Riverside County Fire Department

Fire Department Water Supply and Fire Hydrant Requirements for Commercial & Residential Development

Guideline OFM-01B

PURPOSE

The effectiveness of emergency response and firefighting operations is directly related to the proper design, installation and maintenance of fire hydrants and water supply. This document provides direction and guidance for hydrant quantity and placement as required by the 2022 California Fire and Building Codes (CFC and CBC) and as amended by Riverside County Ordinance 787 and other locally adopted ordinances. This guideline includes requirements for:

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SCOPE

This guideline applies to new, remodeled, reconstructed, or relocated residential or commercial structures, developments, and facilities to which emergency response may be necessary. The information contained in this document is intended to assist the applicant in attaining compliance, and to ensure that both privately owned water-based fire protection systems, and public fire hydrants necessary for emergency response purposes will be always available for use. Some of the topics discussed within this document may also be covered in more detail through other Riverside County Fire Department- Office of the Fire Marshal (RVC-OFM) guidelines and/ or policies.

NOTE: See RVC-OFM Technical Policy #16-001 AND #16-002 AND #23-001 for potential alternatives pertaining to One- and Two-Family Dwellings and/ or accessory buildings (new construction, alteration, or additions) upon a <u>single-parcel</u> containing no more than two buildings with no more than three dwelling units, and any number of accessory structures. Subdivision Map submittal projects regulated by Riverside County Ordinance 460 or Partner City Ordinances shall comply with this Guideline.

DEFINITIONS

The following definitions are provided to facilitate the consistent application of this guideline:

Bollards - Permanent poles that are placed to protect an area, structure, or piece of equipment from potential vehicular damage.

Fire Apparatus Access Roads – A road that provides fire apparatus access from a fire station to a facility, building, or portion thereof. This is a general term inclusive of all other terms such as fire lane, public street, private street, parking lot lane, and access roadway. Roads must extend to within 150 feet of all portions of the exterior of the first floor of any structure as measured by an approved route around the exterior of the building or facility, and must meet specified criteria for width, pavement characteristics, road gradient, turning radius, etc.

SUBMITTAL REQUIREMENTS

1. Plan Submittal Requirements

Plans shall be submitted for review and approval to demonstrate compliance with all codes and other regulations governing water availability for firefighting and emergency access to development of sites and new structures within the jurisdiction of RVC. In addition, alterations to existing structures or sites shall be reviewed by RVC-OFM to ensure that the modifications do not affect water availability or emergency access.

A. Submittals. All plan submittals and revisions must be electronically submitted via the RVC PLUS portal at: https://rivcoplus.org. Plan review and subsequent inspection services are provided on a deposit basis and due at the time plans are submitted.

B. Scope. The scope of work shall be clearly indicated on the plan. If the building or site in question was approved previously, include the RVC-OFM permit number of the prior approval on the new plans. A copy of the previously approved fire department water supply plan(s) shall be submitted along with new plans for any revision.

C. Plan Submittal Sequencing. Sequencing of fire department access and water supply plan submittals shall meet one of the following options:

1) PREFERRED SEQUENCE: A site plan that demonstrates compliance with BOTH fire department access AND water supply/ fire hydrant requirements. This plan may be included as part of the architectural plan or submitted separately as part of the plot plan.

OR

2) ALTERNATIVE SEQUENCE: A site plan is submitted for RVC-OFM review demonstrating compliance with fire department access requirements. After approval, a second plan demonstrating compliance with water supply/ fire hydrant placement requirements must be submitted RVC-OFM for review.

D. Building Data. Information related to the building's location, use, building size, and construction shall be clearly indicated on the plan.

1) Include the project's street address (or a working address of the job trailer or future building on the site when not known) and the tract, tentative tract, or parcel map number, and APN (Assessor's Parcel Number), and County/ City Planning Case #.

2) Indicate the specific types of occupancies that will be housed in each structure as listed in California Building Code (CBC), Chapter 3.

3) Note the type of fire sprinkler system installed/proposed (e.g., NFPA 13, 13-R, or 13-D).

E. Required Plan Notes. Include the RVC – OFM Water Notes on the plan. (See Attachment 1).

F. Water Availability (Fire Flow Data). To facilitate the review process and avoid untimely delays in project approval, applicants are strongly encouraged to arrange a hydrant flow test (or water modeling report) with the local water agency *prior to submitting plans to the RVC – OFM,* if the project includes a new structure or increase in the floor area of an existing structure. If the project requires evaluation of the available fire flow, it will not be approved without a completed Fire Flow Test Report from the applicable water agency serving the project. Water availability information must be no older than **six-months**.

G. Conditions of Approval. To ensure consistency of the fire access plan with project conditions, include any conditions of approval pertaining to the review of the project on the plans. If the project does not require review and entitlement by the County/ City Planning Commission, Board of Supervisors/ City Council, or the Planning Department permit review process is required but has not yet been completed, please state this on the plan. If you are unsure whether your project requires planning approval, please contact the applicable County/ City Planning Department.

H. Complete Attachment 2, Fire Department Water Supply Plan Submittal Checklist, and verify that basic project information has been provided and that general water supply and fire hydrant requirements have been addressed on the plan.

2. Fire Hydrant Location and Performance Requirements

Applicants must provide documentation that fire hydrants are provided in the quantity and spacing described in California Fire Code (CFC) Appendix C as locally amended. They must also demonstrate that hydrants can deliver the amount of water required by CFC Appendix B, as locally amended (See Attachments 3, and 4). The quantity and spacing of hydrants are governed by the fire flow required for the structure(s) served. The required fire flow is dependent upon the size of the structure, type of construction, and whether the building is equipped with fire sprinklers. This information must be shown clearly on the plans to assist in the determination of the fire flow requirement.

A. Water Availability and Fire Flow – To facilitate the review process and avoid untimely delays in project approval, applicants are strongly encouraged to arrange a hydrant flow

test (or water modeling report) with the water agency *prior to submitting plans to RVC-OFM* if the project includes a new structure or increase in the floor area of an existing structure. If the project requires evaluation of the available fire flow, it will not be approved without a completed RVC Water System Flow Test or equivalent documentation from the applicable water agency. Fire Flow test information must be no older than **six-months**.

1) Schedule a Fire Flow Test (or water modeling report) from the applicable Water Agency serving the project.
   a) Document the results of the test on RVC Water System Flow Test form (Note: Other forms provided by the applicable water agency may also be acceptable). As stated above, fire flow is dependent on several factors, so the largest building or group of structures is not necessarily the most demanding in terms of fire flow.

B. To Determine Required Minimum Fire Flow for One- and Two-Family Dwellings, Group R-3, R-4 buildings and Townhouses: Use CFC Table B105.1(1) and CFC Table B105.1(2). The required values are **not** locally amended.

C. To Determine Required Minimum Fire Flow For all other Buildings: Use locally amended Table B105.2 (See Attachment 3) and unamended CFC Table B105.1(2).

   a) In newly developed areas without water infrastructure, the water agency may issue a signed “will-serve” letter indicating the minimum amount of water that will be delivered once the public water system is installed and operational.

   b) If multiple hydrants are located within the maximum distance allowed by CFC Table C102.1, the amount of water available from each hydrant may be combined, provided that the hydrants are flowed simultaneously.

   c) It is the applicant’s responsibility to ensure that the following information is provided:

      (a) Static pressure and residual pressure in psi and observed flow in g.p.m.; AND
      (b) Calculated Fire Flow in g.p.m. at 20 psi.

      NOTE: Scan all completed form(s) onto your plans. Please ensure that the fire area, building size, construction type, and flow data are complete and accurate. Errors or omissions in this information may result in plans having to be resubmitted or fire flow testing being redone.

D. Fire-Flow Calculation Area. The fire-flow calculation area shall be the total floor area of all floor levels within the exterior walls, and under the horizontal projections of the roof of a building, except as modified in Section B104.3. Portions of buildings which are separated by fire walls without openings, constructed in accordance with the California Building Code are allowed to be considered as separate fire-flow calculation areas. The fire-flow calculation area of buildings constructed of Type IA and Type IB construction shall be the area of the three largest successive floors. CFC Appendix B Section B104

E. Hydrant Location, Number and Spacing. The minimum number of hydrants shall be provided and spaced along the length of the fire apparatus access road(s), based on fire flow specified in Table C102.1. (See Attachment 4)

1) Hydrants shall be located at street intersections for both public and private streets.

2) Hydrants must be located no more than three feet from the edge of a fire apparatus access road and cannot be located in areas where they will be visually or operationally obstructed (behind fences or walls, in bushes, behind parking spaces, etc.). Clearance shall be provided to a distance no less than three feet from the perimeter of the hydrant.

3) The hydrant outlets must face the fire apparatus access road. Where all of the outlets cannot face the fire access road (e.g., the hydrant is located in a landscape peninsula or island in a parking lot; the hydrant has three outlets), the 4" outlet(s) shall take precedence.

4) Hydrants shall be located at least 40 feet from the building(s) it serves. Where it is impractical to locate hydrants 40 feet from adjacent structures, hydrant spacing shall be reduced by 50% to provide alternative hydrants for use by fire department personnel responding to an emergency. Fire hydrants may be located closer provided that nearby walls do not contain openings and the hydrant is not otherwise located where it can be rendered inoperable due to damage from collapsed walls, debris, or excessive heat.

5) Hydrants with a primary function of connection to a Fire Engine for the purpose of pumping an FDC shall be located so that a hose line running between the hydrant, fire engine, and the fire department connection(s) (FDCs) does not exceed 100 feet. This is commonly accomplished by using a public fire hydrant. In addition, consideration should be given to avoid configurations in which hose lines have to cross driveways, obstruct roads, or fire lanes, or otherwise interfere with emergency vehicle response and evacuation of a site, when possible.

6) Hydrants and fire department connections shall not be located behind parking stalls or in other locations where they are likely to be blocked by vehicles or other objects. Hydrants shall be placed at street and drive aisle intersections in preference to mid-block locations. Where on-street parking is allowed, hydrants should be placed in the shortest parkways between adjacent driveways, at corners and chokers where parking is not normally allowed, and in similar areas where impact to space available for parking and the potential for hydrants to be obstructed is minimized.

7) Hydrants and fire department connections should not be located where apparatus staged at these appurtenances would then encroach on minimum fire apparatus turning radii unless alternative routes are available. Hydrants shall not be placed in the "bulb" end of a cul-de-sac where apparatus staged at the hydrant would prevent the cul-de-sac from being used as a turnaround.

F. Protection of Hydrants. Where hydrants are located such that they are exposed to potential damage from vehicular collision, they shall be protected by curbs or bollards. (See Attachment 5)

1) If vehicles can approach the hydrant from more than one direction, the hydrant shall be protected by four bollards of concrete-filled pipe four inches in diameter and mounted in concrete in a square around the hydrant. The bollards need to be spaced a minimum of three feet from the perimeter of the hydrant. The bollards must be placed so that their location does not impede access to or use of the hydrant. Two bollards may protect hydrants that can be approached from only one side. Bollard installation requirements can also be found in CFC § 312.2.

2) Hydrants may not require protection by bollards if they are located such that the potential for collision is minimal or if they are sufficiently protected by a standard concrete curb at least six inches in height.

G. Hydrant Markers and Color.

1. Blue reflective pavement markers (“blue dots”) shall be used to identify fire hydrant locations. Blue reflective markers used for any other purpose should be removed. (See Attachment 6)

a) Two-way streets and roads – Markers shall be placed six inches from the edge of the painted centerline or from the approximate center of streets without a painted centerline on the side nearest the hydrant.

b) Streets with left turn lanes at the intersection – Markers shall be placed six inches from the edge of the painted white line on the side nearest the hydrant.

c) Streets with continuous two-way left turn lane – Markers shall be placed six inches from the edge of the painted yellow line on the side nearest the fire hydrant.

2. Hydrant Color.

a) Private hydrants (fire hydrants owned by a private property owner, segregated from public water mains by and located downstream from a backflow prevention device) shall be painted as specified in RVC – OFM Guideline-02 (Private Underground Fire Service Mains Serving Private Fire Hydrants & Fire Sprinkler Systems). NOTE: Plans for any Private Underground Fire Service Mains Serving Private Hydrants and/or Fire Sprinkler Systems shall be submitted to the RVC for review and approval prior to installation.

b) Public hydrants shall be painted Chrome Yellow, or any color (other than red) as specified by the local water purveyor or City Ordinance.

3. Fire Hydrants and Water Supply During Construction

Fire department water supply for firefighting during construction shall comply with CFC Chapter 33 and the provisions listed in this section and, where applicable, elsewhere in this guideline. Construction activities at job sites not complying with these requirements may suspended at the discretion of the RVC-OFM inspector until a reasonable level of compliance is achieved.

At no time shall construction projects impair or obstruct any existing fire access roads or access to and operation of existing fire hydrants serving other structures. Should existing roads or hydrants need to be moved or otherwise altered during construction, the developer shall provide alternative access routes and other mitigation features to ensure adequate fire and life-safety protection. Such alternatives and features shall be submitted to RVC - OFM for review and approval prior to alteration of existing conditions.

A. A water supply inspection. An inspection shall be scheduled with a RVC-OFM inspector to verify that access roads, operable hydrants, and other access features have been provided for buildings under construction prior to:

    1) For buildings of Type I through Type V construction, a water supply inspection shall occur prior to Building Permit Issuance.

       Provisions shall be made to ensure that hydrants are not blocked by vehicles or obstructed by construction material or debris. A three-foot clear space shall be provided around the perimeter of the hydrant and no parking or similar obstructions shall be allowed along the adjacent road within 15 feet of the hydrant. Inoperable hydrants shall be bagged.

    2) If applicable, an additional inspection shall also occur prior to construction reaching 40 feet in height for buildings of all construction types that will have four or more floors when complete. Standpipes shall be installed and operational prior to the building reaching 40 ft.

B. Permanent or Temporary Fire Access Roads. Refer to RVC-OFM Guideline OFM-1A (Fire Department Access Requirements for Commercial & Residential Development for all RVC-OFM access requirements.

INDEX OF ATTACHMENTS

NUMBER: SUBJECT ..... PAGE

ATTACHMENT 1

Riverside County Fire Department- OFM Water Supply and Fire Hydrant Plan Notes

All the notes listed in the INSPECTION REQUIREMENTS and GENERAL REQUIREMENTS sections shall be placed, verbatim, on the plan under the heading "FIRE DEPARTMENT WATER SUPPLY AND FIRE HYDRANT NOTES."

INSPECTION REQUIREMENTS

1. Riverside County Fire (RVC) inspections are required for this project. Email: RRUOFMSCHEDULING@FIRE.CA.GOV. Please provide at least 2-days advance notice.
4. An RVC-OFM inspection shall be performed prior to building permit issuance. All required fire hydrants, standpipes, and access roads shall be in place and operational.
5. Phased installation of fire hydrants and fire access roads requires additional approval and inspections and shall be coordinated with RVC-OFM.
6. An original approved, signed, stamped water supply and fire hydrant plans shall be available on-site at time of inspection.
7. Fire hydrants shall be maintained and remain clear of obstructions at all times during and after construction. Areas where parking is not permitted shall be clearly identified at all times. Obstruction of fire lanes and hydrants may result in cancellation or suspension of inspections.
8. The project address shall be clearly posted and visible from the public road during construction.
9. Buildings of four or more stories shall be provided with stairs and an approved standpipe before reaching 40 feet in height.

GENERAL REQUIREMENTS

10. Fire lane widths shall be measured from top face of the curb to top face of the curb for fire lanes with standard curbs and gutters and from flow-line to flow-line for fire lanes with modified curb designs (e.g., rolled, ramped, etc.). The developer is responsible to verify that all approved public works or grading department street improvement plans, or precise grading plans conform to the minimum street width measurements per the approved RVC-OFM fire department fire hydrant and water improvement plans, and standards identified in RVC-OFM Fire Department Access Guideline for Commercial & Residential Development (FP-01A) AND RVC-OFM Fire Department Water Supply and Fire Hydrant Guideline (FP-01B).
11. All fire hydrants shall have a "Blue Reflective Pavement Marker" indicating their location. On private property markers are to be maintained in good condition by the property owner.
12. Any future modification to the approved Fire Department Water Plan(s) or approved site plan, shall require review, inspection, and approval by RVC-OFM
13. Approval of this plan shall not be construed as approval of any information or project conditions other than those items and requirements identified in RVC-OFM Fire Department Water Supply and Fire Hydrant plans (Guideline FP-01B) and related portions of the CFC and CBC. This project may be subject to additional requirements not stated herein upon examination of actual site and project conditions or disclosure of additional information.

ATTACHMENT 2

RVC-OFM Fire Hydrant and Water Supply Plan Submittal Checklist

PROJECT INFORMATION

Scope of project is clearly defined on the plan?	☐ Yes	
Conditional Use Permit conditions included with submittal?	☐ Yes	☐ N/A (CUP was not required by County/City)
Tract/Tentative Tract/Parcel Map Number has been provided?	☐ Yes	
Planning Case # provided?	☐ Yes	
Standard RVC Hydrant & Water Supply plan notes are included?	☐ Yes	
Building area, construction, occupancy, sprinklers noted on plan?	☐ Yes	
AM&M request letter scanned onto plan?	☐ Yes	☐ N/A (No alternate methods proposed)
Access/hydrant construction phasing plan provided?	☐ Yes	☐ N/A (No phasing of access/hydrant installation)

WATER AND HYDRANTS

Fire Flow Test form completed and provided?	☐ Yes	☐ No
All hydrants within 400’ of the site are shown on plan?	☐ Yes	
Are hydrants provided/spaced per CFC Appendix C?	☐ Yes	

NOTE: This is a list of basic fire hydrant and water supply plan submittal requirements. Other information or requirements may be necessary depending on conditions specific to each project.

ATTACHMENT 3

CFC TABLE B105.2
REQUIRED FIRE FLOW FOR BUILDINGS OTHER THAN ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3, R-4 BUILDINGS AND TOWNHOUSES
(As amended by RVC)

AUTOMATIC SPRINKLER SYSTEM (Design Standard)	MINIMUM FIRE FLOW (Gallons per minute)	FLOW DURATION (hours)
No Automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B105.1(2)
Section 903.3.1.1 of the CFC	50% of the value in TableB105.1(2) [a]	Duration in Table B105.1(2) at the reduced flow rate.
Section 903.3.1.2 of the CFC	50% of the value in TableB105.1(2) [b]	Duration in Table B105.1(2) at the reduced flow rate.

ATTACHMENT 4

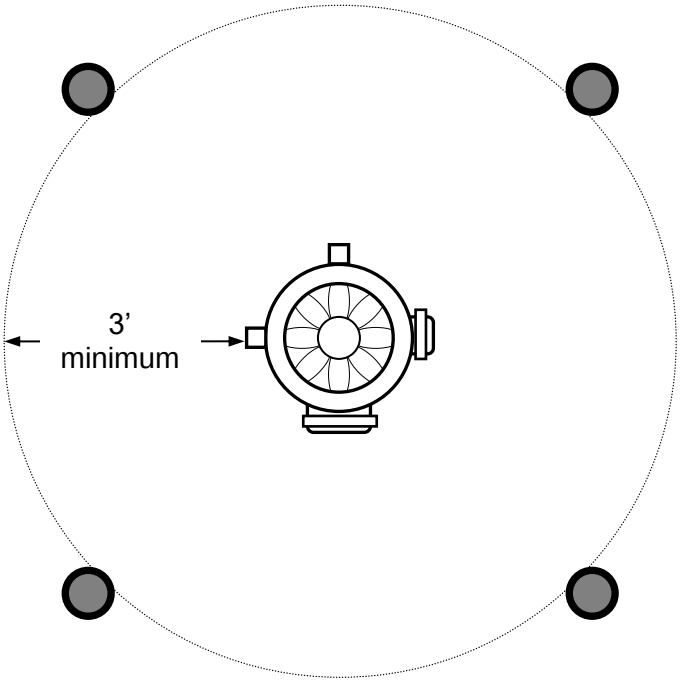
CFC TABLE C102.1:
Hydrant Quantity Based on Fire Flow [h]

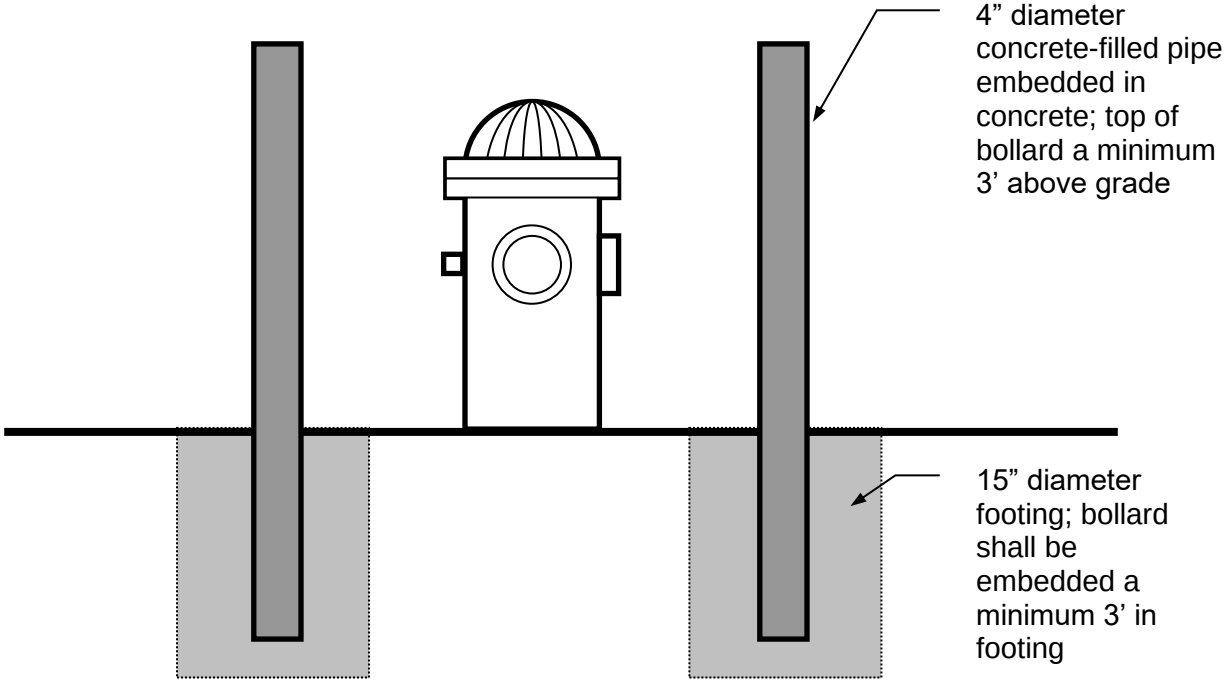
FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS [a,b,c,f,g]	MAX. DIST. FROM ANY POINT ON STREET/ ROAD FRONTAGE TO A HYDRANT [d,f,g]
1,750 or less	1	500 (ft)	250 (ft)
1,751–2,250	2	450	225
2,251–2,750	3	450	225
2,751-3,250	3	400	225
3,251-4,000	4	350	210
4,001-5,000	5	300	180
5,001–5,500	6	300	180
5,501–6,000	6	250	150
6,001-7,000	7	250	150
7,001 or more	8 or more[e]	200	120

a. Reduce by 100 feet for dead-end streets or roads.
b. Where streets or roads are provided with median dividers that cannot be crossed by firefighters pulling hose lines or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30000 vehicles/ day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis.
c. Where new water mains are extended along street where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1000 feet to provide for transportation hazards.
d. Reduce by 50 feet for dead-end streets or roads.
e. One hydrant for each 1000 gallons per minute or fraction thereof.
f. A 50% spacing increase shall be permitted where the building is equipped with throughout with an approved automatic fire sprinkler system in accordance with CFC Section 903.3.1.1.
g. A 25% spacing increase shall be permitted where the building is equipped with throughout with an approved automatic fire sprinkler system in accordance with CFC Section 903.3.1.2 or 903.3.1.3.
h. The fire code official is authorized to modify the location, number, and distribution of of fire hydrants based on site specific constraints and hazards.

ATTACHMENT 5

Protection of Hydrants, Detector Checks, Fire Department Connections, and other Appurtenances
(Bollards shall not obstruct outlet use)



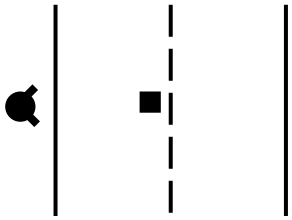


ATTACHMENT 6

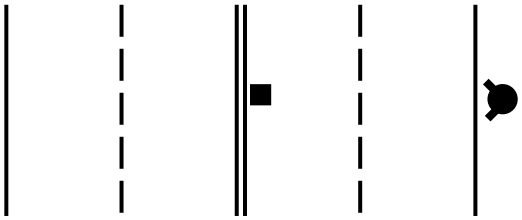
Blue Dot Hydrant Marker Location

(Note: hydrant markers shall be offset 6" from the adjacent centerline, lane stripe, or edge line)

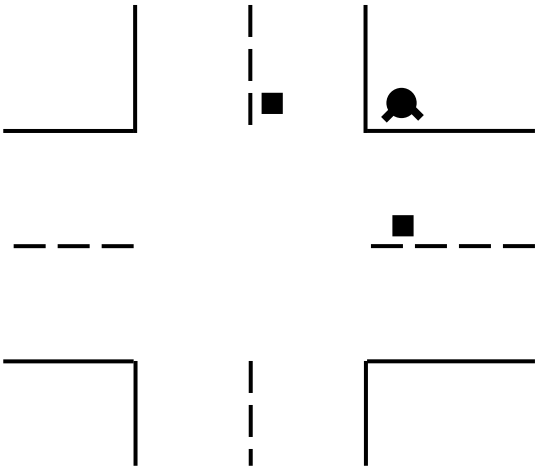
TWO LANE STREET



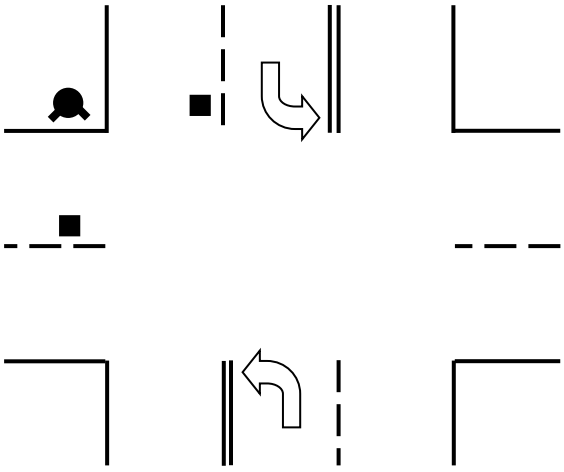
MULTI-LANE STREET



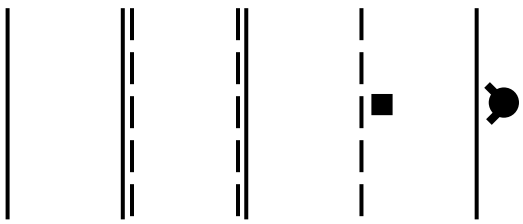
INTERSECTION



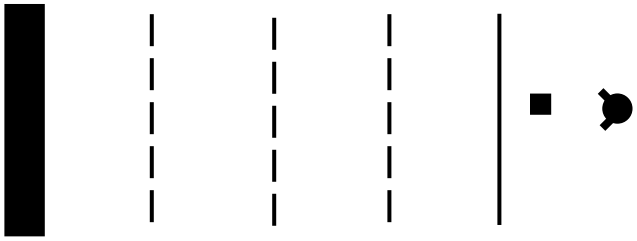
INTERSECTION WITH TURN LANES



MULTILANE STREET WITH TURN LANE



FREEWAYS AND EXPRESSWAYS



NOTE: For Public Fire Hydrants the developer should contact the local water purveyor to coordinate the installation of the blue dots in accordance with their adopted standards.