

# IMMOKALEE WATER & SEWER DISTRICT

1020 SANITATION ROAD

IMMOKALEE, FL 34142

TELEPHONE (239) 658-3630

## STANDARDS FOR DESIGN AND RECORD ELECTRONIC DRAWINGS

**PURPOSE:** To establish standards for digital format of submitted design and record drawings for utility improvements to the Immokalee Water & Sewer District system and to allow efficient migration of the data to the District's or Collier County's geographic information system (GIS).

**INTRODUCTION:** AutoCAD is an accepted software for electronic drawings for design and record drawings and offers statewide and national standards, including layering of information. The intent of the layering standard is to promote consistency between drawings and maximize the reusability of drawing data. The effective use of layering standards also facilitates the efficient transfer of data to shared graphical information for display, editing, and plotting purposes. Layer naming conventions must be followed for approval.

### 1) AutoCAD Standards Information:

- a) File format: AutoCAD 2023, Civil 3D 2023, or compatible.
- b) Refer to the National CAD Standards (NCS) for AutoCAD files standards at:  
<http://www.nationalcadstandard.org/ncs5/about.php> for latest edition and layering guidelines.

### 2) Requirements:

The deliverables must follow Map Projection, Horizontal, and Vertical Datum requirements as below.

- a) Map Projection:
  - i) All projects, independent of approval date, must be submitted in the correct coordinate system - State Plane, Florida East FIPS 0901, US feet, geographic coordinate system GCS North American 1983.
  - ii) If any record is submitted in a different coordinate system, or no coordinate system, it will be rejected and returned to the applicant. It will require further manipulation to meet the standards required for record electronic files before receiving project approval or acceptance for turnover.
- b) Horizontal Datum: State Plane, Florida East FIPS 0901, US Feet, geographic coordinate system GCS North American 1983.
- c) Vertical Datum: North American Vertical Datum — NAVD 88.
- d) Survey Accuracy: All survey data shall be done according to the Minimum Technical Standards as stated in 61G17-6 of the Florida Administrative Code pursuant to Chapter 472 of the Florida Statutes. For record surveys of underground utilities, an accuracy of 0.25 feet (three inches) both vertically and horizontally is required at location points which shall be no more than 100 feet apart along installed utility lines except where field conditions limit the frequency of points that can be reasonably located and at all junctions and changes in direction.
- e) Map Accuracy: The contractor must adhere to USGS National Map Accuracy Standards (NMAS) for all mapping work as referenced at this link: <http://nationalmap.gov/standards/nmas647.html>
- f) Accepted software applications: AutoCAD 2023, Civil 3D 2023, or compatible.
- g) Data Delivery Media: Acceptable delivery media of digital files are email or via link to a download (from FTP site, drop box, etc.) only.

### 3) Drawing Composition:

- a) All AutoCAD drawings shall be purged of empty, unused, or non-essential drawing data prior to submittal to Immokalee Water & Sewer District. This includes all unused layers, linetypes, blocks, fonts and entities.
- b) AutoCAD drawings shall not contain any frozen layers. All unused entities on frozen layers should be erased, and the empty layers purged.

# IMMOKALEE WATER & SEWER DISTRICT

1020 SANITATION ROAD

IMMOKALEE, FL 34142

TELEPHONE (239) 658-3630

- c) AutoCAD drawings shall not contain multiple overlaid lines or lines with multiple segments unless the overlaid lines or adjacent line segments are assigned to different layers.
- d) Survey data shall be included in the AutoCAD drawings as COGO Points in the datum listed above and shall be placed on the appropriate layers.
- e) Survey reference points and benchmark data must be clearly labeled with their coordinate values on the plan set.

#### 4) Entity Properties:

To ensure the integrity of the original drawing when viewing or printing, it is essential that AutoCAD entities are created following these standards:

- a) Entity colors shall be defined by layer, not by entity.
- b) Blocks shall be defined (created) on layer 0 (zero).
- c) All attributes shall be defined on layer 0 (zero).
  
- d) Layer property naming for utilities should include the utility system, material, and size. If the infrastructure being represented existed prior to the project, it should also be clarified in the layer name (EX).

#### 5) Auto CAD Model Space and Paper Space Usage:

These guidelines are suggested for using Model Space and Paper Space effectively:

- a) Place title blocks, schedules and general notes at full-scale in Paper Space whenever possible.
- b) Label scaled viewports with the appropriate scale in Model Space.
- c) Do not place or draw model-related blocks, tags and objects in Paper Space.
- d) Draw all Model Space objects at full scale.
- e) Scale objects using Paper Space viewports — zoom viewports to the appropriate scale.
  
- f) Drawing units should be set to decimal or engineering.

#### 6) External References - XREF's:

External References (XREF's) contained in AutoCAD drawings created outside of Immokalee Water & Sewer District can result in content discrepancies in the delivered drawing set. In some cases, XREF's may be permissible; however, this arrangement must be worked out in advance with Immokalee Water & Sewer District. To ensure the integrity of the drawing set and minimize potential problems:

- a) AutoCAD drawings submitted to Immokalee Water & Sewer District shall not contain any XREF's.
- b) XREF's shall not be "bound" to drawings prior to delivery.
- c) If drawings contain XREF's, they should be inserted as blocks prior to submittal to Immokalee Water & Sewer District. Layers contained in XREF's inserted as blocks shall conform to Immokalee Water & Sewer District standards.

#### 7) AutoCAD Drawing Support Files:

Drawings created using *non-standard* AutoCAD fonts, linetypes, and hatch patterns can result in content discrepancies in the delivered drawing set. To ensure the integrity of the drawing set, and minimize potential problems:

- a) Only native AutoCAD or AutoCAD Civil 3D fonts, linetypes, and hatch patterns or the CAD Symbology provided by the National CAD Standards are allowed.

# IMMOKALEE WATER & SEWER DISTRICT

1020 SANITATION ROAD

IMMOKALEE, FL 34142

TELEPHONE (239) 658-3630

- b) Custom fonts, linetypes, and hatch patterns, including those provided by 3rd party software, shall not be used.
- c) Only these TrueType fonts shall be used: Arial, Courier New, Times New Roman.
- d) Postscript fonts shall not be used.

## 8) File Transmittal:

The content of electronic CAD drawings provided must match the delivered signed and sealed PDF set as closely as possible—if not exactly. To ensure the integrity of the electronic drawing set upon delivery to Immokalee Water & Sewer District:

- a) Ensure the drawings adhere to the guidelines presented in this document. Review the procedures for preparing drawings for submittal as detailed in the preceding paragraphs.
- b) Include a digital index containing filenames and sheet numbers for each submittal. This ensures the completeness of the drawing set and assists in archival procedures. (See item 10 below)
- c) Include a transmittal sheet with all submittals indicating Immokalee Water & Sewer District project number, project name and a complete listing of all items submitted.
- d) Include AutoCAD .PC2, .PCP or .CTB plot configuration files.
- e) Include all field survey data as indicated in Drawing Composition, Section 3 above.
- f) Submit PDF scanned copies of original contractor "red line" plans and specifications.
- g) All electronic PDF copies of civil and site plan must be sealed and signed by a Licensed Surveyor or Professional Engineer and clearly marked, such as "90% Design", "Record", etc.
- h) When digitally signing and sealing, your digital signature and seal, with the date the document was sealed, should appear on the first page of the engineering document. When electronically signing and sealing, your electronic signature and seal, with the date the document was sealed, should appear on the signature report. With either of these methods, a title block should appear on each sheet of the document. This should adhere to the most recent version of the FBPE chapter 61G15-23. (<https://fbpe.org/legal/statutes-and-rules/>)

## 9) The following documentation shall be delivered to Immokalee Water & Sewer District at the following project milestones:

- a) Design - Schematic/Preliminary/Working Drawings: A complete set of Review Documents in AutoCAD in DWG format for Auto CAD and in PDF format for review of conformance to these CAD Standards by Immokalee Water & Sewer District. During the preliminary and design phases of the project, review staff that review the design may use the DWG format and PDF format to provide design/conceptual comments/questions.
- b) Pre-Construction: CAD drawing files in DWG format for AutoCAD and project specifications in PDF format shall be submitted to the Immokalee Water & Sewer District.
- c) Record Drawings: Engineer of Record shall submit, in digital formats, project Record Documents to the Immokalee Water & Sewer District as part of the project turnover and acceptance procedure. The submittal shall contain the record information on the project, with the drawings in AutoCAD DWG and Adobe PDF formats.
- d) Record GIS Information: The developer will also provide record information data from the record CAD drawing files as individual shapefiles for the following features:

(1) Water Mains, by line size

(2) Water Valves, by size

# IMMOKALEE WATER & SEWER DISTRICT

1020 SANITATION ROAD

IMMOKALEE, FL 34142

TELEPHONE (239) 658-3630

- |                           |                                 |
|---------------------------|---------------------------------|
| (3) Water Tees            | (11) Manholes                   |
| (4) Water Reducers        | (12) Sewer Service Lines        |
| (5) Water Caps            | (13) Lift Stations              |
| (6) Casing Pipes          | (14) Force Mains, by line size  |
| (7) Hydrants              | (15) Force Main Valves, by size |
| (8) Water Service Saddles | (16) Irrigation Service Lines   |
| (9) Water Service Lines   | (17) Irrigation Meters          |
| (10) Water Meters         |                                 |

## 10) Digital File Index:

Each project must be accompanied by a digital project file index. The index can be submitted in Word or Excel formats. Each index should contain the following —

- a) Organization/Company name.
- b) A contact name and position.
- c) Street address.
- d) City.
- e) State or province.
- f) Postal/Zip code.
- g) Country.
- h) Phone number.
- i) Fax number.
- j) Email address.
- k) Technician's entry end date of the data/design.
- l) Filename
- m) Sheet Number