



Liberty UtilitiesSM

12725 W. Indian School Road, Suite D-101 Avondale, AZ 85392

MARICOPA COUNTY

GENERAL CONSTRUCTION GUIDE

(Water and Sewer Service)

**Liberty Utilities (Litchfield Park Water & Sewer) Corp.
Liberty Utilities (Black Mountain Sewer) Corp.**

Effective January 1, 2014

GENERAL CONSTRUCTION GUIDE– MARICOPA COUNTY

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FOR WATER LINE CONSTRUCTION INSPECTION REQUIREMENTS, SEWER LINE CONSTRUCTION INSPECTION REQUIREMENTS, WATER LINE OPERATIONAL/ FINAL APPROVAL AND SEWER LINE OPERATIONAL/ FINAL APPROVAL SEE “SECTION FOUR, CONSTRUCTION INSPECTION” OF THE UTILITY’S MARICOPA COUNTY DEVELOPMENT GUIDE (LATEST REVISIONS).

FOR QUESTIONS, OR TO SCHEDULE INSPECTIONS CALL 623.935.9367

SECTION 1
GENERAL CONSTRUCTION REQUIREMENTS

GENERAL

1. It is the Contractors responsibility to field verify the location of all facilities prior to construction.
2. All construction is to conform to the latest MAG Specifications and Details and to any MAG supplements provided by Utility unless otherwise indicated on the approved plans.
3. Liberty Utilities shall be contacted 48 hours (2 business days) prior to any construction **contact UTILITY (623-935-9367)**. Construction work concealed without prior inspection by Utility or its designated representatives shall be subject to removal and replacement at the contractor's expense.
4. Utility is not responsible for errors in development guide and or plans, and Utility has the right to require correction of errors in plans, which are found to be in violation of any law or Utility standard.
5. This Plan set shall automatically terminate if Developer fails to begin construction within one year from the Plan Approval Date, unless otherwise agreed to in writing by Utility. In the event the Developer elects to construct the facilities in phases after plan approval, any phase of construction that has not commenced construction within one year from the Plan Approval Date will need a new approved Plan set prepared for Utility's approval unless otherwise approved by Utility in writing. Each phasing of construction shall be recognized as an independent construction project as it pertains to this note.
6. The contractor shall contact the **BLUESTAKE CENTER (602-263-1100)** at least 48 hours prior to commencing any underground excavation.
7. The contractor is responsible to obtain all necessary permits prior to starting construction.
8. A signed and approved set of Utility construction plans must be on the job site at all times.
9. Water and sewer line separation shall be as defined in MAG Standard Detail 404.
10. Minimum 2-foot separation is required between Utility owned lines and storm drain and dry utilities.
11. Storm drain, dry utilities as the water and sewer lines to be owned by Utility will not be installed within the same trench or Utility easements when parallel to Utility owned lines.
12. Utility testing will not be done until after the contractor has pre-tested 100% of the mains. Final testing must be scheduled with Utility 48 hours (2 business days) in advance. **Contact UTILITY (623-935-9367)**.
13. All new and active underground facilities installed in any real property after December 31, 2005 shall be installed with a detectable underground location device unless the facility is capable of being detected from above ground with an electronic locating device per ARS 40-360.22 - J.
14. One set of 4-mil Mylar, two black line on bond as-builts and an AutoCAD disc of construction drawings must be submitted to and approved by Utility prior to receiving a Final Approval. The As-Built plans shall include the locations of all vertical and horizontal pipe bends, valves, manholes, sewer taps, etc., by station/ offset. As-builts shall be submitted and approved prior to final inspection being conducted.
15. The contractor shall follow OSHA guidelines and regulations at all times.
16. All pavement replacement shall conform to MAG Specifications and Details or any additional agency standards, whichever are greater.
17. The contractor is hereby advised that the products and workmanship for this project are warranted to Utility for a period of two (2) years from the date of the signed Utility Final Acceptance letter or as set forth in the applicable agreement.

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18. The Contractor will coordinate work efforts with any curb and gutter contractors for the placement of “W” and “S” symbols into the wet concrete at time of installation. The “W” and “S” symbols will be at each location where a water or sewer service connection crosses the curb and gutter.
19. Soil test reports and concrete submittals.
 - a. The soil and aggregate compaction test report results must be submitted to Utility Construction Inspector upon completion of the water and sewer utility trench backfill and including compaction test results at all manholes.
 - b. The concrete delivery invoice submittals for manhole bases, thrust blocks and concrete collar (at ring and cover/final grade) must be submitted to Utility Construction Inspector.
20. The contractor shall grade all areas disturbed by the pipeline installation to match the surrounding contours. All existing drainage ways shall be restored to existing conditions after construction. The entire disturbed area of pipeline alignment shall be hydroseeded using native seed mix as approved by the county in which the work is performed.
21. Any and all types, footages, quantities and sizes of existing mains removed from service shall be tracked and accounted for by the contractor and submitted to the engineer. The engineer shall show these quantities on the Utility approved as-builts.
22. All construction materials are to be brought to the current utility and or industry standards.

SECTION 2
WATER CONSTRUCTION REQUIREMENTS

GENERAL WATER

1. The contractor shall not connect to the existing Utility water system until all testing is complete and has passed laboratory analysis. Utility authorization for connection to the existing system shall be given only on the basis of acceptable hydrostatic, disinfection and bacteriological test results. Water mains must also have an Approval of Construction (“AOC”) issued by Maricopa County Environmental Services Department (“MCESD”) prior to connecting to the existing Utility water system.
2. Testing water shall be supplied through a metered connection equipped with a backflow prevention device at the point of connection to the potable water source used. The Contractor shall provide any temporary piping needed to deliver potable water to the piping that is to be tested.
3. Contractors should note that the unlawful extraction of water from a fire hydrant is a criminal offense. Utility will actively and aggressively pursue prosecution of persons illegally extracting water from water system hydrants. Hydrant meters can be obtained by calling 623-935-9367. All construction water (regardless of use) is to be metered.
4. All mains shall be chlorinated per MAG Specification Section 611. The initial chlorine residual shall be at least 200 ppm. All water mains shall be flushed and bacteriologically tested after disinfection by a third party certified in the state of Arizona at no cost to the Utility. Samples will be delivered to an Arizona certified laboratory for analysis. Results shall be sent to the Utility at 12725 N Indian School Rd Suite D101, Avondale, Arizona 85392 ATTN. Development Services Department.
5. Existing waterline valves shall only be operated by Utility personnel.
7. Utility will furnish and install all water meters once prevailing fees are paid and any other applicable requirements have been fulfilled.
8. In accordance with AAC R18-4-213, all materials, which come into contact with drinking water, shall conform to National Sanitation Foundation Standards 60 and 61.

WATER MAINS

1. Water pipelines shall be constructed of Ductile Iron Pipe (DIP) class 350. US Pipe or American DIP, mortar-lined or approved equal in accordance with AWWA standard C153 Equivalent O.D., pressure class 350 minimum. Mortar lining shall be in accordance with MAG section 750 & AWWA C104.
2. Star pipe, US Pipe American, Sigma or Tyler Union push-on or mechanical joint in accordance with AWWA C111 and MAG Section 750.4.
3. Joint restraints, where required, shall be Megalug or Star Pipe Products “Stargrip” or flanged joint for lengths in accordance with MAG Detail 303-2. Field lock style gaskets are not allowed.
4. All DIP and fittings shall be polyethylene wrapped for the entire length in accordance with MAG Section 610.6.
5. Water line excavation, backfill and compaction will conform to MAG Standard 601 and any subsequent MAG Specifications and Details. Backfill and bedding material shall consist of imported aggregate base course (ABC) at a minimum of 4” beneath and 12” above all water mains. Pipeline bedding shall conform to MAG Specification 601.4 modified to Mechanical Compaction Only. Water settling of pipelines may be allowed with prior approval by Utility. Any water required for backfill operations shall be metered.
6. “Megalug” or Star Pipe Products “Stargrip” joint restraint system shall be installed on every dip section. Joint restraint lengths (with polyethylene wrap) will follow MAG standard details 303-1 and 303-2.

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7. Thrust blocks shall be installed per MAG Standard Details 301,380, and 381.
8. Transmission mains 24 inches and larger will be constructed of ductile iron pipe or steel cylinder pipe as an option with Utility approval.

FIRE HYDRANTS

1. Fire hydrants shall be dry barrel type Waterous Pacer or Mueller Centurion, Clow Medallion or equal (WITH NATIONAL STANDARD THREAD) and shall be installed according to MAG Standard Detail 360. A valve shall be placed at the tee between the water main and each fire hydrant. All DIP and fittings shall be polyethylene wrapped for the entire length in accordance with MAG Section 610.6.
2. Prior to final inspection, the contractor shall repaint all Utility owned fire hydrants OSHA Safety Yellow (T-12).
3. Each fire hydrant shall be flow tested at walkthrough and the main steamer nozzle cap shall be color-coded based upon the hydrant discharge flow. Utility will provide color-coding information to the contractor prior to the final walkthrough.
4. Each placement of fire hydrant shall be restrained by thrust block.
5. All fire hydrants must be marked or indicated as “OUT OF SERVICE” until Final Approval.

PRIVATE WATER SYSTEMS/FIRE LINES

1. Commercial and apartment developments or similar projects will require the water lines on private property to be owned by the property owner/HOA and not by the Utility. On the developers (property owners) side of the water line a double check detector valve backflow prevention assembly with bypass backflow prevention assembly and Sensus iPEARL water meter will be required. A water valve shall be placed at the upstream side of the backflow prevention device on private property to be owned by the property owner/HOA and not by the Utility.
2. All private fire hydrants are to be painted red.
3. Any facilities installed on the customer side of backflow prevention device and valve upstream of the backflow prevention device are considered “Private” and will not be owned, operated, or maintained by Utility, this includes the backflow prevention device.
4. Fire lines require a double check detector valve backflow prevention assembly with bypass backflow prevention assembly and Sensus iPEARL water meter. A valve shall be placed at the tee between the water main and backflow prevention assembly. Backflow prevention assemblies must be inspected by an Arizona certified technician and passing test results sent to Utility prior for Final Approval.

BACKFLOW PREVENTION DEVICES

1. All backflow devices for fire lines, commercial and irrigation shall be Watts, Febco Backflow Prevention Assemblies or approved equal and shall have a certificate of approval issued by University of Southern California Foundation for Cross-Control and Hydrant Research (USC-FCCCHR) or other approved third-party certifying entity unrelated to the product manufacture or vendor, in accordance with AAC R-18-4-215. A certified test must be submitted to Liberty Utilities Water Quality Specialist (Backflow Prevention) for approval.

ALSO SEE PRIVATE WATER SYSTEMS/FIRE LINES FOR ADDITIONAL BACKFLOW PREVENTION DEVICE REQUIREMENTS.

AIR RELEASE VALVE (ARV)

1. Apco ARV or approved equal. Above ground vandal enclosure to be GS-1 Guardshack. Below ground 36” Dia. Fiberglass Reinforced Plastic (FRP) manhole W/H2O load rating in accordance with ASTM D-3753 with 24” frame & cover per MAG Standard Detail 424.

WATER SERVICES

1. All water services shall be installed to Utility standards.
2. Every residential unit must have its own separate water service connection and meter. This excludes condominiums and apartments or as otherwise outlined in the applicable agreements.
3. All water services shall use double strap bronze service saddles, brass corporation stops, and shall be Ford, Mueller, or Jones and shall be International Pipe Thread (IPT) and all service lines shall consist of one continuous piece (non-spliced) type “K” copper (with pack joint fittings) from the main corporation stop to the meter location. Polyethylene or plastic pipe is NOT allowed. All service lines for meters 3-inch and larger shall be ductile iron. Minimum service line size shall be shall be 1-inch for residential and shall be 2-inch for commercial and apartment developments or similar projects. Minimum irrigation water service line size shall be as determined by developer or developer’s representative for the adequate irrigation service line size. Water meters 2-inch and smaller shall be Sensus iPearl. Water meter are purchased through the Utility.
4. When water meter is a lesser size than the service line, adapters (reducers) are to be furnished and installed by contractor. Adapters are to be a one-piece Ford meter adapter or approved equal.
5. All meter services shall have a shut off valve (ball valve) and small round irrigation style box and cover installed in line after the meter on the customer’s side of the service that must meet Utility standards for pressure and material, that is placed within 18 inches of the outside of the meter box and must be accessible at all times.
6. Water meter boxes shall be supplied by the Utility and installed by the contractor and shall be set 12 inches behind the sidewalk. If no sidewalk is present, the meter box shall be set 12 to 36 inches behind the curb and be 2.5 inches higher than the back of the curb. Compaction around and under the water meter boxes shall be performed using mechanical compactors. **IN NO EVENT SHALL A WATER METER BOX BE SET IN A SIDEWALK OR DRIVEWAY.**
7. The Contractor will coordinate work efforts with any curb and gutter contractors for the placement of “W” symbol into the wet concrete at time of installation. The “W” symbol will be at each location where a water service connection crosses the curb and gutter.
8. In no event shall a water meter box be set in a sidewalk or driveway.
9. Water services installed for commercial and apartment development or similar projects shall be outfitted with an approved RPZ backflow prevention device located 24 inches past the water meter box. A certified test must be submitted to Utility prior to installation of a permanent water meter. The device must be inspected by an Arizona certified backflow technician and passing test results sent to Utility prior to placement of water meters.
10. Utility representative will inspect the final placement and elevation of each meter box prior to final approval.

VALVES AND VALVE BOXES

1. All valves shall be resilient-seat non-rising stem gate valves and shall open to the left. Approved manufacturers shall include Clow or Mueller, Kennedy, or Waterous in accordance with MAG Section 630.
2. Valve extensions shall be installed so that the maximum depth to operating nut is 16 inches from final grade.
3. All valve boxes shall be concrete or 8” PVC C-900 DR14 or DR18 and installed per MAG Standard Detail 391-1 Type “A”. Valve box cover shall have a minimum 4” skirt and shall be traffic rated.
4. All valves shall conform to MAG Specifications 610.6 and 630.
5. Three valves shall be present on any cross, and two valves on any tee connections. Valves shall be flanged by mechanical joint and be located free of the curb, gutter, valley gutter or apron.

SECTION 3
SEWER CONSTRUCTION REQUIREMENTS

GENERAL SEWER

1. Grease, oil, or sand interceptors must be provided for restaurants, fast food establishments, auto repair shops, carwashes and other facilities, where oil and grease may be discharged into a public sewer and must meet all city, county, UPC and Utility requirements, except that such interceptors shall not be required for private living quarters or dwelling units. All systems must be approved by the Utility Pretreatment Department before receiving water/sewer service. All industrial facilities must meet Utility Pretreatment requirements before receiving water/sewer service.

FORCE MAINS

US Pipe, American Protecto 401 Ductile Iron Pipe, minimum pressure class 250.

SEWER MAINS

1. Sewer pipelines shall be constructed of JM Eagle, PW Eagle or Diamond Plastic PVC materials, SDR 35 PVC sewer pipe or US Pipe, American Protecto 401 Ceramic Epoxy lined ductile iron pipe, ductile iron pipe or product approved by Utility and/or Utility approved.
2. Sewer line excavation, backfill and compaction will conform to MAG Standard 601 and 615 and any subsequent MAG Specifications and Details. Utility reserves the right to require the design engineer to provide trench loading and backfill calculations for the type of pipe designed. Backfill and bedding material shall consist of imported aggregate base course (ABC) at a minimum of 4” beneath and 12” above all sewer lines and services. Pipeline bedding shall conform to MAG Specification 601.4 modified to Mechanical Compaction Only. Water settling of pipelines may be allowed with prior approval by Utility. Any water required for backfill operations shall be metered.
3. Prior to beginning any pipe installation, contractor shall furnish and place a watertight plug in the existing sewer mains at all points of connections to the existing sewer system. The plugs shall remain in place throughout the project until the project is given Operational Approval. Under no circumstance shall the developer/ contractor allow flow from the new sewer main to flow into the existing sewer system until authorized by Utility.
4. No sewer line will be accepted or placed into service until it has passed all testing and inspections as required by Utility and other government agencies. Only at this time will sewer service be provided. And as long as the appropriate Agreement and all documentation has been accepted. Sewer mains must also have an Approval of Construction (“AOC”) issued by Maricopa County Environmental Services Department (“MCESD”) prior to Utility accepting sewer flows.
5. ALL installed sewer mains will be videotaped and a DVD submitted to Utility for inspection. Any portion of the pipeline installation deemed unacceptable by Utility shall be removed and replaced at the contractor’s expense. The final DVD and inspection report shall be submitted to Utility as part of the permanent record. The costs for the videotaping and video inspection shall be the contractor’s responsibility. The sewer line must have been cleaned and flushed and free of any debris prior to recording sewer video tapping, otherwise sewer video will be rejected prior to a full review of the sewer video.
 - a. The maximum allowable sewer sag is 0.5-inches.
 - b. Multiple sags within the same run (from manhole to manhole) will be deemed unacceptable, regardless if sags are within Utility’s acceptable limits.
 - c. The video company is to be a reputable company and the video is to be of good quality and the imagery of the video is to be clear.
 - d. The video camera is to have an attached measuring device and the actual measurements on the measuring device are to be clearly defined.

PRIVATE SEWER SYSTEMS

1. Commercial and apartment developments or similar projects will require the sewer lines on private property to be owned by the property owner/HOA and not by the Utility. On the developer's (property owner's) side of the sewer line a manhole or cleanout will be required. A manhole or cleanout shall be placed on the development's property outside of the ROW or Liberty easement.
2. Any facilities installed on the developer's (property owner's) side of the sewer lines (outside of the ROW or Liberty easement) are considered "Private" and will not be owned, operated, or maintained by Utility, this includes the manhole or cleanout on the developments property outside of the ROW or Liberty easement.

SEWER MANHOLES AND CLEANOUTS

1. All sewer manholes will be 5-foot in diameter with 30" ring and cover. NO steps in any manholes.
2. All manhole construction shall conform to MAG Specifications and Details and any supplemental specifications and details provided by Utility.
3. Watertight manhole covers are required when the edge of the manhole covers are constructed within 2-feet of the edge of gutter, in areas that are unpaved and areas prone to flooding. Manhole should be set 2-tenths of a foot above finish grade in all unpaved areas.
4. All manhole lids and rings shall be cast iron and shall be imprinted "LPSCO Sanitary Sewer" or "BMSC Sanitary Sewer" depending on the location of the Utilities sewer facilities. Manhole lid is to be traffic rated.
5. Drop manholes shall conform to MAG Detail 426.
6. Sewer clean-outs may be installed at the end of lines that do not exceed 200 feet from the nearest manhole shall be fitted with iron access covers and shall be encased in concrete and shall conform to MAG Specification 615.8 and MAG Detail 441.
7. All manholes are to be treated with a roach pesticide paint type application. Pesticide shall be effective for a minimum of two (2) years.
8. After all paving adjustments have been made; all sewer lines shall be flushed, cleaned and hydrovacuumed and certified to be clean and clear of any obstructions. A copy of the certification may be required prior to any acceptance.
9. All manholes will be water tightness tested as per A.A.C. R18-9-E301.3.e.
10. All sewer manhole adjustments will not exceed 24" from top of the corbel to finish grade.
11. The contractor shall adjust manhole frames and covers to final finished surface or as directed by Utility.

SEWER SERVICES

1. Sewer service lines shall be constructed of JM Eagle, PW Eagle or Diamond Plastic SDR 35 PVC sewer pipe in accordance with M.A.G Specifications and ASTM D 3034. Every residential unit must have its own separate sewer service connection.
2. All sewer connections shall conform to MAG Specification 615.6 and MAG Detail 440-1.
3. All taps shall be WYE type and shall be at least 4.5 feet deep at the property line and shall conform to MAG Specifications 615.7 and MAG Detail 440-1. Sewer Service shall be installed at 2 o'clock and/or 10 o'clock position. (NO EXCEPTIONS)

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4. A sewer valve shall be installed on all sewer service lines (for projects where Utility only owns/ operates the sewer facilities).
5. The Contractor will coordinate work efforts with any curb and gutter contractors for the placement of “S” symbol into the wet concrete at time of installation. The “S” symbol will be at each location where a sewer service connection crosses the curb and gutter.
6. Sewer tap on grinder pump system. Install 1 ½” PVC check valve at curb (just outside of ROW) and a 1 ½” PVC ball valve (just upstream of check valve) with valve box and cover. Cover shall be imprinted “Sewer” per MAG Detail 270. The Utility does not own or maintain the service line, check valve or grinder pump system.

RECLAIMED WATER

All reclaimed water material, workmanship, installation and construction practice shall be in accordance with all Federal, State and local requirements (latest revisions) and/or with the Utility’s Maricopa County Development Guide (latest revision) and the General Construction Guide (latest revision).

All reclaimed water approved materials shall be in accordance with Liberty’s water and sewer approved materials unless otherwise noted below.

1. All pipes shall be appropriately identified through integral coloring and wording of the pipe, stenciling of the pipe, or pipe sleeving (pipe socks) in accordance with MAG Section 616. Marking tape shall be installed in accordance with The Blue Stake Law.
2. Valve box and cover shall be per MAG Section 616 and MAG DETAIL 391-1 Type “A” square box design. Valve riser pipes shall be purple pipe or painted purple (Seymour Safety Purple) inside and out. Debris caps with identification tag shall be installed in accordance with MAG Detail 392, MAG Section 616.
3. Water services are to be bagged in purple bagging and the meter box is to be Seymour Safety Purple.
4. ARV’s are to be Seymour Safety Purple.