
 GUAM WATERWORKS AUTHORITY	STANDARD OPERATING PROCEDURE	No.	SOP-1000-AM-002
	GIS Data Integration Post Field Repair Activities	Effective Date	6/6/2025
		Final Approver	 Miguel C. Bordallo, P.E. General Manager
		Revision Letter	A

1.0 Purpose

This Standard Operating Procedure (SOP) establishes guidelines for integrating spatial data in the Geographic Information System (GIS) related to the Guam Waterworks Authority's (GWA) water and wastewater infrastructure. It ensures that field data collected during field repair activities are properly integrated into the GIS.

2.0 Scope

This SOP applies to GWA personnel responsible for collecting, processing, and managing GIS data.

3.0 Policy

Maintain an accurate and up-to-date GIS database, which is essential for managing GWA's water and wastewater assets and planning maintenance activities. Compliance with this SOP is mandatory to ensure the integrity of the GIS and to improve operational efficiency.

4.0 Definitions

- 4.1. **ArcGIS (GIS for Geographic Information System):** A software used to view, edit, manage, and analyze spatial data.
- 4.2. **ArcSDE (SDE for Spatial Database Engine):** A software used to store, use, and manage spatial data that is used as part of GWA's water and wastewater geodatabase.
- 4.3. **Attributes:** Data in a GIS layer providing detailed information such as location coordinates, pipe diameter, material type, and other relevant characteristics.
- 4.4. **Geodatabase:** A data storage for ArcGIS used to store spatial and attribute data.
- 4.5. **Geographic Information Systems (GIS):** A system used to create, manage, analyze, and map all types of spatial data.
- 4.6. **Global Positioning System (GPS):** A satellite navigation system used by GWA personnel to collect spatial data in the field, such as points, lines, and polygons.
- 4.7. **Handheld GPS Device:** A device GWA personnel use in the field to collect accurate spatial data in real-time.
- 4.8. **Shapefile:** A common geospatial vector data format for geographic information system software.

5.0 Roles and Responsibilities

5.1.	General Manager (GM)	Approves this SOP and all its subsequent changes.
5.2.	Assistant General Manager - Operations (AGM-O)	Oversees the development, revision, and implementation of this SOP as the Policy Owner. Endorses any amendment(s) needed to this SOP to the SOP Committee.

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5.3.	GIS Manager	<p>Reviews this SOP annually and makes necessary changes to be presented to the AGM-O for consideration.</p> <p>Ensures proper training is provided for the affected employees to ensure proper compliance with this SOP.</p> <p>Assists with GIS database updates as needed.</p> <p>Performs a QA/QC review prior to final data dissemination.</p>
5.4.	GIS Analyst	<p>Receives and reviews field data from Work Orders or handheld GPS devices.</p> <p>Notifies the Division Managers or Supervisors if issues occur with the handheld GPS device data download.</p> <p>Updates the GIS database.</p> <p>Notifies the GIS Manager when the data download is complete.</p> <p>Emails shape files to the Assistant General Manager for Operations (AGM-O), O&M Managers and Supervisors.</p>
5.5.	Supervisors, Operation & Maintenance (O&M)	Submits updated field data via Work Orders or handheld GPS devices to the GIS Section.
5.6.	All Employees	Strictly abide by the contents of this SOP and conduct activities accordingly. When confronted by a situation not covered by this SOP or requiring clarification, seek the Manager's or Supervisor's assistance.

6.0 Procedure Description

6.1. O&M Data Integration:

- 6.1.1. **Data Submission:** Upon completion of field repair activities, the O&M Supervisor or Designee shall provide the GIS team with the field data (e.g., pipe specifications, exact location, and GPS coordinates, etc.) via Work Orders (WO) or handheld GPS devices¹.
 - 6.1.1.1. **Work Orders:** Completed WOs are emailed to the GIS Analyst and/or Manager at the end of each shift.
 - 6.1.1.2. **Handheld GPS Device:** These devices must be turned in to the GIS Section every Friday morning and retrieved the following Monday. If any issues occur during the download, the O&M Supervisors must be notified.

¹ Refer to the *Water Line Leak Repair* and *Sewer Force Main Break* SOPs for further details.

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- 6.1.2. **Data Integration:** The GIS Analyst shall review and compare the data to the existing GIS records (i.e., pipe diameter and material, location, installation date, etc.). If changes are needed, the following steps shall be taken:
 - 6.1.2.1. Draw the new features (e.g., pipe section, valves, bends, saddles, etc.) in the water or wastewater geodatabase².
 - 6.1.2.2. Populate the attribute information in the appropriate geodatabase.
 - 6.1.2.3. Once the data is updated, upload it to the appropriate geodatabase in the ArcSDE³.
 - 6.1.2.4. When the data upload is complete, download the geodatabase into the GIS Portal.
 - 6.1.2.5. Notify the GIS Manager via email or text message once the download is complete.
- 6.1.3. The GIS Manager shall perform a quality control/quality assurance (QC/QA) review of the downloaded data to ensure its accuracy and completeness before final dissemination. The GIS Manager shall communicate the approval or disapproval of the data to the GIS analyst via email or text message.
- 6.1.4. Upon receiving approval, the GIS Analyst shall disseminate the updated shapefile via email to the Assistant General Manager for Operations (AGM-O), O&M Managers, and Supervisors.
- 6.2. **CC&B Data Integration:** All new or updated service connection data (meter location) entered in CC&B by the Meter Reading Unit is automatically extracted and emailed weekly to the GIS Analyst and Manager.
 - 6.2.1. Upon receipt, the GIS Analyst shall review and reformat the extracted data (e.g., latitude and longitude coordinates, account and spatial ID numbers) in Microsoft Excel to ensure it is compatible with the geodatabase (i.e., converting date fields from general text to date format).
 - 6.2.2. After the data is reformatted, upload it into the appropriate geodatabase in the ArcSDE.
 - 6.2.3. When the data upload is complete, download the geodatabase into the GIS Portal.
 - 6.2.4. Notify the GIS Manager via email or text message once the download is complete.
- 6.3. **GIS Update Deadlines and Notification Requirement:** All GIS data updates shall be completed within two (2) weeks from the date of receipt. If the GIS section is unable to meet the deadline, the GIS Manager must notify the respective Manager or Supervisor via email, explaining the reason for the delay and provide an estimated date of completion.
- 6.4. **Training:** The GIS Manager shall conduct training on GIS data integration when needed. All new or applicable employees must receive training and sign the *Employee's Acknowledgment Receipt (Attachment 1)* to confirm their understanding and compliance with the procedures outlined in this SOP.

² See *Procedures for Managing an ArcSDE Enterprise Geodatabase Appendix A Data Checkouts*.

³ See *Procedures for Managing an ArcSDE Enterprise Geodatabase Appendix B Data Checkins*.

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6.5. Non-Compliance with this SOP:

- 6.5.1. **Employee:** Failure of the employee to adhere and comply with any of the guidelines, policies, and procedures stated herein may result in progressive or adverse disciplinary action, including but not limited to suspension, demotion or termination of employment as provided by GWA Personnel Rules and Regulations (PR&R).
- 6.5.2. **Supervisors and Managers:** Failure of the Manager or Supervisor to report and enforce all the guidelines, policies, and procedures stated herein may result in progressive or adverse disciplinary action, including but not limited to suspension, demotion, or termination of employment as provided by GWA PR&R.

7.0 Document Approvals

Role	Position	Name of Approver	Approval Signature	Date Approved
Authors	GIS Manager Legal Secretary III	Rodney A. Toves Antonette Dione Gutierrez	Approval on File	On File
Policy Owner	Assistant General Manager for Operations	Thomas A. Cruz, P.E.	Approval on File	On File
Final Approver	General Manager	Miguel C. Bordallo, P.E.	Page 1	Page 1

By existing Guam and federal laws, the contents of this SOP were reviewed thoroughly by its policy owner and were found to be:

- ☒ appropriate for publication on the GWA website without compromising the security of GWA's system or the public's health and safety.
- ☐ not appropriate for publication on the GWA website because it might jeopardize the security of GWA's system or the public's health and safety.

8.0 Records of Revisions

All suggestions for improvement shall be directed to the policy owner indicated below. The policy owner will consider input received, develop recommendations on how to address the suggestions, and obtain authorization to make the recommended changes. Updates, revisions, corrections, and waivers to this SOP shall be made in writing and be approved by the GM.

8.1. Policy Owner: Assistant General Manager for Operations

8.2. Authorization: General Manager


Effective Date	Revision Letter	Document Authors	Description of Change
Page 1	A	Rodney A. Toves Antonette Dione Gutierrez	Initial Release of SOP

9.0 References

- 9.1. SOP on *Water Line Leak Repair* (Draft).
- 9.2. SOP on *Sewer Force Main Break* (Draft).
- 9.3. *Procedures for Managing an ArcSDE Enterprise Geodatabase Appendix A Data Checkouts* (Draft).
- 9.4. *Procedures for Managing an ArcSDE Enterprise Geodatabase Appendix B Data Checkins* (Draft).

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Attachment 1: Employee’s Acknowledgement Receipt



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Mangilao, Guam 96913
rtoves@guamwaterworks.org

**GIS DATA INTEGRATION POST
FIELD REPAIR ACTIVITIES
EMPLOYEE’S ACKNOWLEDGMENT
RECEIPT**

I, the undersigned, an employee of the Guam Waterworks Authority, hereby acknowledge receipt of SOP-1000-AM-002 entitled “GIS Data Integration Post Field Repair Activities” this _____ day of _____, 20____.

Employee’s Name/Badge No.:	Employee’s Signature:	Date:

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