

**FIRGROVE MUTUAL INC.
DESIGN STANDARDS**

Design and Materials

Developer shall take state and local design standards into consideration, however, Firgrove will ultimately approve the design.

Water system extensions shall improve water quality, pressure, flow, and service reliability wherever possible.

Water system improvements will be installed by the Developer or its contractor, but will be reviewed, inspected, and approved by Firgrove.

Developers requesting water service will be required to extend the water main from an existing main location to the development/property. If the existing main does not meet the needs of the project and/or Firgrove's Water System Plan requirements, the Developer may be required to upgrade the main in order to meet the needs of the property. Water main(s) shall be extended to the far end of the property as a minimum, and extensions may be required in more than one direction, as determined by Firgrove.

Any property being redeveloped, remodeled, etc. is subject to review by Firgrove to verify that the property meets Firgrove's current standards. Repair, replacement, upgrade, removal, etc. of existing Firgrove facilities and/or appurtenances may apply at Firgrove's discretion.

It is the responsibility of the Developer or its engineer to locate and/or survey ALL existing water mains and appurtenances and pothole, if necessary, to determine depth and location for design and construction. Locations of existing utilities shown are approximate. Existing utilities shall be field located by respective utility companies prior to construction. The contractor shall notify all affected utilities at least two (2) business days prior to construction.

Water main size will be determined by Firgrove based upon its adopted Water System Plan and/or Firgrove's updated system grid map or required hydraulic modeling. All pipe shall be 8 inch minimum Class 52 ductile iron and shall be encased with 8 mil polyethylene. Encasement may be waived at Firgrove's discretion.

Firgrove may require that a well, tank, pump station, intertie, reservoir, or other facility be provided. Such facilities will be of sufficient size and configuration to meet company, city, county, state, and federal standards/regulations. Firgrove may also require upsizing and/or installation of lines or facilities to accommodate future system requirements.

All private wells must be decommissioned per Tacoma Pierce County Health Department and Firgrove Cross Connection Control standards and documentation must be provided to Firgrove.

Fire hydrants are required every 500 feet in residential areas and every 300 feet in commercial and multi-family areas. Additional hydrants may be required by the Fire Prevention Bureau and at Firgrove's discretion.

Pipe runs from main line to hydrants that are less than 50 feet in length shall be a minimum of 6 inches. Pipe runs from main line to hydrants that are more than 50 feet in length shall be a minimum of 8 inches.

Valve spacing shall be at 500 foot intervals and in each direction at intersections and connection points as determined by Firgrove. Additional valves may be required based on design.

Minimum required bearing areas for all thrust blocks shall be calculated and noted on the plans.

Properly sized air and vacuum release valves shall be installed at principal high points in the system. All valves shall be approved by Firgrove.

Dead-end lines are not permitted except in certain unavoidable situations, in which case fire hydrants shall be installed at the termination point. Blow-off assemblies will be installed only at Firgrove's request.

Construction shall be performed in compliance with Firgrove's requirements, as well as appropriate municipal, county, state, and federal agencies. This includes providing required physical separation between water and other utilities or encasing as necessary. See appropriate agency standards for requirements.

System improvements required for multi-family/commercial/industrial developments will be considered and defined by Firgrove at the time service is requested. All costs for domestic service, fire protection, storage, pumping facilities, and flow rate control of the supply shall be borne by the Developer.

The maximum length of service lines shall be 60 feet measured by the distance between the main and the meter box, unless otherwise approved by Firgrove.

Work shall be done only by contractors experienced in laying public water mains.

Mains shall be laid only in dedicated ROW or in easements which have been granted to Firgrove.

The Developer shall pay for permits which may be required for the work, whether applied for by Firgrove, Firgrove's Engineer, or the Developer, and the Developer shall pay for all surveys, easements, ROW, and franchises required for the work.

All easements shall be a minimum of 16 feet in width, and shall be clearly written in a manner that the easement can be plotted from the description. Locations are at Firgrove's discretion. Single and/or consecutive easements shall run in a straight line from end to end. Water mains that run directly over property lines shall be offset at 5 feet or 11 feet from easement edges, as determined by Firgrove. The main shall also be valved at the entrance to and exit from the easement and no services are permitted on these private easements. No permanent structures are permitted within an easement and Firgrove is not responsible for the maintenance of the easement areas. Backfill material requirements can be found in the specifications section of the construction standard details. The Developer shall pay for all related easement acquisition. All easements required shall be obtained by the Developer without cost to Firgrove and shall provide for a permanent easement and construction easement as shown on the Plans. Executed copies of offsite easements shall be delivered to Firgrove prior to construction. All other easements shall be delivered to Firgrove prior to Firgrove's acceptance of the work. The Developer shall provide Firgrove with supporting data to verify the location of all easements. In all unimproved easements, as determined by Firgrove, pipe markers shall be installed per Firgrove specification. In the event that legal services are required incident to easements beyond review of the form thereof, the costs of such services shall be paid by the Developer in the amount as billed to Firgrove before acceptance of the proposed extension. Developer shall also, upon request, provide Firgrove satisfactory title insurance insuring without exception Firgrove's interest in all easements conveyed to Firgrove. All easements shall be obtained on Firgrove's easement form and recorded against the specific property and recorded on the face of the final plat where Firgrove shall be expressly named.

Submittals

Plans must be formatted to Firgrove's Standard Plan Sheet and must incorporate the following specific items:

1. Paper size shall be 22"x34"
2. Keynote format is required, see example plan sheet attached.
3. All existing and proposed water improvements shall be shown. New or proposed water improvements shall be depicted by a weighted solid line. Existing water improvements shall be depicted by regular weight lines, and other utilities as well as structures and property lines shall be depicted by light weight lines.
4. Scale shall be 1"=50' unless a larger scale is requested and/or approved by Firgrove. A larger scale may be more appropriate for smaller projects.
5. Project name and description.
6. Vicinity map depicting adjacent streets and the location of the project.
7. North arrow.
8. Water easements shall be depicted with dashed lines.
9. Main size and type shall be labeled at both proposed and existing main locations.

10. Table entitled "Service Table" that shows a breakdown of the building or lot by number, building and lot square footages, service size, meter size, fire line size, and backflow assembly(ies) with references to applicable keynotes.
11. Table entitled "Thrust Blocking" to contain calculated minimum thrust blocks for each type of fitting and line size.
12. Sheet one shall be plan view with keynotes. Profiles with corresponding plan view sections shall be on subsequent sheets with applicable keynotes. More than one plan view sheet will be permitted if the size of the project and the required scale necessitate.
13. Each drawing shall be signed and sealed by a Professional Engineer.
14. Specifications and necessary construction notes to the contractor have been provided on the construction standards, no additional notes are permitted on the plan sets without Firgrove's consent.
15. First submittal shall be 2 folded hard copies including all profiles (construction standards need not be included) and 1 e-mailed PDF. All subsequent submittals shall include 3 folded hard copies OR 6 folded hard copies and 1 e-mailed PDF copy if a Pierce County ROW permit is required. Only 3 sets need construction standards attached.
16. Use revision blocks.
17. NO changes are permitted to water plans unless requested by Firgrove or specifically coordinated with Firgrove (i.e., do not move valves, change pipe footages, relocate hydrants, etc.).
18. Redlines must be returned with all submittals.
19. Stamped, signed plan sets with construction standards attached are the ONLY sets permissible and approved for construction, reproduction, and other distribution.

Metering and Meter Installation

Commercial, Multi-family, Irrigation, etc. shall provide a table based upon fixture count performed by a Professional Engineer to determine meter size.

Details for bedding, physical connection, parts, and procedures can be found in the Firgrove's Construction Standards and Meter Installation Requirements.

Separate irrigation meters, at the Developer's expense, are required for commercial properties. Firgrove does not recognize deduct meters. A separate irrigation meter is also required for each individually irrigated parcel.

Duplexes connected to the Firgrove system shall have 2 meters due to potential condominium options, larger lots, and higher potential for individual irrigation systems. The connection fees shall be 2/3 of a share per unit and appropriate meter installation fees. This shall also apply to all townhome and duplex style condominiums.

All apartment buildings and condominiums with 3 or more units shall be permitted to have one meter or individual meters. The connection fees shall be 2/3 of a share per unit and appropriate meter installation fees. The meter size(s) shall be recommended by the development engineer and approved by Firgrove.

Any unit being added to an undivided parcel where there is a current residence shall be considered an accessory dwelling unit (ADU). These units shall pay for 2/3 of a current residential share charge and the appropriate meter installation fee. If and when property subdivides, payment of the remaining 1/3 share for the ADU will be required at the then current rate.

Service lines, the lines from the meter to the customer, are the responsibility of the customer. Service lines shall not be extended for more than 350 feet in length, except at Firgrove's discretion.

Properties undergoing redevelopment will have any and all existing water meters removed from the premises upon vacation due to potential cross connection hazards, meter damage from construction, inappropriate use, vandalism, and water theft. Firgrove field personnel will remove the meter(s) and identify the location on the property with blue painted stakes. The Developer or its contractor is responsible for protection of existing meter boxes and service stubs. The Developer or its contractor or builder will have the option of reusing these services for irrigation or other uses appropriate to service size. Any services not reused will have shares credited toward new services, and the contractor will be required to remove all unused services from the main.

Conservation and Cross Connection Control

The Developer and any subsequent builder or landscaper shall provide a minimum of 6 inches of amended topsoil or equivalent for all areas of individual lots, parks, and other areas that are to be landscaped or turfed at the time of the completion of construction. An agreement shall be executed committing the Developer to this policy.

Cross connection control is required on all properties that have a potential to contaminate the potable water system. A survey will be completed and an agreement shall be executed committing the Developer to this policy.

1. Commercial buildings shall be protected by a reduced pressure backflow assembly (RPBA) on the domestic water line at the meter or another location as approved by Firgrove. No connections are permitted upstream from the RPBA.
2. Fire control systems shall be protected by a double check detector assembly (DCDA) or a reduced pressure detector assembly (RPDA) where there are chemicals present. No connections are permitted upstream from the DCDA/RPDA.
3. Any equipment with direct connection to internal plumbing shall be protected by a reduced pressure backflow assembly (RPBA) at the location of the hazard.
4. Irrigation systems shall be protected by a double check valve assembly at the point of the irrigation system's connection.
5. Swimming pools, hot tubs, etc. which are not directly connected to plumbing and are filled via garden hose or other method, shall be protected by an atmospheric vacuum breaker (AVB) at the hose bib as a minimum.

All notes for backflow assemblies, etc., shall be cross referenced on mechanical, fire, and plumbing plans as needed.

As-Builts

Firgrove requires that the Developer/engineer submit three (3) clear and legible hard copies as well as pdf and AutoCAD electronic copies of the as-built of the project. The engineer should use the original electronic plans, make the changes as noted (not in legislative edit) and submit to Firgrove for approval.

All relevant structures shall be survey located. The survey location of the points shall be based on the Washington State Plane South coordinate system, NAD 83/91 horizontal datum and NAVD 88 vertical datum. The electronic as-built submittal will include a text document identifying the method of collection: RTK, GPS, or conventional survey and the published survey grade reference points used to establish the coordinate datum. Alternately, projects surveyed using RTK constrained to the Washington Reference Station Network as their method of establishing the coordinate datum, will be accepted. The survey data can be included as point blocks in a digital ACAD file, may be submitted as an ESRI shape file or may be submitted as an ASCII point file. All points must be attributed to include the type of structure and the following items (in addition to geographic location):

Component	Location Point	Attributes
Valve	Center of Lid	size, type, mfg, yr, closed/open, depth of valve
Hydrant	Center top	size, type, mfg, yr, depth of bury, storz
PRV	Center hatch	size: main valve & bypass, elev @ top of pipe, type, mfg, yr
Meter	Center box	size, type, mfg, yr
Air Vac	Center box	size, mfg, yr
Blow-Off	Center box	size, mfg, yr