COLORADO SPRINGS FIRE DEPEPARTMENT, DIVISION OF THE FIRE MARSHAL

WATER SUPPLIES FOR FIRE PROTECTION

General requirements per the Locally Amended 2021 International Fire Code

Fire Construction Services
6/27/2023

TABLE OF CONTENTS

PURPOSE

This guidance document has been developed in an effort to provide the highest level of service to the customers of the Colorado Springs Fire Department. The Colorado Springs Fire Department and the Colorado Springs Utilities work closely together reviewing water plans to ensure that minimum design criteria are met. The major goal of the water system plan reviews is to ensure adequate fire flow, location of hydrants, and the number of hydrants meets the minimum requirements of the adopted codes and ordinances of the City of Colorado Springs.

SCOPE

This guidance document outlines the requirements set forth in the adopted International Fire Code, local amendments, departmental policies, and appropriate NFPA standards as they relate to the installation of fire hydrants and fire lines for commercial and residential occupancies having access to city water supplies. Also included in this guidance document is information covering items required to be included on the working drawings and supporting documents. This guidance document is not intended to provide an all-inclusive listing of submittal and inspection requirements, as it would be virtually impossible to cover all situations.

DEFINITIONS

AHJ	Authority Having Jurisdiction
CSFD	Colorado Springs Fire Department
CSU	Colorado Springs Utilities
DFM	Division of the Fire Marshal
FDC	Fire Department Connection
Fire Flow Calc. Area	The Gross Square footage of all floors
Fire Flow	The rate of water in GPM measured at 20 psi residual pressure
Fire Line	That portion of underground pipe from water main to a building dedicated to the fire sprinkler system.
Ft^2	Square Feet
GPM	Gallons per Minute
IBC	International Building Code
IFC	International Fire Code
NFPA	National Fire Protection Association
PIV	Post Indicator Valve
PSI	Pounds per square foot
Water LESS	Water Line Extension and Service Standard

GUIDELINES

I. INTRODUCTION

A. APPLICABLE CODES, STANDARDS AND STATE STATUTES & REGULATIONS.

1. 2021 International Fire Code and its local Amendments
2. 2022 NFPA 24 Installation of Private Fire Service Mains and Their Appurtenances
3. Colorado Springs City Ordinances
4. CSFD Administrative Rulings and Interpretations
5. CSU Water Line Extension and Service Standards (LESS)

B. ADMINISTRATIVE REQUIREMENTS.

1. **Approved Contractors**. All fire lines must be installed by contractors who are registered with the State of Colorado as a "Fire Suppression System Contractor – Underground." Per 8 CCR 1507-11 & C.R.S 24-33.5-1202. Please contact the Colorado Division of Fire Prevention and Control at 303-239-4600 for additional information on obtaining this registration.
2. **Code/Standard Editions**. All water system designs shall meet the criteria of the adopted IFC as amended and all applicable requirements of the most recent edition of NFPA 24. NFPA standards are effective on the January 1st of the year following the effective date printed in the standard. All water system designs shall also meet the requirements set forth in adopted ordinances, CSFD administrative rulings and CSU standards such as the Water LESS.
3. **Plan Reviews/Inspections**. Required plan submittal with approvals and associated inspections must be secured through CSFD. This is in addition to the review and inspections conducted by CSU.
4. **Revisions**. All revisions shall be clouded and identified with a sequential numbering or lettering system, such as Revision A, B, etc. or Revision 1, 2, etc. Revisions are date sensitive, thus each revised sheet must bear the date of the revision.

II. SUBMITTAL INFORMATION

Submittals shall be of sufficient clarity and quality to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of the IFC, and other relevant laws, ordinances, rules and regulations adopted by Colorado Springs, as determined by the Fire Construction Services and CSU. You may refer to the attachments section of this guidance document for a more complete checklist of items required to be provided on the submitted plans. Please refer to CSU standards for their requirements on submittal information. Fire Construction Services and CSU conduct concurrent reviews of water plans involving new or relocated fire hydrants and new fire line service.

A. MINIMUM REQUIREMENTS.

1. **Drawing Size.** Drawings shall be submitted electronically via the online portal. Plans shall be scaled or suitably dimensioned and reproducible. Plans shall contain the information and/or details indicated in the checklist in the appendix
2. **Number of Drawing Sets.** Only one (1) copy is required when submitting electronically via the online portal. A stamped copy will be returned to the contractor after approval**.**
3. **CSFD Plan Review Application.** Fill out the plan review application form and attach to all submittals.

4. **Fire Flow Report.** Fire flow reports older than 1 year will not be accepted. Reports must be obtained from Colorado Springs Utilities or outside jurisdictions as necessary. Requests can be made online. See the Fire Flow section for a link to request a report.
5. **Tax Schedule Number**. Drawings shall be provided with the Tax Schedule Number found on the approved development plan or through the El Paso County Tax Assessor.
6. **Signature Block**. When all requirements have been met, the water plans will be signed off by this office. The following must be included on plans along with space to provide an electronic stamp:

CSFD ACCEPTANCE
All Fire Hydrants shall be installed according to Colorado Springs Utilities water line extension and service standards.

The number of fire hydrants and hydrant locations as shown as shown on this water plan are correct and adequate to satisfy the fire protection requirements as specified by the City of Colorado Springs Fire Department.

Signed: _____
CSFD Division of the Fir e Marshal

CSFD Plan Review Number: _____

7. **Building Data.** At the very minimum, you must supply the Fire Flow calculation area and the construction type of the building. The fire flow calculation area is the total floor area of all floors within the exterior walls, and under the horizontal projections of the roof of the building (IFC Appendix B104.1). Before we approve the plans for signature, you must provide all of the following information on the plans:

   a. Building Name
   b. Address, if known
   c. Gross Square Footage
   d. Construction Type
   e. Fire Sprinklers: ❒ Y ❒ N (If Yes, SHOW 50% REDUCTION DATA)
   f. Required Fire Flow
   g. Minimum # of hydrants required
   h. Maximum Average Spacing
   i. Maximum Hose Lay

B. PRELIMINARY REVIEW ON THE DEVELOPMENT PLAN.

CSFD will look at hydrant placement and number of required hydrants during the development plan review stage, if specifically requested. You must provide, at a minimum, the type of construction and square footage for this review to take place. Keep in mind; this is only a preliminary review. Installation of hydrant, FDC or water lines may not begin until the water plans have been signed by both CSFD and CSU.

III. GENERAL INFORMATION AND REQUIREMENTS.

A. FIRE FLOW. Fire flow requirements may be ascertained by applying Appendices B and C of the adopted IFC (See Appendixes) to the building in question. At a minimum you must know the construction type of the building and the fire flow calculation area of the building. For worst case scenario, use type V-B construction with your building area. Be sure you are not providing us just a building footprint area.

Fire flow reports older than 1 year will not be accepted. Reports must be obtained from Colorado Springs Utilities. Requests can be made online at https://www.csu.org/Documents/FireFlowReport.pdf?csf=1&e=CWhXaj

Fire flow for delegated jurisdictions need to be obtained from that jurisdiction or through a licensed contractor.

1. **Type of Construction.** The type of construction that the architect has assigned to the structure must be indicated on the plans. Be sure you have reconciled with the architect – differences in construction type can have a significant impact on required fire flow resulting in an underdesigned distribution system.
2. **Fire Flow Calculation Area.** The area to be considered in determining the fire flow for these buildings shall be the total floor area of all floors within the exterior walls, and under the horizontal projections of the roof of the building (IFC Appendix B104.1). For type IA and IB construction, it is the three largest consecutive floors. NOTE: Fire walls with openings, whether protected or not, cannot be used to reduce the fire flow calculation area IFC B104.2.
3. **Fire Sprinklers.** A 50% reduction in fire flow is allowed with the use of a fire sprinkler system, whether they are required or not. For example, if your building requires 5000 GPM by the table, and the building is sprinklered, the required fire flow may be reduced to 2500 GPM. Your required number of hydrants and spacing will be determined by the reduced fire flow. The minimum flow accepted is 1500 GPM. When reducing the fire flows, you will occasionally end up with an odd number such as 1825, in these cases you must round up to the nearest 250 GPM.
4. **Simultaneous Fire Flows.** If you do not meet the required fire flow, CSFD accepts the practice of using multiple hydrants that are open simultaneously to determine available fire flow. Models for this can be requested through CSU
5. **Alternatives.** If the required fire flow still cannot be met by any reasonable means (changing construction type, increasing pipe sizes, looping mains) there are alternatives that may be considered.
    a. Fire sprinkler systems, if not already provided, may allow for a 50% reduction in required fire flow.
    b. Request a simultaneous fire flow report.
    c. Reduce the size of the building.
    d. Fire walls constructed in accordance with the adopted IBC creates separate buildings. **Note:** fire walls cannot have any openings in them.
    e. On site stored water with an automatic pump supply providing the required fire flow and duration.
    f. Actual flow test of existing hydrants.
6. **Reminders.**
    a. 1,500 gallons per minute (GPM) at 20 psi is the minimum flow and pressure permitted for both residential and commercial sites when hydrants are flowing individually.
    b. 750 GPM at 20 psi is the minimum flow and pressure permitted per hydrant for both residential and commercial sites when hydrants are flowing simultaneously.
    c. “On site/actual” fire flows dated less than five years is an acceptable alternative to a theoretical report from CSU, at the time of plan review. These actual fire flows must be provided with the flow at 20 psi.

B. HYDRANTS. The primary purpose of fire hydrants is to supply water to firefighting apparatus. The proper location, operation and system capability is essential to the successful execution of fire department operations during an emergency.

Providing appropriate water flow is the responsibility of the developer or property owner. These systems must meet CSFD and CSU standards and gain approvals prior to installation.

1. **Existing Hydrants.** Label all existing hydrants with the CSU number.
2. **Private Hydrants.** Private hydrants become the ultimate responsibility of the property owner with regards to maintenance and repair. They must be flow tested and painted prior to issuance of a Certificate of Occupancy. Should the property owner not be willing to undertake this responsibility, it is strongly recommended they seek a solution with CSU to allow the installation of public hydrants. Use of a private hydrant owned by another property owner requires the use of a *Private Hydrant Agreement*, examples of which are available from the Fire Construction Services office. This is a legal document and must be registered through the El Paso County Clerk and Recorder's Office. CSFD does not need to be involved in this process.
3. **Placement.**
    a. Hydrants should be placed at intersections for increased flexibility. Where this is not possible, it may be placed along a curb or in a parking lot island. Access and turning radius must always be in consideration.
    b. Hydrants must face the direction of water flow i.e., the lateral line they are connected to. Keep this in mind when laying the water mains, as the large diameter outlet connection on the hydrant must face the street.
    c. In most cases, fire hydrants should be on the same side of the street that the building is located on. Having to lay hose across streets or driveways could inhibit access for additional fire apparatus.
    d. Avoid putting hydrants at the end of dead-end streets or cul-de-sacs.
    e. Hydrants shall be located so that the center of the large diameter outlet is not less than 18-inches above final grade, and not more than 36-inches above grade.
    f. Hydrants shall not be located behind obstructions such as parked cars, fences, retaining walls, trash enclosures, planters, etc.
    g. Fire hydrants should be a minimum of 40 feet from any building to insure they are kept out of the "Collapse Zone."
    h. A 3-foot clearance is required around all hydrants.
4. **Spacing.** Hydrants shall be located with the following considerations in mind:
    a. Meet the requirements of Appendix C of the adopted IFC (See Appendixes) for location and distribution.
    b. For sprinkled buildings, the FDC shall be located within 100 feet of a fire hydrant, and be located on the street side of the building. If this cannot be accomplished due to unusual site configurations or existing infrastructure, please call Fire Construction Services to discuss potential solutions.
5. **Protection from Vehicular Damage**. Posts or concrete barriers may be used to protect hydrants from vehicular damage. Please refer to our guidance document titled "Protection of Equipment from Vehicular Damage" for additional requirements.

C. FIRE LINES.

1. Fire lines shall be installed by an underground contractor registered with the State of Colorado as a "Fire Suppression Contractor – Underground."
2. The minimum size of a fire line for a commercial building is typically 4-inches. If a smaller size is desired, it must be hydraulically proven to provide the necessary water supply for the fire sprinkler system.
3. Fire lines must be flushed and hydrostatically tested prior to the connection of any aboveground piping. Be advised the chlorination flush performed by Colorado Springs Utilities does not satisfy the requirements of the CSFD for flushing the fire lines, as it is not at the velocity or volume required by NFPA. Keep in mind if a fire pump is to be installed; the required flushing velocity is 20 feet per second.
4. Fire lines shall NOT be run underneath buildings!

D. FIRE DEPARTMENT CONNECTIONS (FDC). Fire department connections provide a means for CSFD to supplement the water supply to a fire sprinkler system. By considering the location of the FDC at the water plan stage, all parties involved can prepare for this requirement.

1. FDC's shall be located with the following considerations in mind:
   a. On the main entrance and/or the street side of the building.
   b. Cannot be obstructed by parking, landscaping, planters, columns, fences, retaining walls, etc.
   c. A 3-foot radius of clearance shall be provided around the FDC to provide for our hose connections.
   d. Within 100-feet of a hydrant.
   e. Within 40-feet of a fire department access road.
   f. Away from and on a separate wall from any utility meters.
2. FDC's shall be mounted not less than 18-inches and not more than 4-foot above the level of the adjacent grade or access level.
3. If a remote FDC is installed, there must be indications on the submitted water plans that an outside horn/strobe unit will be provided in a highly visible and acceptable locations, and it must be within 20 feet of the FDC. **NOTE:** Remote FDC piping is not inspected by Colorado Springs Utilities. This piping must be inspected by CSFD prior to burial.

E. FIRE WALLS. In buildings utilizing fire walls, it is important that they be listed slightly differently in the building data block, than normally utilized.

1. Please use this format, and list each structure as follows:

   Business Name
   Business Address
   Tax ID Number
   Total Gross Square Footage of Building
   Ratings of Fire Walls Being Installed

Building A	Building B
Type of Construction	Type of Construction
Square Footage	Square Footage
Fire Sprinklers	Fire Sprinklers

Required Fire flow	Required Fire Flow
Min # Hydrants	Min # Hydrants
Max Average Spacing	Max Average Spacing
Max Hose Lay	Max Hose Lay

2. Fire walls shall be not less than 2-hour fire-resistance rated. These walls are not allowed to have openings (including protected openings) in order to be considered for reducing the fire flow requirements. Most buildings need to have openings in these fire walls for their operations, making this a less than desirable method to reduce building size.

F. DEAD END SERVICE LINES. Unless approved by the fire code official, dead end fire service mains shall not be used when there is not a reliable secondary or redundant means of water supply within 500 feet of a structure along an approved route.

LINKS

a. Colorado Division of Fire Prevention and Control Web site.
https://dfpc.colorado.gov/

b. CSU LESS.
https://www.csu.org/Pages/default.aspx

c. Administrative Rulings and IFC Amendments can be found on the CSFD web site at.
https://coloradosprings.gov/fire-department/page/fire-code-amendments-and-administrative-rulings?mlid=9796

APPENDIXES

1. CSFD Submittal Checklist
2. Appendices B and C of the Adopted IFC
3. How to Figure Fire Flow Required and # of Hydrants Needed
4. Supplemental Information
5. Flow Chart for Water Plan Submittals.

APPENDIX A - CSFD SUBMITTAL CHECKLIST

HYDRANTS & WATER MAINS

The following must be included on all plans to ensure a complete submittal. Specific details for each item are found in this packet:

- ❑ Include completed CSFD Plan Review Application
- ❑ Include Fire Flow Report from CSU with map (not required for USP)
- ❑ Include all red-lined plans for re-reviews when requested
- ❑ Development Plan must be approved by CSFD before water plans can be signed
- ❑ Provide CSFD Plan Review # on cover sheet
- ❑ Provide CSFD Signature Block on cover sheet
- ❑ Provide El Paso County Tax ID Number
- ❑ Provide Building Data, if required (not required for utility service plan only)
- ❑ Provide City Water Map Page Numbers
- ❑ Show Fire Department Connection (FDC) location, if applicable
- ❑ Show Water Supply Feeds for the sprinklers, standpipes, domestic water systems, all valves, including post indicator valves
- ❑ Show tie-ins to all existing water lines
- ❑ Label new and existing hydrants with CSU number and fire flow, ensure numbers match flow report
- ❑ Label all hydrants and water mains as public or private
- ❑ Label all streets with name and/or proposed name
- ❑ For gates, fences and walls: show how CSFD will gain access on fire lanes and around building
- ❑ Provide Service Line Integrity Statement on cover sheet, if applicable

APPENDIX B

IFC TABLE B105.1(2) MINIMUM REQUIRED FIRE-FLOW AND FLOW DURATION FOR BUILDINGS

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
-	-	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
-	-	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
-	-	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
-	-	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
-	-	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
-	-	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
-	-	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
-	-	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the *International Building Code*.

b. Measured at 20 psi residual pressure.

Exception: A reduction in required fire-flow of 50 percent, as *approved*, is allowed when the building is equipped with an *approved automatic sprinkler system*.

IFC TABLE C102.1 NUMBER AND DISTRIBUTION OF FIRE HYDRANTS

Fire Flow Requirement	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO HYDRANT (Engine Hose Lay)
1,750 or less	1	500	250
2,000-2,250	2	450	225
2,500 – 2,750	3	450	225
3,000 – 3,250	3	400	225
3,500 - 4,250	4	350	210
4,500 - 5,250	5	300	180
5,500 - 5,750	6	300	180
6,000 – 6,250	6	250	150
6,500 - 7,250	7	250	150
7,500 or more	8 or more	200	120

NOTE: TABLE REVISED FROM IFC TO INCLUDE INTERMEDIATE FIRE FLOWS.

APPENDIX C- HOW TO FIGURE FIRE FLOW REQUIRED AND # OF HYDRANTS NEEDED

Example Problem: You have a Type V-B Construction Building, at 12, 000 square feet.

Fire Flow Calculation Area × 0.0929 for sq. meters					FIRE FLOW GPM	FLOW DURATION (hours)
Type I-A I-B[2]	Type IIA IIIA[2]	Type IV V-A[2]	Type IIB IIIB[2]	Type V-B[2]	× 3.785 for L/min.	
22,700	12,700	8,200	5,900	3,600	1,500	
30,200	17,000	10,900	7,900	4,800	1,750	
38,700	21,800	12,900	9,800	6,200	2,000	2
48,300	24,200	17,400	12,600	7,700	2,250	
59,000	33,200	21,300	15,400	9,400	2,500	
70,900	39,700	25,500	18,400	11,300	2,750	
83,700	47,100	30,100	21,800	13,400	3,000	
97,700	54,900	35,200	25,900	15,600	3,250	3
112,700	63,400	40,600	29,300	18,000	3,500	
128,700	72,400	46,400	33,500	20,600	3,750	
145,900	82,100	52,500	37,900	23,300	4,000	
164,200	92,400	59,100	42,700	26,300	4,250	
183,400	103,100	66,000	47,700	29,300	4,500	
203,700	114,600	73,300	53,000	32,600	4,750	
225,200	126,700	81,100	58,600	36,000	5,000	
247,700	139,400	89,200	65,400	39,600	5,250	
271,200	152,600	97,700	70,600	43,400	5,500	
295,900	166,500	106,500	77,000	47,400	5,750	
Greater	Greater	115,800	83,700	51,500	6,000	4
		125,500	90,600	55,700	6,250	
		135,500	97,900	60,200	6,500	
		145,800	106,800	64,800	6,750	
		156,700	113,200	69,600	7,000	
		167,900	121,300	74,600	7,250	
		179,400	129,600	79,800	7,500	
		191,400	138,300	85,100	7,750	
		Greater	Greater	Greater	8,000	

Notes:
1. The areas listed in this table represent the maximum allowable areas for the listed flow rates.
2. Types of construction are based on the International Building Code

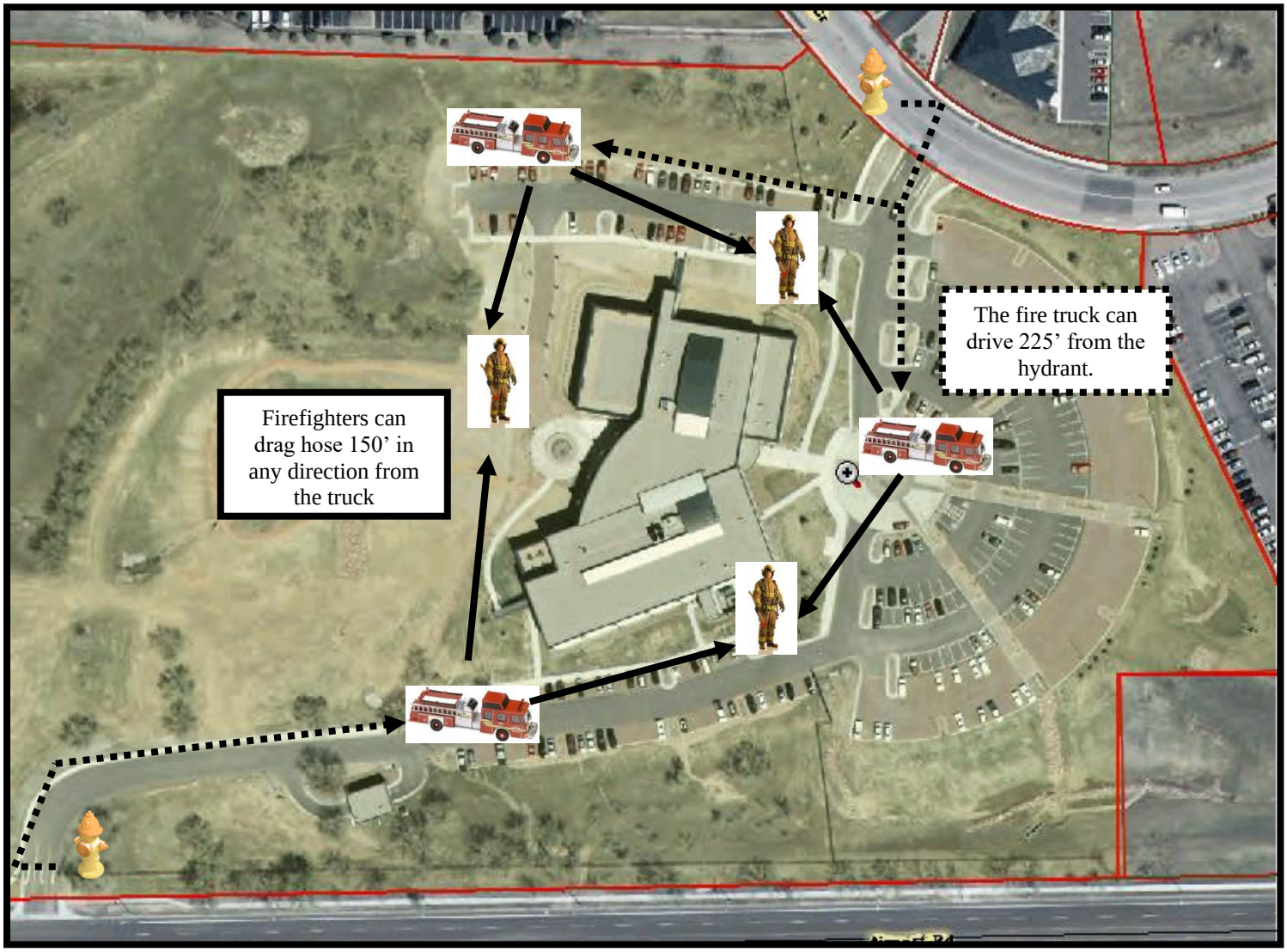
Table 2: Fire Hydrant Number & Distribution Requirements

FIRE FLOW REQUIREMENT (gpm)	MINIMUM Number of HYDRANTS	Average Spacing between Hydrants (feet)	Maximum Distance from any point on Street or Road Frontage to Hydrant (Engine Hose Lay)
× 3.785 for L/min		× 0.3048 for meters	
1,750 or less	1	500	250
2,000 - 2,250	2	450	225
2,500 - 2,750	3	450	225
3,000 - 3,250	3	400	225
3,500 - 4,250	4	350	210
4,500 - 5,250	5	300	180
5,500 - 5,750	6	300	180
6,000 - 6,250	6	250	150
6,500 - 7,250	7	250	150
7,500 - 8,000	8	200	120

Example Problem (Con't): Type V-B Construction Building, at 12,000 square feet.

1. Select the column for the Building Type *(V-B)*
2. Move down that column to your building square footage The Table represents the maximum square footage at a given flow. In this case 12,000 sq. ft. exceeds 11,300 and therefore you must move up to the 13,400 sq. ft. line.
3. Follow that row to see what fire flow is required *(3,000 GPM)*
4. Find your required fire flow in Table 2. * If you have a required fire flow of 1,850 GPM, you need to round up to 2,000 GPM.
5. Follow that row for your hydrant requirements *(3 hydrants required, spaced 400 ft apart, with a maximum hose lay of 225 ft)*
6. What does this tell you? Your building needs to be accessible on all sides for firefighters. From the numbers you found in the chart, the following picture will explain how you can meet the access requirement.

   The 400-foot spacing is the maximum average spacing allowed between hydrants along a drivable surface. The 225-foot hose lay is the maximum distance the engine can drive from the hydrant, while laying hose down. From this point, you can measure 150-feet as a person would walk around the building.



APPENDIX D - SUPPLEMENTAL INFORMATION

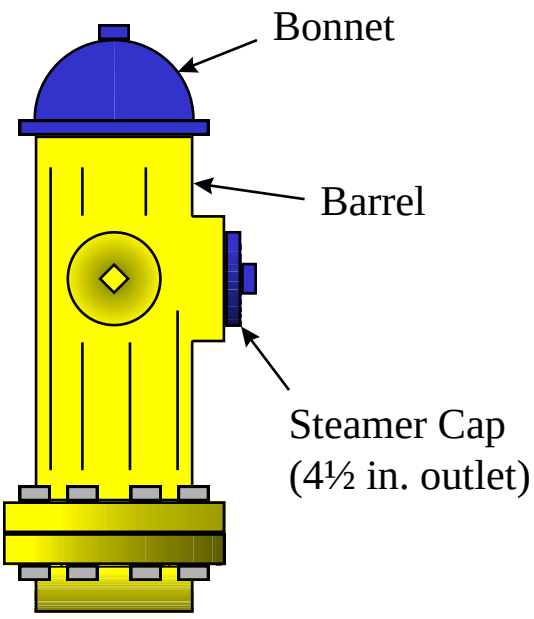
This information is provided to explain, in further detail, the requirements of CSFD.

A. Hydrants.

1. **Colors and Painting.** Hydrant colors are based upon the available flow measured at 20 psi residual pressure under maximum day demand conditions. All hydrants, public or private, shall be painted in accordance with the table below. Also included for your convenience, are the manufacturers and specifications for the paint used on public hydrants. This is not to imply only these manufacturer's products are acceptable. Any manufacturer's products that are equivalent in color and quality are acceptable.

Fire Flows (GPM)	Color	Painted on:
0 - 499	Red	Bonnet
500 - 999	Orange	Bonnet
1,000 - 1,499	Green	Bonnet
1,500 - 3,000	Blue	Bonnet
Above 3,000	Blue	Bonnet & Steamer Cap
-	Yellow	Barrel

Color	Manufacturer	Specification
Red	Rust-Oleum	Safety Red #2163
Orange	Aervoe	Orange #305
Green	Rust-Oleum	John Deere Green #7424830
Blue	Aervoe	Ford Blue #560
Yellow	Rust-Oleum	Equipment Yellow #2148



2. FIRE LINES.

Fire lines must be flushed and hydrostatically tested prior to the connection of any aboveground piping. Be advised the chlorination flush performed by Colorado Springs Utilities does not satisfy the requirements of CSFD for flushing the fire lines, as it is not meet the velocity required per NFPA. The table below is taken from NFPA *24 Installation of Private Fire Service Mains and Their Appurtenances* to assist you in selecting the proper equipment to flush a fire line. Fire lines supplying fire pumps are required to be flushed at a higher velocity. Consult NFPA 20, Chapter 14 for these required flow rates.

Fire Lines shall also be hydrostatically tested at a minimum of 200 psi or 50 psi over the static pressure for a minimum of 2 hours.

NOTE: The installing contractor is responsible for completing the required "Contractor's Materials & Test Certificate for Underground Piping per NPFA 24. This form must be completed and signed prior to inspector arriving on site for the inspection.

Installing/testing contractor is responsible for providing proof that they are registered with the State of Colorado as a Fire Suppression System Contractor – Underground prior to the start of the inspection.

NOTE: Fire Lines within City of Colorado Springs must be visually inspected by a CSU Inspector prior to burial. Documentation of this visual inspection is to be provided to your CSFD inspector at time of the underground hydrostatic test and flush. See visual inspection form below that is to be provided to your CSU Inspector.

Fire lines for delegated projects will require a visual inspection of the fire line by a CSFD inspector prior to burial.

Underground Pipe Size (in)	*Required Flow Rate (gpm)*	*Hose/Pipe Sizes*					
		2½"	3"	4"	5"	6"	8"
4	390	1	1	1	-	-	-
6	880	2	2	1	1	1	-
8	1560	4	3	2	1	1	1
10	2440	6	4	3	2	1	1
12	3520	8	6	4	2	2	1

Underground Fire Line Visual Inspection Form

_____

Project Name and Address

The underground fire line for this porject has been visually inspectded prior to burial and the installation of this fire line meets CSU's Line Extension and Service Standard (LESS)

_____ _____

Signautre of CSU Inspector) Date of Inspection

APPENDIX E-FLOW CHART FOR WATER PLAN SUBMITTALS

PROCEDURAL FLOW CHART FOR WATER PLAN SUBMITTED TO FIRE CONSTRUCTION SERVICE