

## **CHAPTER 3**

# **ASSET MANAGEMENT SYSTEM**

The Oahu SWMP includes a comprehensive Asset Management System (AMS) that will provide program staff with tools for the efficient and effective management of information generated by the components of the program. The AMS will house and organize vast amounts of data, and provide the means to analyze this data through computerized processes and solutions. Much of the data will exist as geographic information system (GIS) databases or GIS layers, which allow for spatial analyses. In general, the AMS will provide the following support to the Oahu SWMP:

- An information repository capable of real time tracking of program activities;
- Analytical and management tools;
- Reporting support for each individual program; and
- Mapping of the Oahu District's storm drain system and storm water related infrastructure.

Most of the programs described in Part II will be supported by an AMS module. An AMS module includes a set of computerized tools (toolsets) that would assist program managers or users in accessing or analyzing program-specific information for various purposes. These toolsets, to be defined through coordination with program managers, will result in developing business process diagrams, detailed data schematics, and diagrams depicting information connectivity. These diagrams and schematics will act as blueprints in developing each module by illustrating the information flows and processes that will be facilitated by the AMS. Figure 3-1 shows a simplified template for the development of business processes. Procedures for updating information and data used in the programs will be included in individual program modules.

### **3.1 System Development**

During the initial planning phases of the AMS, a data development matrix was prepared, which listed the types of data needed for each program described in Part II. The data development matrix forms the backbone of the AMS system because it contains all the required files and attributes that will characterize the various components of the Oahu SWMP. Currently, the data development matrix contains over 50 types of data requirements, and the data or databases in the matrix are divided into the following three categories:

- Essential requirements – Data or databases explicitly required by either the Consent Decree or Oahu MS4 NPDES Permit;
- Critical requirements – Data or databases that are not specifically identified in the Consent Decree or Oahu MS4 NPDES Permit, but are nevertheless critical for the program to meet the requirements; and
- Connectivity requirements – Data or databases used to prioritize certain tasks, such as inspections, erosion control projects and street sweeping schedules, which require that they be linked and integrated (e.g., street sweeping scheduling require connectivity of information between the location of 303(d) water bodies and street sweeping routes).



Each required database or dataset contains a number of fields, also referred to as attributes that help describe an individual data entry or data record. Table 3-1 provides sample dataset and data field/attribute descriptions.

**Table 3-1  
Sample Dataset and Data Field Descriptions**

<b>Sample Dataset</b>	<b>Sample Fields or Attributes</b>
Data file	Attribute 1 Attribute 2
Outfalls	Culvert size Culvert type
Street Sweeping	Route Name Sweeping Date Amount of Debris Collected

The data development matrix is designed to be flexible, able to expand as each of the Oahu SWMP programs evolve over time.

**3.2 Oahu MS4 Mapping**

An important dataset of the AMS is a comprehensive, computerized (GIS) mapping of HDOT Highways’ storm drain system (Oahu MS4), including storm drain inlets, outfalls, manholes, pipes, and open channels. The drainage features are identified through a combination of HDOT CADD files, as-built information, and field verifications. Each storm drain feature is being digitized, and assigned individual attributes and network connectivity. The inventory of the storm drain network will be used in conjunction with other pertinent and readily available information available in GIS, such as highway and roadway networks, land uses, topographic or contour maps, streams, watersheds, and aerial photography, to build toolkits for individual modules. In addition, some individual Oahu SWMP Plan programs require development of additional GIS inventory datasets, which is currently underway.

The initial base for the desktop solution became operational in early January 2006. Development of AMS modules will be prioritized based on whether they are “critical”; “essential” or have “connectivity” requirements as discussed in [Section 3.1](#). Those requirements stated within the Consent Decree or Oahu MS4 NPDES Permit will be completed in accordance with their stipulated deadlines. The remainder of this chapter describes how the AMS will be utilized by the staff of the Oahu SWMP. In particular, this chapter will explain:

- AMS analytical, management and reporting tools that will be available to support the programs described in Part II;
- User interface with the AMS; and
- Description of software and hardware requirements.

### **3.3 AMS Support to Individual Programs**

This section summarizes how the AMS will support the individual programs of the Oahu SWMP, which are described in greater detail in Part II. For each program, the AMS will provide the following information:

- **Data Requirements & Analysis:** For each program, the AMS will facilitate collection and analyses of data obtained through program activities and other sources. The analysis of the integrated data from various modules will result in water quality based recommendations.
- **Reporting:** Production of data summaries and tabular information about activities and accomplishments of each program to support the reporting requirements specified by the Oahu MS4 NPDES Permit, as well as to evaluate program effectiveness based on specified performance measures (see Chapters Twelve and Thirteen).

#### **3.3.1 Public Education and Outreach**

Under the Public Education and Outreach Program (Public Education Program), as described in Chapter Four, activities will be planned and implemented to increase public awareness about storm water pollution issues.

##### **3.3.1.1 Data Requirements & Analysis**

The AMS will provide the following support to the Public Education and Outreach Program:

1. **Adopt-A-Stream Program** (see Section 4.2.3.2): Providing an Adopt-A-Stream database where stream cleaning activities are tracked.
2. **Public Website** (see Section 4.2.1.5): Mapping capabilities, including information about the location and water quality data for water bodies throughout Oahu, that allow the public to view places of interest within their community, and view them in relation to watersheds or impaired streams.
3. **General Support:** Identifying targeted groups, such as property owners, schools, public office buildings, and other parcel owners that are located in priority watersheds or located near impaired streams and watersheds, using the GIS and parcel data that could be used to invite people to participate in the Adopt-A-Stream program, other clean up events and school outreach activities, as well as notifying them about public meetings and special events, sending them informational brochures or to solicit their input about certain programs of the Oahu SWMP Plan.

##### **3.3.1.2 Reporting Support**

For each reporting period, the AMS will provide tabular summaries about public reports of potential illicit discharge and illegal connections (also see Section 3.3.2.2).

### **3.3.2 Illicit Discharge Detection and Elimination**

The purpose of the Illicit Discharge Program, as described in Chapter Five, is to prevent, detect and remove illicit discharges and illegal connections into the Oahu MS4 from properties located adjacent to HDOT Highways rights-of-way.

#### **3.3.2.1 Data Requirements & Analysis**

The AMS will provide the following support to the Illicit Discharge Program:

1. Permitting (Licensing) of Oahu MS4 Connections (see Section 6.1): Providing databases of Oahu MS4 connection and discharge permit holders, which will be used to help schedule inspections of industrial and commercial properties or facilities (also see Section 3.3.6)
2. Investigations of parcels suspected of illicit discharges or illegal connections to the Oahu MS4 (see Section 6.2):
  - a. Mapping of the estimated location of the suspected illicit discharge or illegal connection, in addition to other pertinent data such as aerial imagery, drainage area, land use, soil information, topography, and land ownership;
  - b. Providing the location of all associated Oahu MS4 outfalls or flow paths by which the suspected illicit discharge or illegal connection could enter or affect State waters; and
  - c. Providing a database of potential illicit discharges or illegal connections, identified by tax map key (TMK), which includes fields on why cases were added to the database (e.g., follow-up investigations, public complaints, or outfall screening) tracking status of investigations, follow-up activities and resolution of cases (e.g., case closed because no discharge was found or case referred to enforcement actions).
3. Follow-Up Investigations (see Section 6.2.1): Storing the list of parcels identified in the *Storm Water Questionnaire Survey of Parcels Adjacent to Highway Rights-of-Way* (December 2000) (2000 Questionnaire Survey), and based on priority (Scheduling and tracking of investigations of these parcels will be conducted through the illicit discharges or illegal connections database).
4. Response to Public Complaints (see Section 6.2.2): Logging of incoming public complaints or reports of potential illicit discharges or illegal connections.
5. Oahu MS4 Outfall Field Screening (see Section 6.2.3) by:
  - a. Providing the locations of all major and minor outfalls using the GIS database of the Oahu MS4; and
  - b. Prioritizing inspection areas utilizing land use and water quality data, such as the locations of 303(d) listed water bodies vis-à-vis the locations of major/minor outfalls.

### **3.3.2.2 Reporting Support**

For each reporting period, the AMS will produce the following information for the Illicit Discharge Program in summary and tabular formats:

- New Oahu MS4 connection and discharge permits;
- Completed investigations of possible illicit discharges or illegal connections stemming from the 2000 Questionnaire Survey, public complaints or reports and outfall screening, including the results of such investigations (e.g., case closed, warning letters, enforcement actions, remedial measures, etc.);
- Public complaints or reports of possible illicit discharges or illegal connections; and
- Outfall screening activities (numbers, locations, etc.).

### **3.3.3 Construction Site Runoff Control Program**

The Construction Program, as described in Chapter Seven, ensures that all construction projects initiated, approved or permitted by HDOT Highways, have received NPDES approval from HDOH, if applicable, and include plans for site-specific construction BMPs, if appropriate.

#### **3.3.3.1 Data Requirements & Analysis**

The AMS will provide the following support to the Construction Program:

2. Inspections (see Section 7.4):
  - a. Maintaining a database of all active construction (contract, in-house, maintenance and encroachment) projects for inspection; and
  - b. Providing user interface for inspectors to record initial and periodic inspection activities of construction BMPs.

Initial program components will be tracked using a series of spreadsheets. As the AMS develops, these spreadsheets will be incorporated into the AMS databases.

#### **3.3.3.2 Reporting Support**

For each reporting period, the AMS will produce the following information for the Construction Program in summary and tabular formats:

- Contract, in-house, maintenance and encroachment projects, which require NPDES coverage, that underwent initial construction BMP inspections; and
- Contract, in-house, maintenance and encroachment projects that underwent at least one periodic inspection during the reporting period.

### **3.3.4 New Development and Significant Redevelopment BMP Program**

The Post-Construction Storm Water Management in New Development and Significant Redevelopment Program (Post-Construction SWM Program), as described in Chapter Eight, involves the review of new development and significant redevelopment projects so that they

include permanent BMPs, if appropriate, as well as evaluating what improvements can be made to the Oahu MS4 to improve the quality of storm water discharges that empty into 303(d) water bodies.

#### **3.3.4.1 Data Requirements & Analysis**

The AMS will provide the following support to Post-Construction SWM Program:

1. Design Review (see Section 8.2.2): Providing user interface and database for program staff to record the status of contract and encroachment projects undergoing plan or construction documents reviews to verify that all applicable projects include appropriate permanent BMPs if required based on the Unified Criteria (see Section 8.1.1) and Permanent BMP Manual and Specifications (see Section 8.1.2); and
2. Operations and Maintenance (see Section 8.2.4):
  - a. Providing a permanent BMP database with GIS capabilities, which will include the following information:
    - i. Project name,
    - ii. Owner,
    - iii. Location,
    - iv. Project construction start date / end date,
    - v. Type and number of source control BMPs,
    - vi. Type and number of treatment control BMPs,
    - vii. Latitude/longitude coordinates of controls using GPS and NAD 83 datum,
    - viii. Photographs of controls,
    - ix. Operation and maintenance requirements, including frequency, and
    - x. Frequency of inspections; and
  - b. Providing GIS mapping to help inspectors locate the permanent BMPs and information of any previous problems that have occurred at any site.
3. Retrofit Feasibility Study (see Section 8.3): Providing the following spatial and other information to assist the feasibility study:
  - a. Roadway network;
  - b. Oahu MS4 drainage areas;
  - c. 303(d) listed streams, beaches and bays for sediment, turbidity and trash;
  - d. Permanent BMP types and locations;
  - e. Monitoring data locations and results;
  - f. Storm drain network including inlets, pipes and outfalls;
  - g. Contours;
  - h. Soils and land use data; and
  - i. Results of inspection data.

#### **3.3.4.2 Reporting Support**

For each reporting period, the AMS will summarize and produce tabular information about contract and encroachment projects that were reviewed for required permanent BMPs, and the results of the review (i.e., require or not require permanent BMPs).

### **3.3.5 Pollution Prevention and Good Housekeeping Program**

The Pollution Prevention and Good Housekeeping Program, as described in Chapter Nine, consists of four sub-programs with AMS connections: Debris Control BMP Program, Erosion Control BMP Program, Maintenance Facilities BMP Program, and Storm Water Pollution Control for Flood Control Projects. The Debris Control BMP Program provides the framework to manage HDOT Highways personnel and service contractors that sweep highways and clean the Oahu MS4. The function of the Erosion Control BMP Program is to identify erosional areas within highway rights-of-way based on water quality concerns, and to implement erosion control projects to address these areas. The Maintenance Facilities BMP Program largely consists of preparing and implementing Storm Water Pollution Control Plans (SWPCP) for the baseyards. The final sub-program provides assistance to HDOT Highways personnel who have responsibility for maintaining the storm water pump station at the H-1 Freeway Punahou Street overpass.

#### **3.3.5.1 Data Requirements & Analysis**

The AMS will provide the following support to the Pollution Prevention and Good Housekeeping Program:

##### Debris Control BMP Program

1. Street Sweeping and Storm Drain Cleaning (see Section 9.1.1):
  - a. Providing a street sweeping database;
  - b. Providing a storm drain cleaning database, which is linked to the overall Oahu MS4 database (see Section 3.2);
  - c. Periodically prioritizing street sweeping and storm drain inspection schedules based on collected data (e.g., cubic yards of debris removed or cleaned) and water quality information (e.g., location of drainage infrastructure in relation to 303(d) water bodies); and
  - d. Maintaining a database of vehicles and equipment used for street sweeping and storm drain cleaning, which includes information of the different types of equipment used and where they are stored.

2. Management System (see Section 9.1.2):
  - a. As noted in Section 3.2, a complete inventory of the Oahu MS4, including the tools to update the system as new features are added; and
  - b. A process to verify mapping accuracy of the storm drain features by inspectors during regularly scheduled inspections using their GPS/PDA units.
3. Informational Placards (See Section 9.1.3):
  - a. Developing a list of storm drain inlets for priority installation of placards based on proximity to industrial and commercial land uses and other factors; and
  - b. Interfacing with GIS database of the Oahu MS4 (see Section 3.2) to include fields about the number and location of informational placards.

#### Erosion Control BMP Program

1. Identification of Erosional Areas (see Section 9.3.2):
  - a. Providing a GIS database of the erosional areas identified in the Islandwide Assessment; and
  - b. Assisting program staff through spatial analysis of erosional areas in relation to 303(d) water bodies and other geographic information (e.g., Oahu MS4, contours, etc.).
2. Remediation Measures (see Section 9.3.3): Providing a GIS database of implemented remediation measures, first at the high priority erosion areas and then at the next high priority areas identified in the Islandwide Assessment.
3. Erosion Potential at Storm Drain Outfalls (see Section 9.3.4):
  - a. As noted above under AMS support of the Debris Control Program, verifying the outfall location information through inspections, and inputting the following information collected by inspectors:
    - i. Outfall size, type and general condition,
    - ii. Presence and type of velocity dissipation measures, if any;
    - iii. Drainage area and its general condition (i.e., level of erosion),
    - iv. Visual assessments of water flowing from outfall,
    - v. Quality of outfall runoff,
    - vi. Pollution near or in proximity to outfall area,
    - vii. Photographs of outfall and surrounding area, and
    - viii. GPS coordinates of outfall location;
  - b. Assisting program staff in the evaluation of erosion potential at outfalls by providing the following information in addition to the information above collected by inspectors:
    - i. Locations of 303(d) (with sediment listed as pollutant) water bodies in relation to outfalls,
    - ii. Distance between outfalls and receiving waters (distance from outfall to the "blue-line" stream / waterway),
    - iii. Classification of receiving water bodies,
    - iv. Steepness (slope), types of soils and erosion potential at outfall drainage areas, and

- v. Availability of space (within HDOT right-of-way) for installing velocity dissipators or other BMPs, such as stilling basins or forebays.

#### Maintenance Facilities BMP Program

1. Storm Water Pollution Control Plans (see Section 9.4.2):
  - a. Storing the latest versions of the Storm Water Pollution Control Plans (SWPCP) for each baseyard;
  - b. Providing storage for the results of quarterly inspections of baseyards; and
  - c. Maintaining a database of equipment used for maintenance within the baseyards, which includes information of the different types of equipment used, and where they are stored.
2. Dewatering Facilities (see Section 9.4.5): Providing mapping of the locations of the dewatering facilities.

#### **3.3.5.2 Reporting Support**

For each reporting period, the AMS will produce the following information for the Pollution Prevention and Good Housekeeping Program in summary (e.g., aggregate) and tabular formats:

Debris Control BMP Program:

- Highway sweeping activities, including:
  - Dates (including adherence to schedules) in which specific highway segments (by mileposts) were swept, and
  - Amount of debris removed during street sweeping events;
- Storm drain cleaning activities, including:
  - Dates (including adherence to schedules) in which specific storm drain structures (e.g., inlet catch basins, pipes and open ditches or trenches) were inspected and cleaned, and
  - Amount of debris removed during storm drain cleaning events; and
- Placard installations.

Maintenance Facilities BMP Program: quarterly baseyard site inspections.

Storm Water Pollution Control for Flood Control Projects Program: Monthly inspection and maintenance activities at the Punahou Pump Station.

#### **3.3.6 Industrial and Commercial Activities Discharge Management Program**

The Industrial and Commercial Activities Discharge Program (Industrial Discharge Program), as described in Chapter Ten, is designed to address pollutant discharges into the Oahu MS4 originating from industrial and commercial areas.

**3.3.6.1 Data Requirements & Analysis**

The AMS will provide the following support to the Industrial Discharge Program:

1. Database Inventories (see Section 10.1): Providing a database of industrial and commercial facilities and activities that are indirectly discharging into the Oahu MS4 of the types described in Section 10.1, and will include the following characteristics:
  - a. Created from:
    - i. Findings from the 2000 Questionnaire Survey,
    - ii. Available information about zoning, facility activities, land use, and parcel ownership from the City and the State,
    - iii. Collection of new information obtained during field activities, and
    - iv. Readily available intra-agency informational databases; and
  - b. Fields will include:
    - i. Priority area,
    - ii. Facility name,
    - iii. Street address,
    - iv. TMK,
    - v. Nature of business or activity,
    - vi. SIC code(s) that best reflect the facility product(s) or service(s),
    - vii. Principal storm water contact, and
    - viii. Receiving state water; and
  - c. Inspection information repository.
2. Inspections of Industrial and Commercial Facilities (see Section 10.2):
  - a. Scheduling and tracking inspections of industrial and commercial facilities holding connection permits;
  - b. Prioritizing or ranking industrial and commercial facilities or dischargers that do not have direct connections to the Oahu MS4 for inspections using the following information:
    - i. Number of industrial and commercial facilities in a particular area,
    - ii. Density of industrial and commercial facilities,
    - iii. Previous storm water violations in the area,
    - iv. Water quality impairments, and
    - v. Distance to 303(d) listed streams or water bodies;
  - c. Scheduling and tracking inspections of industrial and commercial facilities or dischargers that do not have direct connections based on whether or not such facilities have or require NPDES coverage;
  - d. Producing inspection reports and tracking correspondence with HDOH, which would receive the reports within two months of the inspection, and other parties, such as facilities found to be in violation; and
  - e. Maintaining electronic records, in addition to paper records, of all inspection activities.
3. Enforcement (see Section 2.4 and 10.3): As noted above, tracking enforcement correspondence with violators, and scheduling and tracking follow-up activities (e.g., inspections of remediation measures).

### **3.3.6.2 Reporting Support**

For each reporting period, the AMS will produce the following information for the Industrial Discharge Program in summary and tabular formats:

- Completed investigations of industrial and commercial facilities holding connection permits, including the results of such investigations (e.g., case closed, warning letters, enforcement actions, remedial measures); and
- Completed investigations of industrial and commercial facilities indirectly discharging into the Oahu MS4, including the results of such investigations.

### **3.3.7 Water Quality Monitoring and Waste Load Allocations**

The Water Quality Monitoring and Waste Load Allocations program, as described in Chapter Eleven, will be used to assess the Oahu MS4's relative contribution to nutrient loads and other water quality waste loads, which will assist in the implementation of Waste Load Allocations (WLA) designated to HDOT Highways for the Ala Wai Canal, Kawa Stream, Waimanalo Stream and other watersheds.

#### **3.3.7.1 Data Requirements and Analysis**

The AMS will provide the following support to the Water Quality Monitoring program:

1. Annual Monitoring Plan (see Section 11.1):
  - a. The ability to assess Oahu MS4 outfalls as identified in the implementation plan described above;
  - b. Ability to characterize major outfalls drainage areas;
  - c. Assist in developing the monitoring approach for each monitoring station; and
  - d. Assist in selecting water quality monitoring locations.
2. Waste Load Allocations (see Section 11.2):
  - a. Provide the ability to identify the locations of Oahu MS4 outfalls within each WLA watershed covered in this program (Ala Wai Canal, Kawa Stream and Waimanalo Stream);
  - b. Provide land use and hydrological information associated with each major Oahu MS4 outfall within the program's WLA watersheds;
  - c. Provide mapping and other information to assist program staff in conducting watershed reconnaissance;
  - d. Assist in identifying HDOT Highways activities within the watershed relating to waste loads, which are being tracked in other programs of the Oahu SWMP (e.g., street sweeping data); and
  - e. Assist in identifying and evaluating load reduction best management practices (BMPs) from permanent BMPs, which are inventoried and tracked in the Post-Construction SWM Program.

**3.3.7.2 Reporting Support**

For each reporting period, the AMS will produce the following information for the Water Quality Monitoring Program in summary and tabular formats:

- Results of water quality monitoring of the Halawa Stream watershed; and
- Results of water quality monitoring of the Ala Wai Canal, Kawa Stream and Waimanalo Stream watersheds.

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