	GENERAL PROJECT REQUIREMENTS	
1	Pre-design Meeting	Engineer should contact RWU to schedule a pre-design meeting.
2	Easements (On-Site/Off-Site)	Submit formal easement documents, an easement dedication plat, or a final plat to dedicate easements for review before executing any required easement (Submit a copy of the property deed for each parent tract with easement submittal). Off-site easements must be approved and filed for record before a pre-construction meeting can be scheduled.
3	Responding to Review Comments	In subsequent reviews submit responses to our review letter comments.
	GENERAL PLAN REQUIREMENTS (for approved plans)	
4	Engineer's Seal, Signature, and Date	Approved plans will display the engineer's seal, signature, and date on each plan sheet (except RWU Standard Detail sheets).
5	Engineering Firm's Certificate of Authorization	Approved plans will display the engineering firm's Certificate of Authorization on the Cover Sheet.
	COVER SHEET	
6	Area Map	Clearly identify the location of the project on an area/vicinity map.
7	Project Address/Building Addresses	Identify the project site address. (Building unit addresses and lot addresses will be shown on the Utility Plan & Preliminary Plat).
8	Identify Building Use	Identify the use of the building to determine if a sewer system pre-treatment review is required. (Will sand, oil, grease, solids, lint, or hair interceptors be necessary?)
9	Contact Information	Show the contact information for the engineer and owner/developer on the plans (phone numbers, mailing addresses, email addresses).
10	Index of Plan Sheets	Include an index of plan sheets.
	SITE PLAN	
11	Existing & Proposed Utility Easements	Show all existing (with Book and Page) and proposed utility easements-all adequately dimensioned.
12	Existing Above Ground Features	Display all above ground features such as hydrants, meters, manhole lids, cleanouts, etc.
13	Sign Locations	Locate all proposed signs outside utility easements.
	GRADING PLAN	
14	Existing Water & Sewer Lines and Easements	Show existing water and sewer mains and their easements on the grading plan.
15	Minimum Protective Cover	Do not remove minimum protective cover from existing water or sewer mains.
16	Adjusted Manhole Rim Elevations	If the rim elevation of an existing manhole needs to be adjusted, display the existing and proposed rim elevations. Reference the appropriate RWU Standard Detail for adjustment with each application.
	UTILITY PLAN (GENERAL)	
17	Overall Plan	Provide an overall Utility Plan sheet.
18	Existing & Proposed Street Names	Show all existing and proposed streets and street names.
19	Existing Water & Sewer Lines	Display all existing water & sewer lines with their diameter.
20	Water & Sewer Main Sizes	Depict all proposed water & sewer line sizes (diameter). Also, differentiate between existing and proposed water & sewer mains.
21	Valves, Fire Hydrants, & ARVs	Show all valves, fire hydrants, & ARVs using clearly indicated symbols and notes.

22	Existing Septic System	Verify there is no existing septic system to be removed from the site. Indicate how the existing septic system will be removed or abandoned in accordance with state requirements.
23	Manholes in Sewer Design	Eliminate any unnecessary manholes in the sanitary sewer design.
24	Existing Easements	Show existing easements and their dimensions, along with book and page information.
25	Proposed Easements & Dimensions	Show proposed easements and their dimensions.
26	Easement Boundary Lines	The utility easement boundary lines must be located a minimum horizontal distance of 7-1/2 feet or the depth of the main, whichever is greater, from the water or sewer line.
27	Mains Within Easement/Right-Of-Way	Locate all proposed public water and sewer mains within a Utility Easement or City Right-of-Way.
28	Acute Utility Line Crossings	Minimize acute angles between water, sanitary sewer, & storm sewer crossings. They should cross as close to a 90° angle as possible.
29	Utilities 90° to Centerline of Street	Design all water and sewer street crossings to be made 90° to the centerline of street/road.
30	10' Horizontal Separation - Water & Sewer	Provide a minimum of 10-foot horizontal separation between parallel water and sewer mains (including the public portion of service lines) and label the 10-foot minimum distance on the plans. (The private portion of service lines requires 5’ min. separation between service lines as per plumbing code.)
31	5' Horizontal Separation with other Utilities	Provide and label the minimum 5-foot separation between water or sewer mains (outside of manhole) with parallel storm sewer (outside of inlet box), gas, electric, and communications / telephone lines.
32	7.5' Horizontal Separation from Slopes	Provide and label a minimum separation of 7.5 feet for water or sewer mains from any detention/retention basin, or the slopes of its embankment.
33	5' Horizontal Separation From Street Lights	Depict the location of street lights. Maintain 5' minimum separation from water and sewer mains.
34	30' Horizontal Separation From Transformers to Meters	Depict the locations of the electric transformers. Locate them as far from water meters as is practical but in no case within 30 feet of water meters. (The purpose for this requirement is to eliminate interference when leak detectors are employed.) This does not apply to electric junction boxes which can be 5' from meters.
35	Water & Sewer to Property Line/Limits When Applicable	Extend water and sewer mains to the property line / limits of development when applicable.
36	City of Bentonville's 48" Transmission Line	If utilities cross the City of Bentonville's 48" transmission main, a copy of the plans & notification must be sent to the Bentonville water department.
37	One Water/Sewer Service Per Lot	Verify that only one water and sewer service line extends to each lot.
38	Water/Sewer Services at Opposite Ends of Lots	Water and sewer services should be located at opposite ends of lots. Pair like services on each side of a lot line. (Sewer with sewer and water with water).
39	Phasing of Projects	When a project is divided into phases, fire hydrants and manholes will be required at the phase lines.
UTILITY PLAN (WATER SERVICES)		
40	Meter Locations	**1.** Identify existing and proposed meter locations. **2.** Locate all proposed water meters within a Utility Easement or City Right-of-Way. **3.** Locate water meters at the street corner when the lot is a corner lot. All other meters will be located on lot lines. (This will minimize the possibility of conflict with driveways.) **4.** Meters should be a minimum of 3' from backs of curb.
41	Connecting Water Service to Existing Main	When connecting a water service to an existing main note on the plans that RWU will construct the water meter service at the developer's expense.

42	Meters For Leased Units	One water meter per building is allowed when connecting to an apartment or townhome (residential) that will be leased to tenants.
43	Water Service Line Regulations	**1.** All water service lines will be less than 100 feet long measuring from water main to meter service. **2.** Provide a 1" water service line for each residential lot with a width of 65 feet or more (1" service line may supply up to two 5/8" meters - 1 domestic and 1 irrigation). **3.** No water services will be connected to a fire line. (The fire line is that portion of line beyond the demarcation valve). **4.** The layout must conform to the Commercial, Irrigation, and Fire Line connection detail where applicable. (Refer to RWU Standard Detail WD-2/2)
44	Sub. Entrance Walls & Signs	Show subdivision entrance walls and signs. These are not to be installed over utility lines.
45	Non-Residential Domestic & Irrigation Meter	Label the size of each non-residential domestic water or irrigation meter.
46	Irrigation RPZA (Proposed & Existing)	PROPOSED - Specify that a USC-FCCCHR approved RPZA will be required and located in a heated space or frost free enclosure prior to any tees or branches for all irrigation service lines. (Provide a detail for installation indicating manufacturer, model number--complete with all suffixes and prefixes, size, and installation orientation must be shown). EXISTING - Identify any existing cross-connection cross control devices (RPZA / DCDA, etc.) located on the property that will continue to be used in the future. Include the manufacturer, model number, and size.
47	Fire Line Plan & Profile	Provide a Plan & Profile of Fire Lines up to the backflow preventer. Label the valve at the beginning of a fire line as a demarcation valve.
48	Fire Dept. Connection (FDC)	The FDC line must connect downstream from the required Double-Check Detector Assembly on the fire line.
UTILITY PLAN (WATER MAIN)		
49	Water Main Configuration	**1.** Water mains shall be configured with a looped connection to the existing system with valves located so no more than 20 services will be affected by a line break. **2.** Provide stub-outs with plugged valves to accommodate future water main extensions. **3.** The water main alignment must conform to AWWA C600 for the minimum radii using joint deflection. (The minimum radius for 8" and 12" pipe is 290'). Joint deflection meeting this requirement is preferred in lieu of additional fittings. **4.** Locate all proposed public waterlines within a Utility Easement or City Right-of-Way.
50	Fire Hydrant Location	**1.** Locate fire hydrants at the end of all dead end water mains with the hydrant located just past the last service connection to the water main. **2.** Fire hydrants should be located on lot lines. **3.** Locate fire hydrants inside valve clusters, so that lines can be isolated for flushing. **4.** No fire hydrants will be located in the greenspace between the curb and the sidewalk.
51	Fire Hydrant Lines	Show a maximum length of one joint of pipe for any 6" diameter fire hydrant lead in accordance with Detail WD-1/4A. Otherwise, 8" pipe diameter is required in accordance with WD=-1/4B. (Provide a profile of the fire hydrant line when it exceeds 20' in length.)
52	Butterfly Valves	Water valves 12" and larger are to be specified as butterfly valves.
53	Valve & ARV Locations	Locate valves and air/vacuum release valves (ARVs) near hydrants or by other easily identifiable objects. Locate ARVs near lot lines whenever possible.
UTILITY PLAN (SEWER SERVICES)		**All sewer service lines must conform to the following service connection guidelines**
54	Service Line Guidelines	**1.** 4" diameter sanitary sewer service lines can connect to sanitary sewer mains up to 12" in diameter. **2.** 4" diameter sanitary sewer service lines must connect at a manhole for sanitary sewer mains larger than 12" in diameter. **3.** Sanitary sewer service lines larger than 4" in diameter must connect to a manhole. **4.** Sanitary sewer service lines smaller than 4" (residential) should be located outside the manhole if possible. **5.** Specify sewer service line material as SDR 26 PVC for all public service lines. **6.** The minimum cover for sewer services is 3 feet, anything less will be reviewed by RWU for approval. **7.** Clean-outs that are within paved areas will require metal (traffic rated) lids.

	UTILITY PLAN (SEWER MAIN)	
55	Sewer Main Regulations	**1.** All public sewer mains are required to be 8" minimum diameter in Arkansas. **2.** The maximum distance between manholes is 600 feet from centerline of manhole to centerline of manhole (unless approved otherwise by RWU). **3.** Provide a change in flow direction of less than a 90° from any line into a manhole and the out-flowing main. (The service effluent cannot be flowing in an upstream direction when entering the manhole.)
56	Manhole Regulations	**1.** A maximum of four pipe penetrations, including the outlet main, inlet mains, and service lines (manhole preferably 6' or larger in diameter), is allowed at each manhole. **2.** Label each manhole located in areas subjected to flooding or pooling to have Water Tight Covers. **3.** When connecting a force main to a manhole note on the plans that the manhole shall be epoxy-lined with a GMI 24" composite ring & lid (downstream manholes will need to be epoxy-lined as well). **4.** When a new manhole will be constructed over an existing clay sewer line, one stick of SDR-26 PVC pipe must be cut in on the existing clay line at the new manhole location. **5.** Existing unused service lines out of manholes will need to be abandoned in accordance with RWU policy.
	PLAN & PROFILE (GENERAL)	**(Utility Plan Requirements Also Apply to Plan & Profile Sheets)**
57	Layout (Plan & Profile)	**1.** Show the plan and profile views at the same horizontal scale, no greater than 1”=50’. The vertical scale should be no greater than 1”=5’. **2.** Locate corresponding plan and profile views on the same sheet with the plan view located above the profile view. **3.** Show all water mains, sanitary sewer mains, storm sewer lines, and "other" (gas, electric, etc.) utility lines within utility easement or right-of-way area that run parallel to the sanitary sewer mains and/or water mains on the plan and the profile. **4.** Show casing pipes on plan and profile views in accordance with SD-1/19 and WD-1/21.
58	Permeable Pavers	When crossing beneath permeable pavers: Sewer mains and service lines must have a clay cap over them. Water mains must have a clay cap over them as well. Water service lines (public portion) must be sleeved (encased).
59	Plan View Layout	**1.** Show water and sewer main stationing on plan views. **2.** Show, dimension, and label existing and proposed utility easements and right-of-way lines.
60	Profile View Layout	~~**1.** Show the station (for water & sewer) and invert elevation (for sewer) at each end of all "jack & bore" casings.~~ **2.** Show existing and finished grades at point of bury and adjacent street centerline. **3.** Show all water, sanitary sewer, and storm sewer line crossings. **4.** Show all "other" (gas, electric, etc.) utility crossings. **5.** Show the storm sewer line when it runs adjacent to the water or sewer main (to verify that water and sewer services will be able to cross the storm sewer). **6.** Show all street crossings and required granular backfill material. **7.** Water should be designed over sewer. When there is less than 18" between outside of pipes encasement will be required for the sewer main unless the sewer is an existing line in which case the water main will be encased. **8.** When sanitary sewer has to be designed over water, encasement will be required for the sewer main no matter what the vertical separation will be. The minimum separation is 18" and no less.
	PLAN & PROFILE (WATER MAIN)	
61	Force Main Appurtenances	Show and label all force main horizontal and vertical fittings, plug valves, and air release valve assemblies.
62	Water Main Appurtenances	Show and label all water main appurtenances such as valves, crosses, tees, elbows, reducers, and ARVs on the plan and profile views.
63	Fire Hydrant Bury Depth	Specify the proposed bury depth of each fire hydrant on the profile (ex. 3½’, 4’, 4½’, 5’). The bury depth will be the distance from the bury line marked on the fire hydrant to the bottom of the fire hydrant.
64	Pipe Information	**1.** Identify the diameter & material of water main pipe. **2.** Show the elevations on the profile for existing water mains.

65	Profile View Layout	**1.** Provide Plan & Profiles for all Fire Hydrant Lines over 20 feet in length. **2.** Water mains shall be designed a minimum of 3.5 feet below street centerline or 3 feet below point-of- bury, whichever provides the most cover. (Street centerline should be taken for the street that is immediately adjacent to and abuts utility easement area for the subject water main.) For large transmission mains, the minimum required cover will be 4 feet. **3.** Water mains shall be designed above storm sewers where they cross. When storm sewer must cross over the water main, water line encasement is required if the storm sewer is 36" in diameter or greater. **4.** Specify Ductile-Iron Pipe on the profiles for all water mains. See RWU Specification 02-01. (Fire lines must also be specified as Ductile-Iron Pipe.)
	PLAN & PROFILE (SEWER MAIN)	
66	Plan View Layout	Show the upstream and downstream manholes when a new manhole is placed over an existing sewer main, along with rim and flow-line elevations.
67	Profile View Layout	**1.** Specify sewer pipe material as SDR 26 PVC for all sewer mains. Terminate all sanitary sewer mains at a manhole. **2.** Provide a minimum depth of 6 feet for sanitary sewer mains and manholes. **3.** Label all sanitary sewer manholes with: stations, rim elevation, and all invert elevations (including service lines). **4.** Label the diameter & material of sanitary sewer main pipe. **5.** Label the slope and distance between manholes. **6.** Label manholes deeper than 14 feet to be six feet in diameter. **7.** For manholes 4’ deep or less a flat top manhole will be required. **8.** Invert drops across all proposed sanitary sewer manholes must be exactly 0.10 feet. Drop manholes are not allowed. Match pipe crown elevations where pipe diameter changes.
68	Jack & Bore Design	Boring for sanitary sewer mains should be at a minimum grade of 1%.
69	Force Main Requirements	Provide hydraulic grade lines on the force main profiles and hydraulic calculations. Ensure a scouring velocity is attained in the force main.
	LANDSCAPE PLAN	
70	Utility Layout	Show existing and proposed water and sewer mains on the Landscape Plan.
71	Tree Layout	Large Trees (over 20' tall at maturity) must be located at least 10 feet from any water or sanitary sewer main (including private fire lines).
	DETAILS	
72	Standard Details	All plan submittals must include RWU's current (2022), unedited, Standard Water & Sewer Details. These are available in .pdf and .dwg format at: www.rwu.org/engineering.htm