities to eliminate and minimize the pollution.

BMPs related to spill response rely on a combination of structural controls, employee awareness and relevant training to be effective methods for protection of environment.

Table 23 shows the storm water BMPs and Harbors Oahu District programmatic roles that provide oversight for the SSS OMP activities and tasks.

Table 23. Storm Water BMPs and Harbors programmatic roles.

STORM WATER BMPS	UNITS
Semiannual Storm Drain Screening Inspections	OCM, MCS/HA
Quarterly Hotspot Inspections	OCM, MCS/HA
Comprehensive Inspections	OCG, OCB
Storm Drain Cleaning	OCG
IDDE and Complaint Inspections	MCS, OCG, OCB
Structural Repairs	Wharf Maintenance

STORM WATER BMPS	UNITS
Grate Replacements	Wharf Maintenance
Grounds Special Maintenance	OCG, OCB, WM
Routine Sweeping Routes	OCG, OCB
Refuse Collection	OCG
Repair Leaking Pipes	Construction & Maintenance
Signage and Stenciling	Wharf Maintenance

3.5 Regulatory Requirements

The regulatory requirements guiding the *Storm Sewer System O&M Program Manual* are listed with relevant information or language.

3.5.1 2014 Consent Decree

The Hawaii Department of Transportation CD with the USEPA and HDOH was entered in the US District Court for the District of Hawaii, Docket No. 1:14-CW-00408-JMS-KSC on November 5, 2014. The CD requires Harbors to comply with specific requirements of the CWA, as amended, along with the provisions set forth in the Notice of General Permit Coverage (NGPC) permit.

The CD Section 20 requires Harbors to develop and implement a SSS OMP for Honolulu Harbor and Kalaeloa Barbers Point Harbor.

3.5.2 NPDES NGPCs for Honolulu and Kalaeloa Barbers Point Harbors

The Honolulu Harbor NPDES NGPC HI 03KB482, and the Kalaeloa Barbers Point Harbor NPDES NGPC HI 03KB488, issued by the HDOH, set forth requirements for Harbors to implement minimum control measures to reduce the discharge of pollutants from Harbors MS4 to the MEP in order to protect water quality and satisfy appropriate water quality requirements of the CWA.

The HDOH CWB granted NGPCs for both harbors in separate letters dated May 19, 2003. Coverage was extended by HDOH administrative extension to December 9, 2013, at which time the HDOH renewed the NGPCs for both harbors. The NGPCs for both Honolulu and Kalaeloa Barbers Point Harbors new administrative extension date is December 2, 2016.

The NGPCs require that Harbors effectively prohibit non-storm water discharges through its storm sewer system into State Waters.

3.5.2.1 40 Code of Federal Regulations 122

Harbors is required to comply with the USEPA NPDES regulations (40 CFR Part 122) for urbanized areas.

3.5.2.2 Hawaii Revised Statutes

The Hawaii Revised Statutes (HRS) Chapter 342D Water Pollution, Part III Water Pollution Control states:

> § 342D-50 Prohibition. (a) No person, including any public body, shall discharge any water pollutant into state waters, or cause or allow any water pollutant to enter state waters except in compliance with this chapter, rules adopted pursuant to this chapter, or a permit or variance issued by the director.

3.5.2.3 Hawaii Administrative Rules

The Harbors Division is required to comply with Hawaii Administrative Rules (HAR) Title 11, Chapter 54 Water Quality Standards.

The Harbors Division is required to comply with HAR Chapter 11-55 Water Pollution Control, Appendix K, Appendix A, and HAR Sections 11-55-34.04(a), 11-55-34.07, 11-55-34.11, 11-55-34.12, and other applicable Sections of HAR Chapter 11-55.

The HAR Chapter 11-55 Appendix K NPDES Permit Authorizing Discharges of Storm Water and Certain Non-Storm Water Discharges from Small Municipal Separate Storm Sewer Systems, Section 6 Storm Water Plan Requirements, Subsection (a) Minimum Control Measures, item (6) Pollution Prevention/Good Housekeeping states:

> Develop, implement, and enforce an operation and maintenance program to prevent and reduce storm water pollution from activities, including, but not limited to, park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance that, at a minimum, includes the following:
>
> (A) Good housekeeping and other control measures, and
>
> (B) Employee and contractor training on good housekeeping practices to ensure that good housekeeping measures and best management practices are properly implemented.

3.5.3 SWMP for Honolulu and Kalaeloa Barbers Point Harbors

In compliance with the CWA, as amended, HRS Chapter 342D, and HAR Chapters 11-54 and 11-55, Harbors is authorized to discharge storm water runoff and certain non-storm water discharges as identified in the NGPCs.

The *SWMP* identifies the six minimum control measures established by the USEPA and required by HAR 11-55 Appendix K; and a schedule for implementation of BMPs to reduce, to the MEP, the amount of pollutants from the Small MS4s that enter the receiving State Waters.

The *SWMP* control measures for Public Education and Outreach Program target Harbors tenants, the general public including visitors to our islands, Harbors employees, vessel operators, and general contractors who perform construction on Harbors property. The Signage and Stenciling Program installs signs that prohibit dumping or discarding pollutants at suitable locations on Harbor property. Harbors stencils or labels all inlets and open channels on Honolulu Harbor and Kalaeloa Barbers Point Harbor to promote storm water awareness and reduce non-storm water discharges into harbor waters.

The *SWMP* control measures for Pollution Prevention and Good Housekeeping Program include the SSS OMP.

3.6 Notifications Information and Contacts

Harbors internal procedures determine the point of contact personnel responsible for contacts to the HDOH and CCH agencies for specific circumstances.

Table 24 provides notifications information and contacts.

Table 24. Notifications information and contacts.

NOTIFICATIONS INFORMATION AND CONTACTS	PHONE NUMBER
Harbors Stormwater Hotline (working hours only)	(808) 587-1962
Harbors Traffic Control Center (available 24 hours)	(808) 587-2076
Harbors Environmental Section (HAR-EE) Notify HAR-EE for IDDE and applicable environmental issues or concerns. Connection and Discharge Permittees must notify HAR-EE at least 24 hours before commencing discharge or construction work to arrange for necessary inspectional services.	(808) 587-1962
DOH Clean Water Branch (CWB) Immediately notify the DOH CWB of pollutants entering or threatening to enter State Waters. Immediately notify DOH of any municipal wastewater spills or overflows from private laterals and failing septic systems that discharges into the MS4. Immediately notify the DOH CWB of any spills of any chemical of a *reportable quantity*; and a written notification must also be submitted no later than thirty (30) days after the initial release. *Note:* The reportable quantity for oil and fuel products is a spill of 25 gallons or more, a spill not cleaned within 72 hours, or a spill that threatens ground or surface waters.	(808) 586-4309
DOH Hazard Evaluation and Emergency Response (HEER) Office Notify HEER office of any discharge/spill that enter State Waters after work hours. Notify HEER office of any chemical spill of a *reportable quantity*, and a written notification must also be submitted no later than thirty (30) days after the initial release.	(808) 586-4249 or (808) 247-2191 *(after hours)*
DOH Solids and Hazardous Waste Branch	(808) 586-4226
US Coast Guard Marine Safety Office, Oahu The US Coast Guard should be notified of any quantity spill that reaches the ocean.	(808) 522-8260
CCH Department of Environmental Services (ENV) Sanitary Sewer Spills/Trouble	(808) 768-7272
CCH Environmental Concern Line	(808) 768-3300
CCH Industrial Discharges to Sanitary Sewer	(808) 768-8210
CCH Storm Drain Permit Connection	(808) 768-8106

3.6.1 MOU for HDOT and City & County of Honolulu

Harbors is not involved in the 2002 Memorandum of Understanding (MOU) for HDOT and the City & County of Honolulu (CCH); however, the MOU serves to identify the owners of upstream storm sewer system network connectivity that impacts Harbors. Harbors property is located between the lower portions of both HDOT and City systems and the receiving State Waters.

Pertinent sections are provided, as follows.

> "The purpose of this Memorandum of Understanding (MOU) is to define the roles and responsibilities of the State Department of Transportation, Highways Division, (DOT), and the City and County of Honolulu (City) Department of Environmental Services (ENV), and Department of Facility Maintenance (DFM), as part of permit requirements on the control of illicit discharges and nonpoint sources of pollution into the DOT's municipal separate storm sewer system on Oahu, and the City's municipal separate storm sewer system.
>
> On Oahu, the regulations require both the DOT and the City to have NPDES permits for their respective municipal storm sewer systems. Because the DOT and City systems are interconnected, DOH regulations require that an interagency agreement between the DOT and the City or a Memorandum of Understanding (MOU), be executed that delineates policies governing interconnection and enforcement that will control the discharge of pollutants from the upper portions of the municipal separate storm sewer systems into the lower portions of both DOT and City systems to waters of the United States.
>
> The objectives of this MOU are to:
>
> a) Establish effective intergovernmental coordination between the DOT and the City;
>
> b) To clearly delineate the roles and responsibilities of each agency in an effort to minimize, to the maximum extent practicable, the discharge of any pollutant from one municipal separate storm sewer system to the other municipal separate storm sewer system;
>
> c) Minimize duplication of effort; and
>
> d) Ensure accountability through judicious application of best management practices, design and engineering methods, and periodic water quality monitoring.

The DOT, through the Oahu District Engineer, will . . .

3. Implement a storm water monitoring program in conformance with the requirements of the DOT municipal NPDES Permit, and provide analytical data of storm water discharges to the ENV whenever such discharges are conveyed into the City's municipal separate storm sewer system.

The City and County of Honolulu, Department of Environmental Services (ENV) will . . .

3. Implement a storm water monitoring program in conformance with the requirements of the City' municipal NPDES Permit, and provide, upon request, analytical data of storm water discharges to the DOT whenever such discharges are conveyed into the DOT's municipal separate storm sewer system."

CHAPTER 4
HARBORS ASSET MANAGEMENT SYSTEM (AMS)

The Harbors AMS is a commercial off the shelf (COTS) solution using ESRI GIS and Cityworks® AMS software which requires Internet browser access to log in. The AMS interface enables staff to track and manage Harbors storm water infrastructure assets and MS4 permit compliance through a centralized database.

The AMS collects data from specific geospatial features of the Harbors storm water system (i.e., inlets, manholes, pipes, aboveground drainage features, post-construction control measures, and outfalls), drain inspections and cleaning activities, BMP inspections for construction and post-construction projects, and tenant and outfall inspections. The AMS manages schedules and special reports, and tracks the Work Orders and Service Requests required for drain inspections and cleaning. The data serves to identify higher risk "hotspots" with greater potential to discharge pollutants.

This chapter presents an introduction to Cityworks® AMS capabilities. Chapter 6 information presents a guide for Cityworks® AMS usage.

4.1 ArcGIS Online and Server Configuration

Cityworks® uses ArcGIS Server to provide the map and other tools, such as geocoding, to the user. Different maps may be configured for individual users or groups to display data relevant to their responsibilities and daily activities.

4.1.1 Cityworks® AMS – How It Works

Cityworks® is a proprietary GIS-centric asset management software solution that combines elements of ArcGIS data with asset data management capabilities in order to allow users to perform intelligent and cost-effective inspection, monitoring, and condition assessments. The AMS takes into account the interdependencies of maintenance, operations, asset performance, environmental conditions, life cycle costs, and capital planning to maximize the useful remaining life of system assets.

4.1.1.1 AMS Alignment with *SWMP* and CD

The Cityworks® AMS approach adopted Service Requests, Work Orders, and Inspections work activities—cyclical or reactive—with their associated costs, to align with Harbors compliance activities with the *SWMP* requirements. This alignment ensures Harbors personnel capabilities to address the storm sewer system compliance requirements of the CD.

4.1.1.2 Tasks Workflow Process Using Cityworks® AMS

Map layers are created to display the progressive relationships among open Service Requests, status of Work Orders, and schedules for Inspections through a customized inbox or map screen for Harbors personnel users.

Reports of many types may be generated through search parameters or customized report templates so field users can receive the information they need to efficiently perform their jobs.

This section introduces Cityworks® AMS capabilities. Chapter 5 provides a transition from what Cityworks® AMS can do to how tasks are performed in coordination with Cityworks® AMS. *See* Chapter 5 for details about the HAR-OC and HAR-OM tasks workflow processes.

4.1.2 Asset Configuration

Cityworks® AMS uses the ArcGIS geodatabase as the asset database, and differentiates assets types as follows:

- *Feature* classes with assets shown as points, lines, and polygons.
- *Other* types with no records in the geodatabase but still allow tracking of work activities, e.g., training, meetings, etc.

4.1.2.1 Configured Assets

Each configured asset fits the designated storm sewer system tasks, which are grouped to correspond with the CD. These assets exist as GIS layers and class tables within the Cityworks® AMS on which users can create activities.

Figure 22 shows the Honolulu Harbors storm sewer system assets.

Figure 23 shows Kalaeloa Barbers Point Harbor storm sewer system assets.

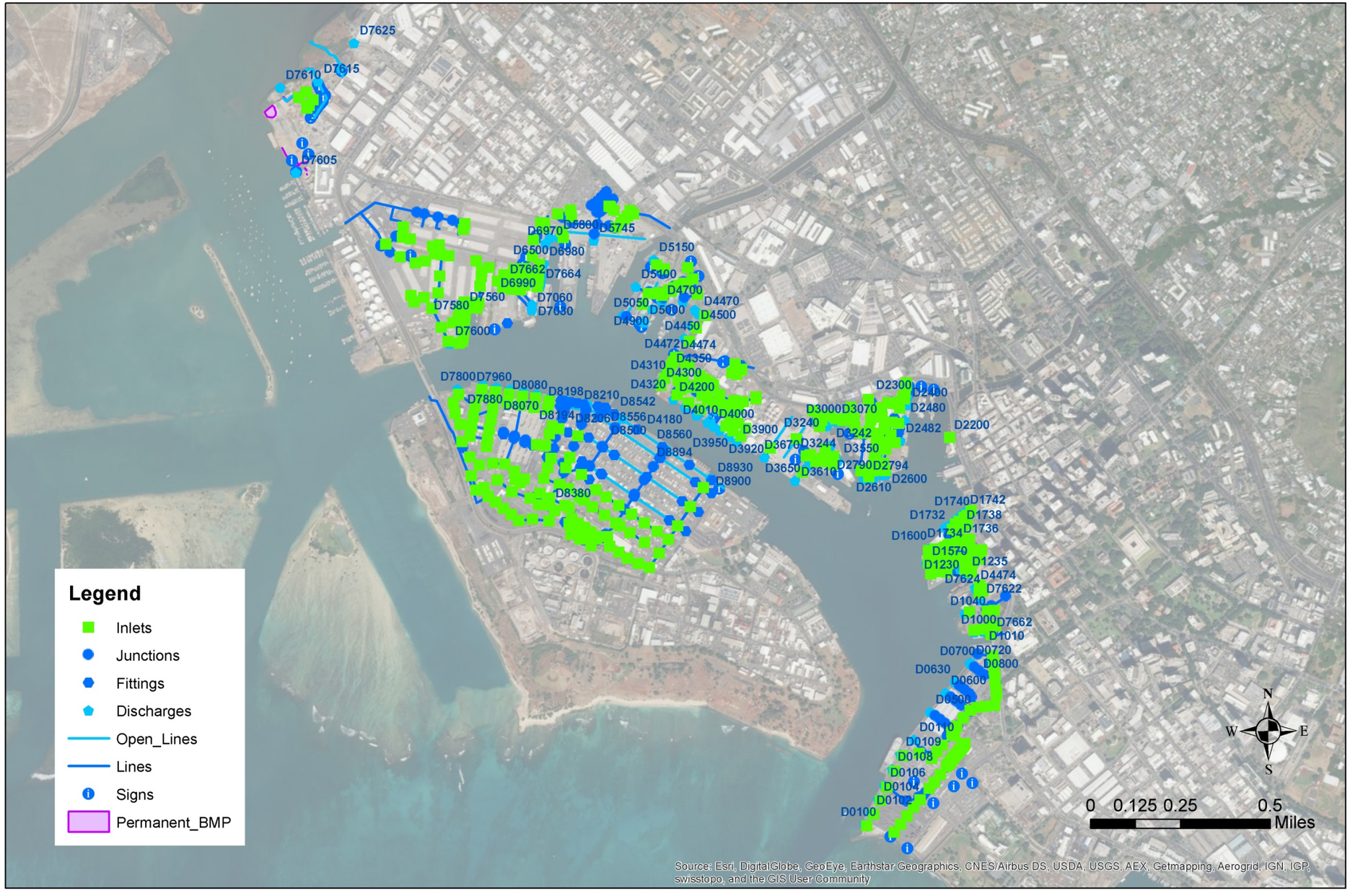

Figure 22. Honolulu Harbor Storm Sewer System Assets.

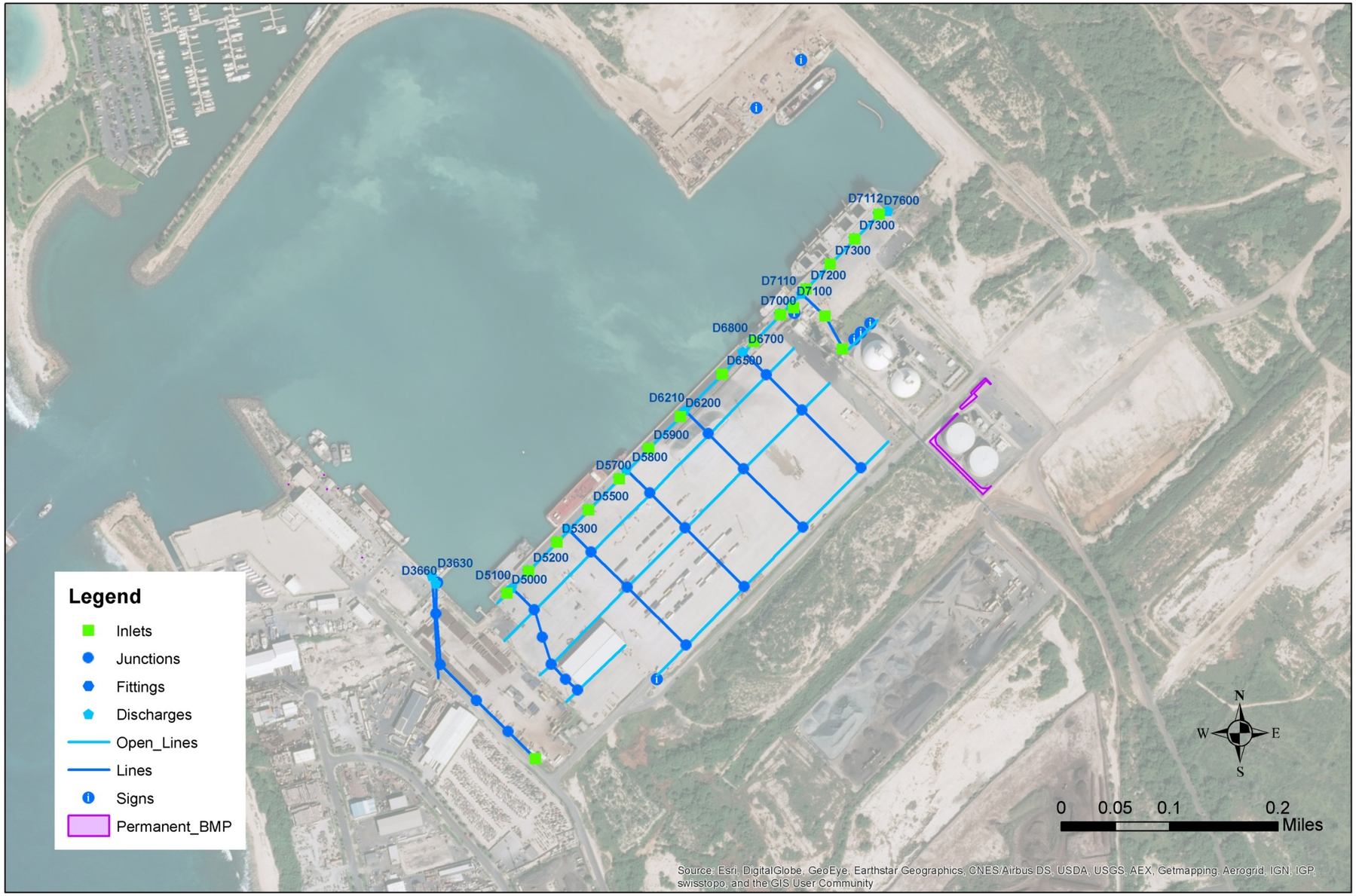

Figure 23. Kalaeloa Barbers Point Harbor Storm Sewer System Assets.

Table 25 shows the Cityworks® AMS configured assets groups defined for Harbors.

Table 25. Cityworks® AMS configured asset groups.

ASSET GROUP	ASSET NAME
Enforcement	Enforcement
Engineering	Project (HC Footprint) BMP
Environmental Sec A	Public Outreach, Training Employee
Environmental Sec B	Discharge (Outfall), Enforcement, Illicit Discharge, Tenant
Operations	Grounds, Refuse, Sweeping, Vehicle
Storm drain	Fitting, Inlet, Line, Manhole, Open Line, PBMP, Signs
Administration	Config

4.2 Work Orders

Work management involves initiation, screening (qualifying), planning, dispatching, and performing (executing) requests for work, called a *Work Order*.

Work Order configuration templates are designed to incorporate the current SSS OMP work practices and modernize data entry by the Harbors personnel who perform inspections of the storm drain system.

Harbors O&M activities are cyclic or reactive, and Cityworks® AMS generates schedules and tasks for "asset-based" Work Orders and Inspections, and address or "location-based" Service Requests.

Work Order generation is the primary decision making point, and work assignments are routed to specific Harbors Sections, Units, and Subunits.

Table 26 shows the Work Orders configured in Cityworks® AMS based on asset group, GIS layer, and asset types.

Table 26. Work Orders assigned to Harbors personnel for follow-up and completion.

ASSET GROUP	GIS LAYER ASSET NAME	ASSET TYPE	WORK ORDER DESCRIPTION	ASSOCIATED PERSONNEL
Engineering	Project (HC Footprint)	Feature	Construction BMP Inspect – Harbors – 1 Initial	EE
Engineering	Project (HC Footprint)	Feature	Construction BMP Inspect – Harbors – 2 Recurring	EE
Engineering	Project (HC Footprint)	Feature	Construction BMP Inspect – Harbors – 3 Final	EE, OM

ASSET GROUP	GIS LAYER ASSET NAME	ASSET TYPE	WORK ORDER DESCRIPTION	ASSOCIATED PERSONNEL
Engineering	Project (HC Footprint)	Feature	Environmental Design Review - Harbors	EP
Environmental Sec A	Training Employee	Other	IDDE Training	O, OC, OM, OCM, OE, OCT, OCG, OCB, MCS, HA
Environmental Sec A	Training Employee	Other	IDDE Survey & Review / Update	O, OC, OM, OCM, OE, OCT, OCG, OCB, MCS, HA
Environmental Sec A	Training Employee	Other	Stormwater Awareness Training	O, OC, OM, OCM, OE, OCT, OCG, OCB, MCS, HA
Environmental Sec A	Training Employee	Other	Stormwater Awareness Training Survey & Review / Update	O, OC, OM, OCM, OE, OCT, OCG, OCB, MCS, HA
Operations	Refuse	Other	Bulk Waste Disposal	OCG, OCB
Operations	Refuse	Other	Repair / Replace	OCG, OCB
Operations	Refuse	Other	Refuse Collect Ad Hoc	OCG, OCB
Operations	Sweeping	Other	Street Sweeper Downtime	HOS, OCB,
Operations	Sweeping	Other	Sweep – Aloha Marine Lines P29	OCG
Operations	Sweeping	Other	Sweep – Channel Street, P02 Shed	OCG
Operations	Sweeping	Other	Sweep – Fishing Village P35	OCG
Operations	Sweeping	Other	Sweep – KBPH Common Roads	OCB
Operations	Sweeping	Other	Sweep – Matson	OCG
Operations	Sweeping	Other	Sweep – NYK P01	OCG
Operations	Sweeping	Other	Sweep – P01 Entrance	OCG
Operations	Sweeping	Other	Sweep – P01, P02 Common Roadways	OCG
Operations	Sweeping	Other	Sweep – P02 for Cruise Ship	OCG
Operations	Sweeping	Other	Sweep – P10, P11	OCG
Operations	Sweeping	Other	Sweep – P18 P19, P23, P24	OCG
Operations	Sweeping	Other	Sweep – P27, P28	OCG
Operations	Sweeping	Other	Sweep – P30, P31, P32, and Shed Areas	OCG
Operations	Sweeping	Other	Sweep – Pasha	OCG
Operations	Sweeping	Other	Sweep – Sand Island Base Yard	OCG
Operations	Sweeping	Other	Sweep – Young Brothers	OCG

ASSET GROUP	GIS LAYER ASSET NAME	ASSET TYPE	WORK ORDER DESCRIPTION	ASSOCIATED PERSONNEL
Operations	Sweeping	Other	Sweep Waste Disposal	OCG
Stormdrain	Fitting	Feature	Inspect	OM
Stormdrain	Fitting	Feature	Install	OM
Stormdrain	Fitting	Feature	Remove	OM
Stormdrain	Fitting	Feature	Repair	OM
Stormdrain	Fitting	Feature	Replace	OM
Stormdrain	Inlet	Feature	Clean & Inspect AD Hoc	OCG, OCB
Stormdrain	Inlet	Feature	Clean & Inspect Hotspot	OCG, OCB
Stormdrain	Inlet	Feature	Inspect Ad Hoc	MCS
Stormdrain	Inlet	Feature	Inspect Comprehensive & Clean	OCG
Stormdrain	Inlet	Feature	Inspect Screening	MCS
Stormdrain	Inlet	Feature	Inspect Screening Wet Weather	MCS
Stormdrain	Inlet	Feature	Install	OM
Stormdrain	Inlet	Feature	Install & Remove Plate	OM
Stormdrain	Inlet	Feature	Install Biosock / Drain Guard	OCG
Stormdrain	Inlet	Feature	Remove	OM
Stormdrain	Inlet	Feature	Remove Biosock /Drain	OCG
Stormdrain	Inlet	Feature	Repair Box	EE, EM, OM
Stormdrain	Inlet	Feature	Repair Frame	OM
Stormdrain	Inlet	Feature	Repair Grate	OM
Stormdrain	Inlet	Feature	Replace Biosock /Drain Guard	OCG
Stormdrain	Inlet	Feature	Replace Box	OM
Stormdrain	Inlet	Feature	Replace Frame	OM
Stormdrain	Inlet	Feature	Replace Grate	OM, CMV
Stormdrain	Inlet	Feature	Stencil New	OM
Stormdrain	Inlet	Feature	Stencil Restencil	OM
Stormdrain	Line	Feature	Clean	OM
Stormdrain	Line	Feature	Install	OM
Stormdrain	Line	Feature	Remove	OM
Stormdrain	Line	Feature	Repair	OM
Stormdrain	Line	Feature	Replace	OM
Stormdrain	Manhole	Feature	Inspect Comprehensive	OCG
Stormdrain	Manhole	Feature	Inspect Screening	MCS, HA

ASSET GROUP	GIS LAYER ASSET NAME	ASSET TYPE	WORK ORDER DESCRIPTION	ASSOCIATED PERSONNEL
Stormdrain	Manhole	Feature	Inspect Screening Wet Weather	OCG
Stormdrain	Manhole	Feature	Install	OM
Stormdrain	Manhole	Feature	Rebuild Cone	OM
Stormdrain	Manhole	Feature	Remove	OM
Stormdrain	Manhole	Feature	Repair	OM
Stormdrain	Manhole	Feature	Replace	OM
Stormdrain	Manhole	Feature	Replace	OM
Stormdrain	Open Line	Feature	Clean & Inspect Ad Hoc	OCG
Stormdrain	Open Line	Feature	Clean & Inspect Hotspot	OCG, OCB
Stormdrain	Open Line	Feature	Inspect Comprehensive & Clean	OCG, OCB
Stormdrain	Open Line	Feature	Inspect Screening	MCS
Stormdrain	Open Line	Feature	Inspect Screening Wet Weather	MCS
Stormdrain	Open Line	Feature	Install	OM
Stormdrain	Open Line	Feature	Install & Remove Plate	OM
Stormdrain	Open Line	Feature	Install Biosock /Drain	OCG
Stormdrain	Open Line	Feature	Remove	OM
Stormdrain	Open Line	Feature	Remove Biosock /Drain Guard	OCG
Stormdrain	Open Line	Feature	Repair	OM
Stormdrain	Open Line	Feature	Repair Box	OM
Stormdrain	Open Line	Feature	Repair Frame	OM
Stormdrain	Open Line	Feature	Repair Grate	OM
Stormdrain	Open Line	Feature	Replace Biosock /Drain Guard	OCG
Stormdrain	Open Line	Feature	Replace Box	OM
Stormdrain	Open Line	Feature	Replace Frame	OM
Stormdrain	Open Line	Feature	Replace Grate	OM
Stormdrain b	Project Permanent BMP	Feature	Inspect Comprehensive & Clean	OCG
Stormdrain b	Project Permanent BMP	Feature	Install	OM
Stormdrain b	Project Permanent BMP	Other	Permanent BMP O&M Training	OCG
Stormdrain b	Project Permanent BMP	Feature	Remove	OM
Stormdrain b	Project Permanent BMP	Feature	Repair	OM

ASSET GROUP	GIS LAYER ASSET NAME	ASSET TYPE	WORK ORDER DESCRIPTION	ASSOCIATED PERSONNEL
Stormdrain b	Project Permanent BMP	Feature	Replace	OM
Stormdrain b	Signs	Feature	Clean	OCG
Stormdrain b	Signs	Feature	Evaluate Annual	EE
Stormdrain b	Signs	Feature	Install	OM
Stormdrain b	Signs	Feature	Remove Graffiti	OCG
Stormdrain b	Signs	Feature	Repair Pole	OM
Stormdrain b	Signs	Feature	Replace Pole	OM
Stormdrain b	Signs	Feature	Replace Sign	OM

4.2.1 Work Order Security

Each Work Order template has a security configuration that can only be altered by Harbors AMS Administrators.

4.2.1.1 Work Order Tables

A table is a collection of related data columns and rows held in a structured format within a database.

- Work Order – Primary Work Order information
- Labor – Labor added to Work Order
- Material – Material added to Work Order
- Equipment – Equipment added to Work Order
- Tasks – Tasks associated to Work Order

4.2.1.2 Permissions

Users and groups are created and assigned a range of database access permissions to the Work Order Tables. Permissions set by the AMS Administrator allow users to create and update, and view work management activities and data fields.

- View – Users may view data, but not add, update, or delete.
- Add – Users may view and add data, but not delete.
- Update – Users may add data and update screen details, but not delete.
- Delete – Users may add, update, and delete data.

- View Labor Costs – Users may view the financial information.

Each permission is applied to each Work Order Table depending on the permission level assigned to a given domain group.

4.2.2 Work Order Status

A Work Order, like an asset, has a life cycle of its own in the Cityworks® AMS. The steps and functions of the Work Order life cycle are integrated to ensure that issues are resolved or activities are efficiently completed.

The Work Order status can be viewed as the time it takes to accept a request for work through the time it takes to complete the Work Order. These stages are as follows:

0. Initiated
1. Assigned
2. In Progress
3. Work Complete
4. On Hold
5. QA Rejected

Status can be thought of as the state, condition, or situation of the Work Order. Status is used for Service Requests and Work Orders. The Status field is designed to change as work progresses. Values in the Status field are pre-populated by Harbors AMS Administrators to reflect the possible stages of work for Harbors personnel.

A Work Order may go through each of these stages from work initiation to QA review and completion, or it may bypass certain stages – it is entirely dependent on what Harbors requires based on the asset work required. In addition, stages may be combined based on the Harbors staff roles and responsibilities. This standard Work Order life cycle process provides a streamlined, consistent method to manage work throughout Harbors.

Every configuration includes workflows that do not follow the standard Work Order life cycle. These are grouped as custom flows to support the remaining 20% of the configuration for which Task Specific Workflows have been specially configured for Harbors. These Task-Specific Workflows are discussed in Section 4.2.3.

Figure 24 displays a Work Order screen shot with selected Status "Assigned."

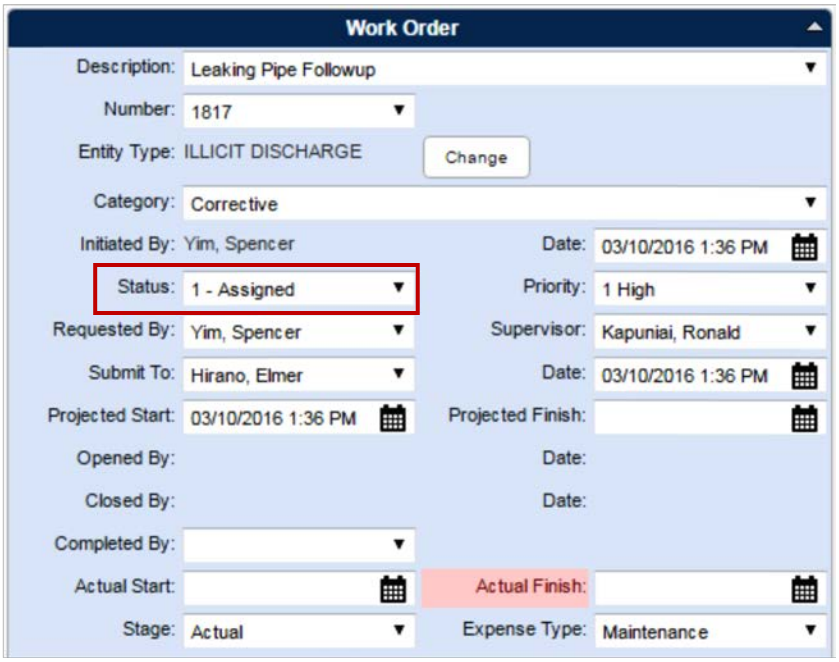

Figure 24. Work Order screen displays status field as "Assigned."

Initiated Work Order Status

The *Initiated* Work Order may go through a screening process to make sure the initial details and information are accurate, and the Work Order or Service Request is valid. If the information is accurate, the Manager / Superintendent / Supervisor keeps the Status field "Initiated."

However, if the information is not accurate, the Screener will tab to the Details Panel to cancel the Work Order by checking the *Cancel Work Order* checkbox.

The Manager / Superintendent / Supervisor will document the reasons for cancellation, and click the Save button to save the Work Order and the screen display will update the Work Order *Status* field to "Cancelled."

Figure 25 displays the Details panel with the checked Cancel Work Order checkbox.

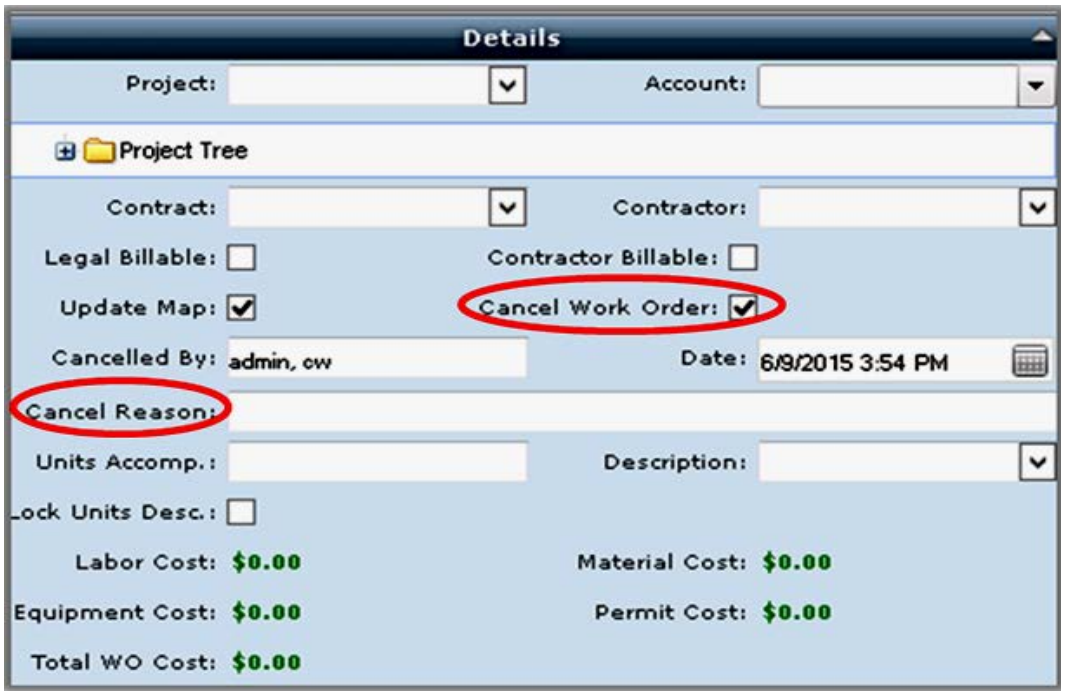

Figure 25. Work Order Details panel.

Work Orders are initiated based upon issues identified during the execution of other maintenance activities or a pre-defined schedule of preventive tasks. Regardless of the circumstances under which a Work Order must be completed, the process for doing so is generally the same, using Cityworks® AMS functionality along with the common Work Order life cycle.

New reactive, corrective, predictive, or preventive Work Orders are initiated based upon reported and observed deficiencies in the storm drain system, or automatically initiated by Cityworks® AMS predefined inspections and cleaning schedules. The asset related to the issue is attached to the Work Order upon selecting the *Initiated* status.

Screening Work Order Status

The Work Order displays in the Cityworks® AMS Inbox (hereinafter Inbox) of the supervisory staff responsible for screening, scheduling, and assigning each specific type of work. HAR-O supervisory staff is responsible for assessing and checking the Inbox in Cityworks® AMS to review the Work Order to determine priority and assign an immediate response, or assign and schedule for a later date.

Work Orders assigned for immediate response (first response Work Order) are followed up by phone or radio notification to the assigned individual. Otherwise, the Work Order will appear in the assigned employee's Inbox before it is scheduled for execution.

Assigned Work Order Status

The MCS, HA, HAR-OCG, and HAR-OM crew will complete the work in the field and the crew leader will fill out all necessary information in Cityworks® AMS. This information will include, but is not limited to, the following:

- Time started, date, and time finished,
- Resources consumed (labor, equipment, and materials)
- Notable findings (damage to the asset or equipment therein, safety hazards, etc.)
- Other information as specified on the Work Order.

Additional corrective actions or follow-up Work Orders for any conditions observed that require action or review will be created by supervisory staff based on MCS and HA inspections.

A Supervisor will prioritize and assign this work.

Completed Work Order Status

After the Work Order information is entered into Cityworks® AMS, HAR-O personnel will change the Status field to "Work Complete" and assign the Work Order back to the Supervisor to review. It will appear in the Inbox Work to Review area for the appropriate Supervisor (HOS, HAR-OCG, HAR-OCB, Marine Cargo, and HAR-OM), who will review and approve, and close the Work Order.

In the event that mobile devices cannot maintain Internet connectivity, Work Order information may be recorded on a pre-printed form for later entry into the system.

4.2.2.1 Tasks

Tasks are used to define distinct work activities within a Work Order. Tasks are typically used for more complex Work Orders that require multiple work activities performed by different people. Simpler Work Orders that only require one type of activity may not have any tasks. Tasks can be predefined and automatically added to each Work Order, as applicable. When one task is complete, the system automatically activates the next task, and the person in charge of the task is assigned the Work Order.

For example, tasks can be used to define or create a workflow on a Work Order for a work activity that requires formal approval or notification, such as reports of illicit discharges of oil that require immediate notification of certain agencies and individuals.

Figure 26 displays the screen for Illicit Oil Discharge Notifications.

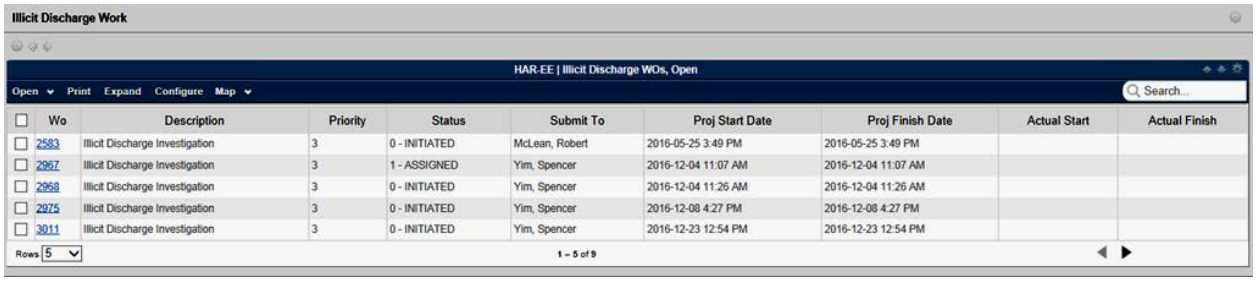

Figure 26. Illicit Oil Discharge Notifications screen.

Task Hierarchy

The task hierarchy is a folder hierarchy in which defined tasks can be organized. The hierarchy allows Harbors personnel users to easily locate a task based on the type of work for which the task is executed, the group that uses the task, or the type of asset(s) on which the task is used.

Figure 27 displays the task hierarchy configured for Harbors.

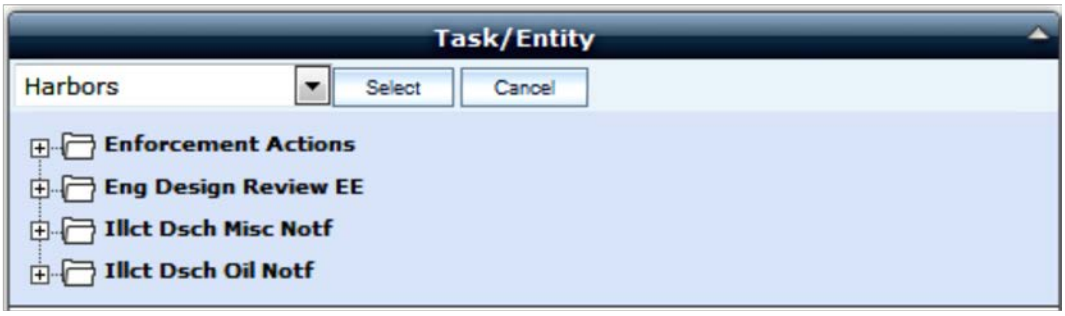

Figure 27. Task hierarchy configured for Harbors.

4.2.3 Task-Specific Workflows

Ten (10) Task-Specific Workflows are custom workflows that do not follow the standard Work Order life cycle, and are specially configured for the unique requirements of Harbors. They are briefly described below.

4.2.3.1 Illicit Discharge / Leaking Pipe

When a report is received or a discovery is made of a suspected illicit discharge or leaking pipe, the receiver or discoverer, likely HAR-OCT, a MCS / HA, or a HAR-EE

employee, will create a 'Suspected Illicit Discharge' or 'Suspected Leaking Pipe' Service Request and answer the specified questions on the electronic form.

If the Service Request is confirmed as an illicit discharge, HAR-EE will create a child Work Order for 'Illicit Discharge Investigation' or 'Leaking Pipe Investigation'. The Work Order should be attached to the closest asset participating in the discharge. Then, if notification of other agencies is required, HAR-EE will enter the notification tasks, found in the 'Illct Dsch Misc Notf' and 'Illct Dsch Oil Noft' trunks of the task hierarchy. The Actual Finish Date of each task will indicate when the notification was made, and comments can be made on the details of the notification. The 'Illicit Discharge Investigation' or 'Leaking Pipe Investigation' work orders are intended to track only the investigation process, and contain custom fields configured to gather the details of the discharge.

In discharge cleanup, an 'Illicit Discharge Cleanup' or 'Leaking Pipe Cleanup' Work Order may be created as a child Work Order for the Investigation to track costs associated with the cleanup, including contracted costs.

If long-term follow-up is required to ensure that the source of the discharge is eliminated, an 'Illicit Discharge Followup' or 'Leaking Pipe Followup' work order may be created as a child to the investigation Work Order.

4.2.3.2 Tenant Inspection

New, recurring, and final tenant inspections, conducted by HAR-EE and its consultants to assist the HAR-Property Management, are tracked using Work Orders that describe the type of inspection being conducted, and usually result in the creation of a Storm Tenant Inspection form. The tenant risk ranking criteria on the Tenant Inspection form developed by Harbors are assessed and scored based on the observations and findings of the inspection. Additionally, tenants categorized as low risk, only reconnaissance is conducted. Tenant reconnaissance inspections are tracked using the 'Inspect – Low Risk Reconnaissance' Work Order. The results of reconnaissance inspections, including pictures and the tracking spreadsheet, will be attached to the 'Inspect – Low Risk Reconnaissance' Inspection.

4.2.3.3 Tenant List Administration

To support including tenant information on the printable version of the tenant inspection, tenant records from GIS will be imported by the AMS Administrator into the Cityworks® customer table using the Bulk Import tool in Designer.

4.2.3.4 Environmental Design Review

When a Harbors or tenant construction project requires design review, HAR-EE is notified of the project via a hardcopy 'blue memo' and creates either an 'Environmental Design Review – Harbors' or 'Environmental Design Review – Tenant' Work Order attached to a HC Footprint or Tenant asset, respectively. HAR-EE adds design review tasks as necessary by selecting from the predefined task list for those Work Orders. Every Work Order has either an 'Exempt from Construction Site Runoff Control Reqs' or 'Not Exempt from Construction Site Runoff Control Reqs' task added to facilitate annual compliance reporting.

4.2.3.5 Storm Inlet / Open Line / Manhole Inspection Process

This process is conducted in two tiers. Supervisors will be responsible for creating their own follow-up work based on the results of inspections. Marine Cargo Specialists conduct screening inspections of every accessible Harbors inlet and open line using a blanket 'Inspect Screening' Work Order for all assets, which creates a 'Storm Inlet Insp Screening' inspection for each asset. The AMS Administrator or HAR-EE initiates this Work Order semiannually from the start date of January 2016. If, on any inspection, follow-up work is required based on the 'Stenciling required', 'Grate condition', or 'Debris depth' observations, the MCS will set the Resolution of the inspection to 'Followup Work Required' and close the inspection.

The HAR-OCG Supervisors will have saved searches in their Inbox for Screening Inspections where follow-up work is required. For the assets where the Screening Inspection recorded more than 6 inches of debris in an inlet, HAR-OCG will create a single 'Inspect Comprehensive & Clean' Work Order, which creates a related 'Storm Inlet Insp Comprehensive' inspection. HAR-OCG will clean the inlet and inspect it with the grate or lid off, recording cleaning and inspection results on the inspection form. If, on any inspection, follow-up work is required based on the 'Structure condition', 'Illicit connection', or 'Guard recommendation' observations, the Resolution will be set to 'Followup Work Required' and the inspection will be closed through the normal process.

HAR-EE, HAR-OCG, and HAR-OM supervisors have 'Saved Searches' for screening and comprehensive inspections that require follow-up work. Supervisors in each branch (HOS, HAR-OCM, HAR-OCG, HAR-OM) will be responsible for creating their own follow-up work based on the results of these inspections.

The *HAR-O|Inlet Insp QC Report* is available which summarizes inspections requiring follow-up work and the follow-up Work Orders created from those inspections to assist in the quality control for this process.

4.2.3.6 Property Damage Report

When a MCS / HA or other Harbors employee discovers damage to state property that can be attributed to a specific party, the damage information is collected using the 'Property Damage Report' custom fields available on all Service Request types that cover damaged assets. If an appropriate Service Request type cannot be identified, a 'Property Damage Report' Service Request can be created and the 'Property Damage Report' custom fields populated there.

4.2.3.7 Street Sweeper Downtime

When a street sweeper is down for repair, HAR-OCG Supervisors will create a Street Sweeper Downtime Work Order. The Actual Start Date and Actual Finish Date of the Work Order will be used to calculate downtime, and the Street Sweeper Downtime custom field template will be used to track the sweeper unit that is down (instead of entering that unit as a Work Order equipment cost) and the reason the sweeper is down. This downtime model is planned to be expanded to other equipment in the future.

4.2.3.8 GIS Updates

Any time a GIS update is required, a Cityworks® user can create a new Administration GIS Update Work Order, preferably as a child to the Work Order requiring GIS updates. The user enters comments and attaches marked-up maps as appropriate to indicate the changes to be made. The GIS Update is routed by default to the appropriate GIS Administrator. After updating the GIS, the GIS Administrator completes and closes the GIS Update Work Order.

4.2.3.9 Cityworks® AMS Configuration Updates

Any user can request a Cityworks® update, such as changes to the list of people in the Supervisor or Submit To drop downs, the addition of a new Work Order type, or a new contractor for instance. To request a configuration update, a user creates a new Administration Cityworks® Configuration Update Work Order. The user enters comments describing their update request.

The Cityworks® Configuration Update Work Order is routed by default to the appropriate Cityworks® AMS Administrator for review. If the configuration change is approved, the Cityworks® AMS Administrator will complete and close the Configuration Update Work Order.

4.2.3.10 New Tenant and Tenant Project Notification

When a new Harbors tenant arrives, HAR-PM will create an Administration 'Tenant – New' Work Order, and attach the new lease or permit documents. The Work Order is routed by default to the GIS and AMS Administrator to update GIS and Cityworks® AMS with the new information.

Likewise, when a tenant applies for permission to undertake a new project, HAR-PM will create an Administration 'Tenant – Project Application' Work Order, and attach the project application. The Work Order will be routed by default to the GIS and AMS Administrator to update GIS and Cityworks® AMS with the new information.

4.3 Inspections

Inspections are used to define and capture observations during the planned and unplanned inspections of asset condition and operability. Inspections may be created from Work Orders or Service Requests by HAR-EE, MCS, HA, or HAR-OCG, depending on the inspection type. All inspections must have an associated Work Order in order to record the labor, equipment, or materials on inspections.

Each custom inspection is comprised of a number of general data fields. These fields are used to record the name of the person that performed the inspection, when the inspection was performed, general observations, recommendations, repairs completed, etc. In addition to this standard information, each inspection contains custom observation fields to record information required of that specific inspection. The ability to edit asset information is also available.

Figure 28 displays five custom Inspection templates configured for Harbors to comply with the inspection requirements contained in the CD.

Asset Name	Inspection Template Name	Inspection Template Description
Project/ HC Footprint	Storm Const Site BMP Insp	Storm Construction Site BMP Inspection Checklist
Tenant	Storm Tenant Inspection	Storm Tenant Inspection
Outfall	Storm Outfall Reconnaissance	Storm Outfall Reconnaissance
Inlet, Open Channel	Storm Inlet Insp Screening	Storm Inlet Inspection Screening
Inlet, Open Channel	Storm Inlet Insp Comprehensive	Storm Inlet Inspection Comprehensive

Figure 28. Harbors Inspection templates.

Figure 29 displays a customized outfall reconnaissance inspection template.

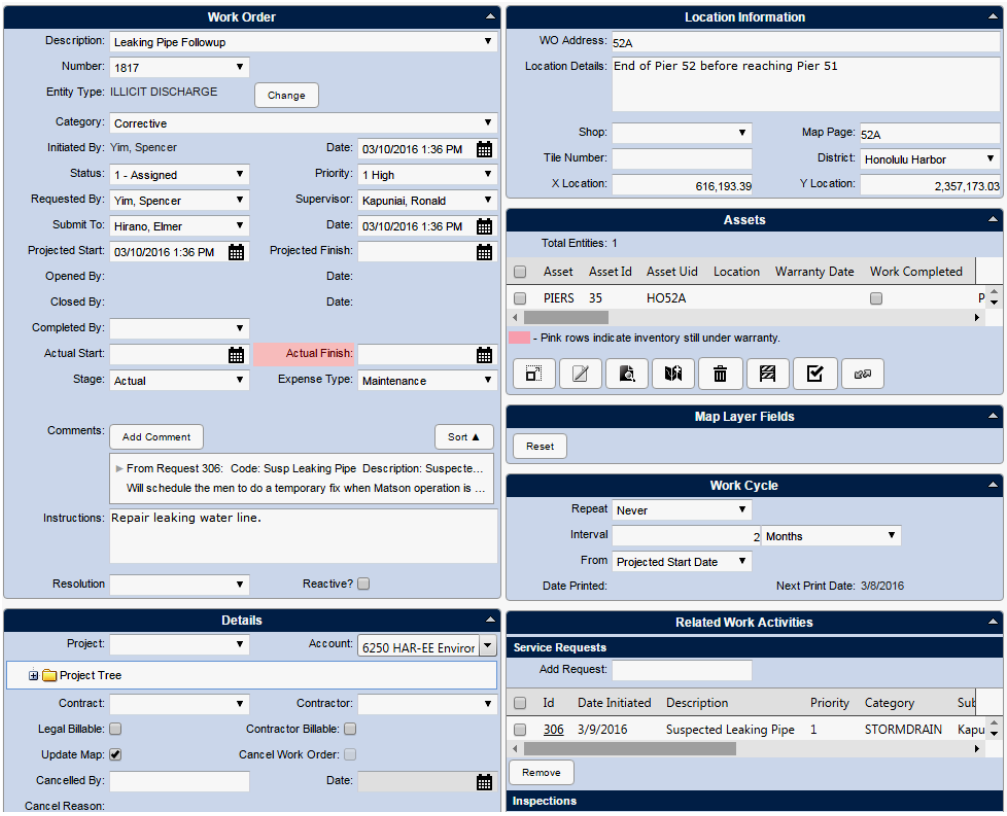

Figure 29. Harbors customized outfall reconnaissance inspection template.

4.3.1 Screening Inspections

The semi-annual Screening Inspections of the drain inlets and open lines, and the 'Inspect Comprehensive & Clean' Work Order that is performed as needed, are configured in the Cityworks® AMS to comply with the CD Section 20.c and 20.d requirements for Storm Sewer System Inspections and Cleaning.

Screening Inspections of all accessible drain inlets (including open channels or trench drains) at Honolulu Harbor and Kalaeloa Barbers Point Harbor are conducted semiannually by the HAR-OCM Marine Cargo Specialists (MCSs) and Harbor Agents (HAs) using the Inspection form configured for this type of inspection. Note that it is impractical for the MCSs and HAs to open drain grates which are bulky, heavy, and traffic rated, and thus can only observe the condition of the inlet from the surface and measure the debris depth through the opening of the inlet (if it can be done reliably).

Figure 30 displays an example of a completed Screening Inspection form.

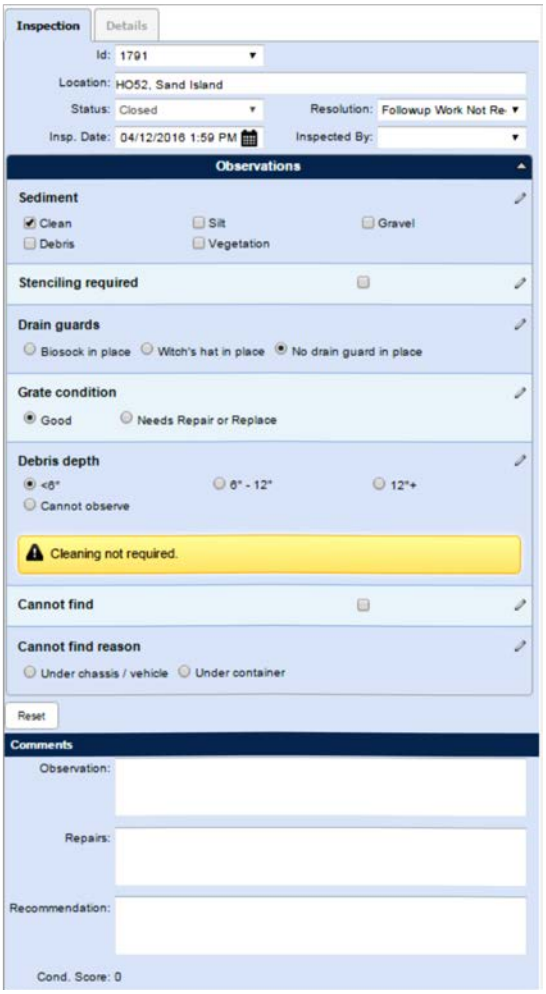

Figure 30. Screening Inspection form example.

As indicated on the Figure 30 example of a completed inspection form, the drain inlet was found to be clean of sediment, no stenciling is required, the grate is in good condition and the debris depth is less than 6 inches (Cleaning not required) – therefore, "Followup Work is Not Required" as indicated in the Resolution box. As a result, the MCS or HA selected Close in the Status Box for the inspection.

If, on the other hand, a drain guard prevented the MCS or HA from observing the debris depth inside the inlet, clicking on Cannot Observe prompts HAR-OCG to generate a Comprehensive Inspection & Cleaning Work Order (see example below) for

a crew with heavy equipment resources to complete the comprehensive inspection and to clean the drain inlet if necessary.

4.3.2 Inspect Comprehensive & Cleaning

Figure 31 displays an initiated Work Order for 'Inspect Comprehensive & Clean within 30 days.'

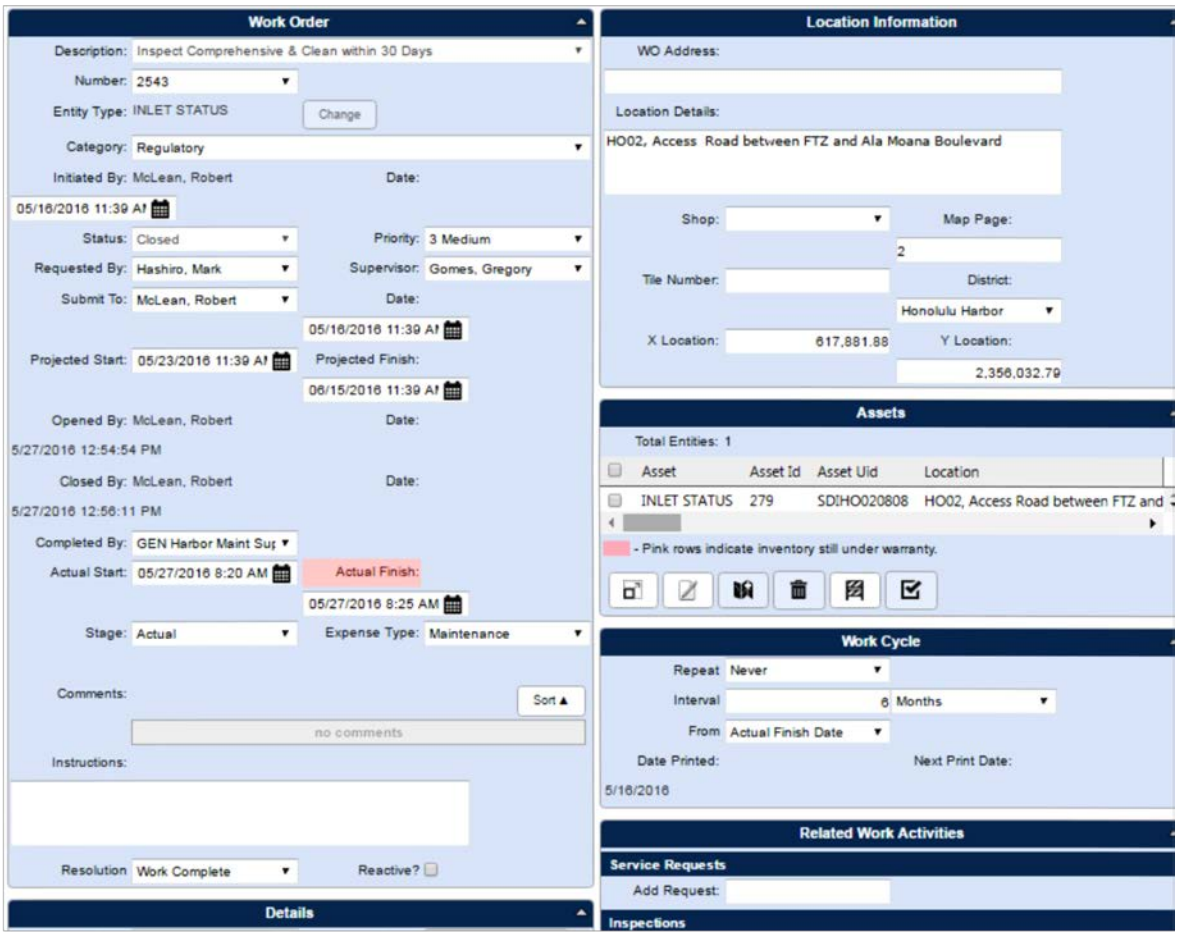

Figure 31. Comprehensive Inspection & Cleaning form example.

4.3.3 Comprehensive Inspection for BMP Work Order

Figure 32 displays an example of Comprehensive Inspection for BMP Work Order.

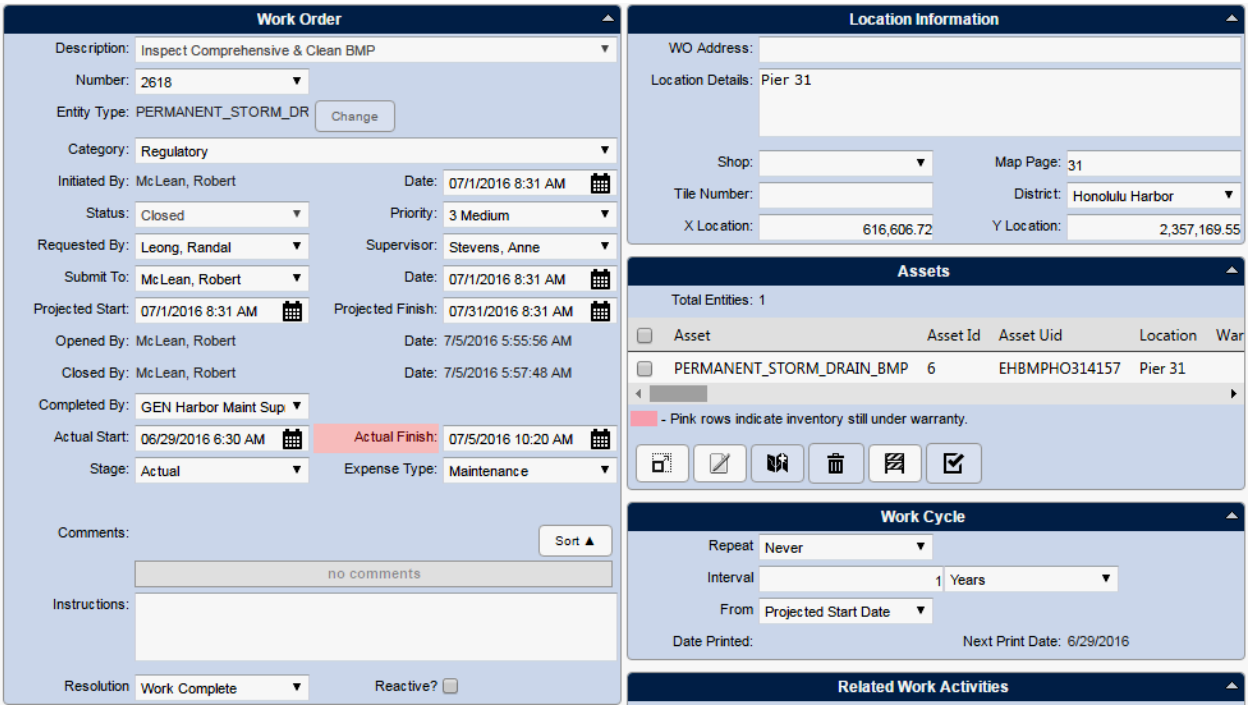

Figure 32. Inspect Comprehensive & Clean BMP Work Order screen.

4.4 Service Requests

Storm water issues and infrastructure needs are identified by Harbors personnel, tenants, and the general public through Service Requests.

The Service Requests are assigned to Harbors personnel for follow-up and completion.

Chapter 4 is a description of Cityworks® AMS capabilities. Chapter 6 provides a user guide and includes details on how to generate a Service Request.

Table 27 shows the Service Requests for storm sewer system tasks assigned to Harbors personnel for follow-up work required.

Table 27. Service Requests assigned to Harbors personnel for follow-up work required.

LIST OF SERVICE REQUEST TYPES	
Grounds Maintenance Special Request	Storm Drain Clogged
Illegal Dumping, e.g., debris in Harbor	Storm Drain Collapsed
Refuse Bulk Pickup	Storm Drain Inlet / Grate Repair
Refuse Overflow Collection	Storm Drain Maintenance Misc
Storm Debris Removal	Storm Drain Missing MH Cover
Erosion Control Measures, on Const Site	Street Flooding, Water in Street
Erosion Problem, not Const Site (KBPH)	Suspected Illicit Connection
Sign Damaged / Vandalized / Stolen	Suspected Illicit Discharge
Stencil/Marker/Medallion Missing/Faded	Suspected Leaking Pipe
Ditch/Stream Vegetation Overgrown & Debris Removal	Sweeping
Abandoned Vehicle	Refuge Bulk Pick-Up
HAZMAT	Refuge Overflow Collection
Dead Animals	

Chapter 4 is a description of Cityworks® AMS capabilities. Volume II is a user guide for storm sewer system O&M activities. Volume II, Chapter 5 discusses tasks work flow processes. Chapter 6 discusses how to use the Cityworks® AMS for inspections and Chapter 7 discusses how to use the Cityworks® AMS for cleaning and maintenance.

4.5 Equipment, Labor & Materials (ELM)

The Harbors SSS OMP implementation costs are broken down by major SWMP component and reported each year as part of the Annual Compliance Report submittal, as required by the CD Section 20.b. To satisfy this requirement, the Cityworks® AMS tracks resource utilization for equipment, labor, and materials.

Resource tracking is organized by category – equipment, labor, and materials – and costs can be tracked as estimated and actual. Tracking resources is done through its corresponding area in the Work Order form and can be performed in the office or in the field.

The Harbors Cityworks® AMS is configured to manage labor, material, and equipment in a single integrated tool named ELM for faster data entry. It accounts for labor hours and costs associated with a Work Order, Service Request, or Inspection. The labor type can include employees or contractors with each having its own hierarchy to choose from. Both estimated and actual resource usage is tracked. Summary costs statistics are available for each Work Order, and can be broken down by resource.

The Material panel of the Work Order tracks materials used and associated costs to complete a Work Order. At any time, the user can view estimated and actual materials assigned to the Work Order along with associated costs. Materials can be added or removed based on actual usage. Stock on hand is adjusted as materials are recorded onto a Work Order. If materials are removed from a Work Order, the stock on hand is adjusted to reflect a return to the storeroom. Material usage can be associated directly to tasks and asset entities.

Figure 33 shows the Material panel of the Work Order to track material use and associated cost.

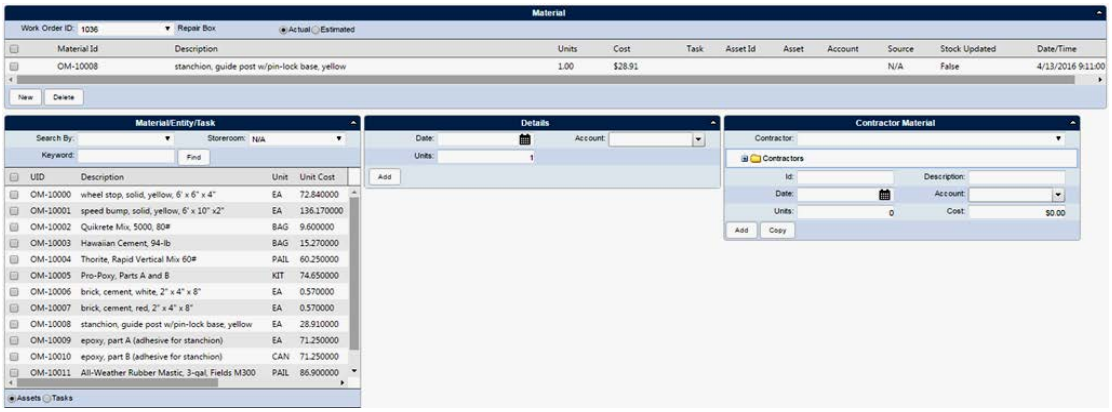

Figure 33. The Material/Entity Task panel.

Work Orders track equipment used by hour and associated cost to complete the Work Order. Equipment can be associated to specific assets and/or tasks on a Work Order.

Figure 34 shows the Equipment/Entity Task panel.

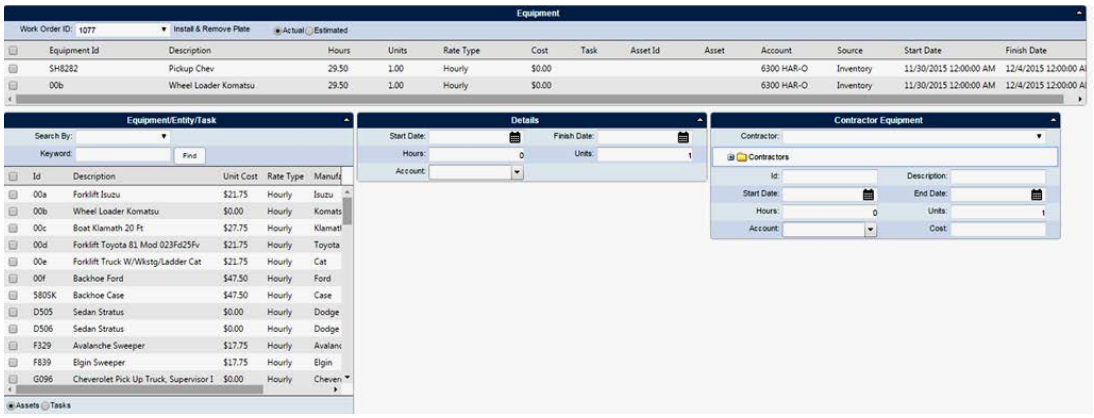

Figure 34. The Equipment/Entity Task panel.

4.6 Defining Hotspots

Hotspots are those storm drain inlets and open channels (trench drains) that present a greater risk of potentially discharging pollutants to the Harbors storm sewer system, as stated in the CD Section 20.d.i. To identify where hotspots exist, the Screening Inspections are performed by the MCS/HA on semiannual schedules for all storm drain inlets (i.e., 100% coverage where a drain can be accessed); and the follow-up 'Inspect Comprehensive & Clean' Work Orders are utilized, as needed. Based on the inspection findings and cleaning results, the Harbors definition of a hotspot is a storm drain location with two (2) consecutive comprehensive inspection and cleaning measurements of sediment and debris over 6 inches.

Currently, no hotspots are identified by this definition.

In the 4th Quarter of 2016, HAR-EE and HAR-EP with input from the MCS elected to broaden the hotspot definition to inlets that required two (2) consecutive Screening Inspections for debris over 6 inches, and any additional inlets that the MCS identified as an area of concern. Under these expanded criteria, 15 discretionary hotspots for quarterly inspection were identified, and Screening Inspections were scheduled in the AMS.

As time progresses and more data are gathered in the Cityworks® AMS, Harbors anticipates that a clearer definition of hotspot criteria will be available, thereby

prompting more frequent cleaning of the hotspots to further reduce the potential discharge of pollutants to the Harbors storm sewer system.

4.7 Rail Tracks Off-Loading at Kalaeloa Barbers Point Harbor

The rail tracks at Kalaeloa Barbers Point Harbor are routinely cleaned by tenants after bulk cargo transfer operations are concluded, in compliance with CD Section 20.d.ii.

4.8 Searches in Cityworks® AMS

Searches are among the most useful functions found in Cityworks®. Search types include the following.

4.8.1 Asset Search

The Asset Search allows for searching assets without using the map. If specific information is known about an asset, the asset search may be an easier way to locate the asset and its information. Work Orders can be initiated and work history can be viewed from the Asset Search.

4.8.2 Service Requests and Work Orders Search

Searching for Service Requests and Work Orders is allowed on any visible field on a Service Request or Work Order. It also allows the search definitions to be saved for later use, or for the results to be shown in an inbox, or on the map as an event layer.

Figure 35 displays the Search Query screen, as well as the fields visible in Search Results.

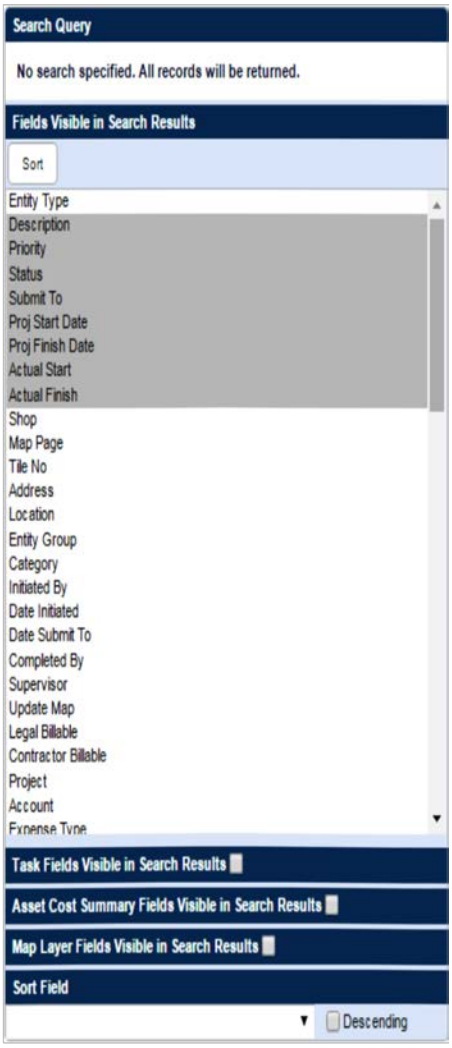

Figure 35. Cityworks® AMS Search Query screen.

4.8.3 Saved Searches

Saved Searches allow users to quickly execute those searches in the future without the need to redefine all of the criteria.

Saved searches are also used to set up Inboxes, Event Layers and Work History.

Event Layers allow a user to add events generated from search criteria to be displayed as a layer on the map. Setting up event layers is one of the more beneficial, advanced functions available in Cityworks® as it fully utilizes spatial representation. Semi-annual activities such as the Screening Inspections conducted by HAR-OCM MCSs and HAs are scheduled using event layers that alert personnel when inspections are due, and record each asset screening inspection when work is completed.

4.9 Reports in Cityworks® AMS

Predefined reports and specific queries can be produced from the Cityworks® AMS database tables and fields. Custom reports created in Crystal Reports and then uploaded to the Cityworks® Server using Report Manager are also available.

4.10 Mobile Devices

Currently, HAR-EE personnel working the storm water program are using Apple iPad Air 2 tablets. HAR-O personnel in HAR-OCM, HAR-OCG and HAR-OM along with their supervisors were recently issued and trained on using the Microsoft Surface Pro laptops or tablets. The mobile devices, which have photo taking and uploading capabilities to the Internet, allow one-time entries into Cityworks® AMS by the users that promote efficiencies in terms of time-savings and information gathering while eliminating the need for multiple entries, associated errors and unnecessary paperwork.

4.11 Quality Control

Supervisors are responsible for conducting regular QC reviews of the various work documents entered in Cityworks® AMS using the searching tools described above. When questionable entries – or lack thereof – are found, the responsible users are notified and corrective action is requested.

Additionally, the Harbors AMS Administrators hold monthly Cityworks® AMS workshops with Harbors employees to reinforce efforts to remedy issues found, hold Q&A sessions as needed, and to apprise Harbors users of new developments and upcoming events associated with the Cityworks® AMS.

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Volume II User Guides for Storm Sewer System O&M Activities

CHAPTER 5

HARBORS TRANSITION TO AMS TASKS WORKFLOWS

Application of the AMS to Harbors management and future decision making is dependent on the quality and accuracy of the data input to the Cityworks® AMS discussed in Chapter 4. The data input responsibility of Harbors operations and maintenance follows the same line of authority that existed with the paper routing of the pink, white, and gold copies progressing up the Harbors supervisory chain.

See Figure 20 for the HAR-O hierarchy of Sections and Units.

The hierarchy of Managers, Superintendents, and Supervisors are responsible to open their Inbox to review and manage the workload on a regular basis. Determinations that they make are similar to the paper process of transmitting work as appropriate, until it is received by those expected to execute it. In this line of authority, personnel are responsible to one supervisor who only assigns work to staff immediately below them.

The AMS tasks workflow processes match the existing chain of responsibilities with electronic Work Orders and Service Requests.

5.1 HAR-O Management Tools

Work assignments are transmitted through Service Requests, Work Orders, and Inspections that contain information for inspection and cleaning, plus proactive queries that trigger follow-up work required. Work Orders and Inspections tend to be work for predefined schedules, e.g., MCS/HA Screening Inspections, OCG storm drain cleaning, and refuse and sweeping. A Service Request tends to be reactive to a situation or location on Harbors property, e.g. suspected illicit discharge.

The Harbors Cityworks® AMS presents a tool for *real-time* operational management, where input data is processed within seconds and a reporting engine makes data available immediately as feedback. The Managers, Superintendents, and Supervisors may look at the data for program improvement.

The 2016 *beta* testing of Harbors Cityworks® AMS is complete, and the remaining minor adjustments require user participation. The evaluation of user feedback will help the AMS Administrator to improve the GIS database with new configurations that expedite analysis and deliver instructive support to Supervisors using the AMS for management of workflow processes.

5.2 Supervisor Responsible for Data Quality Control

The validity of the information and data collected and stored is an important part of effectively maintaining and managing Harbors storm sewer system assets and submitting accurate and reliable reports to EPA and HDOH.

The Service Requests and Work Orders replace the paper tracking of work assignments. The Cityworks® Inbox provides performance dashboards that set targets and informs management of reality versus expectations.

Learning the basic skills to use the database helps Harbors supervisory hierarchy and their Subunits and Crews manage the task workflow processes. Data input provides a quantifiable means to measure progress of performance by Crews, and the costs and time required to complete the work.

Both the resulting information and intuitive map view allow Managers, Superintendents, and Supervisors to easily identify, understand, and mitigate performance related issues. Reports and performance metrics can be directly incorporated into the Inbox allowing information to be readily available to decision makers throughout Harbors.

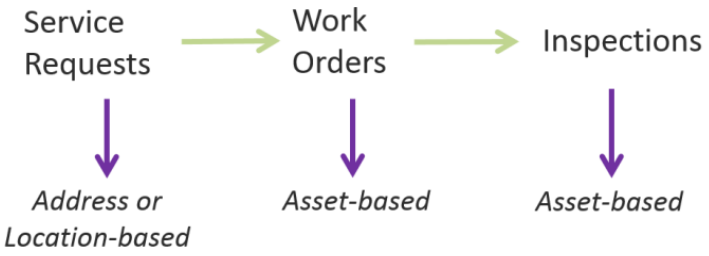
Data input is the responsibility of the Harbors supervisory line of authority that assigns the work and performs oversight.

5.2.1 Designate Data Input Backup Staff

Supervisor designees will be responsible for identification of backup staff for data input for continuous data recording and recordkeeping in the event of vacations and vacancies. Data input validates Harbors fulfillment of the CD requirements, as well as collects information to provide an evaluation tool for prudent decision making. The Supervisors will identify their back-up staff.

5.3 Service Requests (Area Survey)

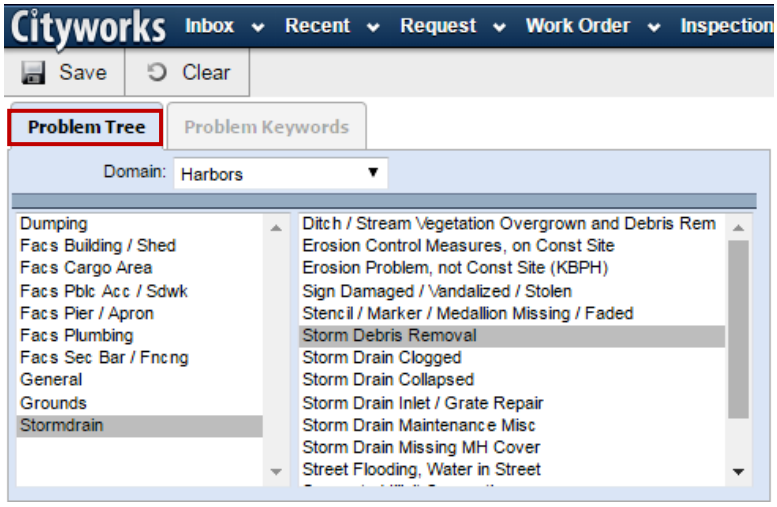
There is a basic progressive relationship between Service Request (Area Survey), Work Orders, and Inspections. The distinction is made that Service Requests are address or location-based; whereas, Work Orders and Inspections are asset-based.



Service Requests can be initiated by Harbors personnel based on inquiries reported by Harbors personnel or the general public whenever a potential problem is identified.

Each problem code (or Service Request template) has unique information and workflow depending on the problem type and the Harbors Section responsible for investigating or fulfilling the request.

The Service Request hierarchy, or Problem Tree, is a folder hierarchy where defined Service Request templates can be organized. The hierarchy allows a user to easily locate a problem type based on a category or the responsible department.



Service Requests may require follow up Work Orders, inspections, and investigations of complaints for suspected illicit discharge/spills, leaking pipes, illegal dumping, clogged drains, environmental concerns, damages, and acts of vandalism.

Service Requests are closed once a Work Order is generated for the next step.

5.4 Cityworks® AMS Streamline Tasks Workflow

The Cityworks® AMS integrates work performed by the HAR-O and HAR-E Branches. The database streamlines the paper system with a virtually paperless system to monitor, manage, and implement corrective actions for the operations, maintenance, repairs, replacement, and management of the Harbors Division storm sewer system.

5.5 Storm Drain Tasks Workflow Processes

MCS/HA inspections result in requests for cleaning and maintenance work performed by HAR-OCG (Work Orders created by HAR-OCG Supervisors). Service Requests for cleaning and maintenance can also be submitted to HAR-OCG Supervisors by Harbors personnel.

Figure 34 shows MCS/HA Inspection Tasks Workflow Processes.

Figure 35 shows HAR-OCG Cleaning Tasks Workflow Processes.

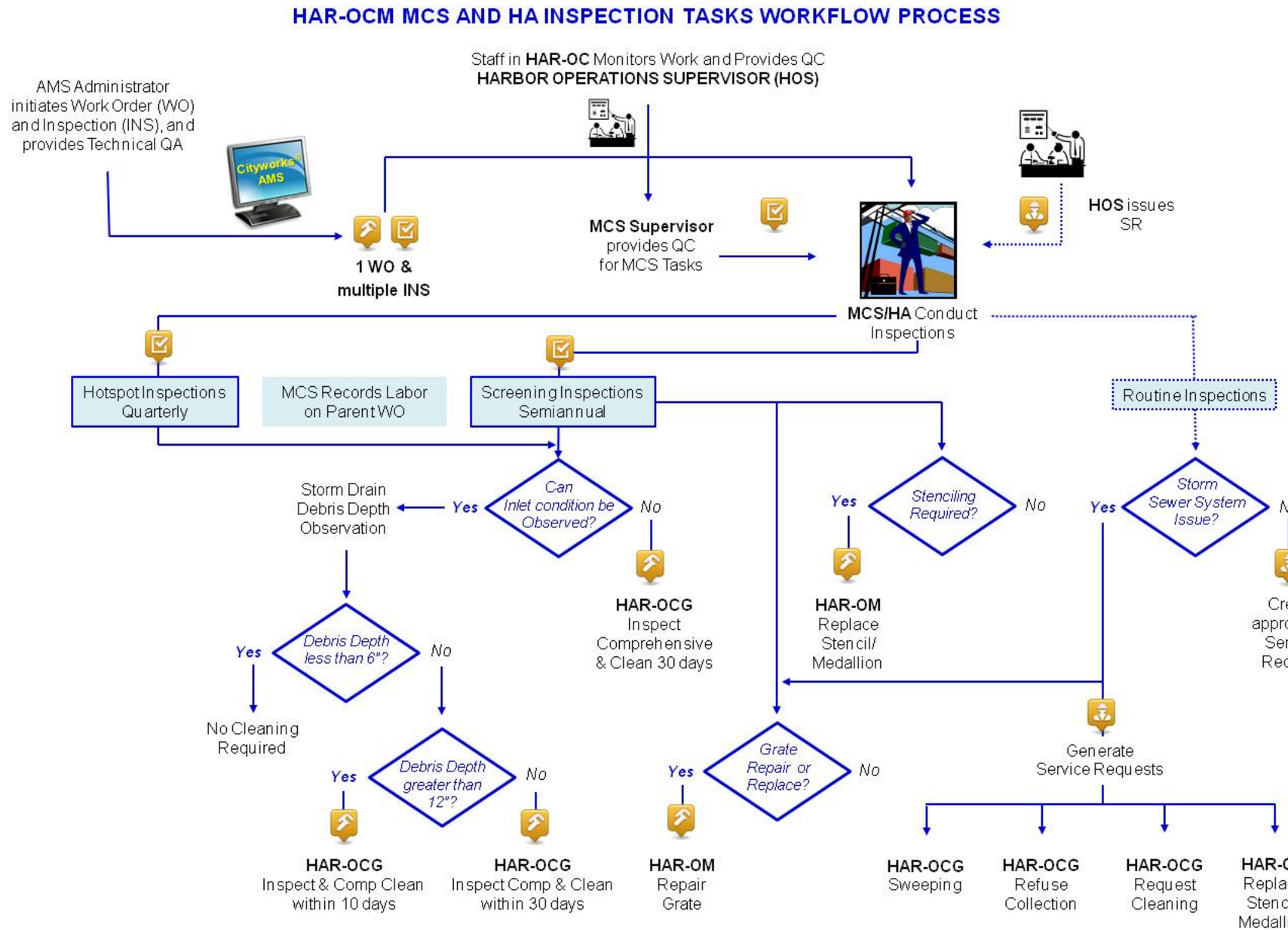


Figure 36. HAR-OCM MCS and HA inspection tasks workflow.

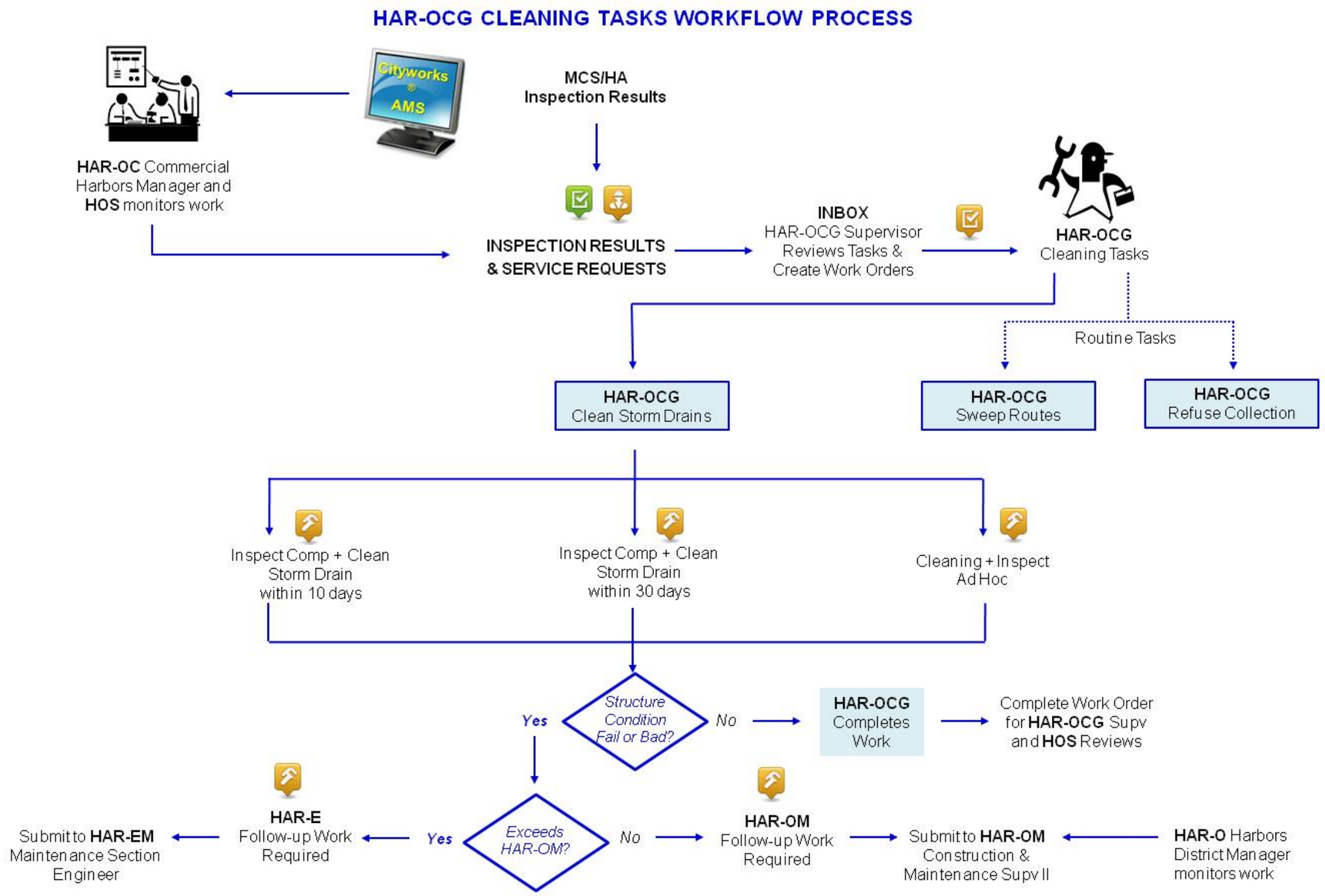


Figure 37. HAR-OCG cleaning tasks workflow.

CHAPTER 6
HARBORS STORM SEWER SYSTEM INSPECTIONS

The Pollution Prevention and Good Housekeeping Program in the *SWMP* identifies the following BMP activities:

- Storm Sewer System Operation and Maintenance Program
- Maintenance and Housekeeping Practices that includes Sweeping Common Areas and Select Tenant Facilities, and Waste Collection
- Tenant Education and Employee Training

This chapter provides user guidance for scheduling and tracking the inspection activities of the Storm Sewer System Operation and Maintenance Program using Cityworks® AMS.

Harbors deployed Cityworks® AMS in December 2015 in compliance with the CD. Computerization streamlines the previous paper routing process, and guides the AMS workflow processes for scheduling and performance of O&M procedures. Cityworks® AMS login is https://ams-har.hidot.hawaii.gov/Cityworks/Login.aspx. Enter username and password, or obtain login information from the Harbors AMS Administrator. Refer to the *Cityworks® User Manual* for details.

There are three Harbors personnel trained as Cityworks® AMS Administrators; additionally, HAR-EE staff are trained as trainers. The AMS Administrators are responsible to keep the asset inventory up to date, and manage the processes for GIS updates and configuration updates (*see* Chapter 4.2.3.8 and 4.2.3.9). The AMS Administrators will determine how often the inventory needs to be reconciled as new storm sewer system assets are added to the system through the GIS update process.

Manpower and resources are mobilized by *cyclical or reactive triggers* that initiate Harbors property storm drain inspections. This chapter focuses on the inspections of storm drain inlets, open channels, trench drains, and identified hotspots of the Harbors storm sewer system network.

There are *cyclical inspections* and preventive maintenance activities routinely scheduled. There are also *reactive inspections* such as follow-up work based on the observations and findings of cyclical inspections; response to illicit discharge and complaint reports by employees and the public; and as needed based on Harbors routine inspections of tenant activities in assigned piers for damage, pier use by cargo operators, and tenant activities that have potential sources of illicit discharges.

6.1 Cityworks® AMS Inbox

The Inbox is the first screen Harbors personnel see after login. Harbors personnel may personalize their Inbox with a dashboard configured to display information features relevant to their responsibilities. The Inbox dashboard may display work activities in lists, reports, charts and graphs, and GIS maps that pinpoint location of assets.

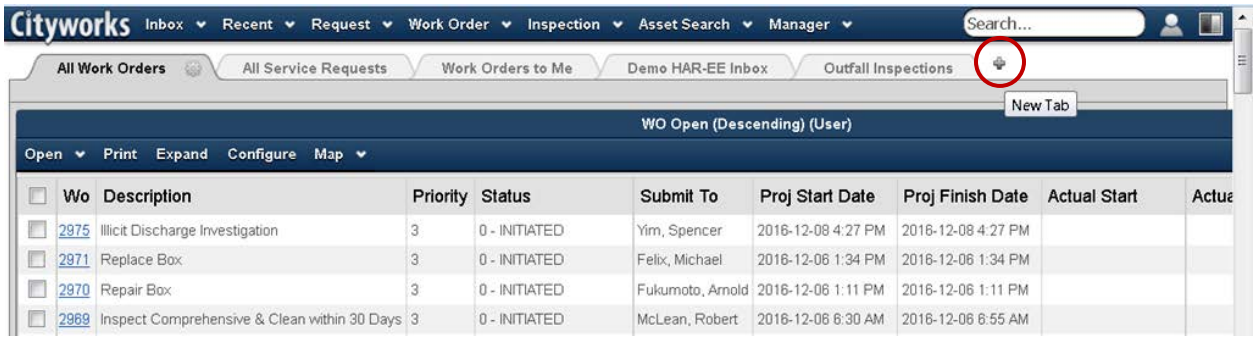
Inbox customization facilitates the workflow processes for Harbors operations and maintenance procedures, and provides a user friendly dashboard to help manage the daily workload.

6.1.1 Main Toolbar

The Cityworks® ribbon or blue bar is always visible at the top of each screen and provides primary navigating buttons with dropdown menus for user functions.

6.1.2 Add a New Tab to Inbox

To add a new tab, click the "+" icon located below the main toolbar.

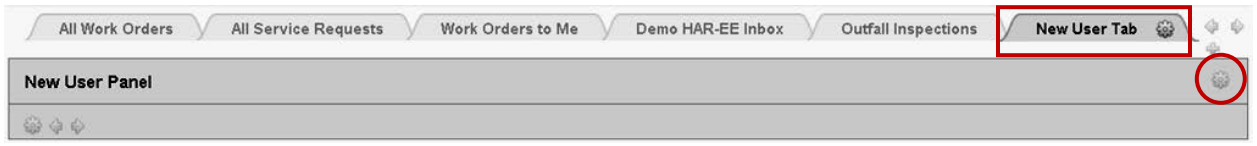


Click the User Tab for additional setup options.

6.1.3 Gear Button to Customize Setting Options

The gear icon or button allows users to edit the setting options. Users may customize or configure the Index tabs, panels, and widget selections. Use the gear button to display options to update, delete, and close functions for selections.

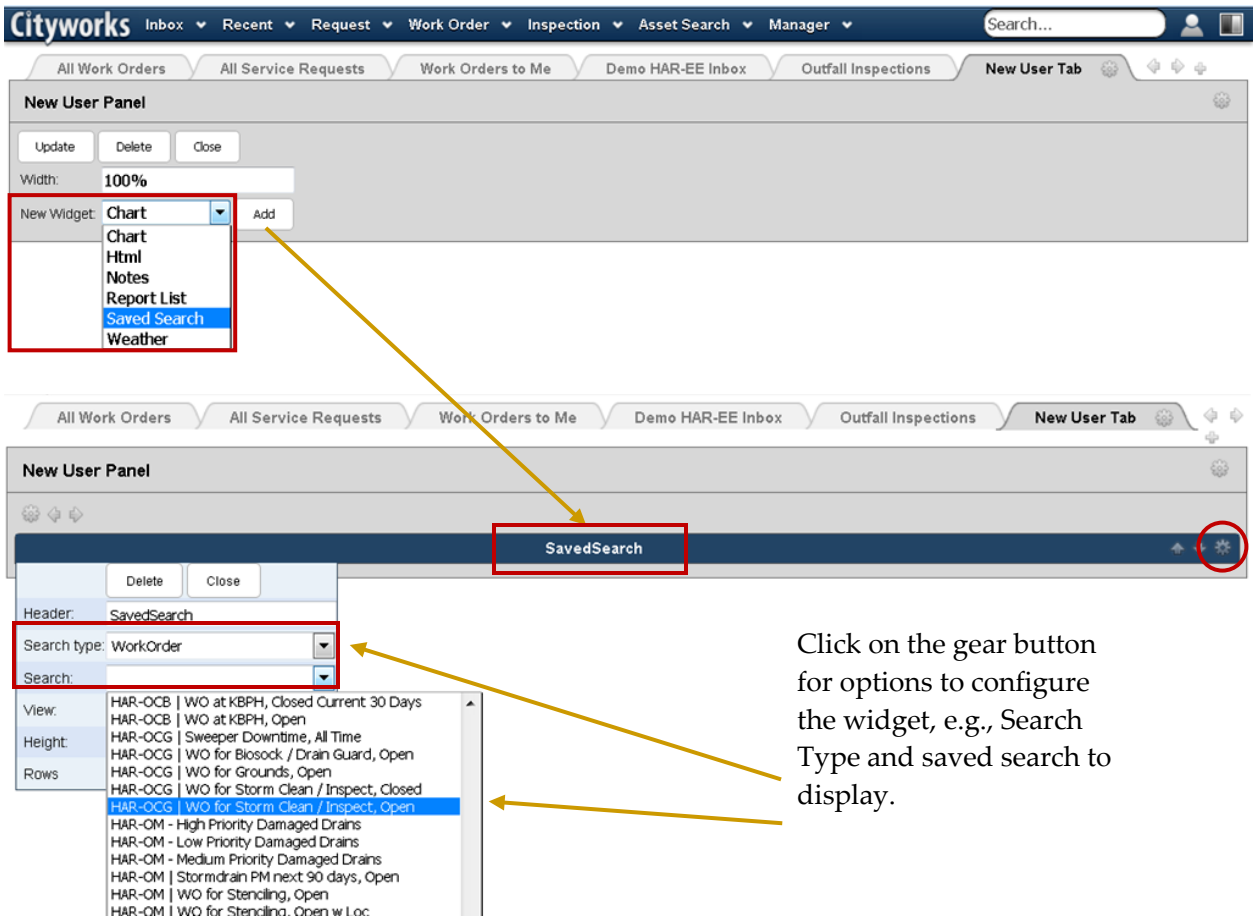
The screen will display the New User Tab. Click on the gear button to rename tab.



Enter new tab name in text box. Next, click on the user panel gear button to customize the user Panel name.

Then, click on the new panel gear button to add a new widget to the Inbox.

The screen displays options to select a widget that enables a user to perform a function or access a service, e.g., SavedSearch panel. Select a widget and click the Add button.



6.1.4 Four Basic Inbox Tabs

The four basic tabs for all Harbors personnel are All Work Orders, All Service Requests, Work Orders to Me, and Service Requests to Me. However, Supervisors may choose to display additional tabs on their staff's Inbox dashboard.

6.2 Work Orders

Work Orders can be generated in response to Service Requests or the findings of inspections conducted to identify structural defects, trash and debris accumulation, and other constraints that limit the flow of storm water. Initiated or requested Work Orders are screened for validity and prioritization by Supervisors.

6.2.1 Parent Work Orders

The AMS Administrator generates the parent Work Order that schedules cyclical inspections: semiannual Screening Inspections of 100% of the accessible storm drain assets and quarterly Hotspot Inspections. The Screening Inspections and Hotspot Inspections show up in the Inbox of the MCS / HA Inspectors and on their map via Event Layers, with a copy to the Supervisor's Inbox. The MCS / HA then conduct inspections and record observations and findings.

6.2.1.1 Initial Inspection and Cleaning of Storm Drains

The initial system-wide inspection and cleaning of all Harbors storm drain inlets, drainage features, and outfalls was completed in July 2015 by a contractor. The contractor collected data on the structural condition of the drainage features, and removed debris from drain inlets to identify repair work needed.

6.2.1.2 Screening Inspections Schedule 2016 Adjustment

Screening Inspections were performed on a quarterly basis following the initial cleaning. However, review of data collected over three quarterly inspections showed the inlets and manholes did not accumulate debris frequently (no inlets contained over 6 inches of debris in consecutive inspections); therefore for the fourth quarter, Harbors decided to reduce the Screening Inspections of storm inlets, open lines, and trench drains to the current semiannual schedule. Hotspot Inspections remained on a quarterly schedule and Inspect and Comprehensive Cleaning of BMPs inspections remained on an annual schedule.

6.3 Responsibility for Data Accuracy

The validity of the information and data collected and stored is an important part of effectively maintaining and managing Harbors storm sewer system assets and submitting accurate and reliable reports to EPA and HDOH.

Harbors Supervisors and Staff users who enter task performance data are responsible for data input to the AMS. Supervisors are responsible to review staff performance as well as staff data input to the AMS to ensure that accurate and valid data and information are entered for quality control. HAR-EE staff also assists with training, data review, and data quality control.

6.4 Standard for Screening Inspections

Harbors established the standard for Screening Inspections to determine when storm sewer drains require cleaning. The primary test is by visual observation. However, if the MCS / HA Inspector observes sediment and/or debris accumulated at the bottom of the drain and is unable to determine the debris thickness, the stick test is used.

During regular inspections, the results of the observation and measurement of accumulated soil, wet organic material, and debris will determine the follow-up action required.

6.4.1 Visual Observation

Visual observation by the MCS / HA is the primary method to measure the levels of accumulated sediment, e.g., silt, gravel, soil, wet organic material, vegetation, and debris.

6.4.2 Stick Test

The stick test is utilized to measure debris levels when the MCS / HA cannot discern the debris thickness through visual observation. The measurement is made from the bottom of the drain structure to the height or depth of the material to determine if cleaning is required.

When observation is blocked, the MCS / HA will note "cannot observe" on the inspection. The inspection will be routed to the HAR-OCG Supervisor's Inbox and the HAR-OCG Supervisor will create a Comprehensive Inspection and Cleaning Work Order.

6.4.3 Observations and Measurements, and Actions Required

The observations and measurements, and follow-up actions required are as follows.

OBSERVATION	ACTION REQUIRED
0 – 6 inches	Cleaning not required
6 – 12 inches	Requires Inspect Comprehensive & Cleaning within 30 days
12 inches or more	Requires Inspect Comprehensive & Cleaning within 10 days
Cannot Observe	Requires Inspect Comprehensive & Cleaning within 30 days
Stencil Required	Requires Replace Stencil Work Order
Grate Condition	Requires Repair Grate Work Order

6.5 Storm Inlet and Open Line Inspection Process

Storm drain inlet and open line (trench drain) inspections are conducted in two tiers, and may trigger follow-up work based on the inspection observations and findings.

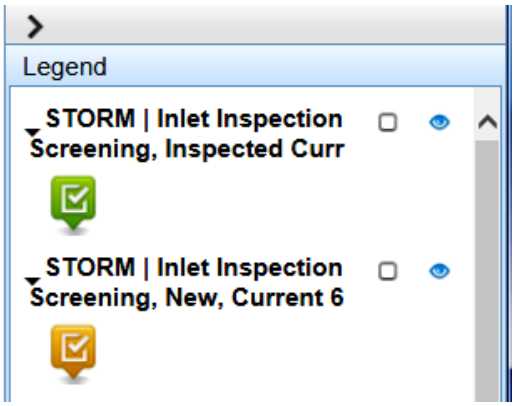
6.5.1 Tier One – Screening Inspections

HAR-OC is staffed with MCSs and HAs who are assigned to conduct a Screening Inspection of every accessible Harbors inlet and open line using the 'Inspect Screening' Work Order for all assets, and the individual 'Storm Inlet Insp Screening' inspections for each asset. These inspections are initiated as a parent Work Order on the 1st day of every semiannual period by the AMS Administrator.

6.5.1.1 Map Event Layers

The MCSs and HAs utilize Event Layers, which are saved searches displayed on the Map to guide the Inspection tasks workflow. This workflow requires that each MCS and HA has the Event Layers configured and available to them in Cityworks® AMS.

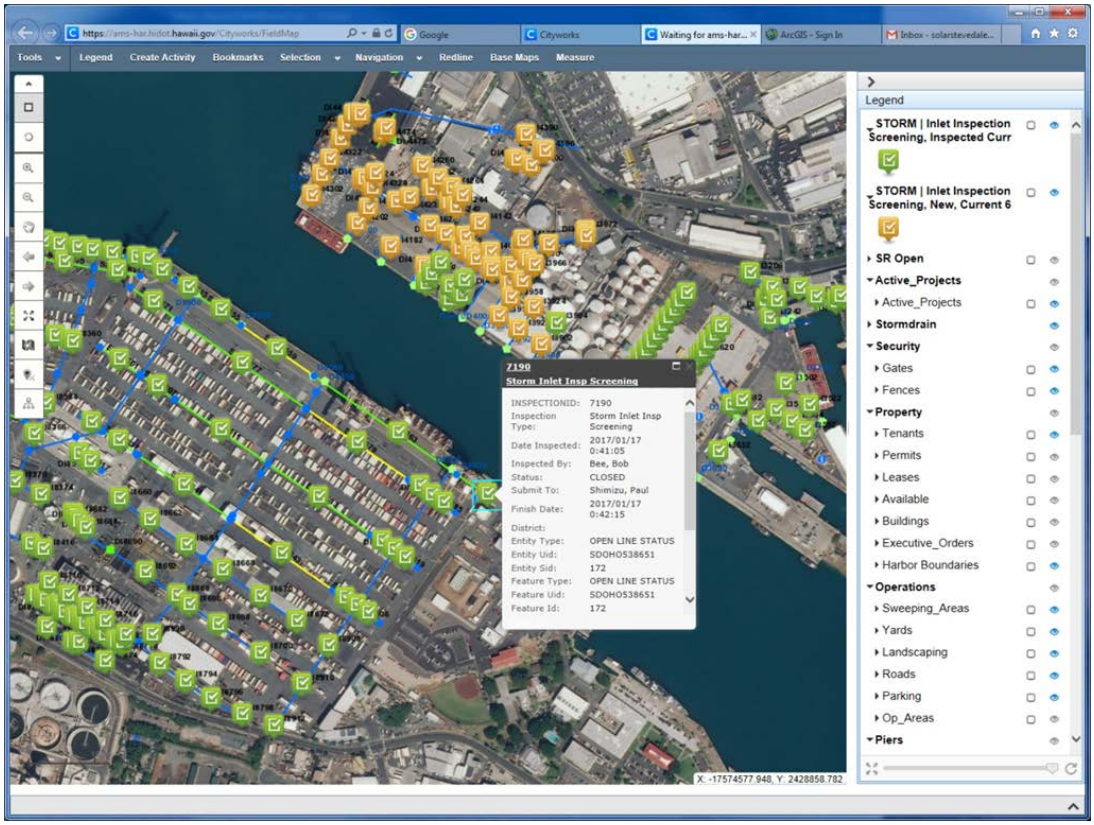
Please request assistance from the AMS Administrator if the Event Layers and map are not setup for Storm Inlet Inspection Screening, as shown in the Legend screen.



6.5.1.2 The Map

The Map is populated with selected event layer symbols—grey, yellow and/or green inspection icons. Each grey or yellow symbol represents an inspection waiting to be completed.

The MCS or HA will open the Inspection screen for a specific asset by clicking the mouse button on the inspection icons on the map, as shown on the screen below.

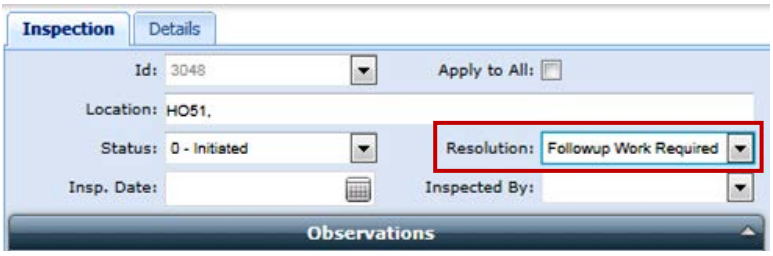


6.5.1.3 Complete Inspection and Record Observations

The MCS or HA conducts the field investigation of the storm drain asset, and records their observations on the Inspection screen with complete responses for each field.

Follow-up Work Required

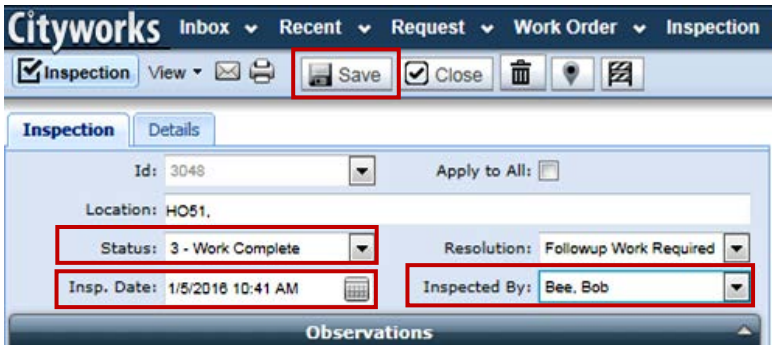
When follow-up work is required for 'Stenciling required' or 'Grate condition' needs repair or 'Debris depth' is over 6 inches, set the Resolution field to the 'Followup Work Required' option.



Set Status Field to 3 - Work Complete and Save Data

On the Inspection screen, set the option in the 'Status' field option to '3 – Work Complete', and fill in the 'Inspection Date' and 'Inspected By' fields.

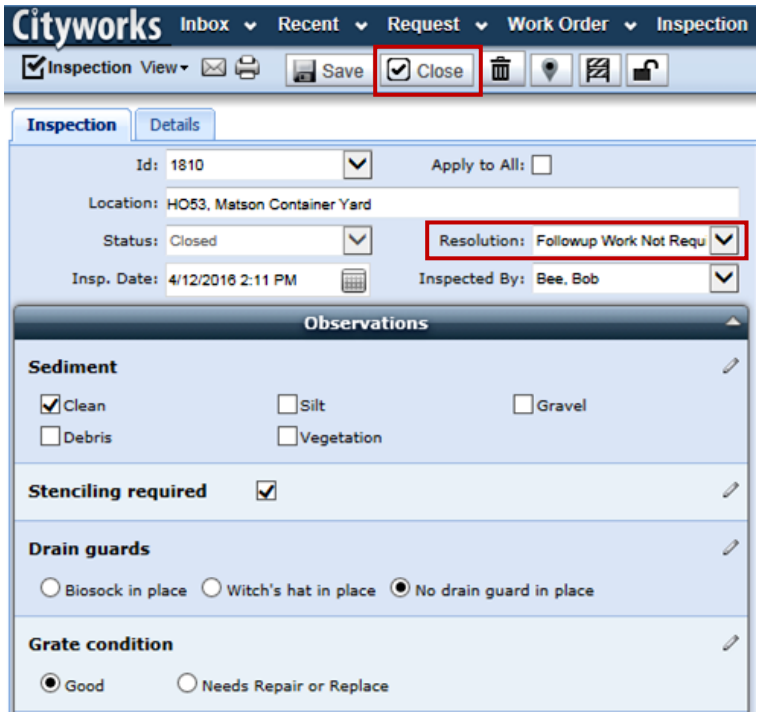
To save the Inspection screen data, click the Save button.



Supervisor Review of Inspections

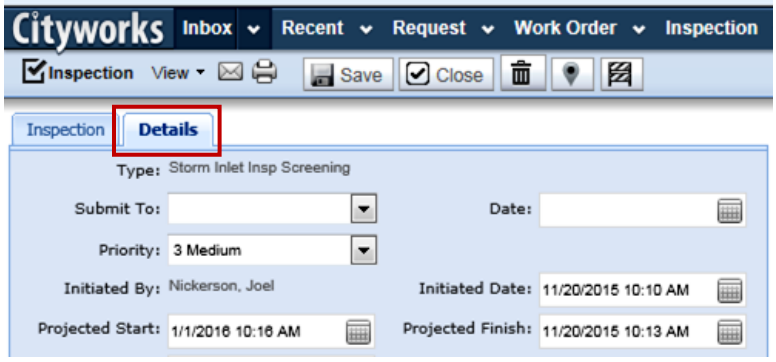
For inspections that the MCS or HA want reviewed by the Harbor Operations Supervisor, leave the inspection open and proceed to the next inspection.

For routine inspections when there is no need to alert the Harbors Operations Supervisor of items to be aware of, the MCS or HA may close the inspection. Click the Close button.

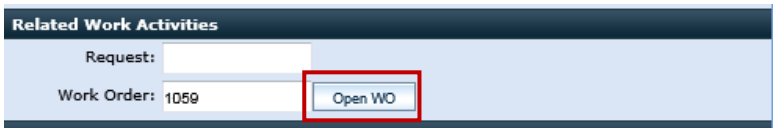


6.5.1.4 Tracking Labor Expenses

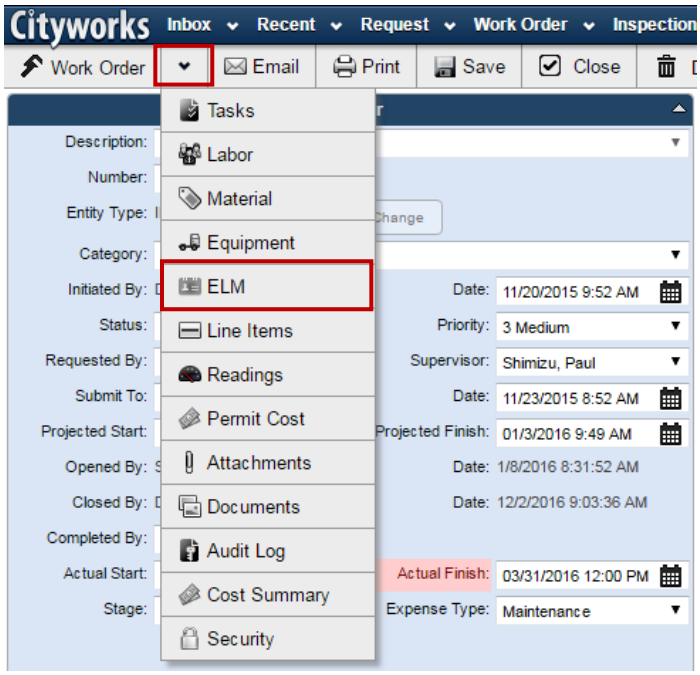
To keep track of the labor expended on the inspections performed, open the Details tab, and go to the Related Work Activities panel.



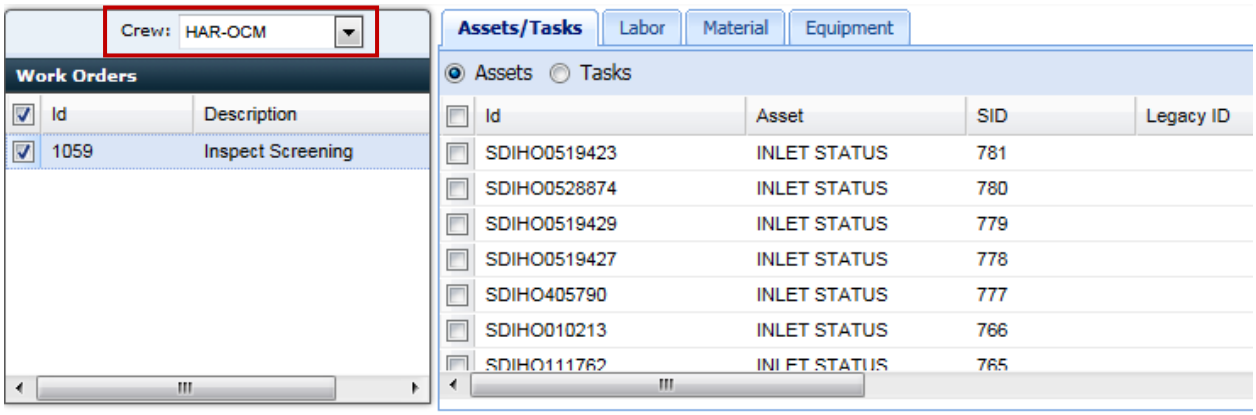
In the Related Work Activities panel, navigate to the parent Work Order to record all labor using the ELM screen. Click the Open WO button.



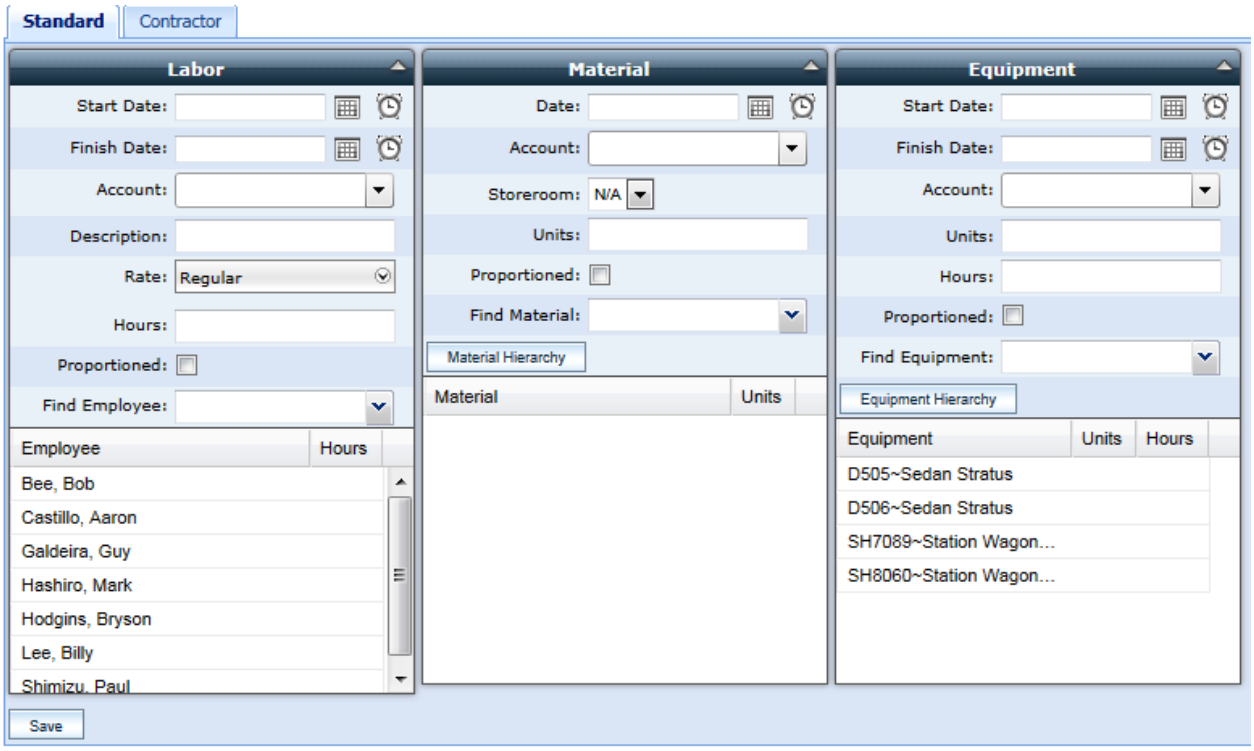
In the parent Work Order screen, click the View button and select ELM.



Select HAR-OCM crew from the menu.



Select the appropriate name in the Employee scrolling menu, and record the labor hours expended on this inspection (or all the inspections performed). Save data by clicking the Save button.

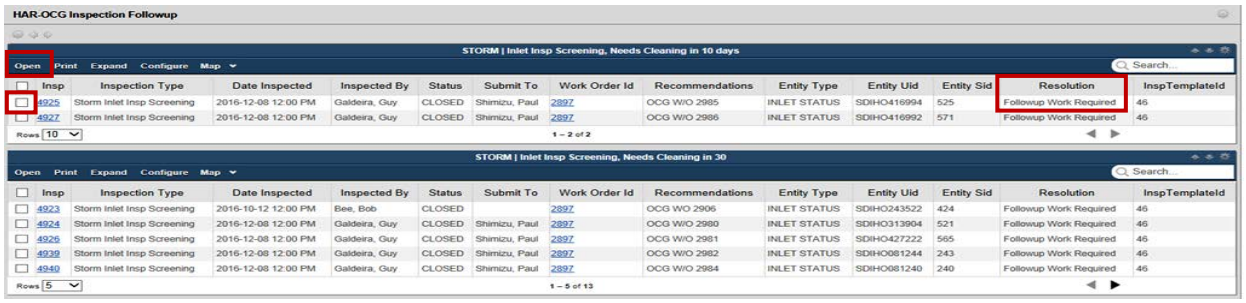


6.5.2 Tier Two – Comprehensive Inspections

Comprehensive inspections are *reactive inspections* performed as needed, in response to follow-up work required based on the MCS/HA observations and findings during storm drain asset inspections. When the MCS/HA indicate '6 to 12 inches' or 'cannot observe' in the 'Debris depth' field of the inspection screen, an 'Inspect Comprehensive & Cleaning within 30 Days' Work Order is required. When the MCS/HA indicate '>12 inches' in the 'Debris depth' field of the inspection screen, an 'Inspect Comprehensive & Cleaning within 10 Days' Work Order is required. The inspections appear in the HAR-OCG Supervisors' Inbox and the HAR-OCG Supervisors create the Work Orders. HAR-OCG Supervisors then schedule staff to remove the grate or lid, clean/inspect the inlet, and track the cleaning/inspection results on the 'Storm Inlet Insp Comprehensive' screen.

6.5.3 HAR-OCG Supervisor Management Tools

To facilitate management of task workflows, the HAR-OCG Supervisors may review a Saved Search in their Inbox which generates a list of Screening Inspections where follow-up work is required. The HAR-OCG Supervisors' Inbox displays the saved search for assets with 'Followup Work Required'. See the example below for HAR-OCG. To create a follow-up work, the HAR-OCG Supervisors will check the box to select the failed inspection, and click Open.



On the Inspection screen, the HAR-OCG Supervisors will open the Details tab and go to the Entity panel. Click the 'Highlight' button to select the asset (inlet or trench drain). To create a new Work Order for the asset and assign work, click the Work Order button in the main toolbar.

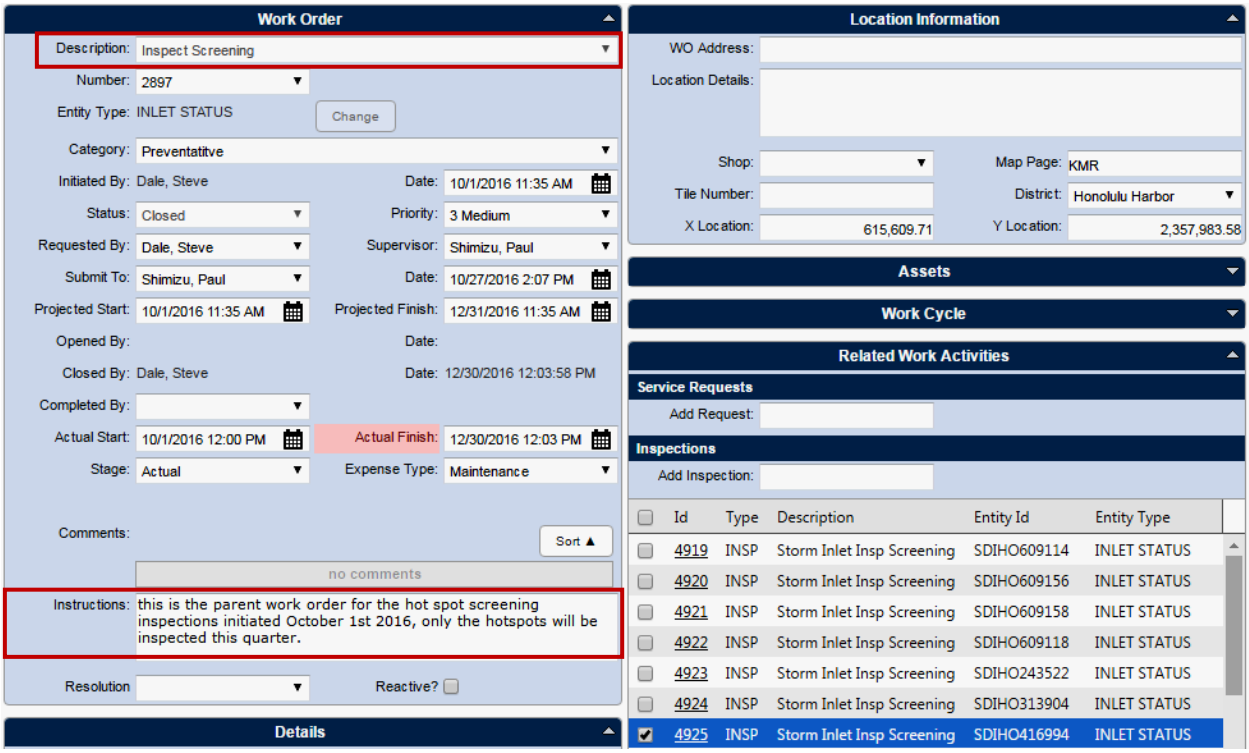
6.6 Hotspot Inspections

A "hotspot" is defined as a storm drain inlet or open line with two (2) consecutive comprehensive inspection and cleaning measurements of sediment and debris over 6 inches (recorded on the 'Inspect Comprehensive & Clean' Inspection).

Currently, no hotspots are identified by this definition.

In the 4th Quarter of 2016, HAR-EE and HAR-EP elected to broaden the hotspot definition to inlets that required two consecutive Screening Inspections for debris over 6 inches, and any additional inlets which the MCS / HA and HAR-OCG Supervisors identified as areas of concern. Under this expanded criterion, 15 discretionary hotspots for quarterly inspection were identified.

Quarterly hotspot inspections are scheduled by an AMS Administrator who initiates the parent Work Order for 'Inspect Screening'. The 'Submit To' field routes the Work Order to the HAR-OCM Marine Cargo Specialist Supervisor who is responsible to assign the Hotspot Inspection tasks to the MCS / HA staff.



6.6.1 Removal of Hotspot Designation

Removal of the hotspot designation occurs after two (2) consecutive comprehensive inspection measurements show less than 6 inches of accumulated trash and debris removed. The inspection frequency will change from quarterly back to semiannual inspections.

6.7 Stencils Inspections

Harbors tracks the locations of existing and newly installed signage and stencils which are preventive control measures to mitigate pollution. Stencils are inspected during cyclical and screening inspections.

Additional locations for signage installation are considered by HAR-EE for areas identified with frequent public dumping, or high traffic tenant areas or areas with a history of illicit discharges.

Service Requests for signage installation, repair, and replacement are routed to the HAR-OM Wharf Maintenance Supervisor who is responsible to assign the tasks to subordinate staff.

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CHAPTER 7
STORM SEWER SYSTEM CLEANING AND MAINTENANCE

The Pollution Prevention and Good Housekeeping Program tasks for the SSS OMP involve storm drain cleaning, pier sweeping routes, refuse and debris removal, and cleaning of the Kalaeloa Barbers Point Harbor rail tracks. The Sanitation & Grounds Unit (HAR-OCG) utilize heavy equipment and personnel resources to open the drain inlets to conduct Comprehensive Inspections, and to perform the actual cleaning of accumulated debris, trash, and sediment.

Work Orders for the second tier Comprehensive Inspection and Cleaning are created by the HAR-OCG Supervisors for follow-up work required when the drain inlet cannot be observed or inspected by the MCS or HA, or when the debris depth is recorded over 6 inches.

The HAR-OCG Supervisors determine the priority, and schedule or assign the work to subordinate crews.

The HAR-OCG Supervisors manage the Grounds Crew, the Refuse Crew, and the Custodial Crew. The Refuse / Grounds crews provide the manpower and operate equipment to conduct street sweeping, refuse/debris removal, and drain cleaning

The HAR-OCB Unit HA Supervisor is responsible for scheduling work at Kalaeloa Barbers Point Harbor, and support is provided by HAR-OCG.

7.1 Service Requests for Cleaning

Cleaning tasks may be submitted as Service Requests to the HAR-OCG Supervisor who is responsible to screen the request, prioritize, and schedule or assign the work to the subordinate staff.

7.2 Storm Drain Cleaning Work Orders

Inspections resulting in the requirement for cleaning are routed to the HAR-OCG Supervisors Inboxes for review. The HAR-OCG Supervisors create Work Orders and assign subordinate staff to inspect the inlet with the grate or lid off, clean the inlet, and track the cleaning and inspection results on the 'Storm Inlet Insp Comprehensive' screen (*see* Chapter 6.5.3). The cleaning schedule of storm drains is determined by the results of the tier one Screening Inspections, as they are *reactive* work.

7.2.1 'Inspect & Clean Ad Hoc'

Harbors personnel may submit Service Requests to HAR-OCG Supervisors who will determine based on the Service Request, whether it is appropriate to create a follow up Inspect & Clean Ad Hoc Work Order and comprehensive inspection.

7.2.2 'Inspect Comprehensive & Clean within 30 Days'

As the MCS / HA cycles through the Screening Inspections schedule, follow-up cleaning is required within 30 days if the storm drain inlets have 6 – 12 inches of accumulated sediment and debris.

7.2.3 'Inspect Comprehensive & Clean within 10 Days'

As the MCS / HA cycles through the Screening Inspections schedule, follow-up cleaning is required within 10 days if the storm drain inlets have over 12 inches of accumulated sediment and debris.

7.2.4 'Inspect & Comprehensive Clean BMP'

Harbors personnel presently proceeds straight to comprehensive cleanings on storm drain inlet and open line permanent BMPs on an annual basis. The storm drain inlets and open lines they inhabit are screened as normal.

7.3 Supervisors Responsible for Follow-up Work

The HOS or HAR-OCG Supervisors are responsible to create follow-up Work Orders based on the results of inspections. The procedure is the same as Section 6.5.1.3, i.e., highlight the asset from the Inspection form Details panel, and create a new Work Order, as appropriate.

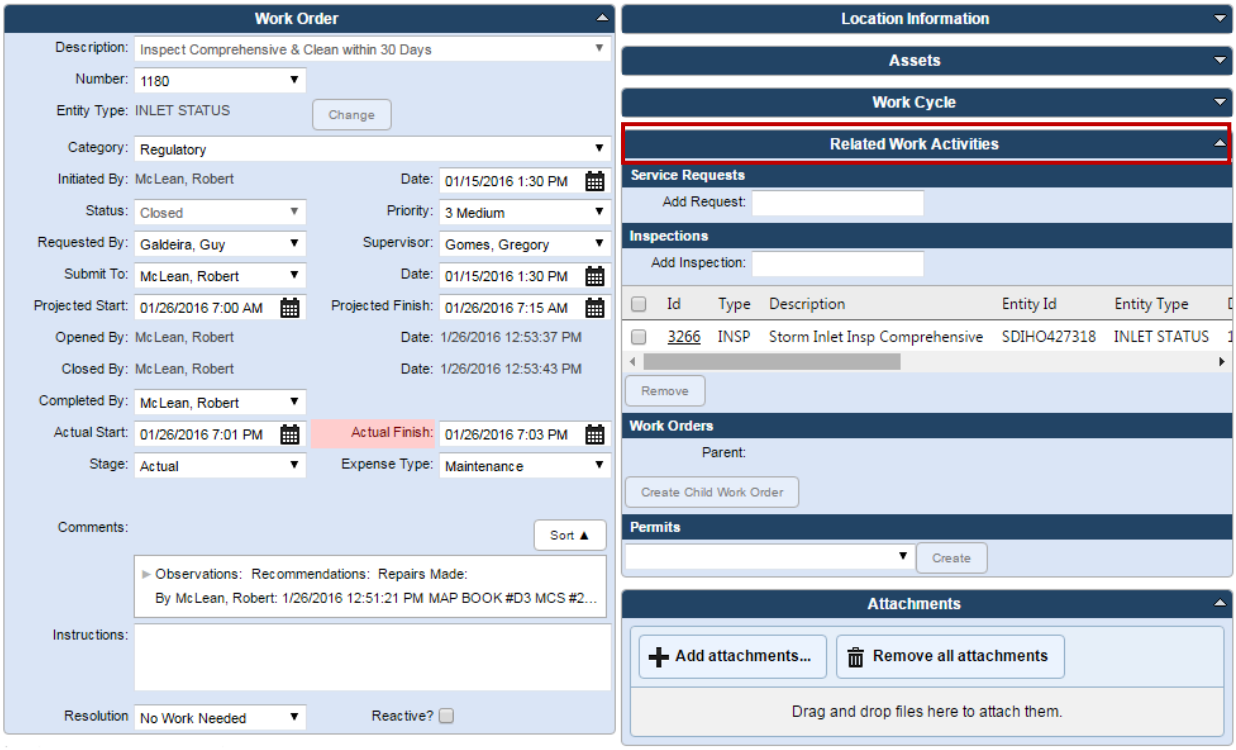
HAR-EE, HAR-OCG Supervisors, and HAR-OM Maintenance Supervisors are responsible for saved searches for Screening Inspections and Comprehensive Inspections which require follow-up work, as follows:

SECTION / UNIT	INSPECTION TYPE	INSPECTION OBSERVATION
OCG / OCB Units	Comprehensive	Cleaning required
Environmental Section	Comprehensive	Illicit connection
Maintenance Section	Comprehensive	Structure condition
Maintenance Section	Screening	Grate condition

SECTION / UNIT	INSPECTION TYPE	INSPECTION OBSERVATION
Maintenance Section	Screening	Stenciling required

The HOS and HAR-OCG Supervisors should check the Related Work Activities panel for a summary of other work before creating a new Work Order screen, to see if that type of Work Order has already been created on that asset.

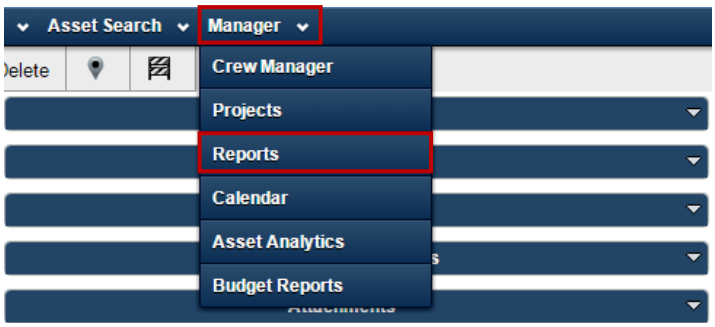
The Related Work Activities is located as shown below.



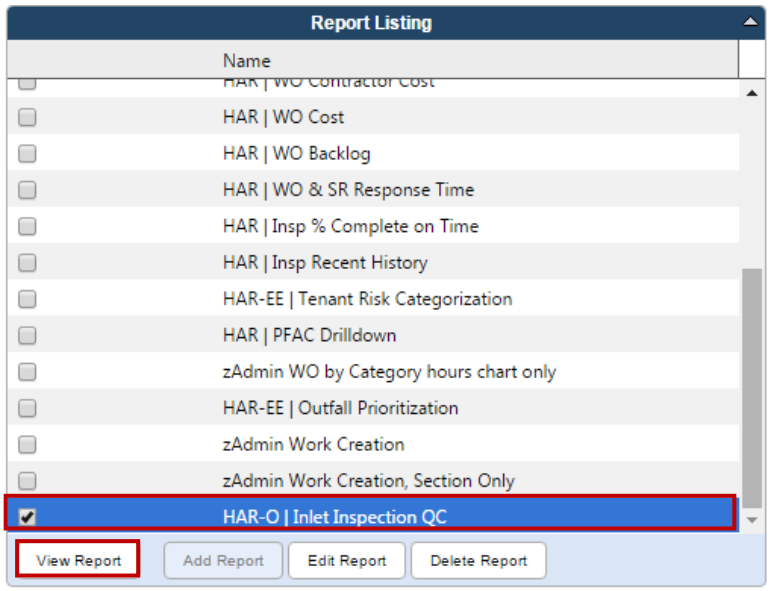
7.3.1 Quality Control Report for Inspection Follow-up Work

For quality control of the inspection follow-up work process, the Cityworks® AMS can generate a report that summarizes inspections which require follow-up work and the follow-up Work Orders created from those inspections.

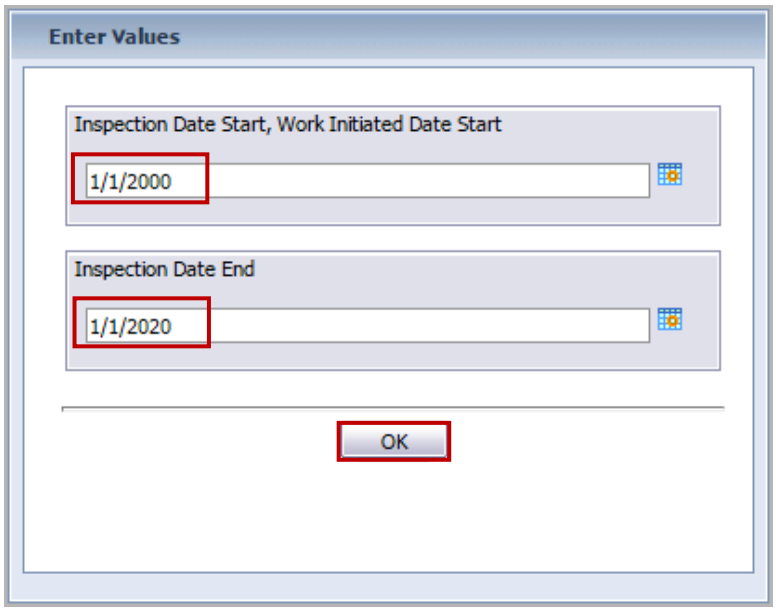
To run the quality control report on inspection follow-up work, click on the Manager button in the main toolbar, and select Reports.



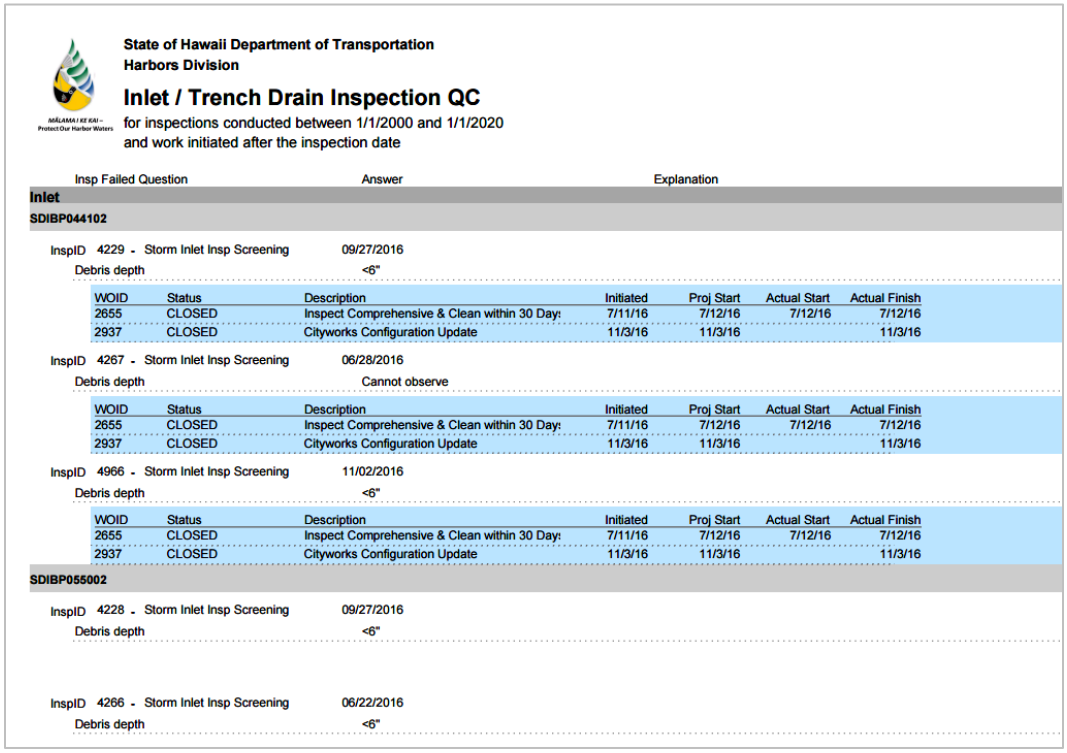
Select 'HAR-O | Inlet Inspection QC' report for a list of follow-up work required. Select from the options at the bottom such as 'View Report'.



Set the Inspection Start and End dates in the window that appears and press the OK button.



The selected 'HAR-O | Inlet Inspection QC' report will appear as shown below. Each asset is listed, along with inspections on that asset which have observations that require follow-up work. If follow-up work has already been created on the asset, those Work Orders are shown in blue.



State of Hawaii Department of Transportation
Harbors Division

Inlet / Trench Drain Inspection QC

for inspections conducted between 1/1/2000 and 1/1/2020
and work initiated after the inspection date

Insp Failed Question	Answer	Explanation
Inlet		
SDIBP044102		
InspID 4229 - Storm Inlet Insp Screening	09/27/2016	
Debris depth	<6"	

WOID	Status	Description	Initiated	Proj Start	Actual Start	Actual Finish
2655	CLOSED	Inspect Comprehensive & Clean within 30 Days	7/11/16	7/12/16	7/12/16	7/12/16
2937	CLOSED	Cityworks Configuration Update	11/3/16	11/3/16		11/3/16

InspID 4267 - Storm Inlet Insp Screening	06/28/2016	
Debris depth	Cannot observe	

WOID	Status	Description	Initiated	Proj Start	Actual Start	Actual Finish
2655	CLOSED	Inspect Comprehensive & Clean within 30 Days	7/11/16	7/12/16	7/12/16	7/12/16
2937	CLOSED	Cityworks Configuration Update	11/3/16	11/3/16		11/3/16

InspID 4966 - Storm Inlet Insp Screening	11/02/2016	
Debris depth	<6"	

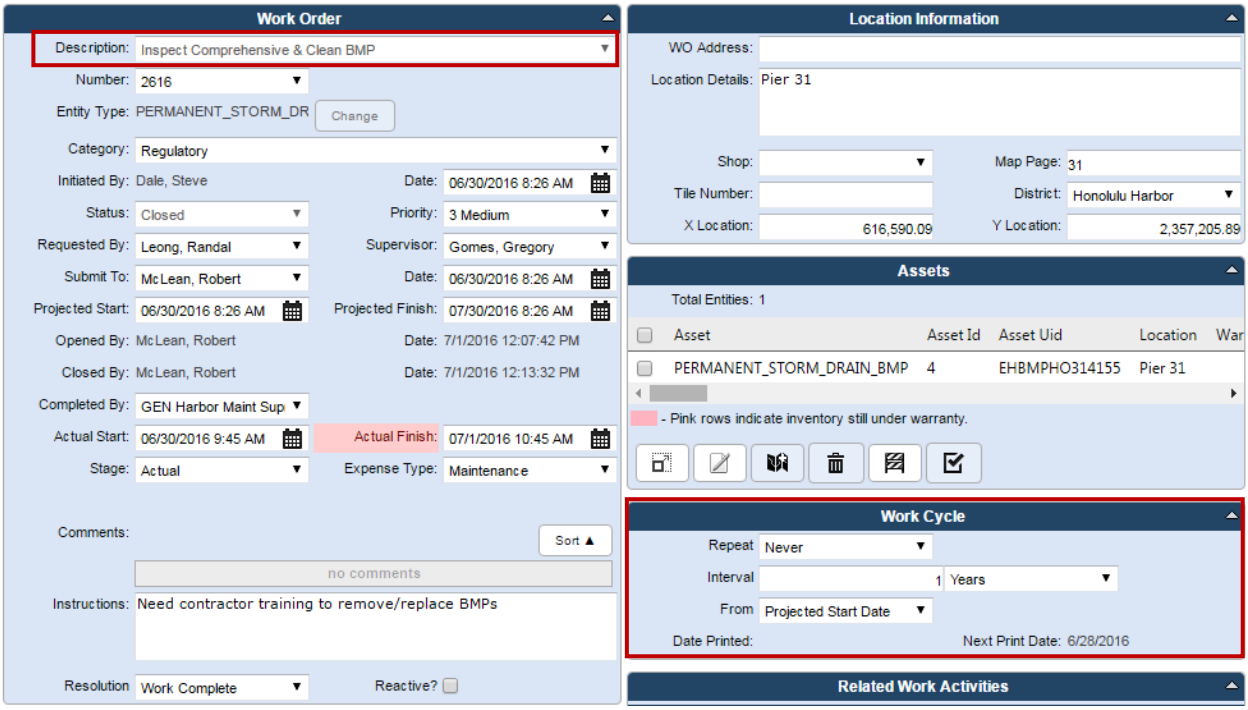
WOID	Status	Description	Initiated	Proj Start	Actual Start	Actual Finish
2655	CLOSED	Inspect Comprehensive & Clean within 30 Days	7/11/16	7/12/16	7/12/16	7/12/16
2937	CLOSED	Cityworks Configuration Update	11/3/16	11/3/16		11/3/16

SDIBP055002		
InspID 4228 - Storm Inlet Insp Screening	09/27/2016	
Debris depth	<6"	
InspID 4266 - Storm Inlet Insp Screening	06/22/2016	
Debris depth	<6"	

7.4 Inspect Comprehensive & Clean BMPs

HAR-EE and HAR-OCG are responsible for maintaining the post-construction BMP inventory, and BMP inspections and maintenance. For Harbors projects, HAR-EE performs the inspection of post-construction storm water BMPs no less than annually.

HAR-EE annually initiates the Work Order for 'Inspect Comprehensive & Clean BMP'. The 'Submit to' field routes the Work Order to the HAR-OCG Supervisor who is responsible to assign the inspection tasks to subordinate staff.



7.4.1 Increase Frequency of BMP Inspections

Some BMPs may be inspected and cleaned more frequently as recommended by the manufacturer manual, or because they are located on a tenant site that is inspected more frequently as part of the Tenant Inspection Program.

7.5 Sweeping Common Areas Work Orders

The Harbors storm drainage system collects rainfall from storm events and releases it directly into the receiving ocean waters. As rainfall travels over surfaces such as roofs, roads, and parking lots, the surface flow may pick up contaminants before entering Harbor waters. Implementation of BMPs and good housekeeping practices that help to reduce the amount of pollutants that enter the storm sewer system include sweeping

floors, processing and storage areas, access roads, parking lots, and sidewalks. HAR-OCG has specialized equipment dedicated to Honolulu Harbor and Kalaeloa Barbers Point Harbor to conduct sweeping activities.

Work Orders for routine operations are routed to HAR-OCG to sweep common areas, and select tenant facilities where cleaning is requested. The HAR-OCG Supervisors are responsible for closing the Work Orders on a regular basis.

7.5.1 Sweeping Routes

Based on availability of equipment and personnel, the sweeping routes and targeted schedule are presented below.

PIER LOCATION	SCHEDULE
Young Brothers	Three times per week
Matson	Twice per week
Horizon Lines Terminal	Once per week
Aloha Cargo Pier 1	Once per month
Piers 10 11	Twice per week
Sand Island Base Yard T	Once per week
Fishing Village Parking Lot and Roadways, Pier 35	Once per week
Piers 30, 31, 32, and Shed Areas	Twice per week
Piers 27, 28, 29	Twice per week
Piers 18, 19, 23, 24	Twice per week
Channel Street Pier 2 Outside and Inside Shed Areas	Twice per week
Pier 1 Entrance	Twice per week
Piers 1 2 Common Roadways	Twice per week
KBPH Common Roadways & Apron	Twice per month

7.6 Kalaeloa Barbers Point Harbor Rail Tracks Cleaning

The HAR-OCB Unit Supervisor is responsible to ensure the rail tracks at Kalaeloa Barbers Point Harbor are routinely cleaned by tenants after bulk cargo transfer "post offloading"operations are concluded.

7.7 Waste Collection and Disposal

HAR-OCG picks up and disposes of certain potential pollutants left in drop off areas or discarded illegally by the public in order to minimize and/or prevent pollution to the environment. This includes automobile parts, boats, lead acid batteries, scrap steel, discarded used tires, and construction debris.

Waste from drop off areas, illegal dumping, and sweeping activities are disposed of with the appropriate waste contractors. The amounts and destination of each type of waste is reported in the *Annual Compliance Report.*

HAR-OCG is responsible for the routine cleaning activities at Harbors facilities, which include emptying dumpsters, and removing and disposing of discarded objects, machinery or equipment; and the prompt repair or replacement of malfunctioning dumpsters.

7.8 Harbors Maintenance Section (HAR-OM)

The HAR-OM Construction & Maintenance Superintendent is responsible to route Service Requests and/or Work Orders for follow-up work to the Wharf Maintenance Unit or the Construction and Maintenance Units. The Unit Supervisors assign tasks to the Subunits for storm drain inlet structural repairs, grate replacement, signage and stenciling installation and maintenance; and repairs for grate, leaking pipes, and other skilled work.

CHAPTER 8
EQUIPMENT AND VEHICLES

Harbors operates the necessary equipment for implementation of operations and maintenance tasks, and does not anticipate the need for additional equipment.

The initial contract for street sweepers included the request for extra brooms. Maintenance and warranty for parts including the providing of broom replacements are covered by the contract. When the service contract and warranty expires, replacement parts will have to be ordered, and spare brooms and other items are planned for inclusion within the operational budget. A street sweeper downtime Work Order is created to address issues associated with street sweepers.

For all equipment, scheduled maintenance is based on hours of use, or semiannually. Repairs for burnout, fuel leaks, etc., which occur outside of scheduled maintenance, are done through the manufacturer by purchase order.