Public Works and Environmental Services Department
WATER AND WASTEWATER SERVICES - ENGINEERING
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MINIMUM DRAWING REQUIREMENTS FOR WATER & WASTEWATER PROJECTS

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This document approved by the Broward County Water & Wastewater Services Technical Standards Committee.



Jeremy Seiden, P.E., BCEE, PMP, Committee Chair

Title formatting

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This document describes the minimum format and content requirements for Broward County Water and Wastewater Services (WWS) to accept design, as-built, and record drawings. These requirements apply to both Capital and Private Developer Projects. This document does not describe design standards, and does not relieve the Engineer of Record (EOR) of their responsibility to comply with all State and Local regulations. This document does not describe drawing requirements for every situation, and some requirements may not apply in every case. It is the responsibility of the EOR to verify WWS acceptance of non-compliance with these requirements ahead of time for a given situation.

1.0 STATE PLANE COORDINATES

State plane coordinates shall be supplied for the Design and Record drawing submittals:

1. As used in this document, the term 'coordinate' or 'coordinates' mean northing and easting values in the NAD_1983_HARN_StatePlane_Florida_East_FIPS_0901 (US Feet) horizontal datum. All horizontal coordinates shall be sub-foot accuracy and labeled to a precision of the nearest tenth of a foot. WWS, sometimes with the help of the County Surveyor, does check the coordinates. To support checking of the coordinates, WWS may request the submittal of a metadata report that addresses the following:
    a. Identify control points used to establish the project coordinates.
    b. Provide full backup information regarding the source of the control point coordinate data and their coordinates. If the source control point coordinate datum/projection differs from the project coordinate datum/projection, then provide coordinates for the control points in both the source datum/projection and in the project datum/projection. Indicate the method and/or software/version utilized to make the conversion.
    c. Describe the method used to establish the project coordinates.
    d. Indicate the estimated accuracy of the project coordinates.

2. All elevations shall be based on the NAVD88 (US Ft) vertical datum.

3. All water and sewer structures shall be surveyed with vertical accuracy of 0.01 ft.

2.0 MINIMUM DESIGN DRAWING REQUIREMENTS – GENERAL

Note: Private Developer Projects have additional requirements – see Section 4.0

All Design drawings submitted to WWS for review shall include the following:

1. Cover sheet shall include:
    a. Name of the project
    b. WWS project number
    c. WWS assigned drawing number
    d. Name of the design firm
    e. Design firm's project number
    f. Design firm's telephone number, mailing address, and e-mail address
    g. EOR's name and Florida registration number
    h. Seal and signature of the EOR
    i. Date of the current version of the drawing set
    j. A general location map showing Broward County and major roads with the location of the project clearly identified
    k. A specific location map showing local existing and proposed roads, and the extent of the project
    l. A drawing index or key shall be included on the cover sheet or on the first sheet following the cover sheet
    m. The statement: "CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH WATER AND WASTEWATER SERVICES MINIMUM

DESIGN AND CONSTRUCTION STANDARDS. PLANS ARE IN ACCORDANCE WITH WWS MINIMUM DRAWING REQUIREMENTS DATED MARCH 11, 2021.

n. The township, range, and section of where the project is located

o. The statement: “The horizontal datum for this project is NAD-83 HARN Florida State Plane East FIPS 0901 (US Ft), and the vertical datum is NAVD88 (US Ft)”

2. Each sheet, except the cover sheet, must include:
    a. Title block
    b. North arrow to be oriented at the top right of the plan view or location map
    c. EOR’s name and Florida registration number
    d. Seal and signature of the EOR
    e. Horizontal drawing scale to be engineering scales of: 1”=10’, 1”=20’, or 1”=30’. The scale shall be selected so drawings are legible as determined by WWS.
    f. Blow-ups detail views may be required in congested areas in larger scales
    g. Horizontal scale shall be labeled in the plan view
    h. Show both horizontal and vertical scales for profile views
    i. Date of the current version of the submittal
    j. At the EOR’s option, a revision block
    k. Match lines and key plan to assist in sheet to sheet navigation

3. The drawing set shall contain an overall layout of the proposed project on a single sheet, indicating all phases of construction, existing and proposed. The overall layout shall be oriented so north is towards the top or the right of the sheet, with a north arrow clearly indicated. For drawing sets containing more than one plan view sheet, the overall layout shall show the coverage of each plan view sheet. Each sheet shall then have a keymap. The drawing set shall also include the following:
    a. All dimensions shall be in English units
    b. All information on the drawings must be clear and understandable to WWS
    c. Privately owned facilities shall be shown with the same level of detail as WWS public facilities
    d. A list of abbreviations used in the drawing set and a description for each
    e. A legend of the symbology used in the drawing set along with descriptions
    f. Each drawing sheet shall be numbered using some type of sequential numbering system so it is clear there are no sheets missing from the drawing set. The numbering system used is up to the EOR but must be understandable to WWS
    g. Each drawing set shall contain WWS Standard Details used in the design. They shall be exact copies and in compliance with WWS requirements. Verify that the standard details are the most current version as published at www.broward.org/waterservices
    h. The current version of WWS Standard Details are stored in a ZIP file and can be accessed at: http://www.broward.org/WaterServices/Engineering/Pages/MinimumDesignandConstructionStandards.aspx

3.0 MINIMUM DESIGN DRAWING REQUIREMENTS - UTILITIES

PIPING PLAN VIEWS

1. Piping plan views must adhere to the following:
    a. After the first review of the design drawings, WWS will assign and provide maintenance access structure identification labels, and lift station identification labels. They shall be included in both the plan and profile.
    b. Indicate facilities that are or will be owned by WWS versus private or other utility company facilities. Indicate the Point of Service (POS) where facility ownership becomes private per WWS standard details.
    c. WWS pipes must be shown with a thicker line type than private pipes. Pipes with diameters greater than 12” shall be represented on the plan with a line width equal to their diameter, or other method of showing the full extent of the pipe diameter.
    d. Show the design location of all proposed WWS facilities. Include the distance from right(s)-of-way lines, and/or easement(s) for each potable water and wastewater facility.
    e. Show and dimension all rights-of-way and easements and reference them as to whether they are by plat or otherwise. All easements are to be identified as to type: General Utility Easements, Broward County Water/Wastewater Easements, FP&L Easements, Ingress/Egress Easements, etc.
    f. Label all public and private roadways on each drawing page, including profiles. Indicate whether roadways are private.
    g. Each main shall be marked with its diameter and type of material, including newly installed privately owned pipes.
    h. Each air release valve connection pipe, blow off valve connection pipe, water service line, and wastewater lateral shall be marked with its material and diameter.
    i. Gravity mains and laterals shall also be marked with their length, as measured from edge to edge of maintenance access structures, and their slope.
    j. Show cleanouts and label as “single” or “double”, and show their invert elevations.
    k. Show arrows to indicate direction of flow on all gravity sewer mains.
    l. Maintenance access structures are labeled with rim and invert elevations, invert direction, and the WWS provided identification label.
    a. Lift Stations to be labeled with the WWS provided identification label.
    m. Label blow off valves with size and type (whether manual or automatic), and indicate the manufacturer of automatic devices.
    n. Show the size of all water and irrigation meters and indicate if the meter box is a “single” or “double” box. For meters greater than 2” in size, indicate the meter type.
    o. Provide top-of-pipe (TOP) elevation and state plane coordinates every 200 feet along a straight run of pressure pipe.
    p. Each pipe fitting shall be marked with its size and top-of-pipe (TOP) elevation. Identify the type of fitting (degree bend, cross, reducer, cap, tee, etc.). Label whether a bend is horizontal or vertical.
    q. Each pipe fitting shall be marked with its material if the material is different than the pipe’s material.
    r. Valves shall be marked with size, type, and top-of-nut (TON) elevation. Identify whether the valve is top or side operated.

s. Control valves to be labeled with top of nut (TON) elevation, set point, and type.
t. Air release valves to be labeled with top of nut (TON) elevation, manufacturer, and rim elevation.
u. Show all horizontal and vertical deflection points on all mains. A deflection point is a change in horizontal or vertical alignment other than the normal minor alignment change associated with a “straight” run of pipe.
v. All existing, proposed, and to be abandoned utilities must be shown. Line type and/or line (plot pen) weight shall be used to differentiate between the type of utilities; and between existing, proposed, and to be abandoned utilities. Label the method of abandonment.
w. Show all known potential underground conflicts. Use “blow-up” detail views when necessary. Show vertical clearances between WWS potable water/ wastewater facilities and other proposed or existing features.
x. Show the location of all bacteriological sampling points. If the sampling points are subsequently modified during the Florida Department of Environmental Protection (FDEP) permitting process, the EOR shall adjust the drawings accordingly and resubmit the drawings to WWS for re-approval.
y. Show any casing pipe(s) with diameter, material, and length.
z. Show any proposed pipe lining and include the lining method, material, and inside diameter.

PIPING PROFILES

1. Profile views are required for all wastewater gravity mains. Profiles for wastewater force mains and water mains are normally optional, but they may be required by WWS in some circumstances.
    a. The vertical scale for the profile is to be between 1" = 1' and 1" = 3’.
    b. All profiles shall show the finish grade line and other possible conflict features such as storm water pipes and other new or existing utilities.
    c. Wastewater gravity main profiles shall contain linear footage between maintenance access structure edges, invert elevations at edge of structures, rim elevations, slopes, drops with inverts, and WWS provided identification label.
    d. Street names shall be labeled on profile views.
    e. Plan view page numbers shall be labeled if the profile views are not on the same sheet as the plan view.
    f. Special “blow-up” detail views are required where the resolution of vertical conflicts must be shown clearly.

4.0 PRIVATE DEVELOPER PROJECT REQUIREMENTS

A Private developer project is a project initiated by a private land owner (corporation, individual, partnership, or governmental entity other than WWS) for the purposes of constructing new water and/or sewer facilities to serve the land owner’s property. The land owner is required to obtain a permit to construct the facilities through WWS Planning and Development Section. At the end of the project, some of those features will be turned over to WWS for ownership and maintenance.

1. Submittals:
    a. Two (2) hard copy sets are required for the first submittal, and six (6) are required for each submittal thereafter.
    b. All drawings must be 24” x 36” size.

2. In addition to section 2.0 MINIMUM DESIGN DRAWING REQUIREMENTS, the following also applies to all Private Developer projects:
    a. Clearly indicate all boundary lines for any property to be served.
    b. Show state plane coordinates (in accordance with Section 1.0 of this document) for boundary property corners. WWS uses the Broward County Property Appraiser parcel boundaries for its basemap and will use them to check the accuracy of the coordinates.
    c. Show the outline of each building to be serviced. Except for single family and multi-family residential buildings, indicate the total gross square footage of each building. For multi-family residential buildings, show the number of units in the building. Show the postal address for each served building (if the addresses are available at the time – *addresses must be included in record drawings*). For buildings with multiple postal addresses, show the postal address for each bay, apartment, etc.
    d. Indicate pavement and parking areas, pavement types, and thickness.
    e. Show all walls, fences, and gates; and indicate the type and height of the wall and/or fence.
    f. Show all wet or dry storm water retention / detention areas.
    g. Show all structures, walls, underground piping, underground structures, duct banks, signs, trees, other significant landscaping, poles, transformers, and any other item within rights of way. This includes existing easements or proposed easements that could potentially hinder the maintenance of the water or wastewater systems.
    h. Show the location of any fire pumps and indicate their design capacity. Label as such any fire lines with no fire pumps.
    i. Show the location of any oil/water and/or sand separators to be constructed as part of the project.
    j. If fire hydrant locations are subsequently modified during the permitting process, the EOR shall adjust the drawings accordingly and resubmit the drawings to WWS for re-approval.

3. For Private Developer projects, the cover sheet must include the following:
    a. Provide the legal description of the project property
    b. ERU and Meter Tally Tables:
        i. The water ERU tally block filled in with the quantity, ERU Code, ERU Factor, ERU extension (to three decimal places) for each type of use; and the total water ERU for the project
        ii. The wastewater ERU tally block filled in with the quantity, ERU Code, ERU Factor, ERU extension (to three decimal places) for each type of use; and the total wastewater ERU for the project
        iii. The irrigation ERU tally block filled in with the quantity, ERU Code, ERU Factor, ERU extension (to three decimal places) for each type of use; and the total irrigation ERU for the project
        iv. The water meter tally block filled in with the number and size of each newly required water meter

c. Sample tables:

WATER ERU TABLE					
Type of Use	**Unit of Measure**	**ERU per Unit**	**Number of Units**	**ERUs**	**Ref. Code**
Gas Station (fueling only)	fuel pump	0.353	24	8.472	C02
Merchandising	1000 SF	0.185	5.928	1.097	C05
Existing Restaurant (Credit)	1000 SF	1.788	5.928	(10.599)	C09
Irrigation	1000 SF	0.549	13.116	7.228	I02
Irrigation Credit (20% of building ERU)				(1.914)	
			TOTAL	0.793	

SEWER ERU TABLE					
Type of Use	**Unit of Measure**	**ERU per Unit**	**Number of Units**	**ERUs**	**Ref. Code**
Gas Station (fueling only)	fuel pump	0.353	24	8.472	C02
Merchandising	1000 SF	0.185	5.928	1.097	C05
Existing Restaurant (Credit)	1000 SF	1.788	5.928	(10.599)	C09
			TOTAL	0.000	

METER TALLY TABLE				
Type of use	**5/8”**	**1”**	**1.5”**	**2”**
Commercial		1		
Irrigation			1	
DDCV		1		
Existing to be returned to WWS				1

4. The cover sheet must include the following statements:
    a. WWS APPROVAL OF THIS SET OF DRAWINGS IS RELIANT UPON THE DRAWINGS CLEARLY SHOWING ALL EXISTING AND PROPOSED UTILITY STRUCTURES, ASPHALT, PAVING, LANDSCAPING, WALLS, FENCES, UNDERGROUND PIPING, UNDERGROUND STRUCTURES, DUCT BANKS, TRANSFORMERS, POLES, STORM WATER STORAGE AREAS, PAVERS, ELECTRIC CABLE, OTHER UTILITY FACILITIES WITHIN RIGHTS OF WAY, AND EXISTING AND PROPOSED POTABLE WATER/ RECLAIMED WATER / WASTEWATER EASEMENTS. WWS HEREBY AUTHORIZES ONLY THE ITEMS SHOWN ON THESE DRAWINGS TO BE WITHIN SAID POTABLE WATER / RECLAIMED WATER / WASTEWATER EASEMENTS

b. STATE PLANE COORDINATES SHALL BE SUPPLIED FOR THE DESIGN AND RECORD DRAWINGS
c. ALL EXISTING METERS TO BE REMOVED SHALL BE RETURNED TO:
WWS/BUSINESS OPERATIONS DIVISION
2555 WEST COPANS ROAD
POMPANO BEACH, FL 33069
EMAIL – wwsbaseone@broward.org
PHONE – 954-868-8453 or 954-831-3243

5. For Private Developer projects involving private sewers, the cover sheet must include this statement (which will be requested by WWS staff if applicable):
THIS PROJECT HAS BEEN APPROVED CONTAINING PRIVATE SEWER SYSTEMS. PRIVATE SEWER SYSTEMS MAY SEVERELY LIMIT THE ABILITY TO SELL PORTIONS OF THIS PROPERTY IN THE FUTURE. ALL WATER METERS FOR THIS PROPERTY MUST BE IN THE NAME OF THE ONE ENTITY THAT IS RESPONSIBLE FOR MAINTAINING THE PRIVATE SEWER SYSTEMS

6. For Private Developer projects containing a single fire service for multiple units, the cover sheet must include this statement (which will be requested by WWS staff if applicable):
THIS PROJECT HAS BEEN APPROVED CONTAINING A SINGLE FIRE SERVICE FOR MULTIPLE UNITS. THIS MAY SEVERELY LIMIT THE ABILITY TO SELL PORTIONS OF THIS PROPERTY IN THE FUTURE. ALL DOUBLE DETECTOR CHECK VALVES AND BYPASS METERS FOR THIS PROPERTY MUST BE IN THE NAME OF THE ONE ENTITY THAT IS RESPONSIBLE FOR MAINTAINING THE FIRE SERVICE SYSTEM

5.0 MINIMUM AS-BUILT DRAWING REQUIREMENTS

As used in this document, the term ‘as-built drawing’ refers to drawings signed and sealed by a Florida registered Professional Surveyor and Mapper (PSM). As-built drawings are not provided to WWS unless requested by WWS. As-built information shall be provided to the EOR who shall prepare or have prepared record drawings based on as-built information provided by the PSM and from information provided by the EOR’s staff.

As-builts shall contain the following:

1. The cover sheet for as-built drawings shall be signed, sealed, and dated by the PSM and include the WWS provided drawing number. The cover sheet shall include the PSM’s name, business name, PSM number, address, and telephone number plus the following statement:
“I hereby certify that the as-built location information of the potable water, reclaimed water, wastewater, and drainage facilities shown on these drawings conforms to the minimum technical standards for land surveying in the State of Florida, Chapter 5J-17.050 (Florida Administrative Code), as adopted by the Department of Agriculture and Consumer Services, Board of Professional Surveyors and Mappers; and that said as-builts are true and correct to the best of our knowledge and belief.”
2. As-built drawings shall be a complete set including cover sheet, index, and any other sheets as included in the approved design set, except detail sheets. (*See* 2.0 MINIMUM DESIGN DRAWING REQUIREMENTS – GENERAL)

3. State plane coordinates in accordance with Section 1.0 of this document.
4. As-built drawings are to document changes between the design and the construction of the utilities.
5. All information that is incorrect due to changes during construction shall be corrected. Incorrect or no longer relevant information shall be erased or struck through.
6. All record information shall be denoted by either a cloud or bold print.
7. As-built information shall include plan and profiles.
8. WWS pre-assigned maintenance access structure identification labels and lift station identification labels shall be included in both the plan and profile views.
9. Any WWS facilities constructed in a horizontal or vertical location materially different (one-tenth foot horizontal, one-tenth foot vertical) than the design location, the design location (coordinates) shall be struck through and shall be redrafted at the constructed location.
10. Design drawing dimensioning for water and wastewater facilities shall be corrected as necessary.
11. Profile as-built drawings are required on projects where profiles were part of the approved design plans.
12. As-built drawing requirements apply to privately owned as well as WWS public facilities.
13. Privately owned facilities shall be shown with the same level of detail as WWS public facilities.
14. WWS standard detail sheets are not necessary.
15. State plane coordinates (in accordance with Section 1.0 of this document) shall be provided for WWS and private facilities, including:
    a. All valves – Isolation, Tapping, Hydrant, Blow-Off, Air Release, Control, and the center of Double Detector Check Assemblies
    b. Hydrant nut
    c. All pipe fittings, including tapping sleeves, wyes, and material adapters
    d. Line stops
    e. Center of lift station wet well and valve pit
    f. Significant pipe deflections
    g. Water service meter boxes
    h. Sewer service cleanouts
    i. Sewer maintenance access structures
    j. Master meters
    k. Water storage tanks
    l. Wells
    m. Connection(s) to existing or private facilities
    n. Corners (vertices) of easements granted to Broward County as part of the project
    o. Top of pipe locations every 200 feet along a straight run of pipe
    p. Beginning and end points of casing pipe
    q. Beginning and end points of pipe lining
    r. Private and existing facilities in relation to the project, including air valves, hydrants, meters, pump or grinder stations, storage tanks, backflow preventers, clean outs, maintenance access structures, and wells

6.0 MINIMUM RECORD DRAWING REQUIREMENTS

Record drawings are different than as-built drawings. As used in this document, the term 'record drawing' refers to the final drawing set signed and sealed by the EOR. The EOR shall prepare or have prepared record drawings based on as-built information provided by a PSM and from information provided by the EOR's staff. The EOR shall retain the signed and sealed 'as-built' drawings provided by the PSM with the other project records for possible review by WWS upon request. The amount of information required on record drawings will require the drawing author to organize its presentation so that the drawings are clearly legible. At times, it may be necessary to place water and wastewater information on separate drawing sheets and/or use blow-up detail views.

At the EOR's option, the PSM can prepare record drawings in lieu of as-builts. If using this option the EOR must coordinate with the PSM so the record drawings contain information provided by the EOR's staff. The drawings will be reviewed by WWS staff for any deficiencies. Deficiencies will be indicated on one (1) set of plans which will be returned to the EOR for necessary corrective action.

Record drawings shall contain the "MINIMUM AS-BUILT DRAWING REQUIREMENTS" from Section 5.0 plus the following additional requirements:

1. Submittals:
   Six (6) sets of plans shall be submitted by the EOR to WWS for review prior to scheduling inspections including, but not limited to, pressure tests, sanitary sewer lamping, or any other element of the system which is determined necessary by WWS. The drawings shall have been reviewed by the EOR for any deficiencies

2. Record drawings shall be a complete set including cover sheet with the WWS provided drawing number, index, details, and any other sheets as included in the approved design set. BCWWS may request to append the as-built drawings to the final record drawing set. (See MINIMUM DESIGN DRAWING REQUIREMENTS – GENERAL)

3. If the record drawings are prepared by the EOR, each sheet of the record drawings must be signed and sealed by the EOR. The cover sheet is to be signed and sealed by the EOR and shall include the following statement:
   "I certify that these record drawings have been reviewed by me or by individual(s) under my direct supervision; and that these drawings incorporate the information contained in the certified as-built drawings. To the best of my knowledge and belief these record drawings substantially reflect the potable water, reclaimed water, wastewater, and drainage facilities as constructed. The accuracy of these record drawings is reliant on the accuracy applied by the surveyor that prepared the certified as-builts, which was [*include the surveyor's name, business name, PSM number, address and telephone number*]. The surveyor has certified to me that the as-built location information of the potable water, reclaimed water, wastewater, and drainage facilities conforms to the minimum technical standards for land surveying in the State of Florida, Chapter 5J-17.050 (Florida Administrative Code)."

4. If the record drawings are prepared by the PSM in lieu of as-builts, each sheet of the record drawings must be signed and sealed by the EOR. The cover sheet is also to be signed and sealed by the EOR and shall include the following statement:
   "I certify that these record drawings have been reviewed by me or by individual(s) under

my direct supervision, and to the best of my knowledge and belief these record drawings substantially reflect the potable water, reclaimed water, wastewater, and drainage facilities as constructed."

In addition to being signed and sealed by the EOR, the cover sheet shall be signed, sealed, and dated by the PSM. The cover sheet shall include the PSM's name, business name, PSM number, address and telephone number, and contain the following statement:

"I hereby certify that the as-built location information of the potable water, reclaimed water, wastewater, and drainage facilities shown on these record drawings conforms to the minimum technical standards for land surveying in the State of Florida, Chapter 5J-17.050 (Florida Administrative Code), as adopted by the Department of Agriculture and Consumer Services, Board of Professional Surveyors and Mappers; and that said record drawings are true and correct to the best of our knowledge and belief."

5. If the record drawings are prepared by a PSM based on as-builts prepared by a different PSM, each sheet of the record drawings must be signed and sealed by the EOR. The cover sheet is also to be signed and sealed by the EOR and shall include the following statement:

   "I certify that these record drawings have been reviewed by me or by individual(s) under my direct supervision, and to the best of my knowledge and belief these record drawings substantially reflect the potable water, reclaimed water, wastewater, and drainage facilities as constructed."

   In addition to being signed and sealed by the EOR, the cover sheet shall be signed, sealed, and dated by the PSM that prepared the record drawings. The cover sheet shall include the PSM's name, business name, PSM number, address and telephone number and contain the following statement:

   "I certify that these record drawings have been reviewed by me or by individual(s) under my direct supervision and that these drawings incorporate the information contained in the certified as-builts. The accuracy of these record drawings is reliant on the accuracy applied by the surveyor that prepared the certified as-builts, which was [*include the surveyor's name, business name, PSM number, address and telephone number*]. The surveyor has certified to me that the as-built location information of the potable water, reclaimed water, wastewater, and drainage facilities conforms to the minimum technical standards for land surveying in the State of Florida, Chapter 5J-17.050 (Florida Administrative Code)."

6. Any WWS facilities constructed in a horizontal or vertical location different (one-tenth foot horizontal, one-tenth foot vertical) than the design location shall have their design location erased and shall be redrafted at the constructed location. All information that is incorrect due to changes during construction shall be corrected. Incorrect information shall not be struck through; it shall be erased and replaced with the corrected information. Any information that is no longer relevant due to changes during construction shall be deleted. Design drawing dimensioning for water and wastewater facilities shall be corrected as necessary.

7. Record drawings shall include color photographs of all connections to existing WWS infrastructure as well as all critical utility crossings and where specifically required on the design drawings. The pictures shall be taken with a GPS camera that automatically geotags the picture. A maximum of six photographs per sheet is acceptable. Each photograph shall have a minimum size of 8"x10". Photographs shall have a density of 3.0 megapixels or greater. Plot resolution is to be minimum 300 dots per inch. Photographs shall normally be taken from a point between four feet (4') and six feet (6') above the subject infrastructure and shall show good detail in both shadow and sunlit areas. Include a measuring device in

the photo for scale and where applicable to indicate the depth or separation of the utilities. A symbol (i.e. an arrow) is to be used in the plan views indicating the location and direction of view for each photograph submitted. The symbol must include the photograph number. A caption under each photograph shall include the following information:

a. Photograph number
b. Photograph description
c. Date of photograph
d. Location and direction of view (for example 201 NW 34 Street looking North)
e. State plane coordinates

All photographs included in the record drawings also be provided to WWS in JPEG format on CD or DVD media. The CD or DVD shall be labeled with the WWS project name and number. Individual photo files shall be named using the same photograph number contained in the record drawings.

8. After final inspection and upon record drawing approval, six (6) plan sets (signed and sealed by a Florida Licensed Professional Engineer) must be submitted to WWS. A PDF file (digitally signed) must also be submitted along with a CAD file (DWG or DXF) of the record drawing georeferenced to horizontal datum: NAD_1983_HARN_StatePlane_Florida_East_FIPS_0901 (US Feet) state plane coordinates. The PDF file shall be book-marked. Check with the WWS GIS group (954) 831-0793 for more information on the format of the AutoCAD submittal.