

SECTION 01 78 29**AS-BUILT DOCUMENTATION****PART 1: GENERAL****1.01 AS-BUILTS**

Where identified as a product of the Work, provide as-built drawings adhering to the criteria provided here and in the special conditions.

- A. Recording the Information – Provide the Record As-Built information in both Electronic and Hardcopy mediums, with the exception of the Field Sketches. The Field Sketches are not required to be in the electronic format. The electronic medium format shall be specified by American Water in the RFP or during the preconstruction meeting.
- B. Coordinate System and Datum – Specified in RFP. Provide the required survey coordinates captured through traditional survey or post-processed or RTK GPS (survey or GIS mapping grade). GPS locations captured with a recreational GPS receiver that does not allow for post-processed or real time correction will not be acceptable. The drawing features included shall be as noted herein.
- C. Submitting the Information – When the Record information is ready, submit Electronic and Hardcopies of all the information, including sketches to the AW Project Manager for approval. All files associated with the post-processing of GPS data including raw and post-processed GPS data shall be included in the submitted deliverable to AW (if required). These files can include but not be limited to: .ssf GPS data, import files, export files, and correction files.

A GIS Mapping As-Built may have predetermined milestone project deliverables. The delivery schedule shall be determined by AW Project Manager during the preconstruction meeting.

The electronic information shall be burned on a CD (CD-RW). The CD shall be labeled with the following information:

American Water (*State and District*)
Facility (Installation Name)
Project (*Name*)
(*Street*) and (*Town*)

- D. The Information Process - The AW Project Manager will approve the submission and 'red line' any information needing to be corrected or added, and return it for resubmission. When the submittal is approved by the AW Project Manager, the contractor shall provide two CD-RW's each containing all approved Record As-

Built information in a clear face hard plastic CD jacket and one hardcopy of all approved Record As-Built information (binder clipped together, not bound)

Initial submission must be provided within (14) calendar days of the 'Construction Completion' date, not including the restoration work. The AW Project Manager will return the submission within (7) calendar days of receipt. The approved final submission must be provided within twenty-eight (28) calendar days from the 'Construction Completion' date, not including the restoration work.

PART 2: PRODUCTS

2.01 Types of As-Built Formats

Type of work performed will determine which as-built format deliverable is required. Format will be indicated in the RFP.

A. **Red-line Markups (field sketches)** – Required on smaller projects where all project information can fit on one drawing (i.e. service connection to a building).

1. Markups drawn on an AW basemap or drawing provided by Base DPW/ACE. If no map provided, a GPS coordinate located on drawing of general project area and nearby streets and buildings clearly noted for reference.
2. Red-line drawing not required to be to scale.
3. North Arrow on drawing.
4. Measurements in feet from known fixed locations (i.e. building corners, curbs) to all valves, fittings, hydrants or manholes.
5. AW Project name, project ID, date, contractor name and contractor contact information provided on drawing.
6. Provided in Adobe .pdf format in either A size (8.5 x 11 in) or B size (11 x 17 in) page.

B. **Construction Drawing Set** – Required for most non-phased construction projects.

1. Signed and sealed drawings supplied in AutoCAD 2010 or newer version specified in RFP. The base drawing shall be drawn in Model Space at a scale of 1 to 1, in real world coordinates and all plotting, labeling and dimensioning shall be drawn from Paper Space. Templates shall not be modified or resized due to Optical Scanning requirements. The layering convention and color scheme shall follow the samples provided.

2. Number of hard copy drawing set(s) delivered to be determined at preconstruction meeting (minimum of 1)
3. All asset locations (including but not limited to mains, sewer lines, hydrants, valves, fittings and junctions) collected through traditional survey or GPS survey (mapping or survey grade). All GPS locations shall be collected with real-time correction or post processed with differential correction software, i.e. Trimble Pathfinder Office (most current version).
4. All assets taken out of service and abandoned or demolished shall be clearly denoted and labeled as such on the plans.
5. All assets (including but not limited to mains, sewer lines, hydrants, valves, fittings and junctions) shall be clearly represented on drawings with coordinates and top of surface and/or invert elevations (when applicable) labeled on drawing.
6. As-builts shall be provided with +/- 1' horizontal accuracy and +/- 0.1' for vertical accuracy unless otherwise specified in the RFP or during the preconstruction meeting.
7. Output GPS files (.ssf), import logs and correction files, including raw and post-processed data of each GPS survey, shall be included in deliverable.
8. Coordinate system and horizontal and vertical datums of deliverable specified in RFP.
9. Drawing set meets the "Plan Review and Approval Requirements" of the American Water Design Guide for Water and Wastewater Facilities.

C. **GIS Mapping Format As-Builts** – Required for multi-phased projects constructed over large areas of the military installation over several months or years. These projects require coordination between AW and the contractor to deliver accurate as-builts that adhere to the military requirements and meet AW quality standards.

1. Deliverable comprised of construction drawing set, derived from GIS in .pdf format, and GIS data in a file geodatabase format including .mxd map project (and associated map files, i.e. .lyr files) files for all maps in the construction set. Hard copies of the drawing set shall be provided with the deliverable. Number of copies determined during the preconstruction meeting or as specified in the RFP.
2. All GIS deliverables created and delivered in most current ArcGIS version, unless specified by AW.

3. All asset locations (including but not limited to mains, sewer lines, hydrants, valves, fittings and junctions) collected through traditional survey, mapping or survey grade GPS. All GPS locations shall be collected with real-time correction, and post processed with differential correction software, i.e. Trimble Pathfinder Office (most current version).
4. All assets taken out of service and abandoned or demolished shall be clearly denoted and labeled as such within the GIS mapping system as a separate layer.
5. As-builts shall be provided with +/- 1' horizontal accuracy and +/- 0.1' for vertical accuracy.
6. Output GPS files (.ssf), import logs and correction files, including raw and post-processed data of each GPS survey, shall be included in deliverable.
7. Coordinate system and horizontal and vertical datums of deliverable specified in RFP.
8. Attribute data format outlined at pre-construction meeting. Format will follow Department of Defense SDSFIE 3.0 unless otherwise specified by AW during the preconstruction meeting. Required asset details will be specified in a GIS As-Built Scope of Work document which will be finalized by the AW Project Manager after the preconstruction meeting.
9. Delivery schedule of GIS data determined at pre-construction meeting.
10. FGDC compliant metadata included using AW template provided.
11. Drawing set meets the "Plan Review and Approval Requirements" of the AW Design Guide for Water and Wastewater Facilities.

PART 3: EXECUTION

- 3.01 General information required – At a minimum, all As-Built record drawings shall contain the following information:
 1. North Arrow with North at the top of the drawing.
 2. Face of curb lines, easement lines, edge of pavement (EOP) or right-of-way lines.
 3. All objects located shall be referenced to other objects with (3) perpendicular measurements. All such measurements shall be from

permanent existing structures, such as catch basins, manholes, buildings, etc. (no utility poles).

4. The proposed pipeline 'line' designation shall be shown in bold or heavier line style per template and sample.

3.02 Additional information required – At a minimum, all As-Built record drawings shall contain the following information:

1. Title Sheet (including American Water location, Project Name, Design Consultant Engineering Company name, Project date, County and Town.
2. Each drawing shall include only the work along one street block (transmission mains excluded), and the intersecting street corners with the distance to the center line of each intersection. Include Match Lines if multiple drawings are required.
3. If more than one drawing is required, include an overall site plan of the whole project with a drawing key.
4. Pipe diameter and material
5. Bill of Materials with arrow identifying where installed
6. Date the water main was put 'In-service' (data provided by AW Project Manager or Utility Manager)
7. Include valve, hydrant and tap/service identifying numbers for each. Numbering system data to be furnished by AW during the design and/or review process.
8. Reference the Point of Connection where the new main pipeline connects to existing AW facilities and provide dimensions to nearest existing appurtenance.
9. If project continues from an existing stub, a dimension from the center line of the nearest street intersection and existing line valve shall be included. Provide coordinates for the referenced existing valve.
10. If the project is a continuation of a previous project, reference the previous project reference number.
11. All valves, tees, manholes, vaults, hydrants, lift stations, horizontal/vertical bends, restraint locations, and the start and end of the new water main and sewer lines shall be located **with coordinates** in the specified format and identified and labeled on the Drawings.
12. All rim and invert elevations for manholes shall be labeled on the as-builts unless specified by AW Project Manager to not be collected.

13. The invert in, invert out, and slope of all gravity sewers shall be labeled on the as-builts unless specified by AW Project Manager to not be collected.
14. All connections, wet cuts and fittings not required to have coordinates shall be dimensionally located.
15. Indicate abandoned pipe with type of material and length (if applicable).
16. Indicate and locate buried valves (if applicable) with coordinates in the specified format.
17. Contractor shall provide a GPS or traditional survey line location every 100 LF, unless otherwise specified by AW Project Manager.
18. At abrupt changes in pipe elevation, provide a referenced drawing showing the profile of the work and list the material used.
19. Provide the depth from finish grade to top of pipe every 300 lf, and at the start and end of a new main.
20. Name of Contractor and Construction Inspector (full last name) on the project (locate in title block)
21. For projects where buildings are constructed, as-built plans shall include detailed mechanical drawings of all interior appurtenances, including mechanical piping, pumps, valves, and electrical boxes.
22. Projects involving the construction of lift stations shall have as-builts that denote the quantity and location of valves, piping, and all other appurtenances. In addition, the wet well operating levels shall be included on the as-built plan.

END OF SECTION 01 78 29