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VOLUME III
SEWER ATLAS MAINTENANCE

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HISTORY OF CHANGE

<i>Version</i>	<i>Author</i>	<i>Date</i>	<i>Description</i>
A	Marc Brown	2005	Initial release of document
B	Doug Rulison	Feb. 2010	Revised language to include GIS based processes
C	Rob Michaels	Sep. 2017	Updated responsible department
D	Annalisa Saqui	Sept. 2021	Changed name from OCSD to OC San
E	Annalisa Saqui	March 2022	Updated logo

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SECTION 1 PROCEDURES FOR SEWER ATLAS MAINTENANCE

1.0 General Procedures Overview

1.0.1 Document Organization

This is Volume III of a five volume set of Information Technology Department, Enterprise Information Management (EIM group) data maintenance process documentation (Document). The purpose of the document is to clearly detail the processes used by the EIM group to maintain the facility models. The purpose of Volume III is to provide background and detailed change management procedures for the Sewer Atlas Facility Model. General discussion and background on the EIM group and the facility model concept are presented in Volume I.

Volume III is divided into four sections. The first section lists the procedures required to maintain the Sewer Facility Atlas Model. The second section provides Alternate Data Collection Procedures if the required data is not available. The third section contains the standards that are used to accurately perform the procedures. The Appendix in the fourth section includes reference material such as forms and supporting documentation.

1.0.2 About Sewer Atlas (briefly)

The Sewer Atlas Facility Model (SA) was completed in 2004 through Capital Improvement Program (CIP) project number 1-98. The SA is an electronic facility model that includes all of the sewer lines, manholes, diversion structures, gravity pipes, siphons, force main valves and pump stations known to comprise the OC San sewer collection system. For more detailed information on the SA, refer to Volume I, Facility Model Maintenance Management Plan.

1.0.3 Sewer Atlas Data Lifecycle

The sewer collection system is constantly undergoing change. As such, the SA requires constant changes to accurately reflect the conditions in the field. When a change is made to the physical collection system, or a discrepancy between the SA and the real world is observed, a record of the changes or discrepancy is noted. Discrepancy records are routed through the EIM group and, if necessary, changes are made to the SA. Once changes are made to the SA, the corrected data must be published in a variety of formats to provide access for OC San staff. The details of the types of discrepancies noted and the framework used to correct and publish updated information is the focus of the remainder of this document.

1.0.4 Sources of Edits

Edits to the SA come from a variety of sources including CIP projects, discrepancies noted in the field by collection systems staff and changes made to the system by operations and maintenance staff. A brief description of these sources is included in this section, for more detailed information, refer to Volume I, Facility Model Maintenance Management Plan.

Capital Improvement Program (CIP) Project

A Capital Improvement Program (CIP) Project is a change to the collection system managed by the Engineering department through the CIP project or Facility Engineering project. For the purposes of this document, CIP projects and FE projects are referred to

as CIP only. When a CIP project is completed, engineering Record Drawings are produced recording the locations, sizes, and nature of concealed items such as sewer lines, manholes, and the like. These drawings that detail changes to the collection system are submitted to the Information Technology department and, in turn, to the EIM group.

Field Discrepancies

A field discrepancy occurs when OC San staff using SA data identifies a discrepancy between the SA data and the actual facilities observed. By identifying and correcting field discrepancies, the SA data becomes more accurate over time.

Closed Circuit TV (CCTV)

CCTV has been used to identify error in OC San GIS data

Periodic Updates

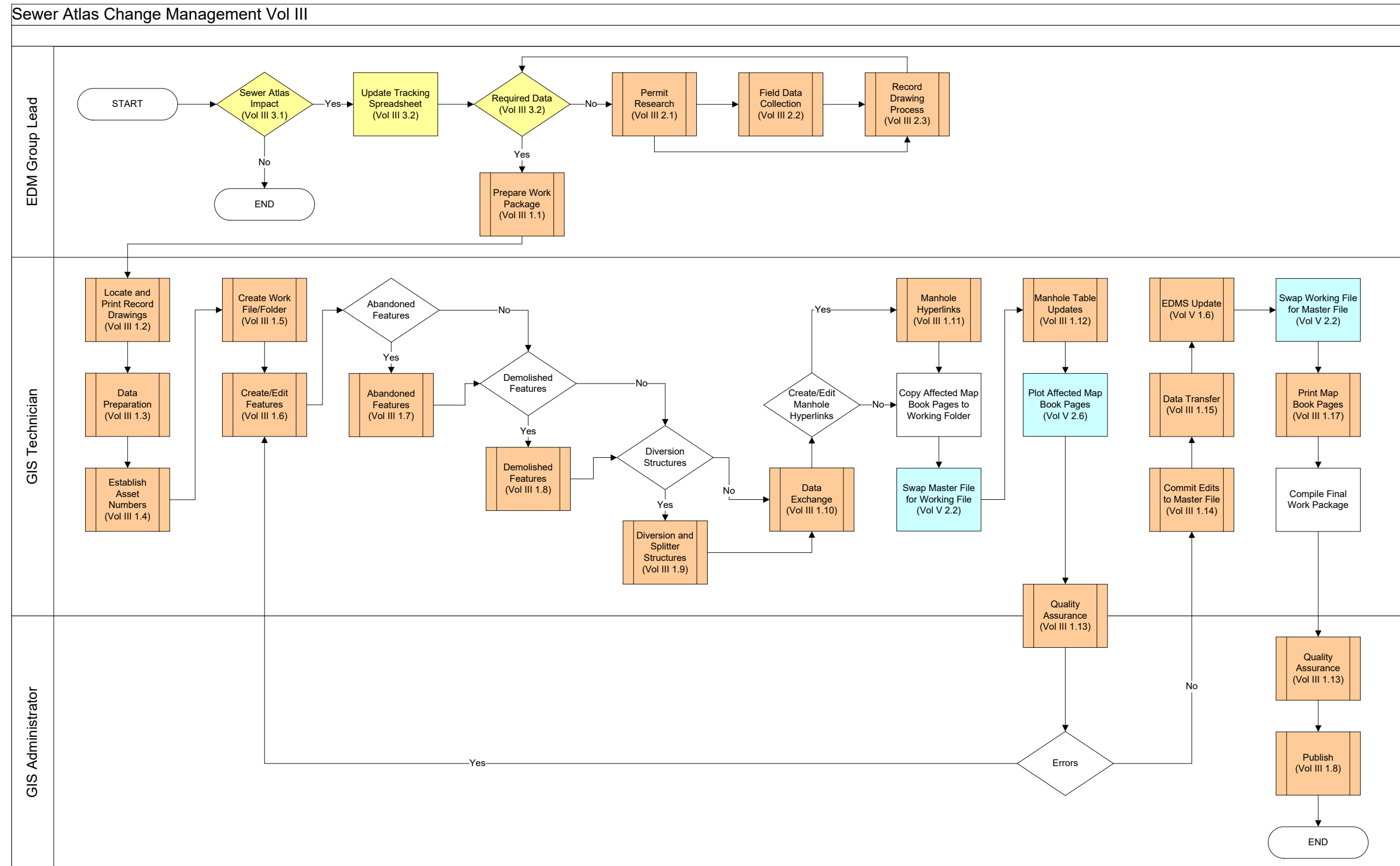
Periodic updates occur when the data in which the Sewer Atlas was built, such as parcels, street centerlines, etc. are updated by the originating source.

1.0.5 Alternate Data Collection Procedures

Section 1 details the expected sequence of events to update the Sewer Atlas Facility Model. Occasionally additional steps must be taken before the process outlined in this section can occur. If the required data is not on the Record Drawing, then it will be necessary to perform Permit Research or Field Data Collection. The results of which are documented on the Record Drawing, using the Record Drawing Process. These procedures are detailed in Section 2, [*Alternate Data Collection Procedures for Sewer Atlas Maintenance*](#).

1.0.6 Process Flowchart

The diagram below details the procedures, standards and tools used to manage and maintain the Sewer Atlas.



1.1 Prepare Work Package

When it is determined that the discrepancy or project does impact the Sewer Atlas and that the required data is on the Record Drawing, then a work package is entered into the IT's work order tracking system and forwarded to the GIS Technician. The work package consists of:

The completed discrepancy form or CIP Record Drawings.

A print of the map book page impacted.

A blank Sewer Atlas check list. Refer to Appendix 4.6, [Change Management Checklist](#).

1.2 Locate and Print Record Drawings in EDMS

The first step for the GIS Technician is to locate and review the required Record Drawings that are stored in the Electronic Document Management System (EDMS). Record Drawings will contain the vast majority of the information required to make a change to the Sewer Atlas. All Record Drawings are accessible via the EDMS. If a Record Drawing is missing, it is imperative that the missing drawing be brought to the attention of the Engineering Librarian. The following search methods are available from the EDMS application:

1.2.1 Locating EDMS drawings

Some general guidelines for locating the drawings in EDMS are listed below. Refer to the EDMS Desktop, Quick Reference Guide for details on locating documents in EDMS, or Volume V, *Tools for Facility Model Maintenance*.

- Use **Simple Search** when the criteria required to locate a document are very specific, such as Item ID.
- Use **Advanced Search** when multiple criteria are required to locate a document.
- Use **Drawing Search** when the search criteria are specific to engineering drawings.

1.2.2 Printing Drawings

Printing is allowed directly from the EDMS interface and is useful when printing a small number of drawings (1 to 4). Refer to Volume V, *Tools for Facility Model Maintenance*.

To print a single document:

- Using the search results, double-click the document title and select print. Alternatively, select the title, right-click and select print.

To print multiple documents:

- Copy all documents from EDMS to a temporary location on the hard drive.
- Use native print functionality for PDFs.
- Delete the files from the temporary directory when finished printing.
- Refer to Section 3.4, [Printing Standards for Large Format Drawings](#).

1.3 Data Preparation

Data preparation is the process of reviewing the Record Drawings and project model files to be used for the creation or modification of an OC San asset or assets. The preparation of that data improves the quality and efficiency of the data input process described in Section 1.6, [Create/Edit Features](#).

1.3.1 Record Drawing Preparation

This process consists of scrubbing or identifying information and data regarding an OC San asset or assets found on the Record Drawing. Items such as manhole location, invert elevation, diameter, etc. are highlighted.

- If the Record Drawings have not been included in the work package or additional drawings are required, refer to Section 1.2, [Locate and Print Record Drawings in EDMS](#).
- Review the work package to understand the work to be performed. It may be necessary to review the CIP Record Drawing and/or the discrepancy form to get a better understanding of the change(s) to be made.
- Highlight the asset information. Refer to Section 3.5, [Data Preparation Standard](#).
- Some attributes are mandatory and therefore it may be necessary to calculate or estimate the values. When doing so the attribute value must be written on the Record Drawing and highlighted.

1.3.2 Project Model Files

If the work package consists of a CIP project, a project model file will be available. The project model file will be used to locate the physical asset, while the Record Drawing will be the source of the attribute information.

- Refer to the CAD Manual, Section 3.0 *File Organization Techniques* and Section 4.0 *Directory Organization* for a description and proper location of the project model file.
- Launch AutoCAD and open the project model file.
- Isolate the desired CAD features by turning off extraneous layers and/or deleting unnecessary objects.
- When complete, save CAD the file to the working folder. Refer to Section 3.8.3, [Working Folder Standards](#) and 3.8.4, [Working File Standards](#).

1.4 Establish Asset Numbers

Each asset within the OC San collection system requires an asset ID. The EIM group is responsible for creating the assets and subsequently the asset ID. The following are the current numbering conventions in use.

1.4.1 Manhole Numbering

Each manhole within the OC San collection system is uniquely identified. The Manhole Numbering Standard can be referenced in Section 3.7.1, [Manhole Number Convention](#). The following procedure is intended to prevent the duplication of manhole IDs.

Inserting manhole on trunk

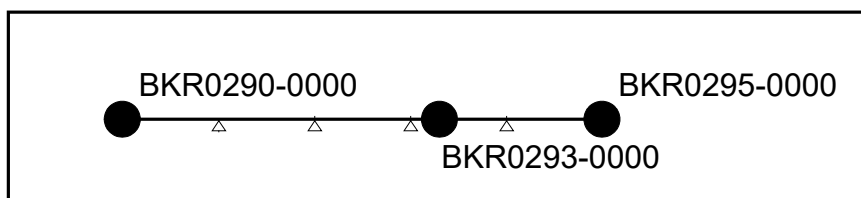
- Open the Manhole feature class.
- Open the Manhole table.
- To reduce the number of records it may be helpful to filter the manhole table by trunk abbreviation.
- Sort the table by the STRUCT_1 column.
- Find the highest trunk sequence number. Do not rely on the current map book page to determine the highest trunk sequence number.
- Number the manhole by incrementing by 5, unless the new manhole is inserted between two existing manholes.

Inserting manhole on a lateral

- Follow the steps listed above.
- Find highest lateral sequence for the entire lateral. Do not rely on the current map book page to determine the highest lateral sequence number.
- Number the manhole by incrementing by 5, unless the new manhole is inserted between two existing manholes.

Inserting manhole between two existing manholes

- Divide the space by 5.
- Identify the point closest to the new manhole location.
- Increment the manhole number accordingly.



1.4.2 Gravity Sewer Line Numbering

Each sewer line within the OC San collection system is uniquely identified within GIS. A sewer line is made up of a downstream manhole and an upstream manhole joined together to establish the pipe id. EIM staff are not responsible for concatenating the downstream and upstream manholes to form the pipe id. However, EIM staff are responsible for populating the sewer table with the STRUCT_2 and STRUCT_1 values. The Sewer Line Numbering Standard can be referenced in Section 3.7.2, [Gravity Sewer Line Numbering](#).

- Create the manholes. Refer to Section 1.6, [Create/Edit Features](#).
- Draw the sewer line using the GIS. Refer to Section 1.6, [Create/Edit Features](#). This will create the sewer line but it does not establish the asset numbers.
- To populate the sewer table with the appropriate STRUCT_2 and STRUCT_1 values, the object data must be exported to the Object Data Database where a series of queries are run and then imported back into the working file. It is not necessary to perform this function right away; it can be done during the 1.10, [Data Exchange](#).
- Export the manhole table and sewer tables. Refer to Section 1.10.1, [Exporting Data](#).
- Open the Object Data database and run queries **qry-1**, **qry-2** and **qry-3**. These queries will move the data from the manhole table to the sewer table to populate STRUCT_2 and STRUCT_1 properties.
- Import the sewer table back into the working file. Refer to Section 1.10.2, [Importing Data](#).
- **Caution:** The definition of a sewer line is; a segment of pipe which has an asset at each end. In other words the sewer line must have a manhole or pump station at both ends. The procedure described above will, most likely, introduce bad data into the working file. It is imperative this does not get introduced into the master file. This can be avoided by closely following the procedure defined in Section 1.14, [Commit Edits to Master File](#).

1.4.3 Bypass Line Numbering

Each sewer line within the OC San collection system is uniquely identified within Enterprise Asset Management System (EAMS). There are however unique situations where two or more lines connect to the same downstream and upstream manholes. Siphon and vent lines are examples of these unique situations. EIM staff are not responsible for the creation of the pipe id for bypass lines. However, EIM staff are responsible for correctly identifying a sewer line as a siphon or vent. This information is used by EAMS to create the pipe id.

1.4.4 Force Main Numbering

A Force Main is a sewer pipeline carrying wastewater or treated effluent in which the flow in the pipeline is dependent on and driven by a pump station. Each Force Main within the OC San collection system is uniquely identified within EAMS. The force main ID changes when it encounters a physical asset such as a manhole or valve. Changes in direction do not constitute a physical asset and therefore do not affect the force main ID. The Force Main Numbering Standard can be referenced in Section 3.7.4, [Force Main Numbering](#).

1.4.5 Force Main Valves and Air Valves

Force Main Valves and Air Valves are numbered by EAMS. OC San standard practice is to request looptag numbers during the design phase of the project and document them in the Record Drawings. If this has not been done, contact EAMS and request the creation of the looptag number.

1.4.6 Pump Station Number

Pump Stations are numbered by CMMS. OC San standard practice is to request Pump Station numbers during the design phase of the project and document them in the Record Drawings. If this has not been done, contact EAMS and request the creation of the Pump Station number.

1.5 Create Working File/Folder

The working file is created by extracting elements from the Master File to be modified within a map book page. It is necessary that all elements within the grid or grids to be included in the working file. This extra information will be used later to update the manhole table and other associated activities. The working folder contains all the files created during the update process. Refer to Volume V, *Tools for Facility Model Maintenance*, for detailed information on how to use the AutoCAD attach and query commands.

The process is as follows:

Create a new drawing file using the template defined in Section 3.8.1, [CAD Template](#).

If the OCSD-GRID is not attached, attach it as an external reference file.

Attach the Master File using the AutoCAD Map command.

If the work is for a CIP project, attach the prepared project model file. Refer to Section 1.3.2, [Project Model Files](#).

Identify the map page and define the query parameters.

Save the working file. Refer to Section 3.8.3, [Working Folder Standards](#) and Section 3.8.4, [Working File Standards](#).

1.6 Create/Edit Features

This process utilizes a custom data software application to increase the speed and accuracy of the data input process. The tools, referred to as the Map Product Generator or MPG, were developed in Visual Basic 6.0 and use Active X controls to load attribute data from a simple user interface into AutoCAD Map object data tables. A data dictionary is used to populate drop down lists with allowable values and to validate entered data, with the intent to reduce data input errors and eliminate duplicate data. Refer to Volume V, *Tools for Facility Model Maintenance*, for detailed information on how to use the MPG tools.



Spatial Update

Digitizer Form

1.6.1 Digitizer Form

The digitizer form is the primary input tool and will be used extensively. The tool controls the creation of manholes, sewer lines, force mains and force main valves.

- When creating assets use coordinates, station and offsets, dimensions, etc. to locate the proposed location of the asset. Use temporary construction elements as necessary.
- If using a project model file, verify that the model aligns with the correct coordinate system before creating assets.
- Manholes must be created first.

Note: Never delete assets. Cut and paste them into the demo file.

1.6.2 Spatial Update

The spatial update form is used to update or edit the location of existing objects as well as object attributes.

1.7 Abandoned Features

An abandoned feature is a manhole, sewer line, etc. wherein the physical object remains in the ground but is no longer in service. The GIS Technician is not responsible for determining whether a feature can be returned to service or for evaluating the method used to take the feature out of service. The Record Drawings are taken at face value and abandoned features are modified as indicated.

The process to abandon a feature crosses several individual procedures. The following is an overview with references to the individual procedures or standards as necessary.

Move the abandoned manholes and sewer lines to the appropriate abandoned layer. Refer to Section 3.10.1, [Layer Convention](#).

Modify the manhole and sewer object data table. Refer to Section 3.10.3, [Object Data](#).

Delete the sewer label and flow arrow.

Hatch the abandoned sewer line. Refer to Section 3.10.2, [Graphic Elements](#).

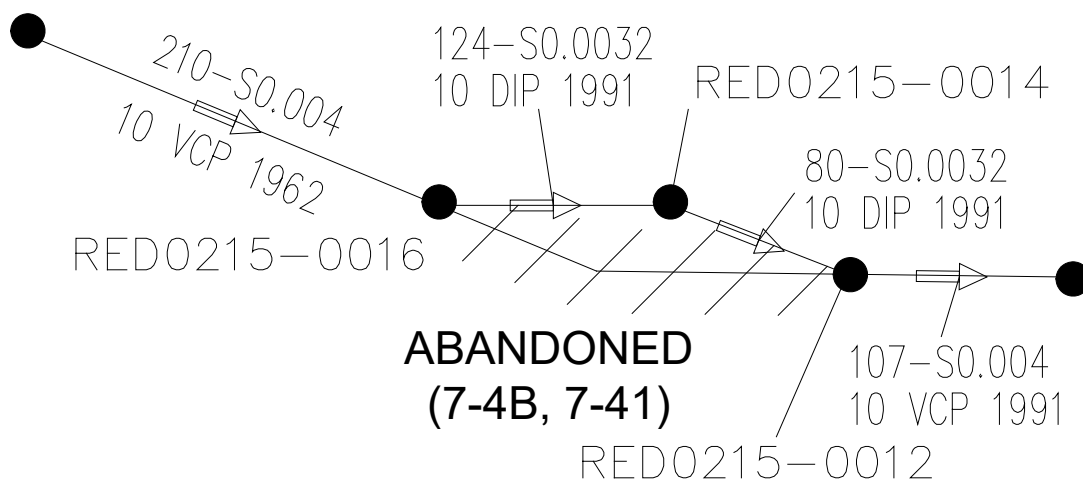
Add annotation "ABANDONED (project A, project B)". Project A is the project that constructed the sewer line and Project B is the project that abandoned the sewer line.

Export the manhole table and sewer table. Refer to Section 1.10.1, [Exporting Data](#).

Open the Object Data database, open the manhole table, and sort the table by the Status column. Highlight and delete the manholes with a STATUS value of ABAND, DEMO or DELETE. This will prevent these manholes from being included in the manhole table.

Commit edits to the master File. Refer to Section 1.14, [Commit Edits to Master File](#).

Export the data for use by the Enterprise GIS and EAMS. Refer to Section 1.15, [Data Transfer](#).



1.8 Demolished Features

A demolished feature is a manhole, sewer line, etc. that has been physically removed and no longer exists in the ground. The GIS Technician is not responsible for determining whether a feature can be returned to service or for evaluating the method used to demolish the feature. The Record Drawings are taken at face value and demolished features are deleted from the Master File as indicated.

This process is also applied to errors made during the original capture of the collection system. For example, manholes and sewer lines that were mistakenly added to the Sewer Atlas and have been verified as not existing in the field.

The process to remove a feature is:

Identify assets to be removed.

Modify the manhole and sewer object data table. Refer to Section 3.10.3, [Object Data](#).

Delete the sewer label and flow arrow.

Export the manhole table and sewer table. Refer to Section 1.10.1, [Exporting Data](#).

Open the Object Data database, open the manhole table, and sort the table by the Status column. Highlight and delete the manholes with a STATUS value of ABAND, DEMO or DELETE. This will prevent these manholes from being included in the manhole table.

Commit edits to the master File. Refer to Section 1.14, [Commit Edits to Master File](#).

Export the data for use by the Enterprise GIS and EAMS. Refer to Section 1.15, [Data Transfer](#).

1.9 Diversion and Splitter Structure

Diversion Structures and Splitters are documented in two locations, the map books and a separate Diversion Structure book. Diversion and Splitter structure edits will typically occur during CIP projects when new features are being added. A diversion structure is one where slots or adjustable gates are present and flow can be directed or redirected from one trunk line to another to control flow or capacity. A Splitter Structure also contains slots or adjustable gates, but flow remains within the same trunk.

The process is the same for each type of structure:

The GIS Technician draws the detail of the structure.

The detail is submitted to the EIM Group Lead to assign an alias number.

To assign an alias number, locate the highest number and add 1.

The EIM Group Lead convenes a meeting of the Diversion Structure committee and submits the detail for approval.

Upon approval, the detail is distributed to the owners of the Diversion Structure book by the EIM Group Lead.

The detail then gets routed back to the GIS Technician to be incorporated into the Map Book.

Insert into open location on existing map book page or create a new map book page as necessary.

Add a hyperlink from the Diversion Structure to the diversion structure map book page.

<p>Note: In order to keep existing hyperlinks functioning, the general rule is to not rename the map book page filename.</p>

1.10 Data Exchange

The Data Exchange command of the MPG is used to move object data between a CAD file and an MS Access database. The exporting of data is a prerequisite for several other activities such as updating of the manhole table and updating the hyperlinks on off-page connectors. The importing of data is used to make global changes to data and to post-process certain attributes.



Data Exchange

When exporting data, the contents of an object data table are written to a MS Access database. The path to this file is preset and can not be changed. The primary key connecting the AutoCAD objects with the database is the objects handle. AutoCAD controls the creation and modification of the handles and they are subject to change. When planning to export and import data it is imperative that special attention be given to the sequence of events. Refer to Volume V, *Tools for Facility Model Maintenance* for additional information on exchanging data.

1.10.1 Exporting Data

- Drop all tables before exporting. This will delete any existing records in the table.
- Create the table and adjust the field lengths for manholes according to Appendix 4.0, [Field Lengths](#). For a manhole data exchange use the file located on the network; J:\Facility Models\Sewer Atlas\Models\ mh_field_sizes.xls
- Choose the data table to be exported and select the feature type.
- Export the data table.
- Repeat the process for additional data tables as necessary.

1.10.2 Importing Data

- If the data is to be modified and imported back into the object data tables, perform the modifications or post-processing prior to closing the current AutoCAD session.
- Choose the data table to be imported.
- Import the data table.

1.11 Manhole Hyperlinks

The links between manholes and Record Drawings are established by the very nature that the manhole is shown on the Record Drawing. To add to the usability of the electronic map book the manhole object is hyperlinked to the Record Drawing. This is done using a default path and the EDMS Item ID or the scanned image filename (The scanned image filename is used for an offline version of the electronic map book).



Hyperlink Manhole

The Hyperlink Manhole command of the MPG as well as the object data database is the most convenient method to create and update the manhole hyperlinks. Refer to Volume V, *Tools for Facility Model Maintenance* for additional information on manhole hyperlinks.

Open the working file.

Select Hyperlink Manhole tool. This command will automatically reference the exported access database from the previous step and prompt the user to select a table that contains the manholes and select the attribute to use for the hyperlink.

Select the Manhole table in the Node Table.

Select Field_216 in the Link Field.

1.12 Manhole Table Updates

The Manhole Table command of the MPG as well as the object data database is used to create and update the manhole table. It is generally not recommended to manually edit the manhole table.

Open the Map Book Page from the working folder.

Select *Manhole Table* tool – this command will automatically reference the exported access database from the previous step and generate a new table with all manholes within the grid.

If the manhole table conflicts with the sheet legend, it will be necessary to create a second sheet and move the conflicting portion.



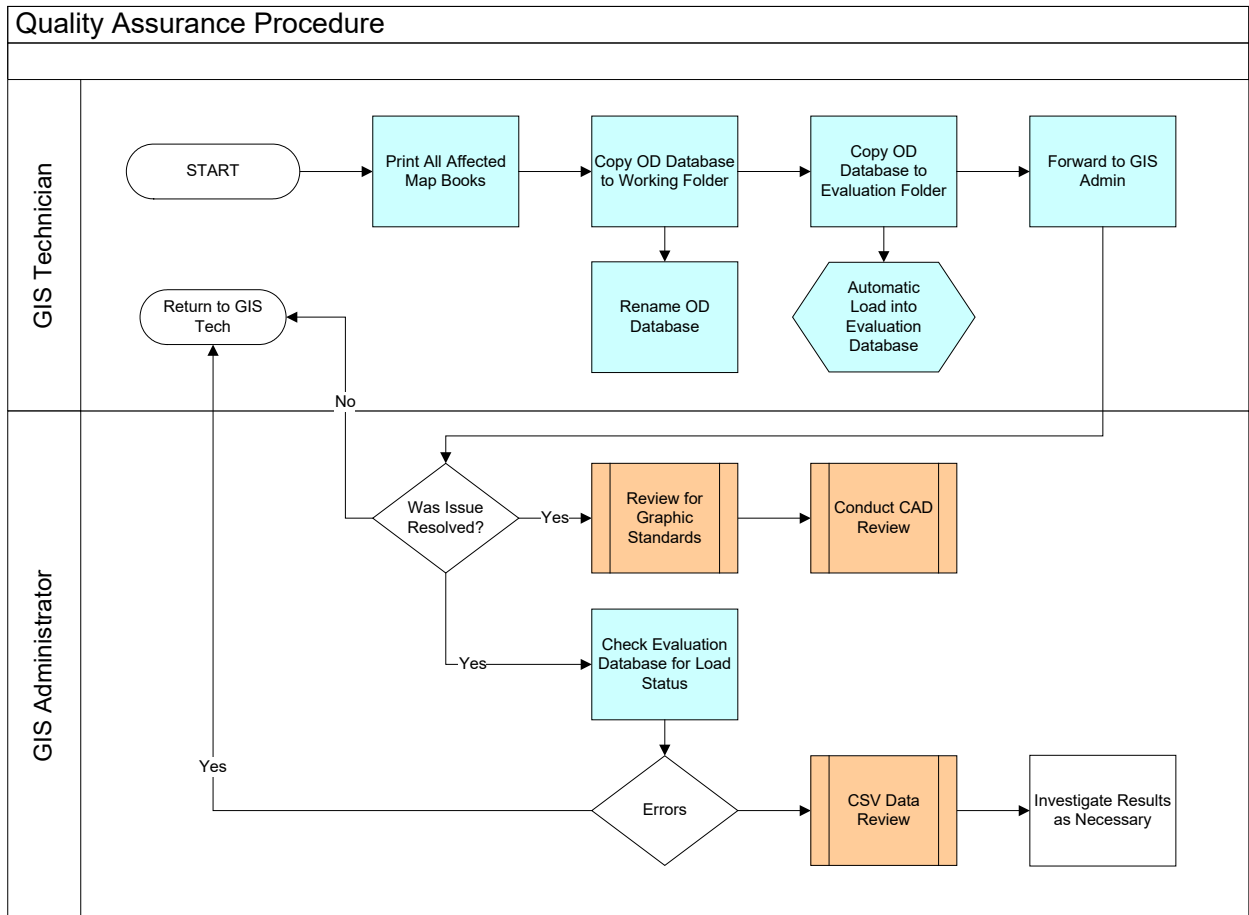
Manhole Table

Note: The path to the object data database is hard coded. As a result it is very important to conduct the data exchange immediately prior to the manhole update.

1.13 Quality Assurance

Quality Assurance (QA) is the process of reviewing the work performed to confirm that it complies with the procedures and standards that have been established. The QA is conducted primarily by the GIS Administrator. However, it is important that others involved in the updating of the Sewer Atlas be aware of the quality expected.

The process to prepare and review a work package for QA is shown in the following diagram.



1.13.1 Completeness Assessment

The completeness assessment is a visual inspection to determine if the original discrepancy or CIP was addressed. For example, questions such as "Was the entire project included? Did we capture every manhole? Is there a label for every manhole?" must be asked. In addition, the QA provides a reality check by asking such questions as "Is the direction of flow accurate? "Is the slope correct?" It may be necessary for the GIS Administrator to go back to the original discrepancy or project and compare the updates to the original source.

1.13.2 Graphic Standards Review

The Graphic Standards review verifies that the graphics follow general guidelines for placement such as the location, direction and placement of labels and arrows to ensure consistency and ease-of-use of the edited maps. Refer to Section 3.12, [Annotation Guideline](#).

Specific review comments are written directly on the item and global comments are written on the side of the map. Post-it notes are avoided as are separate comments sheets.

1.13.3 CAD Review

The CAD elements are verified by using the batch file checker in AutoCAD. The batch checker will check layer names and fonts. The use of filters can verify whether the symbols, blocks and layers meet standards. Refer to Section 3.8.2, [CAD Standards File](#).

1.13.4 CSV Data Review (future)

The CSV data review utilizes an automated loading application and an Oracle database to verify the accuracy of the data being loaded into CMMS. When an OD Database file is placed in the bulkloader folder, an automated loading routine runs. This routine has been designed not to load data that contains format errors. If errors are present, the submission is rejected and returned to the GIS Technician for correction.

- Open the Evaluation Database.
- Check for load errors. Return to GIS Technician if necessary.
- Run the predefined content review reports. Investigate as necessary and return the work package to GIS Technician if required. Refer to Section 3.14, [QA Reports](#).

1.13.5 DWF Review

Before the final DWF file is copied to the server, the file must be reviewed. The review verifies the following:

- The file was produced correctly.
- The map book page matches the printed copy.
- The off-page connectors are functioning.
- The manhole hyperlinks are functioning.
- The “last updated” date has been changed.

1.14 Commit Edits to Master File

After the discrepancy or CIP has successfully completed the quality assurance procedure, it is necessary to commit the edits to the Master File. These edits also need to be isolated for preparation of data transfer tasks. Refer to Section 1.15, [Data Transfer](#).

Open the working file.

Delete all elements that were not impacted by the work package. Save the file to a working_edit file. Refer to Section 3.8.4, [Working File Standards](#).

Create a new working_demo file. Cut and paste all demolished or delete features into this file. Refer to Section 3.8.4, [Working File Standards](#).

Open the Master File.

Cut and Paste all assets to be replaced into the master demo file. It may be helpful to attach the working_edit and working_demo file to the Master File to identify the assets to be replaced.

Copy and paste the contents of the working_edit file into the Master File.

Purge the Master File before saving and closing the file.

1.15 Data Transfer

Previously, the new and/or modified assets were isolated into working_edit and working_demo files respectively. Refer to Section 1.14, [Commit Edits to Master File](#).

The data contained in the working_edit file is exported to an ESRI shapefile format for use in the enterprise GIS applications and CMMS. The data contained in the working_demo file is exported to an MS Access database format for use in the district's CMMS application.

The import of data into the enterprise GIS application is the responsibility of the EIM group and is included in this procedure. The importing of data into EAMS is the responsibility of the EIM group and is not included in this procedure.

1.15.1 Export to GIS

- Open the working_edit file.
- Use AutoCAD Map export tool to export the contents to a series of shapefiles. Refer to Section 3.8.6, [Shapefile Standard](#) for the appropriate grouping of information.
- Load the appropriate Saved Profile. Refer to Section 3.8.5, [Data Transfer Profile](#) and to Appendix 4.1, [CAD Layers](#) to determine which profile file to use.
- Verify all parameters on Selection, Data, and Options tabs (i.e. object data, layers, feature type, etc.)
- Export the data. Refer to Section 3.8.6, [Shapefile Standard](#).
- These shapefiles can also be used for the *Export to EAMS* procedures; either as individual dbf files or by importing into pGDB.

1.15.2 Export to EAMS

- Locate the working directory of shapefiles exported from CAD format (see previous step 1.15.1 Export to GIS).
- Make a copy of the dbf file(s) for import. Maintain taks code, ie ADD, MOD, DEL.
- Import as table into SewerAtlasEdits.mdb.
- CMMS tech reviews periodically Sewer Atlas Tracking spreadsheet for updates.

1.15.3 Import into GIS

- Start ArcMap application with OC San sewer geodatabase files loaded.
- Load and verify new data edits against existing data.
- Use Load Objects tool to import data into geodatabase.
- QC data load for accuracy and completeness, make additional edits as needed to reflect as-is condition.
- Save and Close application.

1.15.4 Import Data into Hydraulic Model

- Refer to the J-101 Procedures Manual.

1.15.5 Import Data into Geometric Network

- Refer to Discrepancy spreadsheet and Sewer Atlas Master Edits database.

1.16 Print Map Book Pages

There are two methods of producing the necessary print files depending on the number of map book pages to be printed. Printing directly from AutoCAD is available when printing a small number of files (1 to 3). For larger numbers of files, it is recommended that the AutoCAD Publish command be used. Refer to Volume V, *Tools for Facility Model Maintenance*.

To meet the needs of the various users, 3 printer outputs need to be produced; full size (22x17), half size (11x17) and AutoCAD DWF. In addition a final hardcopy check print is required. Within the AutoCAD application several page setups have been created to ensure consistency of the final output. The page setups are:

~~Full Size DWF produces an AutoCAD DWF file for use with the Electronic Map Book.~~

~~Full Size Color—Plot to File produces an HPGL/2 print file.~~

~~Half Size Color—Plot to File produces a Xerox postscript file.~~

~~Half Size Color plots to a default color printer.~~

Half Size DWF produces and AutoCAD DWF file for use Electronic Map Book and can be printed to fit 11" x 17" map books.

Printing a single map book page

Open the map book page to be printed.

Import the desired page setup from the appropriate template. It is recommended that the page setup be imported every time a print is produced. This will ensure that the most current configuration is being used. Refer to Section 3.8.1, [CAD Template](#).

Place the print file in the print file folder. Refer to Section 3.8.3, [Working Folder Standards](#).

Repeat the process for each of the 3 page setups.

Printing multiple map book pages

Open a blank file.

Start the **Publish** command.

Select the map book pages to be printed.

Import the desired page setup from the appropriate template. It is recommended that the page setup be imported every time a print is produced. This will ensure that the most current configuration is being used. Refer to Section 3.8.1, [CAD Template](#).

Save the publish file list.

Place the print file in the print file folder. Refer to Section 3.8.3, [Working Folder Standards](#).

Repeat the process for each of the 3 page setups.

Printing multiple DWF's

Open a blank file.

Start the **Publish** command.

Select the map book pages to be printed.

Import the desired page setup from the appropriate template. It is recommended that the page setup be imported every time a print is produced. This will ensure that the most current configuration is being used. Refer to Section 3.8.1, [CAD Template](#).

Verify the following:

The *Plot stamp* is not activated.

The *Publish to* is set to the plotter named in *Page Setup*.

In the *Publish Options* verify:

The *DWF Type* is set to **single-sheet**.

The *DWF Data* is set to **include**.

Place the print file in the print file folder. Refer to Section 3.8.3, [Working Folder Standards](#).

Save the publish file list.

1.17 Publish

Publishing consists of preparing and sending the print files for reproduction as well as distributing the updated pages to the map book holders. The process consists of several individual steps and may not need to be done in a specific order.

1.17.1 Printing Hardcopy Map Book Pages

Identify the number of sets to be made of each size and paper type. See [Appendix ???](#) for specific procedures for creating map page distribution list.

It may be necessary to copy files for map book pages for service area 7 into a separate folder.

Copy the files to a CD.

Complete an OCB work order and attach the OCB Standard Operating Procedure. Refer to Section 4.8, [OCB Standard Operating Procedure](#).

Note: The Library Books database contains a list of the Map Book holders. This database can be used to determine the required number of copies.

1.17.2 Produce an internal memorandum to the map book holders informing them of the changes made and the number of copies they are receiving. Refer to Appendix 4.2, [Sample Memorandum](#).

1.17.3 Distribute sets via interoffice mail or email.

Update EMB and Other Miscellaneous Items

By default AutoCAD adds the layout name to the printed DWF filename. The layout name must be removed prior to copying the files to the EMB server.

Copy the DWF files to the server. (\\magnesium\emb\keyplan)

Update GIS Change Management Tracking Spreadsheet. Refer to Section 3.2, [Tracking Spreadsheet Column Descriptions and Expectations](#).

- Once edits have been approved, dwg files should be move to ...\\Facility Models\Sewer Atlas\<volume ?>\...

This process will ensure that for next edit cycle of this page that latest edits will have already been captured.

SECTION 2 ALTERNATE DATA COLLECTION PROCEDURES FOR SEWER ATLAS MAINTENANCE

2.0 General Alternate Data Collection Overview

Section 1 details the expected sequence of events to update the Sewer Atlas Facility Model. Occasionally additional steps must be taken before the process outlined in Section I can occur. If the required data is not on the Record Drawing, then it will be necessary to perform Permit Research or Field Data Collection. The results of which are documented on the Record Drawing using the Record Drawing Process.

2.1 Permit Research Procedure

Underdevelopment

2.2 Field Data Collection Procedure

The following procedures identify the tasks and the party(s) responsible during the change management process of field discrepancies. This process can be initiated by the Collections staff itself (start at 2.2.1) or by other OC San staff and forwarded to Collections staff for data collection/field investigation (start at 2.2.4). The procedures below describe the overall process.

2.2.1 Create Field Discrepancy Form

- Discrepancy Identified.
- Fill out Field Discrepancy Form.
 - Enter General Information; date, name, extension #, map book page(s)/grid, etc.
 - Print Sewer Atlas Map Page from online Electronic Map Book (EMB).
 - Locate and print project Record Drawing(s), use Sewer Atlas and/or EMB if necessary.
 - Enter Asset Information; manhole or pipe, manhole ID numbers, and Record Drawing info.
 - Enter Asset Location information; address and/or cross streets, and city.
 - Provide brief description of action needed to correct discrepancy.
- Attach Record Drawing(s) and Sewer Atlas Map book page(s) to Field Discrepancy form.
- Submit all documents for review and processing.

2.2.2 Review Discrepancy Form

- Determine if discrepancy has been previously identified.
- Review Discrepancy form for completeness and associated documentation (Atlas page and Record Drawings), attach any missing information and provide any other related info that may be helpful.
- Return to collections staff for missing information or forward to EIM (Enterprise Information Management) Administrator via inter-office mail for submittal.

If discrepancy can be processed without field data collection or GPS data collection then work continues in Engineering for updates. If follow up survey or GPS data collection is

needed then field discrepancy is accepted and logged by EIM Administrator and returned to Field Crew Supervisor for assignment of field crew personnel. Steps for this process follow.

2.2.3 *Generate Maximo Service Request*

- Generate Maximo service request.
- Print & Attach Field Discrepancy Data Collection Sheet.
- Forward to Field Crew Supervisor.

2.2.4 *Create Work Order*

- Create Work Order.
- Print locator map.
- Highlight existing upstream and downstream manhole's to be used as reference for data collection.
- Forward to field crew all Field Discrepancy documentation and maps.

2.2.5 *Collect Data*

- Prior to any field data collection, determine if latest GIS basemap data has been loaded into Trimble. If not, upload latest GIS base map data and GPS Discrepancy DB.mdb (Geodatabase) to Trimble unit; follow the attached Data Upload to GPS procedures.
- Drive to location of discrepancy.
- Set up traffic control as necessary, use appropriate safety procedures to prepare area for data collection.
- Collect Data. Determine the best method for collecting data, GPS or manual collection.

Data can be collected both manually and with the handheld GPS unit. If the GPS unit is not available or not necessary then all data will be entered onto the Field Discrepancy Data Collection Sheet manually.

Refer to Section 3.6, [Field Data Collection Standards](#) for the standards used for both the manual and GPS approach to collecting data. Both the manual approach and using GPS require the data to be entered correctly. The manhole and sewer data lists below define what the acceptable data should be. The GPS procedures follow the attached *Data Collection Process* procedures.

- Follow Data Transfer From Trimble to PC procedures that follow to transfer collected GPS data back to PC for incorporation into edit process.
- Return all work documentation back into Supervisor.

2.2.6 *Review and Forward Documentation*

- Review documents for completion.
- Forward all Field Discrepancy documentation back to EIM Administrator for processing.

2.2.7 Quality Check

- Review Documentation for completeness
- Forward to appropriate personnel within EDM Group for edits.

2.3 Record Drawing Procedure

Underdevelopment

Include text regarding making sure the invert information and construction dates are included on the record drawing when posting permits.

SECTION 3 STANDARDS FOR SEWER ATLAS MAINTENANCE

3.0 Standards Overview

The Standards listed below are intended as a general rule of thumb. It is not possible to create standards that will fit every possible scenario. Instead, the intent of the Standards is to provide rules for most of the tasks and guidelines for the exceptions that will arise.

Each Standard is related to a step in the overall process of maintaining the Sewer Atlas. Refer to Section 1.0.6, [Process Flowchart](#). In addition, the procedures for each step may reference the standard as a rule or guideline to be followed during the course of action outlined in the procedure.

3.1 Deviation Guideline

The Deviation Guideline is used to determine what constitutes a change to the Sewer Atlas.

3.1.1 *Physical Location*

Changes to the physical location occur when district staff identify that an object (manhole) shown in the Sewer Atlas is not in the correct planimetric location.

Changes will occur when one of the following criteria is met:

- A manhole located in field is not shown in the model.
- A manhole is shown in the model but does not exist in the field. The use of a metal detector or other investigation may be required.
- Sewer line alignment in the field does not match the model and can be determined with some level of accuracy.
- Pipe length measured by CCTV differs from the map books by more than 12 feet.

3.1.2 *Data*

Changes to attributes are made when data elements such as pipe diameter are deemed to be incorrect. These attributes are considered to be absolute and all errors will be corrected. The following is a list of attributes that are the most likely to be updated. The remainder consists primarily of system related attributes. Refer to Appendix 4.5, [Object Data Tables](#).

- Manhole ID
- Station number
- Project number or Contract Number
- Rim Elevation
- Manhole Depth
- Diameter

3.1.3 *Omissions*

Omissions consist of layers already included in the Sewer Atlas that are missing objects. Examples include labels for schools, parks, etc. Items that are not already included in the Sewer Atlas are considered enhancements and will be added on a case by case basis.

3.1.4 *CIP Projects*

Changes caused by CIP Projects are derived from Record Drawings. The time delay between receiving Record Drawings and incorporation into the facility model may be substantial. The time delay must be taken into consideration when submitting a change request or discrepancy form.

3.1.5 *Miscellaneous*

Miscellaneous changes may occur from a variety sources such as: ownership agreements, easements, boundary modifications and production errors or improvements. These changes will be evaluated on a case by case basis.

3.2 Tracking Spreadsheet Column Descriptions and Expectations

The following table documents the column names, description and acceptable values for the GIS Change Management Tracking Spreadsheet. The purpose of the spreadsheet is to track the progress of a work package. Therefore, it is the responsibility to the GIS Administrator and EIM Group lead to keep the spreadsheet current.

Category	Column Name	Description/Expectation	
General	ID	The discrepancy ID is a four digit sequential number starting at 0000 and incremented by 1, or the CIP project number.	
	Name of Originator	Name of the individual who submitted the discrepancy or the project manager of the CIP project.	
	Category	• Addition-Modification	Changes that require an addition or modification of an asset.
		• Attribute	Changes that only modifies an attributes value.
		• CIP	Changes that are a result of a CIP Project.
		• Diversion	Changes that modify a diversion structure or diversion structure detail.
		• Easement	Changes to or additions of easement relation graphics.
		• Graphic	Changes related to printing, annotation conflicts, etc.
		• Other	Changes that do not fall into one of the other categories.
	Problem	A description of the issue being submitted as indicated on the discrepancy form, including manhole IDs when appropriate.	
Date Entered	The date when the discrepancy was entered into the tracking spreadsheet.		
Service Area	The service area as indicated on the discrepancy form or CIP cover sheet. Enter the primary service area if the discrepancy or CIP crosses a service area boundary.		
Map Page(s) Affected	List all map book pages that will be revised, including "A" sheets in Service Area 7 and diversion structure pages.		
Permit Research	Routed To	Name of the individual assigned.	
	Date Routed	The date when the discrepancy form was routed.	
	Date Returned	The date the routed to returned the discrepancy form.	
Field Data Collection	Routed To	Name of the individual assigned.	
	Date Routed	The date when the discrepancy form was routed.	
	Date Returned	The date the routed to returned the discrepancy form.	
Record Drawing Process	Routed To	Name of the individual assigned.	
	Date Routed	The date when the discrepancy form was routed.	
	Date Returned	The date the routed to returned the discrepancy form.	

Utility File	Routed To	Name of the individual assigned.	
	Date Routed	The date when the discrepancy form was routed.	
	Internal QC	• Approved	The work package is approved to move onto the next step.
		• Returned	The work package is returned to the individual working on the package.
Date Approved	The date when the discrepancy work was approved.		
Publish	Sewer Atlas Update	• NA	No update is required.
		• Blank	An update has not yet occurred
		• Date	The date the update occurred.
	CMMS Update	• NA	No update is required.
		• Blank	An update has not yet occurred
		• Date	The date the update occurred.
	EMB Update	• NA	No update is required.
		• Blank	An update has not yet occurred
		• Date	The date the update occurred.
	Map Page Update	• NA	No update is required.
		• Blank	An update has not yet occurred
		• Date	The date the update occurred.
Close-out	Closed	• Blank	Work package has not been completed.
		• Yes	Work package has been completed.
		• Pending	Work package will be complete when the bi-annual distribution has been completed.
	Comments	Information useful to describe the current status of the work package.	

3.3 Minimum Data Required on Record Drawings

The first step is to review the Record Drawing to determine if there is sufficient data to start the process or if Alternate Data Collection is required. The table in Section 3.5.2, [Data Categories](#) details the mandatory attributes required to process a change to the SA.

3.4 Printing Standards for Large Format Drawings

When printing large numbers of drawings (5+) it is recommended that AccXES Client Tool be used along with the following standards. Refer to Volume V, *Tools for Facility Model Maintenance*.

Option	Value
Size	ANSI D or ANSI B
Transform	Scale to Fit
Labels	Filename (%f), Date (%d)
Print order	Reverse

3.5 Data Preparation Standard

Data preparation is the process of reviewing the Record Drawings and project model files to be used for the creation or modification of an OC San asset or assets. Even when using a project model file, the majority of data will come from the printed Record Drawing. When calculating or estimating attributes values the resulting value must be written on the Record Drawing. If an attribute value is unavailable or can not be determined, a default value of -9999 will be used.

3.5.1 Standard Highlight Colors

The following highlight colors will be used.

Highlight Color	Category
Yellow	General and Project
Green	Location
Pink	Physical
Blue	Elevation
Purple	Miscellaneous

3.5.2 Data Categories

The following table shows what attributes belong to what categories. Attributes that are bold are mandatory.

Category	Type	Attribute	Reference
General Project	Manhole	ORIGINAL_CONTRACT_NO	Refer to Section 3.5.16
		DATUM_DESIGN	Refer to Section 3.5.14
		INSTALLATION_DATE	Refer to Section 3.5.3
		YEAR_RECONSTRUCTED	Refer to Section 3.5.15
		SERVICE_AREA	
		OWNER_CODE	Refer to Section 3.5.4
		TIF_NUM	Refer to Section 3.5.13
		SHEET_NO	
		STRUCT_1	Refer to Section 3.7.1
		STA_NUM_W_PLUS	
		TRUNK	
		STATUS	Refer to Section 3.10.3
	Sewer	STRUCT_1	Refer to Section 3.7.1
		STRUCT_2	Refer to Section 3.7.1
		STATUS	Refer to Section 3.10.3
		DATUM_DESIGN	Refer to Section 3.5.14
	Force Main	STATUS	Refer to Section 3.10.3
		ORIGINAL_CONTRACT_NO	
		DATUM_DESIGN	Refer to Section 3.5.14
		INSTALLATION_DATE	Refer to Section 3.5.3
OWNER_CODE		Refer to Section 3.5.4	
Location	Manhole	STREET_CODE	Refer to Section 3.5.5
		CROSS_STREET_CODE	Refer to Section 3.5.6
		STRUCTURE_LOCATION_CODE	
		FIELD_215 (DIV #)	
	Force Main	STREET_CODE	Refer to Section 3.5.5
		CROSS_STREET_CODE	Refer to Section 3.5.6
Physical	Manhole	MANHOLE_TYPE_CODE	
		MANHOLE_DIAMETER	
		MANHOLE_LID_TYPE_CODE	
		WALL_TYPE_CODE	
		MH_SHAPE_DIMENSIONS	
		FIELD_216 (DOC ID)	Refer to Section 3.5.12
	Sewer	DIAMETER	

Section 3 Standards for Sewer Atlas Maintenance

		SLOPE	
		PIPE_MATERIAL_CODE	
		REAL_LENGTH	
	Force Main	DIAMETER	
		PIPE_MATERIAL_CODE	
		REAL_LENGTH	

Category	Type	Attribute	Reference
Elevation	Manhole	RIM_ELEVATION_CD	Refer to Section 3.5.7
		MH_CNTR_INV_ELEV_CD	Refer to Section 3.5.8
		UPSTREAM_INVERT_ELEVATION_CD	Refer to Section 3.5.9
		DOWNSTREAM_INVERT_ELEVATION_CD	Refer to Section 3.5.10
		MANHOLE_DEPTH	Refer to Section 3.5.11
	Sewer	UPSTREAM_INVERT_ELEVATION_CD	Refer to Section 3.5.9
		DOWNSTREAM_INVERT_ELEVATION_CD	Refer to Section 3.5.10
	Force Main	UPSTREAM_INVERT_ELEVATION_CD	Refer to Section 3.5.9
		DOWNSTREAM_INVERT_ELEVATION_CD	Refer to Section 3.5.10

3.5.3 *INSTALLATION_DATE*

The installation date or date of construction may not always be annotated on the Record Drawing. Therefore, the following order will be used to identify the installation date.

- Date of construction, if clearly annotated. (The construction date may also be shown on the connection permit)
- Record Drawing date, also referred to as the “as-built” date.
- Design date taken from the title block.
- Project date taken from the project cover sheet.

3.5.4 *OWNER_CODE*

The owner code determines which manhole symbol, OCSD or OCSD-maintained, is used as well as the color of the sewer line. Use the owner code of the manhole downstream of the new manhole location. When adding a completely new sewer line and manholes, the project number can be used to determine the owner code. If the contract number is an OC San project number it is most likely an OC San sewer.

3.5.5 *STREET_CODE*

To avoid multiple spellings and misspellings of a street name, the MPG and CMMS utilize a controlled value list (CVL) that contains numeric values for street names. The MPG hides the CVL from the user and only presents the street name. However, the value or code is written to the object data table. As a result, this attribute must be entered using the MPG and can not be manually entered directly into the object data.

3.5.6 *CROSS_STREET_CODE*

Refer to Section 3.5.5, *STREET_CODE*.

3.5.7 *RIM_ELEVATION_CD*

The manhole rim elevation may not always be annotated on the Record Drawing. Therefore the following order will be used to identify or calculate the rim elevation.

- If the manhole depth and center invert elevation are available, add the manhole depth to the invert elevation.
- Use the profile grid to estimate the rim elevation.

3.5.8 *MH_CNTR_INV_ELEV_CD*

The manhole center invert elevation is the primary invert elevation for attribute data. The invert elevation may not always be annotated on the Record Drawing. Therefore the following order will be used to identify or calculate the center invert elevation.

- If the upstream invert elevation is annotated, use it for both the center invert elevation field as well as the upstream invert field.
- If the downstream invert elevation is annotated, use it for both the center invert elevation field as well as the downstream invert field.
- If the manhole depth and center invert elevation are available, subtract the manhole depth from the rim elevation.
- Use the profile grid to estimate the manhole center invert elevation.

3.5.9 *UPSTREAM_INVERT_ELEVATION_CD*

Refer to Section 3.5.8, *MH_CNTR_INV_ELEV_CD*

3.5.10 *DOWNSTREAM_INVERT_ELEVATION_CD*

Refer to Section 3.5.8, *MH_CNTR_INV_ELEV_CD*.

3.5.11 *MANHOLE_DEPTH*

The manhole depth is a mandatory attribute and must have a value. The depth will be calculated using the rim elevation and manhole center invert elevation. Refer to Sections 3.5.7, *RIM_ELEVATION_CD* and 3.5.8, *MH_CNTR_INV_ELEV_CD* 3.5.8 respectfully.

3.5.12 *FIELD_216 (Doc ID)*

Field_216 is used to hold the EDMS document ID (Doc ID). The Attribute is mandatory and must have a value. The value is determined by locating the document in EDMS and identifying the ID. Refer to Section 1.2.1, *Locating EDMS drawings*.

3.5.13 *TIF_NUM*

TIF_Num is used to store the scanned image filename. This attribute is currently missing from the MPG interface and therefore must be added directly to the object data table. This attribute is mandatory to support the offline version of the EMB.

3.5.14 *DATUM_DESIGN*

If the datum is documented on the Record Drawings, the datum must be captured. The datum annotation is stored in a separate database and a code is entered into the object data.

3.5.15 *YEAR_RECONSTRUCTED*

The year reconstructed is populated when the manhole or sewer have been modified by a CIP project. Raising manhole covers to grade, district staff modifications, etc. do not warrant a change to this property.

3.5.16 *ORIGINAL_CONTRACT_NO*

The original contract no is populated with the project number field in EDMS. It is important that the value entered into this property matches exactly the number in EDMS.

One exception to this rule exists. When working with drawings that are part of the TSI (Tustin Sewer Index) the drawing number is used in place of the EDMS project number.

3.6 Field Data Collection Standards

Data can be collected both manually and with the handheld GPS unit. If the GPS unit is not available or not necessary then all data will be entered onto the Field Discrepancy Data Collection Sheet manually. Refer to Appendix 4.7, [Field Discrepancy & Data Collection Sheets](#).

The following are field data collection standards used for both the manual and GPS approach to collecting data. Both the manual approach and using GPS require the data to be entered correctly. The manhole and sewer data lists below explain what values are acceptable.

Manhole Data

3.6.1 Status

Check "INSRV" or "ABND". In-service if observing flow in the manhole. Abandoned if manhole is plugged or no longer in service.

3.6.2 Distance from Existing Manhole(s)

This consists of the physical location of the object as measured from an existing upstream and/or downstream manhole, both preferred. GPS coordinate(s) with one control point will be sufficient.

3.6.3 Manhole Depth

If profile data on record drawing isn't complete then field staff will estimate the depth by using the laser range finder to determine distance to top of shelf or bench and adding in pipe diameter to get total depth. The accuracy will be approximately +/- one foot.

3.6.4 Manhole Type

Choose Diversion, Standard, Drop, Siphon or Vent. For Diversion, please identify where slots are located within manhole, ie. north, south, east or west.

3.6.5 Direction of Connection

This is a visual observation of city owned assets as they connect to OC San manholes. N, S, E, W, NW, SE, etc. are acceptable.

3.6.6 GPS Data Collected

Manually check "yes" or "no" on data collection sheet, if all or a portion of the data collected is with GPS then check "yes". If yes is checked many of these fields listed will be held as attributes of GPS points. This is an alert to EDM staff to look for and use GPS data in the editing process.

Sewer Data

3.6.7 Status

Check “INSRV” or “ABND”. In service if observing flow in the pipe. Abandoned if no flow observed in the pipe.

3.6.8 Pipe Diameter

The diameter of the pipe will be determined from record drawings. If a record drawing is not available, the diameter will be estimated by field observation. Confined space entry will not be conducted.

3.6.9 Pipe Material

The material of the pipe will be determined from record drawings. If a record drawing is not available, the material will be estimated by field observation. Confined space entry will not be conducted. (i.e. VCP, DIP, PVC, CIP, CIPP, CONPVC, RCB, RCP, etc.)

3.6.10 Pipe Length

Taken from ground measurement from upstream to downstream manholes. Ideally, GPS coordinates will be used to calculate distance.

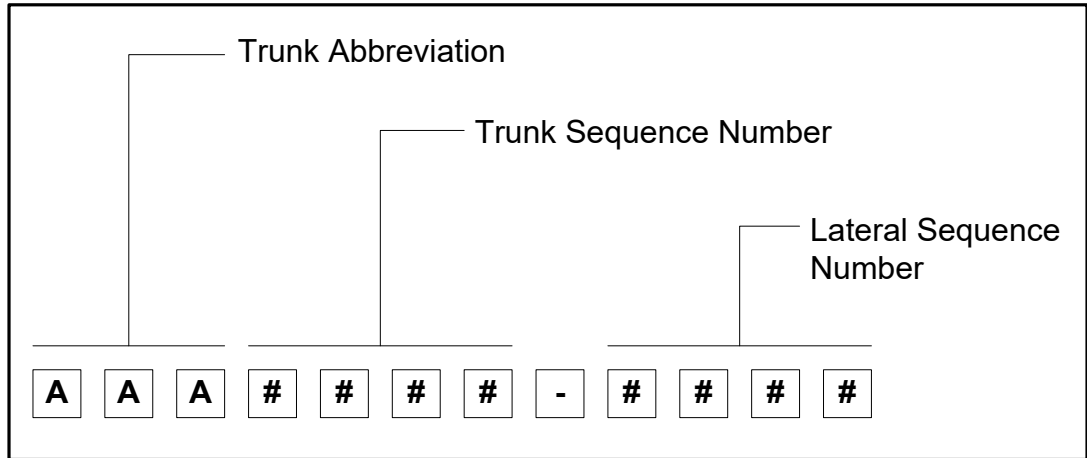
3.6.11 Pipe ID

When collecting data regarding a pipe segment, it is required that 2 manholes be located and their location provided, either GPS or manually measuring from an existing upstream and/or downstream manhole. Identify upstream and/or downstream manhole and associated Manhole ID from GIS or Atlas.

3.7 Asset Numbering Convention

3.7.1 Manhole Number Convention

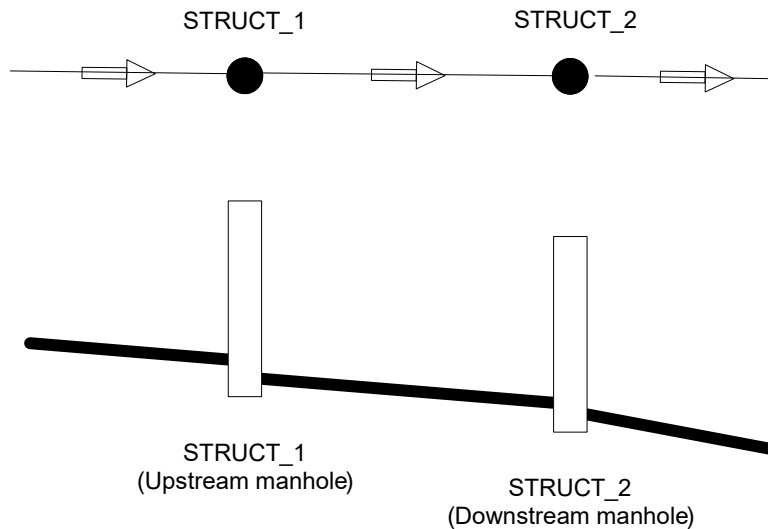
Trunk Abbreviation:	Refer to Section 3.7.7	
Trunk Sequence Number:	0000 – 9995	Start at zero (0000) Incrementing by five (5) Start at the downstream manhole
Lateral Sequence Number: (right)	0005 – 4999	Used for laterals Right hand side of trunk, when viewed towards upstream Start at five (0005) Incrementing by five (5) Start at the downstream manhole Continue along longest length of sewer line Repeat as necessary for additional laterals
Lateral Sequence Number: (left)	5005 - 9999	Used for laterals Left hand side of trunk, when viewed towards upstream Start at five (5005) Start at the downstream manhole Continue along longest length of sewer line Repeat as necessary for additional laterals
Examples:	BKR0005-0000	Baker trunk
	BKR0005-0005	Baker lateral right
	BKR0005-5005	Baker lateral left



3.7.2 Gravity Sewer Line Numbering

Struct_2 (Downstream manhole)	AAA#### - ####	Refer to Section 3.7.1 Downstream manhole number shall always be located first.
Struct_1 (Upstream manhole)	AAA#### - ####	Refer to Section 3.7.1
Examples:	BKR0005-0000:BKR0010-0000 BKR0005-0005:BKR0005-0010 BKR0005-5005:BKR0005-5010	Baker trunk sewer line Baker lateral sewer line right Baker lateral sewer line left

PIPE ID = STRUCT_2 : STRUCT_1

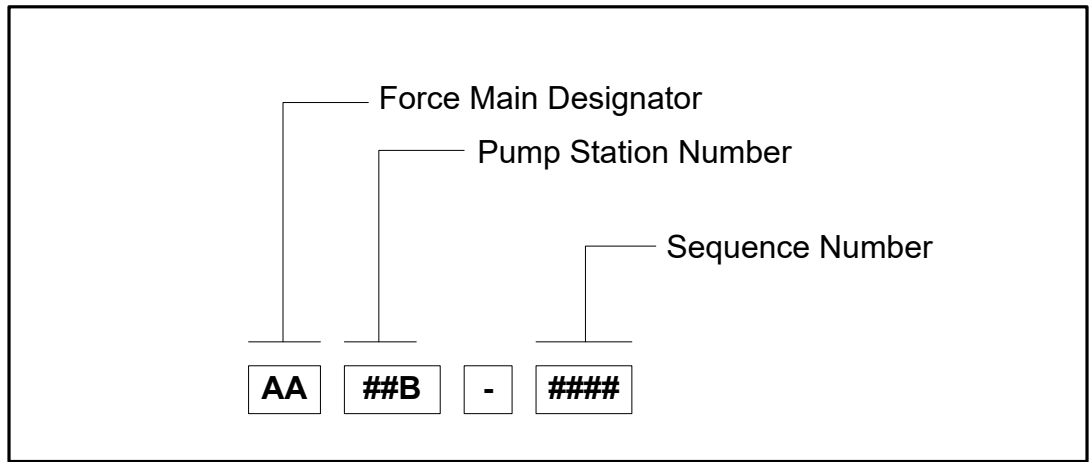


3.7.3 Bypass Line Numbering

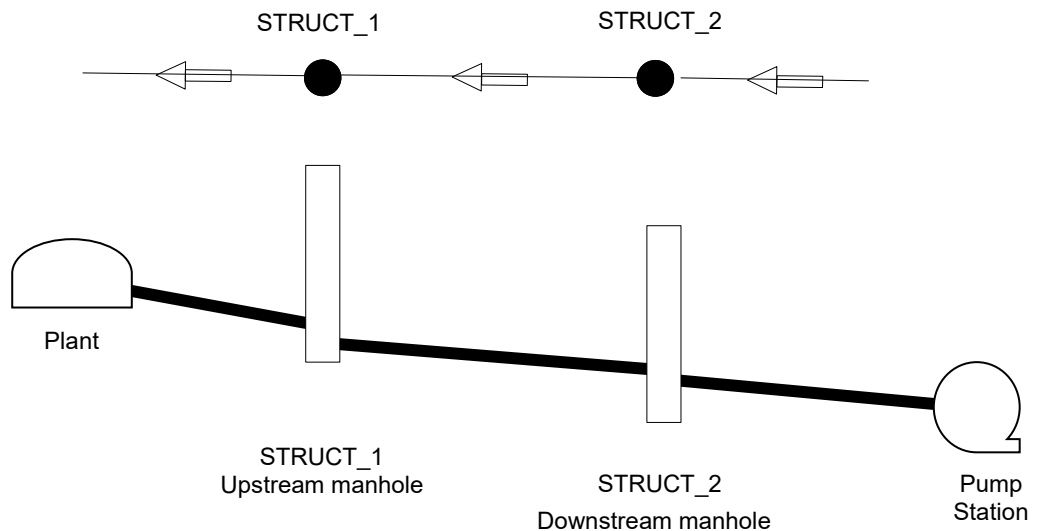
Struct_2: (Downstream manhole)	AAA#### - ####	Refer to Section 3.7.1 Downstream manhole number shall always be located first.
Bypass Designator:	A – E	Used for siphons and parallel lines.
		Numbered from left to right, while looking upstream. Left most line segment will not use bypass designator
	F – Z	Used for vent lines
		Numbered from left to right, while looking upstream. Left most line segment will not use bypass designator
Struct_1: (Upstream manhole)	AAA#### - ####	Refer to Section 3.7.1
Examples:	BKR0005-0000A:BKR0010-0000 BKR0005-0000F:BKR0010-0000	Baker trunk sewer line siphon Baker trunk sewer line vent
<p style="text-align: center;">Struct_2 (Downstream manhole)</p> <p style="text-align: center;">Bypass Designator</p> <p style="text-align: center;">Struct_1 (Upstream manhole)</p> <p style="text-align: center;"> AAA####-#### B : AAA####-#### </p>		

3.7.4 Force Main Numbering

Force Main Designator:	FM	Designates a force main
Pump Station Number:	##B	Refer to Section 1.4.6
Sequence Number:	0000 – 9995	Start at zero (0000)
		Incrementing by five (5)
		Start at the downstream pump station.
		Increment at physical assets only, ex: manhole, valve.
Examples:	PS-58C:FMN5302-0005 FMN5503-0130:SAR0345-0555	Pump station force main Force main Node to SARI line manhole

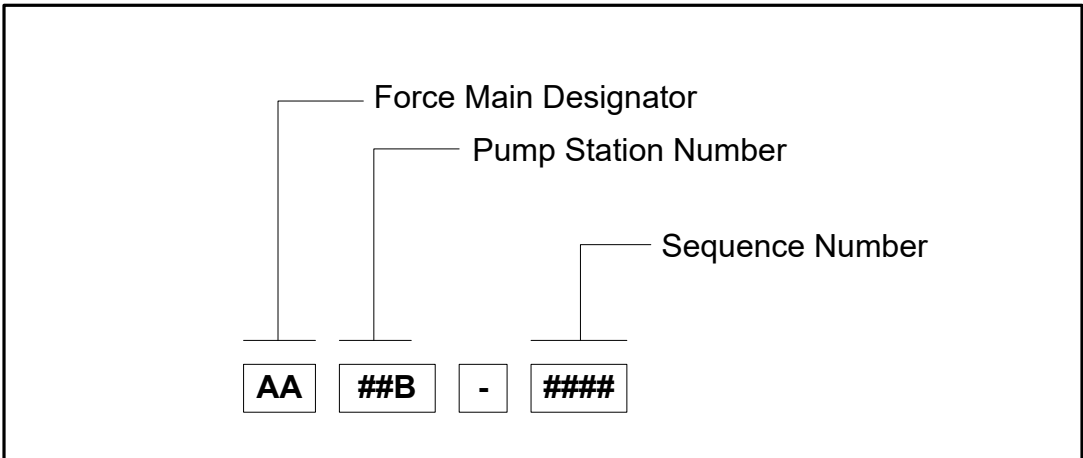


PIPE ID = STRUCT_1 : STRUCT_2

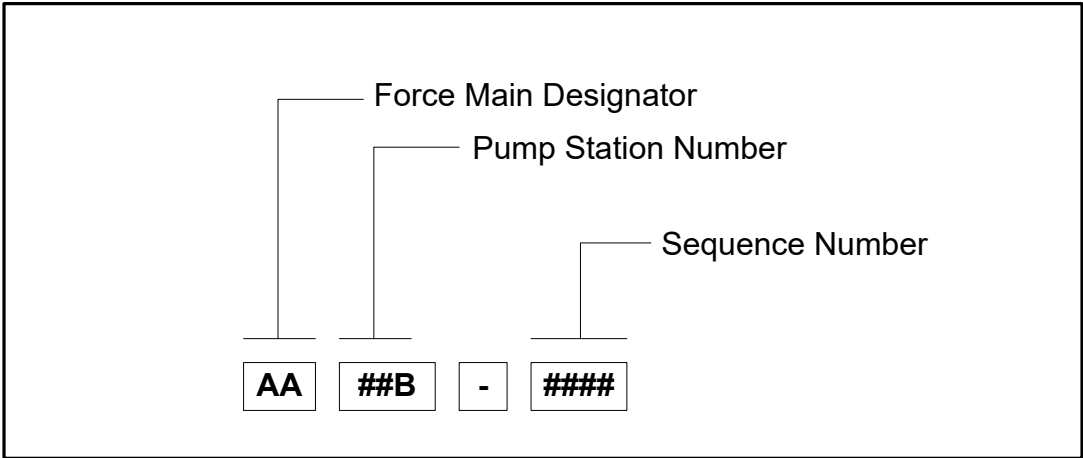


3.7.5 Force Main Valve Numbering

Force Main Valve Designator:	FMV	Designates a force main Valve
Sequence Number:	0000 – 9995	Start at zero (0000) Incrementing by five (10) Start at the downstream pump station. Increment at physical assets only, ex: manhole, valve.
Examples: FM55C-0005 FM55D-0005		Lido pump station force main 14 th Street pump station force main



3.7.6 Force Main Node Numbering

Force Main Node Designator:	FMN	Designates a force main Node
Sequence Number:	5000 – 9995	Start at zero (0000)
		Incrementing by five (10)
		Start at the downstream pump station.
		Increment at physical assets only, ex: manhole, valve.
Examples: FMV5506-0120 FMV5503-0060		
 <p>The diagram shows the format AA ##B - #### with three labels and leader lines pointing to the corresponding parts: Force Main Designator points to AA, Pump Station Number points to ##B, and Sequence Number points to ####.</p>		

3.7.7 *Trunk Sewer Abbreviations*

Abbreviation	Trunk Name
14S	14 th Street Pump Station
AST	A Street Pump Station
BAY	Bay Bridge Pump Station
BKR	Baker-Main
BPT	Bitter Point Pump Station
BUS	Bushard
COL	College Avenue Pump Station
CRY	Crystal Cove Pump Station
CST	Coast
EUA	Euclid A
EUB	Euclid B
HAT	Hats Sewer Line
IPA	Interplant A
IPB	Interplant B
IPC	Interplant C
IPD	Interplant D
KML	Knott-Miller
KNT	Knott
LID	Lido Pump Station
MLR	Miller
NHP	Newhope
NPT	Newport
RED	Redhill
RPT	Rocky Point Pump Station
SAN	Santa Ana
SAR	Santa Ana River Interceptor
SUN	Sunflower

3.8 File/Folder Standards

Working files and folders are considered temporary and will eventually be moved and/or deleted. The following standards will be used.

3.8.1 CAD Template

A drawing template has been created that contains various standard settings such as layers, text style names, external reference files, etc. The file is stored in the default **J:_CAD Standards_Project Template** folder.

The filename is **OCSD-Sewer Atlas Template.dwt**

3.8.2 CAD Standards File

A standards file has been created that contains a list of approved layer names and font styles. The file is stored in the default **J:_CAD Standards_Project Template** folder.

The filename is **OCSD-Sewer Atlas Template.dws**

3.8.3 Working Folder Standards

Working folders will be named according to the following standards

Type	Format
Discrepancy Folders	ID XXXX
CIP Folders	CIP #####
Plot Files – Full Size	\Full
Plot Files – Half Size	\Half

The network location for working folders is **J:_Field Discrepancy**

The XXXX equals the discrepancy ID number. Refer to Section 3.2, [Tracking Spreadsheet Column Descriptions and Expectations](#).

The ##### equals the OC San project number.

3.8.4 Working File Standards

Working files will be named according to the following standards.

ID XXXX_Task

Task	Description
None	Standard working file
EDIT	Working file containing only new, modified or abandoned features. (Status = INSRV, ABAND)
DEMO	Working file containing only demolished or deleted features. (Status = DEMO, DELETE)

3.8.5 Data Transfer Profile

A data transfer profile consists of settings used repeatedly to map GIS attributes to AutoCAD attributes. The default location is **H:\apps\gis.dta\740_data\SA Data\CAD export files**.

3.8.6 Shapefile Standard

The Shapefile will be named according to the following standard: **ID###_Task_Classification** where:

Item	Description/Example
ID###	Discrepancy ID Number
Task	ADD MOD DEL
Classification	FM (Force Main) MH (Manhole) SEW (Sewer Line) FMV (Force Main Valve) FMN (Force Main Node) PS (Pump Station) CON (Connection)

3.9 New Features

The MPG is designed to place assets with the correct layer, font style, color, etc. The following standards are to be used as reference only.

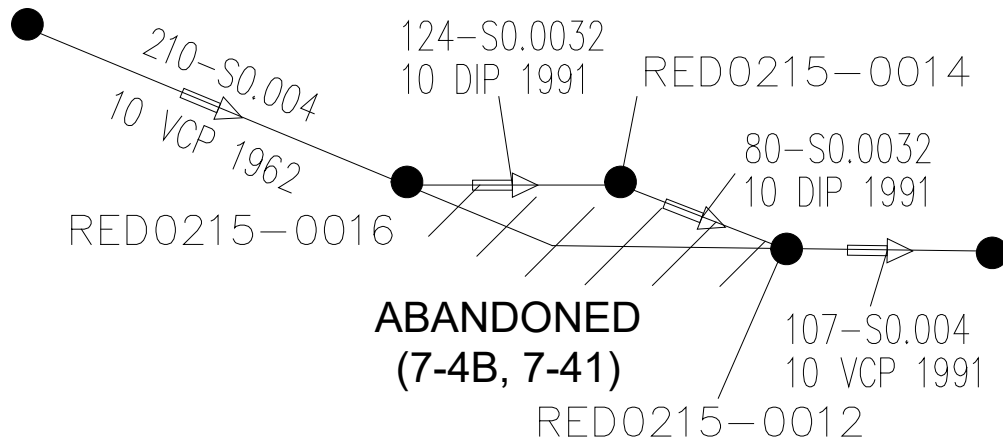
3.9.1 Layer Convention

See Appendix 4.3, [CAD Layers](#).

3.9.2 Block Library

See Appendix 4.4, [MPG Block Library](#).

3.10 Abandoned Features



3.10.1 Layer Convention

Layer Name	Color	Linetype	Description
C-SSTR-OCSD-ABND	6	Continuous	Abandoned OC San manholes
C-SSTR-OTHR-ABND	6	Continuous	Abandoned OC San maintained manholes
C-SSWR-OCSD-ABND	10	Continuous	Abandoned OC San sewer lines
C-SSWR-OTHR-ABND	170	Continuous	Abandoned OC San maintained sewer lines
C-SSFM-ABND	4	Continuous	Abandoned OC San force mains
C-ABND-PATT	21	Continuous	Abandoned hatch pattern
C-ANNO-TEXT	31	Continuous	Annotation
C-ANNO-TEXT-BLWP	31	Continuous	Annotation in balloon blow-up

3.10.2 Graphic Elements

To create the hatch boundary:

- Offset the sewer line or force main 20 feet to each side and create a closed shape.
- Do not overlap sewer lines that are in service.
- Hatch the boundary using the following pattern.
- Delete the boundary once the hatch pattern has been created.
- Make sure the hatch pattern is on the correct layer.

Pattern	Angle	Scale
ANSI31	Varies	200
ANSI31	Varies	80 (balloon blowup)

3.10.3 Object Data

Attribute	Value	Description
STATUS	ABAND	The physical object remains in the ground but is no longer in service. The asset remains in CMMS.
	DEMO	The physical object has been removed and no longer exists. The asset remains in CMMS.
	DELETE	The physical object never existed and has been removed. The asset will be removed from CMMS.

3.11 Demolished Features

A demolished or “delete” file has been created that contains OC San assets that have been removed from the Master File, this includes abandoned manholes.

The file is stored in the **J:\facility models\model** folder.

The filename is **OCSD_C-Demo.dwg**

3.12 Annotation Guidelines

The items below are guidelines to be used placing annotation such as manhole id, pipe labels, etc.

If flow arrow will not fit between manholes and the flow can be determined from either upstream or downstream of the pipe, delete it.

Blocks are never to be scaled unless they are in a balloon blowup.

By default, the flow arrow is placed at the mid-point of the sewer line. If the flow arrow is moved, the pipe annotation and/or leader must still point to the flow arrow.

When placing manhole ID#'s or leaders, do not cross over sewer lines or other assets. Place the annotation on the same side as the asset.

Before printing a map book page check for overlapping elements i.e.; pipe annotation, leaders crossing, manhole ID's, street names, etc.

Manhole ID's should be placed horizontal.

Pipe attributes should be placed parallel to pipe. If not possible, place horizontal and use leader to mid-point of line.

Easement dimensions should follow (parallel) to boundary.

3.13 Balloon Blow Ups

Under Development

3.14 QA Reports

QA Reports consist of a series of database reports, run in succession. The reports will examine the CSV data for missing data and errors.

Report	Description
Struct_1	Are there records that do not have a valid STRUCT_1
Duplicate Struct_1	Are there duplicate IDs
Missing Inverts and manhole depth	Are there any missing invert elevations or manhole depths.
Constructed length	Is the constructed length (record drawing length) within 8' plus/minus of the real length
Slope	Using the inverts and constructed length, is the slope within tolerance
Invert match	Does the manhole upstream and downstream inverts match the sewer line upstream and downstream invert elevations?

SECTION 4 APPENDIX

The items contained within the appendix are copies of the original documents. Where ever possible the path to the original document has been provided. The original documents should be used whenever specific detailed information is required.

4.0 Field Lengths

Attribute Name	Field Length
TIF_NUM	39
SHEET_NO	7
IMAGE_AVAILABLE	1
BC_ID	12
STRUCT_1	12
OLD_STRUCT_1	1
MH_D7_NUM	12
MH_NUM_LTFM	1
STA_NUM_W_PLUS	10
STATION_EQ_YN	1
TRUNK	3
STATUS	5
ORIGINAL_CONTRACT_NO	9
DATUM_DESIGN	3
INSTALLATION_DATE	10
YEAR_RECONSTRUCTED	10
OWNER_CODE	4
AREA_DESIGNATOR_CODE	3
STREET_NAME	31
CROSS_STREET	31
STRUCTURE_LOCATION_CODE	6
DRAINAGE_BASIN_CODE	6
MH_STRATEGIC_PLAN_NUM	1
X_GRID	1
Y_GRID	1
MAP_REFERENCE	4
CAD_DRWG_INDEX	4
MANHOLE_TYPE_CODE	5
MANHOLE_LID_TYPE_CODE	6
WALL_TYPE_CODE	6
MH_SHAPE_DIMENSIONS	16
PIPE_LAT1_DIR	3
PIPE_LAT1_DROP	5
PIPE_LAT2_DIR	5
PIPE_LAT2_DROP	1
REHAB_CROSREF_CONTRACT	9
REHAB_CROSREF_SHEET	6
REHAB_DESCRIBE	131
REHAB_ISSUES	16
FIELD_201	10
FIELD_202	10
FIELD_216	9
FIELD_217	50
FIELD_218	1
FIELD_219	1

4.1 CAD Layers Mapping

4.2 Sample Memorandum

4.3 CAD Layers

4.4 MPG Block Library

4.5 Object Data Tables

4.6 Change Management Checklist

4.7 Field Discrepancy & Data Collection Sheets

4.8 OCB Standard Operating Procedure

4.9 CCTV video Files

[\\Filer-1\sewermovies\](#)

Although, securities have been set on this directory to a limited few, Administrators still have modify and write permissions. Please ensure that your team does not add or edit files and directories – as this will corrupt the relationship between this set of files and our CCTV database.

The directory currently holds 12,236 video files. Files were originally stored in the “TagNumbers” sub-directory organized by CD/DVD barcode number with the original filename from the CCTV vendor. As we rename the original files, they are moved from the “TagNumbers” sub-directory into the “SewerMovies” main directory by a batch program (which also archives the original filename in our database). Over the next few days, all of the files that remain in the “TagNumbers” directory (approx. 1000+) will be renamed and moved. The naming convention for video files in the SewerMovies directory is outlined below.

Naming Convention

- Formerly videos had all sorts of names, some examples:
 - MPEG_A_05242007_1206_1_1i.mpg
 - 133+80_128+46_090430_.mpg
 - KNT0455-0005_KNT0455-0000_091210_26.mpg
 - PC-N_DS-C_060401_1.mpg
 - OCSD C69440 050609_9_1a.mpg
 - Tape1A.mpg
- Although, renaming the video files is not necessary for our system and a future Wincan system to work, it does make it easier for a user to find a specific video without having to search our database – he or she can simply scroll to or search for a file in Windows Explorer.
- The new file naming convention looks like this (example): **RED0420-0160_RED0420-0000_20040107_0853_00101502.mpg**
 - The first two items in the name are the nodes or assets, where the survey started and where it was intended to end, in this example, the survey was started at **Manhole RED0420-0160** and is intended to end at **Manhole RED0420-0000** (the survey may be abandoned before reaching its intended end). Please note that files are not named according to upstream and downstream manhole – but named according to survey start and survey end.
 - The third item is the survey date, in this example 20040107 is **January 7th, 2004**.
 - The fourth item is the survey time, in this example 0853 is **08:53 AM**.
 - The fifth and final item is the video identification number, **#101502**, which is used in our database to track specific video files and as a relation to future Wincan survey numbers.
 - It’s possible for some of the above information to be unavailable, e.g. the start/end assets, date or time - which can result in one of the following (note the video number is always available, i.e. all videos have a number):
 - -----_-----_20040107_0853_00101502.mpg (No assets, i.e. the video location is unknown)
 - RED0420-0160_RED0420-0000_-----_-----_00101502.mpg (No date/time, i.e. the video date and time is unknown)

- **RED0420-0160_RED0420-0000_20040107_----_00101502.mpg** (No time)
- **-----_-----_20040107_----_00101502.mpg** (No assets or time)
- **-----_-----_-----_00101502.mpg** (No assets or date/time)