



VUSBC/VSFPC SITE PLAN CHECKLIST

Department of Community Development and Code Compliance
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OFFICE USE ONLY

SITE PLAN #:

PLAN DATE:

The checklist is based upon the Virginia Uniform Statewide Building Code and the Virginia Statewide Fire Prevention Code [including NFPA 24 – Installation of Private Fire Service Mains and Their Appurtenances and NFPA 13 – Installation of Sprinkler Systems, as referenced in the VUSBC and VSFPC.]

PROJECT NAME:

PARCEL ID NUMBER:

PROJECT ADDRESS:

DATE:

MINIMUM INFORMATION REQUIRED ON SITE PLANS

(SEE FIRE PROTECTION UNDERGROUND PERMIT CHECKLIST FOR PERMIT REVIEW REQUIREMENTS)

STANDARD NOTES/INFORMATION

- NOTE: "No landscaping shall be placed within a three-foot radius of any fire hydrant, fire pump test header, fire department connection for fire protection systems, or fire suppression system control valve. Landscaping shall be of a type that will not encroach in the three-foot radius on maturity if the material."
- NOTE: "Where fire department access is restricted, approved key boxes shall be provided for the proposed facility and building(s) in accordance with VSFPC section 506.1. The requirements for the key box can be obtained from Prince George County Fire & EMS."
- NOTE: "During the construction of any structure or building, permanent fire hydrants shall be installed and in service prior to the use of combustible materials in construction being commenced on any floor above the first or ground floor level. Fire hydrants shall be maintained accessible to firefighting apparatus at all times."
- NOTE: "Approval of site plan does not include the design of the fire sprinkler system underground piping from backflow prevention device to one foot above finish floor level. Prior to installation, shop drawings and a separate permit application shall be submitted through the Community Development and Code Compliance department for review and approval".
- PROPOSED BUILDING(S) INFORMATION: Provide building locations (new and existing), distances between buildings, total building height(s)/area(s), construction type, and building occupancy classifications.

WATER SUPPLY INFORMATION

Minimum Required Fire Flow

- The minimum required fire flow (needed fire flow) for each site must be calculated by an approved method. [VSFPC section 507.3] (IFC Appendix B is an approved method)
- The minimum required fire flow (and calculations) for fire protection purposes shall be shown on the submitted drawings.

Approved Water Supply

- Provide a Hydrant Flow Test (by an approved method) to determine the available water supply to the project (record flow, residual and static pressures). [VSFPC section 507.4]
- The water flow test results and graph shall be shown on the submitted plan.
- The minimum required fire flow for all buildings, with the exception of one and two-family dwellings is 1500 gpm.
- Where no public water is available or the available public water is inadequate, alternate supplies (dry hydrants, onsite storage, etc.) will be considered. Locations and details of proposed alternate supplies must be submitted for review.

SITE ACCESS

Fire Apparatus Access Roads

- Provide details as to the method to be used as access to all exterior points of the building from within 150 feet of an approved fire apparatus access road. [VSFPC section 503.1.1]
- Buildings or facilities may be required to be provided with two separate and approved fire apparatus access roads (commercial/industrial facilities over 30' or 62,000 sf; residential developments over 30 dwellings). [VSFPC section 503.1.2]

Fire Apparatus Access Road Construction

- Fire access roads shall be a minimum of 20 feet wide and have a minimum vertical clearance of 13 feet 6 inches. [VSFPC section 503.2.1]
- Where a fire hydrant is located on a fire access road, the minimum road width shall be 26 feet.
- Fire apparatus access roads shall be constructed of an all-weather surface and the minimum road design weight bearing capacity for emergency fire apparatus travel shall be 75,000 pounds. The road design shall be confirmed upon completion of its construction by a geotechnical report. The geotechnical report shall be submitted to the Prince George County Fire Official prior to the issuance of a certificate of occupancy. A note to this effect shall be placed in the general notes section of the plan. [VSFPC section 503.2.3]
- The minimum turning radius to be provided for emergency fire apparatus to travel, including cul-de-sacs, shall be at least 42' (outside). The turning radius shall be demonstrated on the plan.
- Emergency fire apparatus access roadways and fire lanes in excess of 150' dead end shall be provided with an approved turn-round (90' dia. cul-de-sac; 60' "Y"; 120' hammerhead). All dimensions of the turn-round shall be shown on the plan.

Aerial Access

- Buildings or portions of buildings or facilities exceeding thirty foot in height above the lowest level of fire department vehicle access shall be provided with an aerial fire apparatus access road. The aerial fire apparatus access road shall be a minimum of twenty-six feet unobstructed clear width in the immediate vicinity of the building. Overhead obstructions in form of utility or power lines shall not be located within the aerial fire apparatus access roadway. At least one aerial fire apparatus access roadway shall be located a minimum of fifteen feet and a maximum of thirty feet from the building and positioned parallel to one entire side of the building.

Fire Lane Markings

- Fire lanes that are between twenty and twenty-six feet in width shall be posted and marked on both sides of the roadway. Fire lanes in excess of twenty-six feet in width up to thirty-two feet in width shall be posted and marked on one side of the roadway. The location of and method of marking fire lanes shall be clearly indicated on the submitted site plan. All fire lane signs shall be double faced and installed perpendicular to the curb. [VSFPC section 503.3]

PRIVATE FIRE SERVICE MAINS

- Private fire service mains and appurtenances shall be designed and installed in accordance with NFPA 24.
- Plans shall include underground pipe materials, weight, size, length, location, point of connection to County main, vault details, and restraint details.
- The fire line service must be separate from the domestic service to the building with both being tapped to the main in the street or easement in front of the property. This must be reflected on the

site plan and the Utility plan. [County Utility Design Standard]

- Private fire service mains and fire sprinkler system services may be unmetered and will be equipped with an approved double check valve assembly to assure protection of the public water supply from contamination. Double check valve assemblies will be installed in an approved vault as near to the property line as possible. The vault shall be designed and constructed in accordance with the County's standard detail. [County Utility Design Standard]
- Where required by the County Engineer, a detector check must be installed in accordance with County utility standards.
- No pipe smaller than 6 inches in diameter shall be installed as a private service main. Pipe smaller than 8 inches in diameter shall not be installed to supply multiple private hydrants. [NFPA 24]
- Minimum depth of pipe cover is 42" from finished grade.
- Plans shall clearly indicate the method of providing corrosion protection for rods, nuts, bolts, washers, clamps, and other restraining devices. [NFPA 24]

Hydrants/FDCs/Valves

- Fire hydrant systems shall be installed as directed by the fire department. [VSFPC section 507.5.1] (minimum number and spacing in accordance with IFC Appendix C is an approved method)
- The submitted plan shall clearly indicate the location and type (number and size of hose outlets) of all required or existing public and private fire hydrants. Hydrants on private service mains shall not be equipped with pumper outlets unless the calculated demand for large hose is added to the attack hose and sprinkler system demand on the fire protection water supply. [NFPA 24]
- Post indicating valves shall be located not less than 40 ft. from buildings [NFPA 24]
- Parking stalls or other obstructions shall not be placed in front of the access to fire hydrants, fire pump test headers, fire department sprinkler system connections, fire department standpipe connections or fire protection system control valves. [VSFPC section 507.5.4]
- Where hydrants are subject to damage, bollards shall be installed in accordance with VSFPC section 312. [VSFPC section 507.5.6]
- Plans shall show location of Fire Department Connection (FDC), indicating the location of the check valve and automatic ball drain. [NFPA 24]
 - FDC at valve vault.
 - FDC away from building (minimum 40 feet).
- When a fire pump is required for the building systems, separate FDC piping shall be connected to discharge side of fire pump. The required check valve shall be located immediately adjacent point of connection of the fire department connection to the fire pump discharge piping. The fire department connection piping shall be sloped to the automatic ball drip valve located in valve vault. Based upon pipe configuration, multiple low point drains may be required.
- The Fire Department Connection (FDC) shall be located not less than 18 inches and not more than four feet above the level of adjacent grade. [NFPA 24]
 - A sign constructed of durable materials (preferably metal), permanently installed and readily visible shall be provided at the Fire Department Connection. The sign shall have letters six inches in height. The letters shall be of red reflective material on a white reflective background. The verbiage may be "FDC" or "Fire Dept. Connection" in accordance with the International Fire Code (current edition) Section 912. When the FDC protects multiple addresses within a complex, but not all of the address, the specific addresses being protected shall be shown on the sign.
- Fire department connections shall be located not less than 40 ft. from buildings (where possible); on the street side of buildings; where fully visible and recognizable from the street or nearest point of

fire department apparatus accessibility and arranged so that hose lines can be attached to the inlets without interference from nearby objects; and not more than 50 ft. from the nearest fire hydrant (on the same side of the road/lane) connected to an approved water supply.

- Large private systems may be required to be provided with section control valves. [NFPA 24]
- An approved identification sign must be installed at all valves indicating their function and what they control (including FDCs). [NFPA 24]
- Provide the details for the automatic sprinkler system run-in and stub up, including all applicable notes for piping from 5 ft. outside of the building to 1 ft. above finished floor. The detail shall include, but not be limited to the following:
 - Depth of bury
 - Pipe size, and material type
 - Restraint device(s), thrust blocks, Roding, joint system
 - Transition details for connection of dissimilar piping materials
 - Mechanical fittings, and flanges for connecting sprinkler system components
- All valves controlling water supplies to automatic sprinkler systems (including valves in vaults) must be electronically monitored by the building fire alarm system. Provide a note on the plans.

Thrust Blocks

- Thrust blocks for private fire service mains shall be designed at a minimum test pressure of 225 psi.
- Provide thrust block details and locations on the plans.
 - Provide the required thrust block design and rodding detail chart and the minimum concrete amount design chart. (see attached)
 - For calculated bearing and gravity thrust blocks refer to refer to NFPA -24 Section 10.8.2, Tables A10.8.2 (a, b and c) and Figures A10.8.2 (a, b and c).
 - See attached bearing thrust block tables.
 - Thrust blocking not bearing against undisturbed soil requires an engineer's report.
 - Threaded rod shall not be formed or bent. [NFPA 24 – Section 10.8.3.1.2.4]
 - Listed joint restraint systems; bolted flange, heat fused, welded. [NFPA 24 – Section 10.8.3]
 - Roding and clamps with corrosion protection. [NFPA Section 10.8.3.1.1, 10.8.3.1.2 and Table 10.8.3.1.2.2]
- Plans shall provide calculated vertical and horizontal thrust forces for pipe elevation changes indicating appropriate restraint method. [NFPA 24: 6-3.2, Figure A-6-3.2(d)]
 - Gravity thrust block size
 - Restraint device(s), rodding, mechanical joint system.

Double Check Assembly

- Provide details for the plan and elevation (section) views of the double check assembly vault. (County Utility standard detail available)
- The Double Check assembly Vault top shall be a minimum of six inches above the finished grade. Under no circumstances shall the vault top be at or below the finished grade.
- Plans shall indicate the location and sizes of all piping and equipment maintaining the valve vault free from accumulation of water.
 - Drain line directly to storm sewer or acceptable discharge location.
 - Sump pump and drain line to storm sewer or acceptable discharge location.
 - Engineered drain field, requires professional engineer's sealed drawing(s) and calculations for drain field. SPECIAL CONDITION: requires third-party inspection and certification PRIOR TO requesting a vault inspection.

- Plans shall indicate size and show routing of electrical conduits to valve vault.
 - Conduit for fire alarm system circuit providing electronic monitoring of valves.
 - Where applicable, conduit for 110-vac sump pump circuit installation.

NOTE: Low voltage fire alarm circuits, 24 VDC, cannot be run in conduit common with vac circuits exceeding 50 volts. [Current edition NEC 760-26(B)]

NOTE: A single outlet receptacle supplying a permanently installed sump pump shall not require GFI protection and meets provisions for disconnect. DO NOT GFI PUMP

ADDITIONAL INFORMATION REQUIRED TO BE SUBMITTED WITH A FIRE PROTECTION UNDERGROUND PERMIT APPLICATION

- A minimum of four copies of shop drawings, calculations and submittal data shall be provided with the permit application permitting evaluation of the system PRIOR TO installation.
- Plans shall clearly indicate the project name, the project address, the responsible designer's name, address, and contact information.
- The submitted plans shall be drawn to an indicated scale on sheets of uniform size and shall include the following items that pertain to the design of the system. [NFPA 24 –section 4.1.3]
 - Name of the owner.
 - Location of the project, including the street address.
 - A graphic representation of the scale used on all plans.
 - Name, address and contact information of the installing contractor.
 - Size and location of standpipe risers, hose outlets, hand hose, monitor nozzles and other related equipment where applicable.
 - Manufacturer’s installation requirements for mechanical restraint devices.
- Where the system demand pressure exceeds 150 psi, the fire department connection sign shall state the required design pressure. [NFPA 24 – Section 5.9.5.4]
- Specific detail(s) shall be provided for pipe material transitions, changes in pipe connections (slip joint, fixed flange, mechanical joints, mega-lug joints). [NFPA 24 – Section 4.1.3]
- Provide the following manufacturer’s product data sheets with the submittal:
 - Backflow prevention devices including friction loss chart.
 - OS&Y and PIV valves.
 - Tamper switches.
 - Fire department connection with a minimum of (2) - 2 1/2 “ NST hose connections
 - Automatic ball drain for the fire department connection piping.
 - Check valve for the fire department connection piping.
 - Sump pump.
 - Vault doors
 - Pipe penetration seals at vault (flexible)
 - Pre-fabricated vault construction details.
 - Pipe, fittings, and restraint devices.
 - Other

NOTE: Pre-cast Double Check Assembly Vaults shall be limited to those approved by the Prince George County Department of Utilities. Poured in-place vaults shall be approved by the Prince George County Department of Utilities.

Note: Areas in the following tables have been derived using a water pressure of 225 psi (15.5 bars) and a soil resistance of 2000 pounds per square foot (1.0 bars). The values include a 1.5 safety factor. NFPA 24

CONCRETE THRUST BLOCKS, MINIMUM AREA OF BEARING									
Pipe Size	90° Bend		45° Bend		Tees, Plugs, Caps, & Hydrants				
	in.	ft ²	m ²	ft ²	m ²	ft ²	m ²		
4	2		0.19	2		0.19	2		0.19
6	5		0.46	3		0.28	4		0.37
8	8		0.74	5		0.46	6		0.56
10	13		1.21	7		0.65	9		0.84
12	18		1.67	10		0.93	13		1.21

CONCRETE THRUST BLOCKS, MINIMUM AMOUNT OF CONCRETE	
Size of Fitting	Cubic Yards
3"-8"	³ / ₄
10"-12"	1 ¹ / ₂

THRUST @ 225 PSI WATER PRESSURE FOR FITTINGS			
Pipe	90° Bend	45° Bend	Dead End
4	2559	1385	1810
6	5288	2862	3739
8	9097	4923	6433
10	13685	7406	9677
12	19353	10474	13685

Water Pressure > 100 psi MULTIPLY Table by Ratio of Pressure ...150 psi/100 psi = 1.5 Factor: 2007 NFPA 24

Minimum Thrust Block Size

$$A_b = (h)(b) = T(S_f)/S_b$$

(h) = block height, (b) = block width

T = thrust force table

S_f = safety factor (1.5)

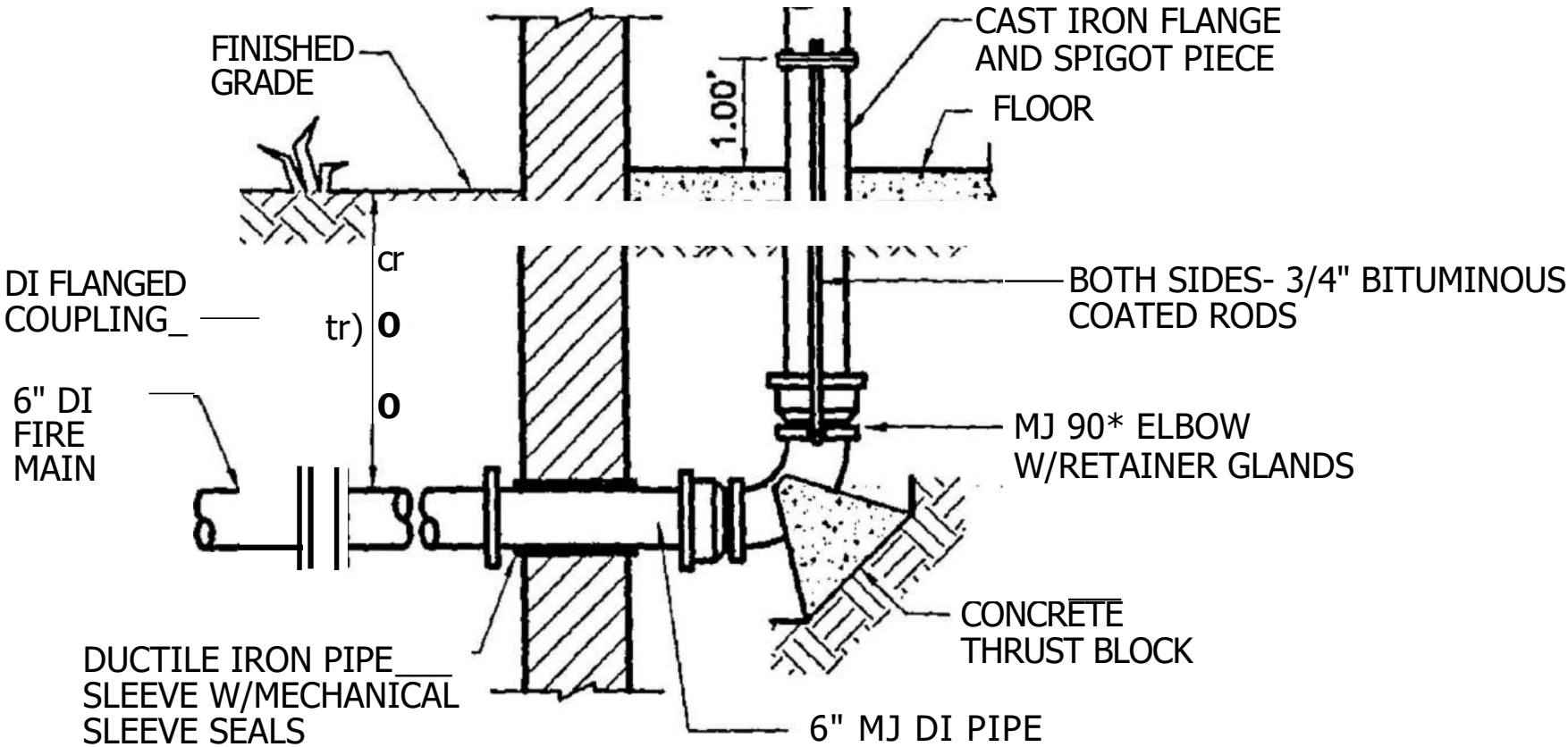
S_b = soil bearing from table

SOIL	BEARING lb/ft ²
SOFT CLAY	1,000
SAND	4,000
SAND CLAY	6,000
HARD CLAY	9,000

ROD NUMBER - DIAMETER COMBINATIONS				
Pipe Size	5/8 in.	3/4 in.	7/8 in.	1 in.
4	2	_____	_____	_____
6	2	_____	_____	_____
8	3	2	_____	_____
10	4	3	2	_____
12	6	4	3	2

Table derived using pressure of 225 psi (15.5 bars) and design stress of 25,000. 1999 NFPA 13 :Table 6-3.3.1.2.

SYSTEM RISER



NOTE: WHERE MAIN PASSES BELOW FOOTING. CLEARANCE SHALL BE PROVIDED TO PREVENT PIPE BREAKAGE DUE TO BUILDING SETTLEMENT.

DETAIL - FIRE PROTECTION SYSTEM RISER

NO SCALE