



citizens
energy groupTM

DIGITAL DATA SUBMISSION STANDARDS

Procedures and Guidelines

2014

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Introduction

Citizens Energy Group (CEG) has adopted Geographic Information System (GIS) technologies to store, manage, and maintain its assets. The design industry has implemented computer aided design and drafting (CAD) as a design/production tool. It is the goal of CEG to implement these technologies to expedite the design and review processes within the administration, by developing standards and procedures for integration of digital engineering CAD drawings into the GIS environment while maintaining the integrity and positional accuracy of the data. CEG will require Digital Plan Data and Digital GIS Data to be submitted based on the standards set forth in this document.

Note: This document is in reference only to Citizens Energy Group assets superseding any and all City of Indianapolis Department of Public Works Digital Submission Standards in regards to Sanitary, Water, Gas, and Thermal assets. Refer to City of Indianapolis Department of Public Works Digital Submission Standards for assets such as Storm, Pavement, etc.

Definitions and Terms

CEG: Citizens Energy Group

CEG Project Manager: CEG Project Manager responsible to maintain project schedule, scope, and communications with consultants and contractors

GIS Specialist: CEG staffer responsible for reviewing all digital submittals to ensure they meet GIS guidelines

Design Consultant: The firm contracted with CEG for project design

Records Specialist: CEG individual assigned to manage the Records Archives

Design Consultant Project Manager: Project Manager assigned to project by consultant/developer for management of project design, coordination, and as-bid/as-built documents

Inspection Consultant: Firm contracted in Professional Services Agreement with CEG for project inspection

Inspection Consultant Project Manager: Project Manager assigned to project by Inspection Consultant to inspect project construction

Resident Project Representative (RPR): On-Site representative from Inspection Consultant who coordinates/reports construction activities and inspection of those activities.

Conformed: An updated set of drawings and CDs reflecting all formal changes issued by addenda during bidding; prior to construction.

As-Bid Plans: Raster Plans for bidding/construction of a project (pdf, tif, etc.). Set shall be conformed to include addenda and revisions made during bidding phase. Pdf files created from CAD software, they must be “flattened” to protect the document from any possible revisions.

As-Bid Digital Plan Data: Conformed digital files of construction documents used for bidding/construction. This will include all CAD drawings, external references, fonts, plot configurations, etc. Also included within this data will be Excel attribute tables to remain as received to be provided to Inspection Consultant.

As-Built Drawing: “Redline” markup plans from Contractor; RPR/Inspector will perform a review of the information.

Record Drawing: Revised drawing created by Design Consultant/Developer, which reflects information from RPR/Inspector approved As-Built drawings.

Record Plans: Raster plans of as-built conditions (pdf, tif, etc.). These may be scanned raster with hand marked comments and dimensions from the RPR or electronically created raster created from a CAD platform. It is the discretion of the Consultant/Developer to create “redlines” implementing graphics software. Pdf files created from CAD software, they must be “flattened” to protect the document from any possible revisions.

Record Drawing Digital GIS Data: Digital Data submitted by the Inspection Consultant, meeting digital standards, representing the project as it was built in the field

Pdf files created from CAD software (not scanned), must be “flattened” to protect the document from any possible revisions.

Reference Documents

1. CEG – To be determined

Digital Data Submission Process

1. Digital Requirements; (CEG Project Manager)

A copy of the Digital Submission Standards, Excel files, CD label template, and sample CAD file prepped for GIS entry shall be provided to the consultant/developer. Upon the request of CEG Project Manager, the GIS Specialist shall provide all GIS data and database files needed.

2. As-Bid Plans; (Design Consultant/Developer Project Manager)

Once the project has been awarded or bid, two copies on disc, containing the conformed specifications, As-Bid Digital Plan Data and As-Bid Plans, along with one set of plotted As-Bid plans are to be submitted from the Design Consultant/Developer Project Manager to CEG Project Manager.

3. Receiving As-Bid Digital Submittals; (CEG Project Manager)

The CEG Project Manager ensures all As-Bid submittals are received, reviewed in regards to the approved design, and provides documentation back to the Design Consultant/Developer to the status of “Accepted” or “Not Accepted”. If any of submittals are found to be “Not Accepted”, the submittals with comments will be returned to the Design Consultant/Developer Project Manager to correct and re-submit until the submittal is “Accepted”.

Once the submittals are accepted, the CEG Project Manager provides a copy of the As-Bid Digital Submittal and a set of As-Bid Plans to the Inspection Consultant Project Manager or RPR for use in developing Record Drawing Submittals. A second copy of As-Bid Digital Submittal is uploaded into CEG’s “Unifier” project management and repository application by the CEG Project Manager.

4. As-Bids to Record Drawings; [Resident Project Representative (RPR)]

Once the project is constructed, the Design Consultant/Developer revises As-Bid Digital Data and Plans to represent the project as constructed. These digital plans are considered the Record Drawing Digital Data and Plans. An inspection firm shall coordinate with the Design Consultant/Developer to obtain these documents.

At the completion of the project, the Inspection Consulting Firm must submit two copies on disc, containing Record Drawing Digital Plan Data and Record Drawing GIS Data, and one set plotted Record Drawing Plans to the CEG Project Manager. These submittals must be checked and accepted prior to final payment to the Inspection Consultant. Attribute tables are not required to be populated at this time.

5. Receiving Record Drawing Digital Submittals; (CEG Project Manager)

The CEG Project Manager will review the pdf/tif plans for clarity and checking all calculations, providing final quality control prior to GIS entry. Once the quality control process has been completed, which consists of an engineering review of the design, the CEG Project Manager will forward the files to a CEG GIS Specialist. The final review by the CEG Project Manager will provide a baseline set of data for the CEG GIS Specialist to check against during data entry. CEG GIS Specialist will then review submitted files for acceptance in regards to GIS Digital Submission Standards, which includes review of final CAD data and populated excel attribute tables.

6. Reviewing and Storing Record Drawing Digital Submittals; (GIS Specialist)

If any of the submittals are found to be not in compliance, a letter will be provided, copying the CEG Project Manager, listing which elements generated a “rejection”. Consultant/developer shall correct and re-submit until the submittal passes and a letter of “approval” are issued.

Once the submittal is accepted, the GIS Specialist will begin entry of assets and data into the GIS databases. Once completed, the CEG internal processes will begin in archiving and storage of submissions.

Contents of Digital Data Submission

Projects will require a set of Record Drawing Plans. Digital Plan Data is required for both the As-Bid Digital Data Submittal and the Record Drawing Digital Data Submittal. If a project includes adding new infrastructure or altering or removing existing infrastructure, Digital GIS Data will be required only for the conformed Record Drawing Digital Data Submittal. All modifications to these files are to be completed by the Consultant/Developer.

Standard transfer media will be accepted. This includes CD-ROM and DVD disks. The disks shall be properly labeled using the provided CD label template with the following information, if applicable.

- CEG project number
- Project name
- Type of submission (As-Bid or Record Drawing)
- CEG Project Manager or contact name
- Name of the firm or organization creating the submittal and contact name
- The submittal/creation date of the media

As-Bid Digital Data Submittals, two copies of a disk containing the following shall be required:

As-Bid Digital Plan Data: Digital files of the conformed construction document plans issued for bidding. The digital data shall be in a .dwg or .dxf file format AND in either Adobe Acrobat (.pdf) or Tagged Image File (.tif) format. Completed attribute tables are not needed with this submission; tables will be populated within the Record Drawing Digital GIS Data submission step.

Record Drawing Digital Data Submittals, two copies of a disk containing the following shall be required:

Record Drawing Digital Plan Data: Digital files of the Record Drawings representing the project as constructed. Digital data is to be Adobe Acrobat (.pdf) or Tagged Image File (.tif) format. When adjusting plans to reflect project as it was constructed, the original design is to be left intact and modification to actual construction information shall be marked up as cross-outs and/or revision clouds. It is also acceptable to adjust the plans by hand so as long as any mark-ups are clear and legible. As an option, electronic redlines may be created using a graphic software package. The mark-ups done by hand should be scanned so that the final version is in a .pdf or .tif format.

If project is non-capital and assets are to be owned and operated by a private company individual, association, or organization, PDF plans are to be stamped "PRIVATE" on each sheet submitted.

Record Drawing Digital GIS Data: Digital Data submitted by the Inspection Consultant/Developer shall be prepared per the most recent Digital Data Submission Standards provided through Citizens Energy Group. These documents shall represent the project as it was constructed. It consists of an overall map showing the new, altered, or removed infrastructure (to include manholes, pipes, lateral stubs, pressure pipes, pump stations, etc.) and any applicable attribute tables. The digital data shall be in a .dwg, .dxf, or .dgn file format. It is not necessary to submit all CAD files and External References along with the final modified horizontal alignment. These files are not incorporated into GIS or archived.

When submitting GIS data, the following files must be provided to pass the review:

- CAD format file of as-built locations, must be in *State Plane East projection, NAD 1983 State Plane Indiana East, US Feet* (refer to supplied CAD file for layers and annotation placement)
- pdf/tif format file of record drawing plans
- Excel attribute tables filled out completely and without any modifications

Detailed Requirements

CEG shall provide the Design Consultant/Developer with the following:

- Copy of Digital Data Submission Standards in Adobe Acrobat (.pdf) format.
- Excel files to be used for the entry of attribute information.
- Sample CAD file
- GIS Data as requested, to be made through CEG's project manager

Digital Plan Data Requirements

With each Digital Data Submission, the appropriate As-Bid or Record Drawing Digital Plan Data is required. An Adobe Acrobat (.pdf) version of the drawing sheets is to be included in the As-Bid and Record Drawing Digital Submittal. A conformed CAD version of the working drawings, including title sheet, details, plan/profile sheets, cross-sections, etc., is to be included in the **As-Bid Digital Submittal** only. The CAD version of the working drawings is not subject to the Digital GIS Data Requirements. These drawings will be checked for their ability to be opened and read, for their format, and their completeness. Specifically, the following requirements should be met:

- An index of drawings, preferably in a text or Adobe Acrobat (.pdf) format.
- The complete original CAD drawing files in dwg or dxf format shall be provided to CEG. The CAD design drawings shall also be submitted in Adobe Acrobat (.pdf) or Tagged Image File (.tif) format.
- Only drawings relevant to the project's phase of submittal shall be included. Do not include drawings or documents that would not normally be included in the set of printed drawings, except for base drawing(s) or drawing(s) to be externally referenced.
- Do not use symbols or linetypes, in CAD drawings, from third-party software as some of these will not be visible by the CEG GIS when opening the drawings.

Digital GIS Data Requirements

With each Digital Data Submission, the appropriate As-Bid or Record Drawing Digital GIS Data is required. Submittals require an overall plan view of the affected construction area to be submitted in one encompassing drawing file showing the new construction, deletion or alteration of existing infrastructure and its related properties. More specifically, if infrastructure impacted during construction is returned to its original condition, these features need not be included as a part of the Digital GIS Data. To keep the GIS system up-to-date, CEG only wishes to receive new information. Therefore, only the changes to infrastructure are required to be shown.

The submitted drawings **are** subject to the requirements of the Digital GIS Data Requirements, and will be used by the CEG GIS department to input data into the system. These Digital GIS Data Requirements apply to the process of creating the proposed or altered features within the overall plan drawing. These must be adhered to in order for the data to be efficiently input in the GIS system.

Listed Below is the requirements for the submission of As-Bid and Record Drawing Digital GIS Data as required for CEG projects.

As-Bids (Design Consultant/Developer)

- **Complete set of conformed construction documents. (pdf/tif formats)**

This set shall include all sheets in drawing set used for construction of projects. These will be passed to Construction Inspection firm/RPR for reproduction and documenting field notes during construction of project. Included in this set shall be and not limited to: cover sheet, plan index, general notes, plan and profile sheets, standard details, erosion control, and maintenance of traffic plans (if required).

- **Complete set of conformed construction documents. (dwg/dgn/dxf formats)**

This set shall include all CAD related files for construction. These will be passed to Construction Inspection firm/RPR for creation of Record Drawings and data submitted to be turned in for entry into GIS. Included in this set shall be and not limited to: cover sheet, plan index, general notes, plan and profile sheets, standard details, erosion control, and maintenance of traffic plans (if required). All required external reference files must also be submitted. External reference files shall include and are not limited to: drawing frames, existing survey, proposed improvements, proposed easements, and proposed abandoned features (if required). Engineer seal and signature must be removed from files if placed in electronically.

Record Drawings (RPR/Consultant/Developer)

- **Complete set of corrected construction documents. (pdf/tif formats)**

This set shall include all sheets in drawing set used for construction of projects. These were provided to Construction Inspection firm/RPR for reproduction and documenting field notes during construction of project. It is required for all field measurements and corrections to be provided on this set of plans. It is at the discretion of Construction Inspection firm/RPR as if these are modified by clearly handwriting changes or performing edits to provided CAD files or electronically created redlines within the pdf file. Included in this set shall be and not limited to: cover sheet, plan index, general notes, plan and profile sheets, lift station design/details, standard details, erosion control, and maintenance of traffic plans (if required).

- **Digital GIS file of all constructed/modified features. (dwg/dgn/dxf formats)**

Modified CAD file showing corrected locations of designed features, connections to existing features, required annotation, and other pertinent information regarding final constructed locations. Requirements for this file are as follows:

- a) All information for new or altered elements in the project and all accompanying geodetic control shall be placed into one CAD file. The features in drawing files will be translated to real world locations. The geodetic control chosen must correspond to the existing features CEG GIS (*State Plane East projection, NAD 1983 State Plane Indiana East, US Feet*).
- b) Acceptable control includes section corners and quarter section corners. State Plane coordinates exist for most quarter section corners in Marion and surrounding counties. Control assistance can be obtained by contacting the County Surveyor's Office. It is a requirement that the control used be referenced and shown in the plan drawing. If point of control is located *within* the project limits, it should be symbolically indicated and annotated in the design file. If the nearest control is located well *outside* of the project area, then it should be tied to another geodetic control points used, and a reference tie annotated and indicated. Any land survey information, such as basis of bearings and or any assumptions must be submitted and annotated on the submitted file.
- c) Features shall be submitted on the specified layer shown below. CAD systems which use a numbering system for layers instead of names shall also include a conversion chart explaining which layer number corresponds to the appropriate GIS layer name:
 1. Sanitary Structures (SANSTR)
 2. Sanitary Sewer Mains (SANSEWER)
 3. Sanitary Laterals (SANLAT)
 4. Sanitary Easements (SANEASE)
 5. Geodetic Control (CNTRL)
- d) Altered existing features shall use a different color than the new/improved infrastructure. It is at the discretion of the submitting firm as to colors.
- e) Only layers that contain data shall be included in submission.
- f) All sanitary lines are to be entered as a single line between structures, as opposed to double lines or a continuous polyline running through structures. Each sewer section between structures must be a separate single line segment. Avoid using polylines, except where turns in the line do not have structures present, i.e. along force mains or instances where flexible pipe is used to follow a curved path. Lateral stubs shall be drawn from the right-of way perpendicular to sanitary main.
- g) All sanitary lines must be digitized in the direction of their physical flow. The beginning point of the line shall be its upstream end and the ending point shall be its downstream end.
- h) All lateral lines shall be drawn from the right-of-way perpendicular to the sanitary main. End point of lateral shall snap to the main collector linework.
- i) Structures and the endpoints of lines shall be input as points or nodes only.
- j) The end points of sewer lines shall be snapped to nodes.
- k) New or altered infrastructure features, such as manholes and runs of sewer pipe are to each have a unique identifying number, DSGN_ID (Design Identification) shown in the drawing. For existing infrastructure use CEG established UNITID (Asset Identification – CEG assigned) for those structures.
- l) It is required that a single segment (the portion of sewer line between two structures) of sanitary sewer have the exact same UNITID/DSGN_ID as its upstream structure.
- m) The UNITID/DSGN_ID should be visible on the drawing in a standard font and the lower left-hand corner of the text should touch the point or linear graphic feature to which it corresponds, unless legibility requires that the label be moved and accompanied by a leader arrow.
- n) Do not use AutoCAD “leaders” as these are not visible to GIS. Instead, use a simple line on a separate layer apart from those used by CEG GIS.
- o) Miscellaneous features and text (except UNITID/DGSN_ID) should be placed on separate layers, apart from those used by CEG GIS.

Note: Existing sewer facilities found on site/in the field may not be present within the GIS data provided and should be identified and noted as such when submitting the Digital GIS Data drawing by inserting text or a callout on a layer apart from those used by CEG GIS.

Attribute Table Requirements

Many of CEG's sanitary features have a significant number of descriptive attributes stored in databases. These attributes are derived from the plans submitted to CEG. The submitting Design Consultant/Developer will be provided approved Excel format tables by the CEG Project Manager. These tables contain all fields and validated data which is needed to be provided to CEG regarding new or modified sanitary assets. The files have been developed implanting data validation and embedding formulas to assist with proper population.

Each record in the file shall be assigned a unique DSGN_ID, which will correspond to text labels in the CAD file showing the referenced feature. The unique numbers for each feature shall be listed within the DSGN_ID column, with the corresponding attributes for each feature provided in the corresponding rows. This will allow CEG GIS personnel to sort and import this data into GIS and assign them to appropriate features imported from the submitted design file. All attributes are required for new or modified features.

The Excel files shall be returned in the same file format as was given, and any modifications to table structure and/or format will result in an immediate rejection of the submission. Each table provided contains a second tab which describes the field name and contents. All attribute fields with a 'YES' flag under the 'Required' column must be populated with the appropriate data for us to accept the entire drawing.

Checklists

Digital GIS Data Requirements & Attribute Table Check Lists

Check lists are provided at the end of this document in pdf format. Check lists must be printed out, completed, and provided with submission.

Revision History

- Released for Approval within Citizens Energy Group – 9/12/2013
- Removed “LAT” and “LAT_TYPE_CODE” columns from “CEG San Lateral” Excel attribute table – 10/02/2013
- Added “ADDRESS” column to “CEG San Lateral” Excel attribute table –3/17/2014
- Removed “DPW” and “IMAGIS” from “Definitions and Terms” section – 3/17/2014
- Removed “DPW” items from “Reference Documents” section – 3/17/2014
- Removed footnote under “Digital Data Submission Process, Items 1” – 3/17/2014
- Removed footnote under “Digital Data Submission Process, Items 6” – 3/17/2014
- Added footnote under “Record Drawing Digital Plan Data” section – 3/17/2014
- Under “Digital GIS file of all constructed/modified features. (dwg/dgn/dxf formats)” section – 3/17/2014
 - General revision item “b”
 - General revision item “c”
 - Added item “h”