



# Fire Alarm Plan Review Requirements

Department of Planning & Development Review, Bureau of Permits and Inspections  
900 East Broad Street, Room 108  
Richmond, Virginia 23219  
Office: (804) 646-4169 Fax: (804) 646-6948

For Public Distribution

2015 Code Cycle

September 04, 2019\*

All project documents under a commercial fire alarm permit application shall be in PDF format and are required to be submitted (thumb/flash drive (preferred) or CD/DVD media) to the City of Richmond, City Hall, Room 108. For walk-in or mailed in permit applications or resubmissions, make sure to have a printed copy of either the permit application or plan intake sheet. **\*\*Do not leave Room 108 without your media (thumb/flash drive or CD/DVD). The City will not claim responsibility for such devices.\*\***

Low voltage security (access or egress control systems or delayed locking or latching systems) and electrical shall be completed under separate permits.

Plans are required to be submitted for all commercial projects. Single and two family dwellings are not required to submit drawings.

The requirements herein may not be required for all submissions. Please contact the Bureau of Permits and Inspections if you are unsure of which requirements are necessary for your project.

The following set of requirements are based on the 2015 version of the Virginia Uniform Statewide Building Code (VUSBC). **Depending on when the building permit application was filed, a project might still fall under the codes listed in the December 01, 2018 version handout. We will still accept the checklist from that handout based on the building permit application version of the VUSBC.**

|   |   |
|---|---|
| Virginia Construction Code (VCC) - 2015               | ICC A117.1 Accessibility Standards - 2009 |
| Virginia Fire Code (VFC) - 2015                       | Virginia Mechanical Code (VMC) - 2015     |
| National Fire Protection Association (NFPA) 13 - 2013 | NFPA 20 - 2013                            |
| National Electrical Code (NEC)/(NFPA 70) - 2014       | NFPA 72 - 2013                            |
| Virginia Existing Building Code (VEBC) - 2015         |   |

Pages 25-26 (Annex D) of this checklist shall be submitted, as a PDF file, with all required Construction Documents as a check to make sure the engineer/owner/contractor has fulfilled the City's requirements. The Checklist shall be signed by either the Contractor/Master Electrician OR signed/sealed by the Engineer of record. All appropriate items within this checklist that pertain to the project shall be checked (i.e. "✓").

**For projects with approved/current permits, make sure all revised plans adhere to Section B-1.8 - B-1.14.**

\*Changes to this document will occur on June 1st and December 1st (or when there is a code cycle change). Make sure to check the webpage on these dates for any revisions:

<http://www.richmondgov.com/planninganddevelopmentreview/forms.aspx>

# Table of Contents

| Section      | Description                                  | Page      |
|--------------|--|-----------|
| <b>A</b>     | <b>General Requirements for All Projects</b> | <b>3</b>  |
| A-1          | Example Title Block                          | 4         |
| A-2          | Project Information                          | 4         |
| A-3          | Example Graphical Scale                      | 4         |
| A-4          | External Links                               | 4         |
| A-5          | File Naming Convention                       | 5         |
| <b>B</b>     | <b>NFPA 72 General Requirements</b>          | <b>6</b>  |
| B-1          | General Requirements                         | 6         |
| B-2          | General Plan Requirements                    | 7         |
| <b>C</b>     | <b>NFPA 72 Initiating Devices</b>            | <b>8</b>  |
| C-1          | Detection Devices                            | 8         |
| C-2          | Fire Safety Control Functions                | 12        |
| C-3          | Zones  | 12        |
| C-4          | Manual Fire Alarm Boxes                      | 12        |
| C-5          | 24 Hour Monitoring                           | 12        |
| <b>D</b>     | <b>NFPA 72 Notification Appliances</b>       | <b>13</b> |
| D-1          | Audible Devices                              | 13        |
| D-2          | Visual Devices                               | 13        |
| <b>E</b>     | <b>Other Code Related Requirements</b>       | <b>14</b> |
| E-1          | General Miscellaneous Requirements           | 14        |
| E-2          | IBC Requirements                             | 15        |
| <b>Annex</b> |  |           |
| A            | Individual Responsible for Signing Plans     | 16        |
|              | <b>Sample Drawings:</b>                      |           |
|              | FA1 - Symbols and Legend                     | 17        |
|              | FA2 - Partial Device Plan                    | 18        |
|              | FA3 - Partial Riser Diagram                  | 19        |
| B            | FA4 - Voltage Drop Calculations              | 20        |
|              | FA5 - Fire Alarm Matrix                      | 21        |
|              | FA6 - Battery Calculations                   | 22        |
|              | FA7 - UL Rated Fire Stop Detail              | 23        |
| C            | UL Fire System Directory                     | 24        |
| D            | Checklist to Submit to City of Richmond      | 25        |
| E            | City of Richmond Plan Intake Sheet           | 27        |

## **Section A: General Requirements for All Projects:**

|    |   |
|----|---|
| 01 | <b>Provide a complete set of electronic (PDF) fire alarm Construction Documents on either a thumb drive or CD/DVD. For plans, make sure you have one PDF file of all plans. All plans to be the same size. All submitted documents shall follow the naming convention in Section A-5, page 5.</b>                       |
| 02 | The plans shall contain only information required for this permit. Information that relates to other permits shall not be on this set of plans.   |
| 03 | Plans shall be neat and legible, and shall be all the same size. See <b>Annex B</b> .   |
| 04 | Plans shall be 1/8" scale (1/ 8" = 1'-0"). Provide a graphical scale on all drawings showing floor plans (see example in <b>Section A-3</b> and <b>Annex B-FA2, FA3</b> ).  |
| 05 | A project with more than one sheet/drawing, provide a list of all plans stating sheet number and description of the plan. Provide the list of plans on the first electrical sheet/drawing. See <b>Annex B-FA1</b> .   |
| 06 | All text on the plans shall be at least 0.125" in height.<br>Exceptions: Text for superscripts, and subscripts shall be at least 0.1" in height.  |
| 07 | All plans shall have the information shown in the example title block in <b>Section A-1</b> . See <b>Annex B-FA1</b> .  |
| 08 | On the first plan, provide the all the project information shown in <b>Section A-2</b> . See <b>Annex B-FA1</b> .   |
| 09 | Provide Manufacturers' data sheets indicating model number and listing for equipment, devices, and materials. <b>Provide an electronic (PDF) copy of these documents. Follow the naming convention in Section A-5, page 5.</b>  |
| 10 | Provide a legend for all symbols and abbreviations/acronyms on the plan(s). Having this on the first drawing would be advisable. See <b>Annex B-FA1</b> .   |
| 11 | For projects that require specifications, provide these on the plans, or submit a hardcopy along with the plans. <b>Provide an electronic (PDF) copy of the specifications. Follow the naming convention in Section A-5, page 5.</b>  |
| 12 | All spaces (specify dwelling unit numbers) and rooms shall be labeled, on the plans, as to their use. See <b>Annex B-FA2, FA3</b> .   |
| 13 | Plans shall be signed by the proper individual. See <b>Annex A</b> for a list of all Use Groups and whom can sign these plans. List is based on the Code of Virginia §54.1-402.   |
| 14 | New work shall be differentiated from that which exists. The plans shall make it clear what is new and what is existing.  |
| 15 | Site work requires plans. Provide graphical scale on all site plan drawings (see example graphical scale in <b>Section A-3</b> and <b>Annex B-FA2, FA3</b> ).   |
| 16 | For multi-level buildings, there shall be a floor plan for each and every level, do not show a "typical" floor plan for multiple levels. The electrical inspector will use this for their inspections.  |
| 17 | Provide plans showing all detector/device location(s) and all mounting height(s).   |
| 18 | Provide building cross-sectional views of structure, roof, ceiling, and rooms with beam of solid joists and drop ceilings, etc. on the plans unless plans declare them smooth ceilings.   |
| 19 | Provide wiring methods, including conductor/cable type and size, along with insulation type on the plan(s).   |
| 20 | Provide riser diagram (see <b>Annex B-FA3</b> ) on the plans. Riser diagram shall show number of devices installed on each circuit, conductor sizes, cable type(s) and size(s), end of line locations, identification of fire alarm zones (if the system is not addressable), and primary and secondary power supplies. |
| 21 | The primary power supply shall be a minimum of 120 Volts alternating current branch circuit labeled "Fire Alarm Circuit" whose access is limited to authorized personnel and noted on the plans.  |
| 22 | Denote the location of the Fire Alarm Control Unit (FACU) and when required, the Remote Annunciator panel location on the plans.  |
| 23 | Provide sequence of operation (operation matrix) for all interface of fire safety control functions.  |
| 24 | State whether building is sprinklered (Type 13, 13R, 13D) on the plan(s).   |
| 25 | Indicate cd (Candela) rating for all visual devices on the plans.   |
| 26 | Indicate mounting heights of all devices on the plans.  |
| 27 | Indicate dB ratings of all horns, horn/strobes, speakers, speaker/strobes, etc. on the plans.   |
| 28 | Provide battery and voltage drop calculations based on <b>Sections B-3</b> and <b>B-4</b> on the plans (see <b>Annex B-FA4</b> and <b>B-FA6</b> ).  |
| 29 | Verify compliance with International Building Code (IBC) sections 907.5.2.1 and 907.5.2.3 for Audible and Visual coverage. State on the drawings you have verified and certify proper coverage.   |
| 30 | Provide a means to separate the new work from existing work. Examples would be to have the line weight of the existing be smaller than that of the new. The plans shall make it clear what is new and what is existing.   |
| 31 | Provide all existing equipment on riser diagram that pertains to any new equipment on the riser diagram.  |
| 32 | For hazardous areas, circuits and equipment shall comply with NEC Article 760.3 (C). For projects with hazardous areas, show this on the plan(s) stating the Class and Division as well. Show an outline of each hazardous area on the plans.   |

**Section A: General Requirements for All Projects:**

**A-1: Example Title Block**

|                  |                                       |  |           |
|------------------|---------------------------------------|--|-----------|
| Project Name:    | Project Address:                      |  |           |
| Designer's Name: | Designer's License No. or Master No.: |  |           |
| Telephone No:    | Fax No:                               |  |           |
| Email:           | Scale:                                |  |           |
| Title:           |                                       |  | Sheet No: |

**A-2: Project Information**

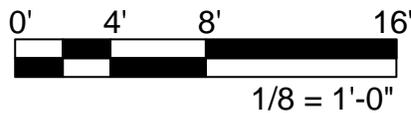
|   |   |  |
|---|---|--|
| Building Code Year:   | Fire Alarm Code Year:   | Construction Type:   |
| Use Group:  | Change of Use? Yes No   | Occupancy Load:  |
| Is project in flood plain?  | BFE per FIRM: (Not applicable (N/A) if project is not in a flood plain) | DFE: (Not applicable (N/A) if project is not in a flood plain) |
| Alteration Level: (Required for renovation projects using the IEBC) |   |  |

BFE—Base Flood Elevation

DFE—Design Flood Elevation

FIRM—Flood Insurance Rate Map

**A-3: Graphical Scale**



**A-4: External Links**

Department of Planning and Development Review—Forms and Applications:

<http://www.richmondgov.com/PlanningAndDevelopmentReview/forms.aspx>

City of Richmond’s Electrical Plan Review Requirements Checklist:

[http://www.richmondgov.com/planninganddevelopmentreview/forms/Electrical\\_Handout.pdf](http://www.richmondgov.com/planninganddevelopmentreview/forms/Electrical_Handout.pdf)

City of Richmond’s Fire Alarm Plan Review Requirements Checklist:

[http://www.richmondgov.com/planninganddevelopmentreview/forms/FireAlarm\\_Handout.pdf](http://www.richmondgov.com/planninganddevelopmentreview/forms/FireAlarm_Handout.pdf)

UL Fire Stopping Details:

<http://productspec.ul.com/index.php?type=firestop>

City of Richmond GIS Flood Plain Map:

<http://cor.maps.arcgis.com/home/webmap/viewer.html?webmap=d039492bec5346c8a75de1b6340da1c8>

City of Richmond GIS Parcel Mapper:

<http://cor.maps.arcgis.com/apps/webappviewer/index.html?id=c3ed34c0fb38441fb95cd2d2d6a22d48/>

FEMA:

[http://www.richmondgov.com/dpu/documents/FEMA\\_CITY.pdf](http://www.richmondgov.com/dpu/documents/FEMA_CITY.pdf)

Virginia Construction Codes:

<https://codes.iccsafe.org/public/collections/Virginia/2012>

Virginia Construction Codes (2015 Edition):

<https://codes.iccsafe.org/category/Virginia?year=2015>

**Permit/Plan/Inspection Status:**

[http://energov.richmondgov.com/EnerGov\\_Prod/CitizenAccess/Site/Public/Main](http://energov.richmondgov.com/EnerGov_Prod/CitizenAccess/Site/Public/Main)

**Section A: General Requirements for All Projects:**

**A-5: File Naming Convention**

**New Plan Construction Documents:**

(see below for a list of file descriptions that the City accepts):

**<file description>\_<Street Address>.pdf**

Example file names:

|  |
|--|
| Plans_6112 Three Chopt Road.pdf          |
| Submittal Data_6112 Three Chopt Road.pdf |

**Resubmission based on City Comments (pre-permit):**

[for documents being re-submitted due to comments for “post-permit” revisions, please see the “Post-Permit Revised Construction Documents” below] (see below for a list of file descriptions that the City accepts):

**<file description>\_<Street Address> - <plan number>.pdf**

Example file names:

|  |
|--|
| Plans_6112 Three Chopt Road - FIRE-016566-2017.pdf           |
| Submittal Data_6112 Three Chopt Road - FIRE-016566-2017.pdf  |
| Response Letter_6112 Three Chopt Road - FIRE-016566-2017.pdf |

**Post-Permit Revised Construction Documents:**

[The “revision date” should be based on the revision date located on the plan(s). All plans in the set shall have the same revision date]. For Post-Permit documents, do not use the “Plan Number” in the file name, only the “Permit Number” (see below for a list of file descriptions that the City accepts):

**<file description>\_<Street Address> - <permit number>\_Rev <revision date>.pdf**

Example file names:

|  |
|--|
| Plans_6112 Three Chopt Road - FIRC-018745-2017_Rev 6-1-2017.pdf                |
| Clarification Letter_6112 Three Chopt Road - FIRC-018745-2017_Rev 6-1-2017.pdf |
| Submittal Data_6112 Three Chopt Road - FIRC-018745-2017_Rev 6-1-2017.pdf       |
| Specifications_6112 Three Chopt Road - FIRC-018745-2017_Rev 6-1-2017.pdf       |

**City accepted “file descriptions”. There are no exceptions to this list:**

- Application
- Checklist
- Clarification Letter (*Note: This letter is to clarify any modification to plans that the City did not comment on*)
- Permit Application
- Plan Intake Sheet
- Plans
- Response Letter (*Note: This letter shall contain responses to all City comments*)
- Specifications
- Submittal Data

## **Section B: NFPA 72 Requirements:**

### **B-1: General Requirements**

#### **Application Information**

|    |  |
|----|--|
| 01 | Provide contact information for contractor (or owner, if owner is applying for the permit) and engineer (if applicable). Required Contact information shall be the following: telephone number, email address, and mailing address. If a business fax number is available, provide this information as well. |
|----|--|

#### **Revised Plans - Due to Plan Review Comments**

|    |  |
|----|--|
| 02 | <b>Provide a complete set of electronic (PDF) fire alarm Construction Documents. Plans shall be in one PDF file and shall not have any City stamps from any discipline within the City of Richmond or any other markings that are not original to the plans. Unless required by the plan reviewer, a checklist is not be required for re-submission. All submitted documents shall follow the naming convention in Section A-5, page 5. For plans being resubmitted due to comments for a “post-permit” revision, provide all plans that were submitted for that post-permit revision (for example if only three plans were submitted in the post-permit revision, then resubmit those three plans). All documents being resubmitted shall be brought into Room 108 at City Hall for processing.</b> |
| 03 | Revised plans are required to be the same size as original plans.  |
| 04 | Provide a response letter, in PDF format with a file name based on Section A-5, Page 5, stating the resolution for each comment item. All comments shall be addressed in the response letter. Failure to provide this information will delay the permit being issued. Provide a detail response for each comment item. Responses of “Will Comply”, “Okay”, “Noted”, “Will Verify”, “This has been complied with”, and other responses that do not provide a detailed response will not be acceptable responses. Responses such as those noted, will be sent back for proper responses.   |
| 05 | Provide clouds around response letter modifications only (do not cloud an entire area, since the modification might not affect that entire area, unless it’s a new plan, in that case cloud the plan number) with numbered revision triangles and remove clouds from previously issued revision(s). See <b>Annex B-FA1</b> for an example.   |
| 06 | Provide revision triangles with number, description and date. <b>See Annex B-FA1 for an example (For space reason, the date and description is not shown on the example, just the revision triangle).</b>  |
| 07 | NOT USED   |

#### **Revised Plans - For Revisions After Permit is Approved**

|    |  |
|----|--|
| 08 | <b>Provide a complete set (revised plans/documents only) of electronic (PDF) fire alarm Construction Documents. Plans shall be in one PDF file and shall not have any City stamps from any discipline within the City of Richmond or any other markings that are not original to the plans. Complete set of the fire alarm plans is not required for changes after the permit has been issued. You only need to submit the plans that were modified based on the clarification letter. For re-submitting post-permit plans based on plan review comments, see items 02 through 06 above. Unless required by the plan reviewer, a checklist is not be required for resubmission. All submitted documents shall follow the naming convention in Section A-5, page 5. All documents being submitted shall be brought into Room 108 at City Hall for processing.</b> |
| 09 | Revised plans are required to be the same size as original plans.  |
| 10 | Provide a clarification letter, in PDF format with a file name based on Section A-5, Page 5, stating all modifications per each plan. The clarification letter shall include the plan number, date of the modification, and a detailed description of each modifications. Cloud each modification separately. Failure to provide this information will delay the permit being issued.  |
| 11 | Provide clouds around modifications only (do not cloud an entire area, since the modification might not affect that entire area, unless it’s a new plan, in that case cloud the plan number) with numbered revision triangles and remove clouds from previously approved revision(s). See <b>Annex B-FA1</b> for an example.   |
| 12 | When a plan reviewer submits comments based on the post-permit plans, make sure NOT to add a new revision number and date. Keep all clouds and triangles based on the original post-permit number and date. If required to add a new revision number, KEEP the same date of the original post-permit submission.   |
| 13 | Do not skip revisions, submit all revisions for review that affect the permit when they are issued; do not wait until 2 or 3 revisions have been made to submit for review.  |
| 14 | There is a fee for revisions after the permit has been issued. For projects that are greater than \$500,000, there will be a one-time fee at the first revision. No other fees will be required for other revisions. For projects under \$500,000, a revision fee of 10% of the original permit application fee will be charged for all revisions after permit has been approved.  |
| 15 | NOT USED   |

**Section B: NFPA 72 Requirements (Cont.):** (All codes refer to NFPA 72 unless noted)

**B-2: General Plan Requirements:**

|  | Description  | Code Section |
|--|--|--------------|
| <b>Point to Point System Wiring Diagram:</b> |  |              |
| 01   | Interconnection and wire routing of identified devices and controls per circuit. | Chapter 7    |
| 02   | Indicate the number of conductors and wire gauge for each circuit run.           | Chapter 7    |
| 03   | Identify separate zones, circuits, and End of Line (EOL) locations.              | Chapter 7    |

**Alarm Indicating Circuit Voltage Drop Calculation:**

|    |  |           |
|----|--|-----------|
| 04 | Quantity of signaling devices, current consumption, EOL voltage for each circuit, and the lowest nameplate operating voltage range for audible and visual notification devices.  | Chapter 7 |
| 05 | Approximate length of each circuit and resistance of wire, use National Electrical Code (NEC) conductor resistance criteria or provide manufacturer specification sheet.<br>Show the formula and acceptable circuit limits on the drawing or on an attached sheet including: | Chapter 7 |
| 06 | Standby power consumption of all current drawing devices times the hours required by NFPA (24 hours) including power consumption of the control panel modules.   | Chapter 7 |
| 07 | Power consumption of all devices on standby power; including door holders, relays, smoke detectors, etc.   | Chapter 7 |
| 08 | Alarm power consumption of all current drawing devices multiplied by the minutes required by NFPA (5minutes for fire alarms or 15 minutes for emergency voice/alarm communication service).  | Chapter 7 |
| 09 | Formula format for battery calculations.   | Chapter 7 |

**Secondary Power:**

|    |  |          |
|----|--|----------|
| 10 | Provide secondary power source for Fire Alarm System.                                | 10.6.7   |
| 11 | Provide proper capacity for secondary power source based on 10.6.7.2(1) through (8). | 10.6.7.2 |

**Performance Based Design:**

|    |   |      |
|----|---|------|
| 12 | Documents are provided outlining each performance objective, applicable scenarios, any calculations, modeling and other technical support in establishing the proposed fire design and life safety Performance. | 17.3 |
|----|---|------|

**Section C: NFPA 72 Initiating Devices:** (All codes refer to NFPA 72 unless noted)

**C-1: Detection Devices:**

|                        | Description  | Code     |
|------------------------|--|----------|
| <b>Duct Detectors:</b> |  |          |
| 01                     | Duct detector locations in air/heat ducts. The air flow rate per minute ratings are provided: including the manufacturer data sheet and a matrix or note detailing what size sampling tubes are to be used for each duct size. | 17.7.5.5 |

**Heat Detectors:**

|    |  |                           |
|----|--|---------------------------|
| 02 | Heat detector heat classification color and operating temperature shall be written at detector location on the plan.   | 17.6.2                    |
| 03 | Heat detector spacing for rooms with smooth ceilings shall not exceed listed spacing and be within distance of one-half of the listed spacing at right angles to all walls or partitions extending within the top 15 percent of the ceiling height, or all points of a ceiling are within a distance that is .7 (70%) of its listed spacing.   | 17.6.3                    |
| 04 | Heat detector spacing for irregularly shaped areas spacing can exceed listing provided the maximum spacing from detector to farthest point of sidewall or corner within its zone does not exceed .7 (70%) of its listed spacing.   | 17.6.3.1                  |
| 05 | Heat detector spacing for ceilings 10 ft. to 30 ft. shall be reduced in accordance with Table 17.6.3.5.1 prior to reductions for sloped, joist, or beam construction and not less than .4 (40%) of the height of the ceiling, alternate designs can be in accordance with Annex B of the NFPA 72.  | 17.6.3.5.1                |
| 06 | A heat-sensing detector integrally mounted on a smoke detector shall be listed for not less than 50 ft. spacing.   | 17.6.3.6                  |
| 07 | Spot-type heat-sensing fire detectors shall be located on the ceiling not less than 4 in. from the sidewall or on the sidewalls between 4 in. and 12 in. from the ceiling.   | 17.6.3.1.3.1              |
| 08 | Line-type heat-sensing fire detectors shall be located on the ceiling or on the sidewalls not more than 20 in. from the ceiling.   | 17.6.3.1.3.2              |
| 09 | Heat detector spacing at right angles to solid joist construction is not greater than 50 percent of the smooth ceiling spacing, and the detectors shall be mounted to the bottom of the joists.  | 17.6.3.2.1,<br>17.6.3.2.2 |
| 10 | Heat detector spacing at right angles to beams projecting greater than 4 in. below the ceiling do not exceed two-thirds of the smooth ceiling spacing or if beams project greater than 18 in. below the ceiling and are spaced greater than 96 in. on center then each bay is a separate area.   | 17.6.3.1.3.2              |
| 11 | Heat detector spacing for sloped ceilings: for peaked ceilings a row of detectors are spaced and located at or within 3 ft. of the ceiling peak and additional detectors, if any, shall be spaced based on the horizontal projection of the ceiling; for shed ceilings the sloped ceiling will have detectors located within 3 ft. of the high side of the ceiling measured horizontally and additional detectors, if any, shall be spaced based on the horizontal projection of the ceiling; for roof slopes less than 30 degrees, detectors shall be spaced using the height at the peak and slopes greater than 30 degrees use the average slope height for detectors other than those at the peak. | 17.6.3.4                  |

**Smoke Detectors:**

|    |  |             |
|----|--|-------------|
| 12 | Smoke detector spacing is in accordance with the listing data sheet.   | VUSBC 109.3 |
| 13 | Smoke detectors in high air movement areas are not located in the supply vent airstream and shall be spaced in accordance with Table 17.7.6.3.3.1 and Figure 17.7.6.3.3.1.   | 17.7.6.3    |
| 14 | Smoke detectors, the designer has declared if the system will use two detectors to initiate the alarm. If designed as such, then the AHJ must approve the design, two detectors are required in each protected area, and alarm verification shall not be used. | 23.8.5.4.3  |

**Section C: NFPA 72 Initiating Devices (Cont.):** (All codes refer to NFPA 72 unless noted)

**Smoke Detectors (Cont.):**

|    | <b>Description</b>  | <b>Code</b>  |
|----|---|--------------|
| 15 | Smoke detector spacing for smooth ceiling will use 30 ft. spacing as a guide, manufacturer's data sheet listing criteria shall be followed. Other spacing is permitted depending on ceiling height, etc., for detecting flaming fires the guidelines of Annex B can be used, all points of a ceiling are within .7 (70%) of the selected spacing.   | 17.7.3.2.3   |
| 16 | Smoke detector spacing for solid joist and beam construction: for level ceilings.<br>1) Beam depth less than 10 percent of ceiling height then use smooth ceiling spacing criteria.<br>2) Beam depth 10 percent or greater than ceiling height and beam spacing is 40 percent or greater than ceiling height detectors are in each beam pocket.<br>3) Waffle or pan-type ceiling with beams up to 24 in. and up to 12 ft. center-to-center spacing then use smooth ceiling spacing including spacing criteria for irregular areas and detectors can be placed on the ceiling or bottom of the beams.<br>4) Corridors up to 15 ft. in width with beams perpendicular to the corridor length then use smooth ceiling spacing including spacing criteria for irregular areas and detectors can be placed on the ceiling or bottom of the beams.<br>5) Only one detector is required for rooms up to 900 square feet. Detectors shall be permitted by use of smooth ceiling spacing and the location of spot-type smoke detectors on ceilings or the bottom of beams or solid joists. | 17.7.3.2.4   |
| 17 | Smoke detector spacing for solid joist and beam construction: for sloped ceilings.<br>1) For beams running parallel to the slope use level beamed ceiling spacing criteria.<br>2) Spot-type detector(s) shall be located on the ceiling within beam pocket(s).<br>3) Ceiling height is determined as the average height over the length of the slope.<br>4) Spacing is based on the horizontal projection of the ceiling.<br>5) No detector required at 50 percent spacing from the low end it slope does not exceed 10 degrees.<br>Beam depth less than 10 percent of ceiling height then use smooth ceiling spacing criteria.<br>6) Beam depth 10 percent or greater than ceiling height and beam spacing is 40 percent or greater than ceiling height detectors are in each beam pocket.<br>7) For beam spacing less than 40 percent of the ceiling height, spot-type detectors shall not be required in every beam pocket but shall be spaced note greater than 50 percent of smooth ceiling spacing.   | 17.7.3.2.4.3 |
| 18 | For beams running perpendicular to the sloped ceilings, the detectors are spaced the same as level beamed ceilings..<br>1) Spot-type detector(s) shall be located on the ceiling within beam pocket(s).<br>2) Ceiling height is determined as the average height over the length of the slope.<br>3) Spacing is based on the horizontal projection of the ceiling.<br>4) Smooth ceiling spacing shall be permitted within beam pocket(s).<br>5) Beam depth less than 10 percent of ceiling height then use smooth ceiling spacing criteria.<br>6) For beam spacing less than 40 percent of the ceiling height, spot-type detectors shall not be required to be located closer than 40 percent of the ceiling height and shall not exceed 50 percent of smooth ceiling spacing.  | 17.7.3.2.4.4 |
| 19 | For sloped ceilings with beam pockets formed by intersecting beams.<br>1) Spot-type detector(s) shall be located on the ceiling within beam pocket(s).<br>2) Ceiling height is determined as the average height over the length of the slope.<br>3) Spacing is based on the horizontal projection of the ceiling.<br>4) Smooth ceiling spacing shall be permitted within beam pocket(s).<br>5) Beam depth less than 10 percent of ceiling height, spot-type detectors shall be spaced with not more than three beams between detectors and shall not exceed smooth ceiling spacing.<br>6) For beam spacing less than 40 percent of the ceiling height, spot-type detectors shall not be required to be located closer than 40 percent of the ceiling height and shall not exceed 50 percent of smooth ceiling spacing.  | 17.7.3.2.4.5 |
| 20 | For sloped ceilings with solid joists, the detectors shall be located on the bottom of the joists.  | 17.7.3.2.4.6 |

**Section C: NFPA 72 Initiating Devices (Cont.):** (All codes refer to NFPA 72 unless noted)

**Smoke Detectors (Cont.):**

|    | Description   | Code                  |
|----|---|-----------------------|
| 21 | Smoke detector spacing located on peaked ceilings shall be spaced and located within 3 ft. of the peak, measured horizontally, and additional detectors, if any, shall be based on the horizontal projection of the ceiling, shed ceilings shall have detectors located on the ceiling within 3 ft. of the high side of the ceiling measured horizontally, and additional detectors, if any, shall be based on the horizontal projection of the ceiling, and room cross sectional are provided. | 17.7.3.3, 17.7.3.4    |
| 22 | Smoke detector spacing under raised floors or above suspended ceilings shall be treated as separate rooms for smoke detector spacing.   | 17.7.3.5              |
| 23 | Smoke detector spacing: when partition distance to the ceiling is within 15 percent of the ceiling height, treat each partitioned area as a separate room.  | 17.5.2                |
| 24 | Smoke detection is provided in areas not continuously occupied where the Fire Alarm Control Unit (FACU) and other control units are located.  | 10.4.4                |
| 25 | Air sampling smoke detector design calculations are within the maximum air sample transport time of 120 seconds, system calculations and a manufacturer design manual is provided.  | 17.7.3.6.2            |
| 26 | Air sampling smoke detector sampling pipe network is detailed on the plans with pipe size and lengths, with calculations showing flow characteristics of the piping network and each sampling port.   | 17.7.3.6.4            |
| 27 | Air sampling smoke system: provided are details of pipe mounting system and signage for each pipe at changes of direction or pipe branches, each side of wall penetration, and at least every 20 ft.  | 17.7.3.6.8            |
| 28 | Projected beam smoke detector locations are detailed on the plans and the manufacturer's design data sheets are provide.  | 17.7.3.7.1            |
| 29 | Projected beam smoke detectors: stratification for a high ceiling was considered in the beam detector's use and documentation is provided attesting that this evaluation was done.  | 17.7.3.7.2            |
| 30 | Projected beam smoke detectors shall be equivalent to a row of spot-type detectors on level or slope ceilings.  | 17.7.3.7.5            |
| 31 | Smoke detectors used in plenums are listed for anticipated environment and shall not be used in lieu of open area detectors.  | 17.7.4                |
| 32 | Smoke detectors used for elevator recall: detectors in the elevator lobby, elevator machine room, hoistways, and control room are connected to the facility fire alarm system.  | 21.3.1                |
| 33 | Smoke detectors for elevators, in non-fire alarmed buildings, shall be connected to a dedicated fire control unit and labeled as such, all of which is detailed on the plans.   | 21.3.2                |
| 34 | Smoke detectors for elevators shall initiate the fire alarm and have a distinct visual indicator at the FACU and annunciator, the activation of fire alarm indicating devices are not required if the signal transmits to a constantly attended location  | 21.3.10, 21.3.11      |
| 35 | For elevator recall the primary and alternate floors for recall are noted on the plans, based on designated level recall (6.16.3.12.1) and alternate level recall (6.16.3.12.2).  | 21.3.14.1, 21.3.14.2  |
| 36 | Smoke detectors for elevators, a lobby detector is located within 21 ft. of the centerline of each elevator door within the elevator bank controlled by the detector.   | 21.3.5                |
| 37 | Smoke detectors used in air duct systems are listed for such use and are appropriate for air velocities, temperatures, and humidity expected.   | 17.7.5.5.6            |
| 38 | Smoke detectors used in smoke control systems: duct detectors for preventing recirculation of smoke beyond a room or space from which the smoke is generated have their location detailed and are in the return air duct or plenum upstream of any filters of the air-handling system when the air system exceeds 2,000 cfm, Exception: detectors are not required in the return air if all portions of the building that are served by the air system are protected by area smoke detection.   | 17.7.5.4.2, VMC 606.2 |
| 39 | Smoke detectors used for smoke control systems: multi-air systems that share common supply or return air ducts or plenums with a capacity exceeding 2,000 cfm the return air system shall be provided with smoke detectors in accordance with Checklist C-1.38, consult the list of exceptions.   | VMC 606.2.2           |

**Section C: NFPA 72 Initiating Devices (Cont.):** (All codes refer to NFPA 72 unless noted)

**Smoke Detectors (Cont.):**

|    | <b>Description</b>   | <b>Code</b> |
|----|--|-------------|
| 40 | Smoke detectors used for smoke control systems: return air risers serving 2 or more stories and serve any portion of a return air system exceeding 15,000 cfm has smoke detectors at each story.   | VMC 606.2.3 |
| 41 | Smoke detectors used for smoke control systems, access to detectors is detailed.   | VMC 606.3   |
| 42 | Smoke detectors used for smoke control systems, detectors are connected to fire alarm system and the visual/audible supervisory signals are shown located at a constantly attended location, Exceptions:<br>1) supervisory signal not required at constantly attended location if the duct smoke detectors activate the fire alarm system<br>2) building without a fire alarm, the plans show the detector activates a visual/audible signal in an approved location (front entry) and the same for showing detector trouble conditions and it is shown to be signed/lettered as an air duct detector trouble. | VMC 606.4.1 |

**Radiant Energy-Sensing Flame Detectors:**

|    |   |          |
|----|---|----------|
| 43 | Radiant energy-sensing fire detector data sheets show the detector matches the spectral emissions of the fire or fires to be detected and how false alarms will be minimized.   | 17.8.2.2 |
| 44 | Radiant energy-sensing fire detector spacing will be in accordance with its listing or inverse square law (fire size verses distance curve for the detector) and the quantity of detectors are based on complete unobstructed view coverage of the area.  | 17.8.3   |
| 45 | Radiant energy-sensing flame detectors, location and spacing is based on a documented and submitted engineering evaluation to include fire size, fuel involved, detector sensitivity, detector field of view, distance from fire to detector, radiant energy absorption, extraneous radiant emissions, purpose of coverage, and the response time required.     | 17.8.3.2 |
| 46 | Radiant energy-sensing spark/ember detector location and spacing is based on a documented and submitted engineering evaluation to include fire size, fuel involved, detector sensitivity, detector field of view, distance from fire to detector, radiant energy absorption, extraneous radiant emissions, purpose of coverage, and the response time required. | 17.8.3.3 |

**Other Detectors:**

|    |  |              |
|----|--|--------------|
| 47 | Video image flame, combination, multi-criteria, and multi-sensor detectors are in compliance with 5.8.5 and 5.9.   | 17.8.5, 17.9 |
| 48 | Other fire detectors not previously covered are installed in accordance with listing requirements, an engineering survey which includes structural features, occupancy and use, ceiling height, ceiling configuration, ventilation, ambient conditions, fuel load and content configuration. | 17.11        |
| 49 | Sprinkler waterflow alarm device is shown on the plan as part of an initiation circuit.  | 17.12        |
| 50 | Other automatic extinguishing systems are shown on the plan as part of an initiation circuit.  | 17.12        |

**Section C: NFPA 72 Initiating Devices (Cont.):** (All codes refer to NFPA 72 unless noted)

|  | Description   | Code          |
|--|---|---------------|
| <b>C-2: Fire Safety Control Functions:</b> |   |               |
| 01   | Positive Alarm Sequence if used is approved by AHJ, and must comply with 23.8.1.3.  | 23.8.1.3      |
| 02   | Fire safety control functions: door release smoke detector locations are detailed and in compliance with 17.7.5.6 and 21.8.   | 17.7.5.6,21.8 |
| 03   | Fire safety control functions: exit door unlocking devices are connected to the fire alarm system and release on alarm activation.  | 21.9          |
| 04   | Fan controls or door controls are interconnected with fire alarm system and detailed; any listed relays that initiate control are within 3 ft. of the control circuit or appliance and the relay data sheet is provided, and wiring is monitored for integrity. | 21.2          |
| 05   | Fire safety control functions: fire pump is supervised by fire alarm system.  | 23.8.5.9      |

**C-3: Zones:**

|    |  |              |
|----|--|--------------|
| 01 | Notification zones and circuits coincide with building outer walls, fire or smoke compartment boundaries, and floor separations.   | 23.8.6.3     |
| 02 | Each floor will be zoned separately, not to exceed 22,500 sq. ft. or exceed 300 ft. in length in any direction and each zone is clearly identified on the plans. Zones in sprinklered buildings shall not exceed the area limits set in NFPA 13. | NFPA 13      |
| 03 | Each floor is considered a zone and if fire or smoke barriers are used for relocating occupants from one zone to another on the same floor, then each zone shall be annunciated separately and all zones are clearly identified on the plans.    | 10.18.5.2    |
| 04 | Emergency voice/alarm communication system complies with 23.9, and a code study is provided, which details how compliance is met.  | 23.9         |
| 05 | Emergency voice/alarm communication system used for partial evacuation or relocation of occupants has its circuits provided with 2-hour protection by rated cable or a rated enclosure or an alternate approved by the AHJ.                      | 24.4.2.8.5.3 |
| 06 | Provide Pathway Survivability Level on the Fire Alarm Drawings.  | 12.4         |

**C-4: Manual Pull Boxes:**

|    |   |           |
|----|---|-----------|
| 01 | The operable part of each manual fire alarm box shall be not less than 3.5 ft. and not more than 4.5 ft. above floor level.   | 17.14.4   |
| 02 | Manual fire alarm boxes shall be located within 5 ft. of the exit doorway at each exit on each floor.   | 17.14.8.4 |
| 03 | Manual fire alarm boxes shall be mounted on both sides of grouped openings over 40 ft. in width, and within 5 ft. of each side of the opening.                                    | 17.14.8.6 |
| 04 | Additional fire alarm boxes shall be provided so that the travel distance to the nearest fire alarm box will not be in excess of 200 ft. measured horizontally on the same floor. | 17.14.8.5 |

**C-5: 24 Hour Monitoring:**

|    |   |                          |
|----|---|--------------------------|
| 01 | Priority alarms, fire alarms, supervisory signals shall be distinctly different.  | 10.10.1                  |
| 02 | Sprinkler alarm, supervisory, and trouble signals are transmitted to supervisory station.   | 10.14, 10.15, Chapter 26 |
| 03 | Transmitting device is detailed and its listing data sheet is provided.   |                          |
| 04 | Important, for digital alarm communicator transmission (DACT), dual monitoring control is required in case the primary transmission method fails. | 26.6.3.2.1.5             |

**Section D: NFPA 72 Notification Devices:** (All codes refer to NFPA 72 unless noted)

**D-1: Audible Devices:**

|    | Description  | Code                       |
|----|--|----------------------------|
| 01 | Sleeping areas shall provide at least a minimum sound pressure level of 15 dBA above the average ambient sound pressure level or 5 dBA above maximum sound pressure level that lasts for 60 seconds or a sound pressure level of at least 75 dBA, whichever is greater, at the pillow.   | 18.4.4.1                   |
| 02 | For narrow band tone signaling the calculations, noise data, documentation and sound pressure design shall be provided on the plans.   | 18.4.6                     |
| 03 | The design for exit marking audible notification appliances shall be on the plans.   | 18.4.7.1                   |
| 04 | Exit marking audible notification appliances are located at each area of refuge and exit entrance such as exterior doors, exit discharge, interior stairs, exit passageway, fire escapes, horizontal exits, etc.   | 18.4.7.4                   |
| 05 | Devices are not less than 90 in. above the floor and are greater than 6 in. from the ceiling unless listed for ceiling mount, 18.4.7.1. Use mounting height criteria from 18.5.5 for audible/visible appliances.   | 18.4.8.1                   |
| 06 | Mounting heights different than noted above are permitted if the sound pressure level requirements are met.  | 18.4.8.5                   |
| 07 | Audible design: the notification signal device is noted to be a three-pulse temporal pattern.  | 10.12.2, 10.12.3, 18.4.2.1 |
| 08 | Audible design: speakers listed for notification use shall not be used for non-emergency use, consult the two exceptions.  | 24.3.4.2                   |
| 09 | Where audible appliances are provided to produce signals for sleeping areas, they shall produce a low frequency alarm signal that complies with the following:<br>1) The alarm signal shall be a square wave or provide equivalent awakening ability.<br>2) The wave shall have a fundamental frequency of 520 Hz ±10 percent. | 18.4.5.3                   |

**D-2: Visual Devices:**

|    |   |                        |
|----|---|------------------------|
| 01 | Visual alarm notification appliances: listing data sheet indicates the flash rate does not exceed 2 flashes per second.   | 18.5.2.1               |
| 02 | Visual alarm notification appliances: details are provided that show wall mounting is between 80 in. and 96 in. above the floor level, and ceiling mounting is in accordance with Table 18.5.4.3.1(b).  | 18.5.5.1               |
| 03 | Visual alarm notification appliances: device spacing and effective intensity (cd) for an area are in compliance with Fig. 18.5.4.3.1, Tables 18.5.4.3.1 (a, b).   | 18.5.5.4.1, 18.5.5.4.2 |
| 04 | Visual alarm notification appliances: for corridors with 2 or more devices that are in the field of view the devices shall be synchronized.   | 18.5.5.5.7             |
| 05 | Visual alarm notification appliances: for corridors greater than 20 ft. wide, device spacing is in accordance with Tables 18.5.4.3.   | 18.5.5.5.1             |
| 06 | Visual alarm notification appliances: devices in corridors are within 15 ft. of the ends of corridor and do not exceed 100 ft. separation.  | 18.5.5.5.5             |
| 07 | Visual alarm notification appliances: sleeping area pillows are within 16 ft. of a device and devices mounted less than 24 in. from ceiling is 177 cd or for devices mounted greater than 24 in. from the ceiling are 117 cd, see Table 18.5.4.6.2.   | 18.5.5.7.3             |
| 08 | Visual alarm notification appliances: in rooms with ceilings exceeding 30 ft. in height, ceiling visual devices will be suspended below 30 ft. or wall mounting and spacing shall be per Table 18.5.4.3.1(a). Center of room ceiling mounted visual device complies with Table 18.5.4.3.1(b). | 18.5.4.3.6, 18.5.4.3.7 |
| 09 | A performance based design that provides at least 0.4036 lumens and is in compliance with 18.5.4.5 is permitted.  | 18.5.4.5               |
| 10 | Textual audible appliances meet the sound pressure level as required in the code.   | 18.4.3, 18.4.4         |

**Section E: Other Code Related Requirements:** (All codes refer to NFPA 72 unless noted)

**E-1: General Miscellaneous Requirements:**

|    | Description  | Code                    |
|----|--|-------------------------|
| 01 | Miscellaneous: speaker amplifier, tone generating equipment, and emergency phone circuit integrity are monitored.  | 10.19                   |
| 02 | Miscellaneous: class A circuit wiring, out and back, is not routed in same conduit or raceway. Class A and Class X circuits using physical conductors shall be installed such that the outgoing and return conductors, existing from and returning to the control unit, respectively, are routed separately. | 12.3.7                  |
| 03 | Miscellaneous: the sprinkler supervisory switch is connected to the fire alarm system; the audible signals shall be different between tamper switch and flow alarm, show how that is accomplished.   | 10.10.1, 10.10          |
| 04 | Voice alarm systems: speakers are located in compliance with the code. Provide location of all speakers on the plans.  | Chapter 18,<br>24.4.2.6 |
| 05 | Telephone communications: equipment is listed for two-way communication.   | 10.3.1,<br>24.5.1.1     |
| 06 | Telephone communications: the design is in compliance with 24.5.1.1 through 24.5.1.19. Manufacturing data sheets are provided to verify the design and operational features.   | 24.5.1.1 - 25.5.1.19    |
| 07 | Wireless systems (low power radio) are listed for use and meet the requirements of 23.16.3.1.  | 23.16.3.1               |
| 08 | Emergency control function interface devices are listed and within 3 ft. of the controlled circuit or appliance.   | 21.2.4                  |
| 09 | The wiring between the relay or appliance and FACU is supervised for integrity in accordance with Section 12.6.  | 21.2.8                  |
| 10 | Elevator recall for firefighters is designed in accordance with 21.3.1 through 21.3.14.  | 21.3.1 - 21.3.14        |
| 11 | Telephone communications: fire alarm fire emergency phone jack locations are shown on the plans.   |                         |
| 12 | Where only one communications technology is used, any failure of the communications path shall be annunciated at the supervising station within 60 minutes of the failure.   | 26.6.3.1.5              |
| 13 | Provide primary and secondary communication methods for DACT   | 26.6.3.2                |
| 14 | Smoke detectors in elevator lobbies, machine rooms, and shafts are connected to the FACU.  | 21.3.14                 |
| 15 | Building without a fire alarm system: Smoke detectors in elevator lobbies, machine rooms, and shafts are provided a dedicated FACU, which is identified as the elevator recall control and supervisory control unit.   | 21.3.2                  |
| 16 | Smoke detectors in elevator lobbies, machine rooms, and shafts initiate elevator recall unless otherwise permitted by the AHJ.   | 21.3.3                  |
| 17 | Smoke detectors in elevator lobbies, machine rooms, and shafts shall annunciate at the FACU and annunciator.   | 21.3.10                 |
| 18 | The designated and alternate recall levels are provided.   | 21.3.14.1,<br>21.3.14.2 |

**Section E: Other Code Related Requirements (Cont.):**

**E-2: Virginia Construction Code (VCC) Requirements:** (All codes refer to 2015 VCC unless noted)

|    | Description  | Code                |
|----|--|---------------------|
| 01 | <b>If there are no rated assemblies or no rated assemblies being penetrated, state this on the plans.</b> Clearly label all fire rated assemblies, firewalls, fire separation walls as to their rating in hours on all electrical plans. See <b>Annex B-FA1, FA2.</b>  | 714.3.2             |
| 02 | Provide, on the drawing(s), UL listed fire stopping detail as found in the latest edition of the UL Fire Resistance Directory for the type of through penetration used (see <b>Annex B-E6, Annex C</b> ).<br>See link below if help is needed:<br><a href="http://productspec.ul.com/index.php?type=firestop">http://productspec.ul.com/index.php?type=firestop</a>  | 714.3.2             |
| 03 | For new buildings and structures, a minimum of one manual fire alarm box shall be provided in an approved location to initiate a fire alarm signal for fire alarm systems employing automatic fire detectors or waterflow detection devices.   | 907.2               |
| 04 | Provide proper fire alarm system based on Use Group.   | 907.2.1 - 907.2.11  |
| 05 | Provide proper fire alarm system based on building/area.   | 907.2.12 - 907.2.23 |
| 06 | Where delayed egress locks are installed on means of egress doors in accordance with Section 1008.1.9.7, an automatic smoke or heat detection system shall be installed as required by that section.   | 907.3.2             |
| 07 | Automatic fire detectors installed for elevator emergency operation shall be installed in accordance with the provisions of ASME A17.1 and NFPA 72.  | 907.3.3             |
| 08 | In areas that are not continuously occupied, a single smoke detector shall be provided at the location of each fire alarm control unit, notification appliance circuit power extender, and supervising station transmitting equipment.   | 907.4.1             |
| 09 | Use Group I-1 and R-1 dwelling units or sleeping units in accordance with table 907.5.2.3.2 shall be provided with a visible alarm notification appliance, activated by both the in-room smoke alarm and the building fire alarm system.   | 907.5.2.3.2         |
| 10 | In Use Group R-2 occupancies required by Section 907 to have a fire alarm system, all dwelling units and sleeping units shall be provided with the capability to support visible alarm notification appliances in accordance with Chapter 10 of ICC A117.1. Such capability shall be permitted to include the potential for future interconnection of the building fire alarm system with the unit smoke alarms, replacement of audible appliances with combination audible/visible appliances, or future extension of the existing wiring from the unit smoke alarm locations for visible appliances. | 907.5.2.3.3         |

## Annex A: Individual Responsible for Signing Plans (Code of Virginia §54.1-402)

| Use Group  | Description                          | 0 to 50 Volts |
|------------|--------------------------------------|---------------|
| A1A        | Theater With Stage                   | (1)(2)        |
| A1B        | Theater - No Stage                   | (1)(2)        |
| A2A        | Night Club                           | (1)(2)        |
| A2B        | Restaurant                           | (1)(2)        |
| A3B        | Museum/Art Gallery                   | (1)(2)        |
| A3C        | Library, Exhibits                    | (1)(2)        |
| A3D        | Passenger Terminal                   | (1)(2)        |
| A3E        | Recreation Center                    | (1)(2)        |
| A3F        | Lecture Hall                         | (1)(2)        |
| A3G        | Restaurant Fast Food                 | (1)(2)        |
| A3H        | Church                               | (1)(2)        |
| A3M        | Misc Assembly                        | (1)(2)        |
| A4A        | Recreation Center                    | Seal          |
| A5         | Grandstand, Stadium                  | (1)(2)        |
| B1         | Business: Auto Dealership            | (1)(2)        |
| B2         | Business: Doctor's Office            | (1)(2)        |
| B3         | Business: Bank                       | (1)(2)        |
| B4         | Business: Car Wash                   | (1)(2)        |
| B5         | Business; Fire Station               | (1)(2)        |
| B6         | Business: Funeral home               | (1)(2)        |
| B7         | Business: Laundry                    | (1)(2)        |
| B8         | Business: Medical offices            | (1)(2)        |
| B9         | Business: Offices                    | (1)(2)        |
| B10        | Business: Miscellaneous              | (1)(2)        |
| E1         | Education: School 1 to 12            | Seal          |
| E2         | Daycare over 2 ½ years               | Seal          |
| F1         | Factory Moderate Hazard              | (1)(2)        |
| F2         | Factory Low Hazard                   | (1)(2)        |
| H1,2,3,4,5 | High Hazard                          | Seal          |
| I1         | Group Home 6 or More                 | Seal          |
| I2A        | Institutional Incapacitated          | Seal          |
| I2B        | Day Nursery                          | Seal          |
| I3         | Institutional Restrained             | Seal          |
| I4B        | Child Care 5 or More Under 2.5 Years | (1)(2)        |
| M1         | Retail: Convenience Store            | (1)(2)        |
| M2         | Retail: Department Store             | (1)(2)        |
| M3         | Retail: Supermarket                  | (1)(2)        |
| M4         | Retail: Store                        | (1)(2)        |
| M5         | Retail: Service Station              | (1)(2)        |
| R1H        | Hotel                                | (1)(2)        |
| R1M        | Motel                                | (1)(2)        |
| R2A        | Dormitories                          | (1)(2)        |
| R2B        | Multi-family - 3 or more units       | (1)(2)        |
| R3A        | 1 or 2 Family over 3 stories         | (3)           |
| R4A        | Assisted Living                      | (1)(2)        |
| R5         | 1 or 2 Family dwelling               | (3)           |
| S1         | Storage Moderate Hazard              | (1)(2)        |
| S2         | Storage - Low Hazard                 | (1)(2)        |
| U          | Temporary, Miscellaneous             | (1)(2)        |

Seal - Professional Engineer's Seal Required.

- (1) Master Electrician or Contractor's qualified individual on state license can do plans if of same quality as a professional engineer would normally submit. This is only applicable when both the design and installation are under the Master Electrician or Contractor's direction or control. Contractor shall be Class A.
- (2) Renovations where a Master Electrician or Class A Contractor's qualified individual shall be able to sign plans.
- (3) NO PLANS REQUIRED

# Annex B: FA1 - Symbols and Legend

## SYMBOLS LEGEND

- FACP** FIRE ALARM CONTROL PANEL
- FAAP** FIRE ALARM ANNUNCIATOR PANEL
- SPE** STROBE POWER EXTENDER
- F** MANUAL PULL STATION
- IM** INTERFACE MODULE
- ?** SMOKE DETECTOR  
 (SMOKE DETECTOR CONTROL FUNCTION)  
 S – AREA SMOKE, IONIZATION  
 PE – SMOKE REFRACTION
- ?**<sub>p</sub> DUCT SMOKE DETECTOR (PHOTOELECTRIC)
- SPEAKER – WALL MOUNTED
- SPEAKER – CEILING MOUNTED
- with **X** SPEAKER/STROBE – WALL MOUNTED  
 (XX) CANDELA RATING  
 (STROBE SHALL BE 15cd U.O.N.)
- 1 HOUR FIRE RATED ASSEMBLY
- - - - - 2 HOUR FIRE RATED ASSEMBLY
- — — 3 HOUR FIRE RATED ASSEMBLY

## ABBREVIATIONS

- AMP(S)** AMPERE(S)
- A.F.F. ABOVE FINISHED FLOOR
- CBL. CABLE
- cd** CANDELA
- CKT CIRCUIT
- DC DIRECT CURRENT
- ELEV. ELEVATOR
- EQUIP. EQUIPMENT
- F/A FIRE ALARM
- FACP FIRE ALARM CONTROL PANEL
- FAAP FIRE ALARM ANNUNCIATOR PANEL
- F.B.O. FURNISHED BY OWNER
- FDV FIRE DEPARTMENT VALVE
- FS FLOW SWITCH
- GPM GALLONS PER MINUTE
- HP HORSEPOWER
- HT. HEIGHT
- JB JUNCTION BOX
- MAX. MAXIMUM
- MIN. MINIMUM
- No.** NUMBER
- PWR. POWER
- RAP REMOTE ANNUNCIATOR PANEL
- S.T. SHUNT TRIP
- TS TAMPER SWITCH
- TEL TELEPHONE
- TYP. TYPICAL
- U.O.N** UNLESS OTHERWISE NOTED
- V VOLT
- W WIRE
- WP WEATHERPROOF
- XMTR TRANSMITTER
- \* DISTANCE DOWN FROM CEILING
- + DISTANCE ABOVE FINISHED FLOOR

## DRAWING LEGEND

- FA1 LEGENDS AND ABBREVIATIONS
- FA2 PART DEVICE PLAN
- FA3 RISER DIAGRAM
- FA4 VOLTAGE DROP CALCULATIONS
- FA5 MATRIX
- FA6 BATTERY CALCULATIONS
- FA7 FIRE STOP DETAIL

## PROJECT INFORMATION:

- USE GROUP: B
- CONSTRUCTION TYPE: IIA
- CHANGE OF USE: NO
- FLOOD PLAIN: NO
- OCCUPANCY: 45
- FULLY SPRINKLERED BUILDING
- BUILDING SQUARE FOOT: 4,500



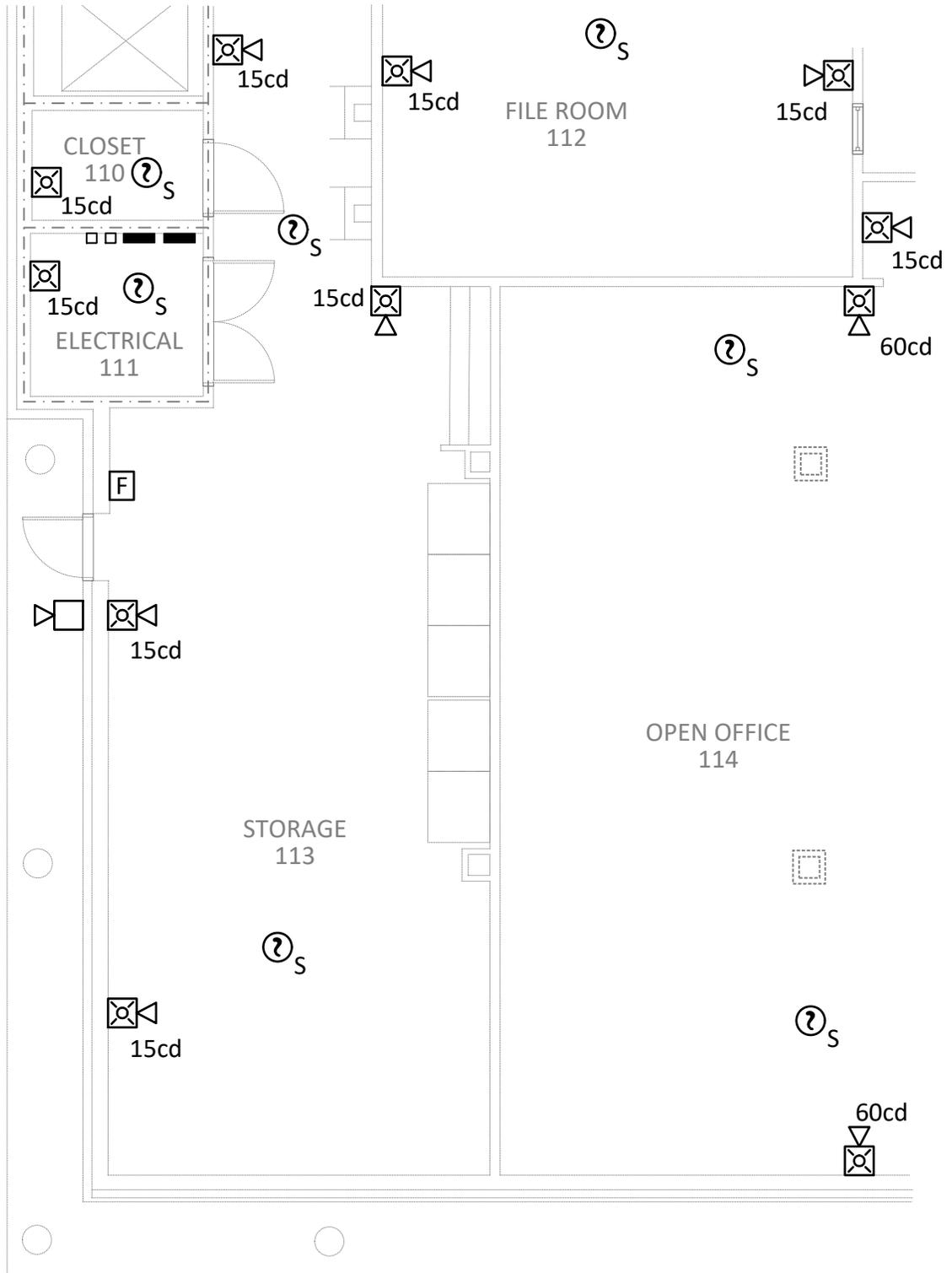
<SIGNATURE AREA>

|                   |  |            |
|-------------------|--|------------|
| Project Name      | Diamond Plating  |            |
| Project Address   | 2312 Westwood Avenue   |            |
| Master's Name     | Robert Duce  |            |
| Master's Card No. | 2733-012345  |            |
| Company Address   | Duce Electric Co.<br>900 East Broad Street<br>Richmond, VA 23222 | <b>FA1</b> |
| Phone             | (804) 555-1234   |            |
| Fax               | (804) 555-4321   |            |

**CODE INFORMATION:**  
 2015 VIRGINIA STATEWIDE BUILDING CODE  
 2014 NATIONAL ELECTRICAL CODE  
 2013 NFPA 72

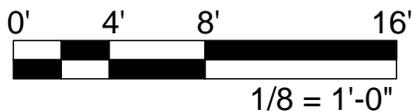


# Annex B: FA2 - Partial Device Plan



## PART DEVICE PLAN

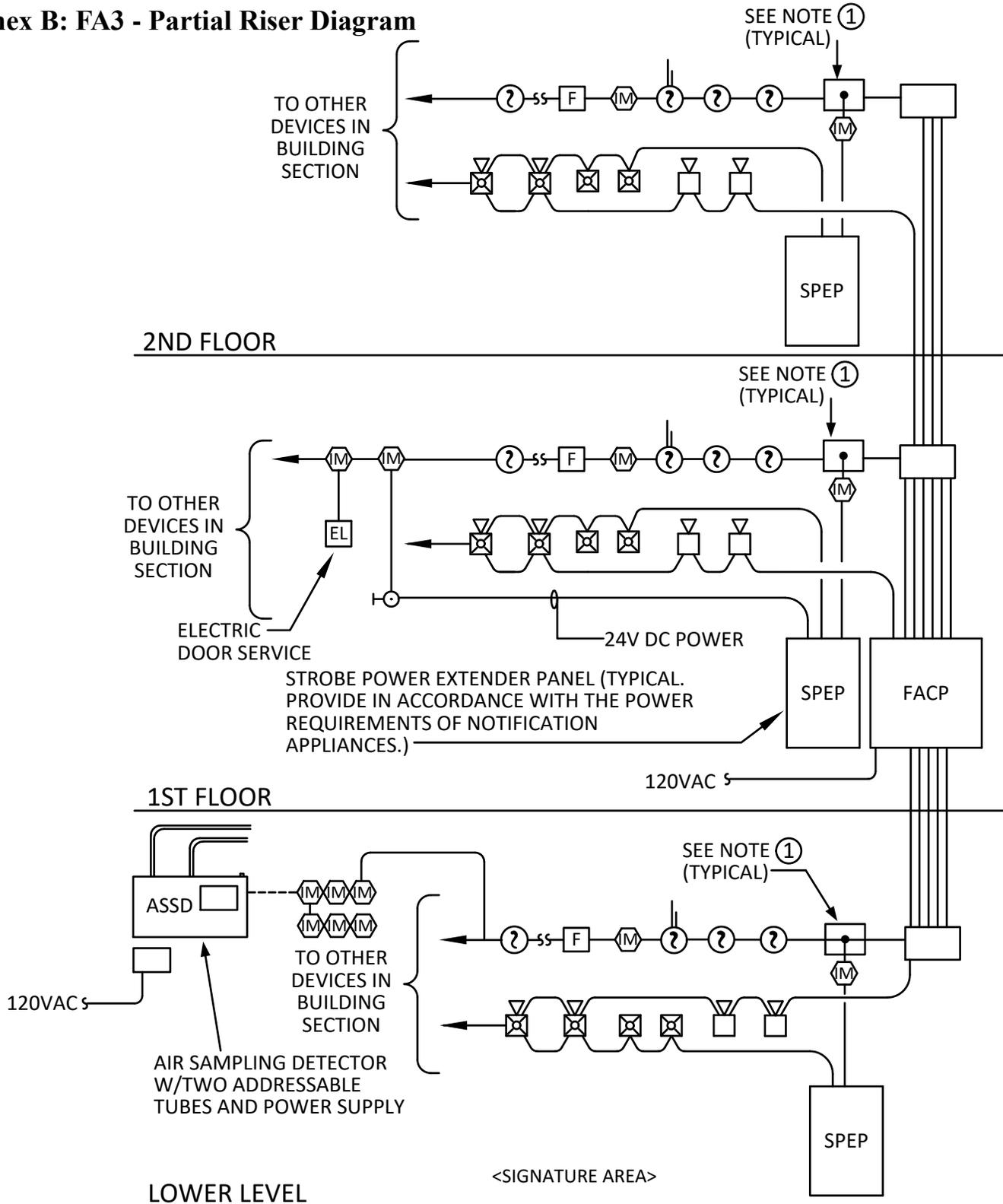
1/8" = 1'-0"



<SIGNATURE AREA>

|                      |                       |            |
|----------------------|-----------------------|------------|
| Project Name         | Diamond Plating       |            |
| Project Address      | 2312 Westwood Avenue  |            |
| Master's Name        | Robert Duce           |            |
| Master's Card No.    | 2733-012345           |            |
| Company Address      | Duce Electric Co.     | <b>FA2</b> |
| Phone (804) 555-1234 | 900 East Broad Street |            |
| Fax (804) 555-4321   | Richmond, VA 23222    |            |

# Annex B: FA3 - Partial Riser Diagram



## RISER DIAGRAM

NO SCALE

### KEY NOTES:

1. A TERMINAL BOX FOR DISTRIBUTION OF THE FLOOR SIGNALING LINE AND NOTIFICATION APPLIANCE CIRCUITS SHALL BE PROVIDED AT EACH LOCATION AT A MINIMUM. ALL CONNECTIONS SHALL BE MADE WITH TERMINAL BLOCKS. PIGTAILING SHALL NOT BE USED TO MAKE FIELD CONNECTIONS.

|                      |                       |            |
|----------------------|-----------------------|------------|
| Project Name         | Diamond Plating       |            |
| Project Address      | 2312 Westwood Avenue  |            |
| Master's Name        | Robert Duce           |            |
| Master's Card No.    | 2733-012345           |            |
| Company Address      | Duce Electric Co.     | <b>FA3</b> |
| Phone (804) 555-1234 | 900 East Broad Street |            |
| Fax (804) 555-4321   | Richmond, VA 23222    |            |

## Annex B: FA4– Voltage Drop Calculations

|                                      |                             |  |                     |                  |              |
|--------------------------------------|-----------------------------|--|---------------------|------------------|--------------|
| Project Name                         | Diamond Plating             |  |                     |                  |              |
| Date                                 | 10/15/2014                  | Nominal System Voltage                 | 24 V                |                  |              |
| Circuit Number                       | 1                           | Minimum Device Voltage                 | 18 V                |                  |              |
| Area Covered                         | 10,000 sq. ft.              | Total Circuit Current                  | 2.037 A             |                  |              |
|                                      | Distance                    | Wire Gauge                             | Ohm's per 1000 feet |                  |              |
| Distance from source to first device | 20                          | 14                                     | 3.07                |                  |              |
|                                      |                             |  |                     |                  |              |
| Device                               | Device Current (in Amperes) | Distance from previous device (in FT.) | Voltage             |                  |              |
|                                      |                             |  | At Device           | Drop from Source | Percent drop |
| horn/strobe 30cd                     | 0.102                       | 20                                     | 23.75               | 0.25             | 1.04%        |
| strobe 75cd                          | 0.135                       | 15                                     | 23.57               | 0.43             | 1.78%        |
| smoke detector                       | 0.010                       | 15                                     | 23.41               | 0.59             | 2.48%        |
| horn/strobe 75cd                     | 0.148                       | 30                                     | 23.08               | 0.92             | 3.85%        |
| horn/strobe 75cd                     | 0.148                       | 40                                     | 22.67               | 1.33             | 5.53%        |
| horn/strobe 75cd                     | 0.148                       | 25                                     | 22.44               | 1.56             | 6.49%        |
| horn/strobe 75cd                     | 0.148                       | 30                                     | 22.20               | 1.80             | 7.52%        |
| horn/strobe 30cd                     | 0.102                       | 15                                     | 22.09               | 1.91             | 7.98%        |
| horn/strobe 30cd                     | 0.102                       | 15                                     | 21.98               | 2.02             | 8.40%        |
| horn/strobe 75cd                     | 0.148                       | 20                                     | 21.86               | 2.14             | 8.91%        |
| smoke detector                       | 0.010                       | 23                                     | 21.74               | 2.26             | 9.41%        |
| smoke detector                       | 0.010                       | 27                                     | 21.60               | 2.40             | 9.98%        |
| smoke detector                       | 0.010                       | 20                                     | 21.50               | 2.50             | 10.41%       |
| smoke detector                       | 0.010                       | 36                                     | 21.32               | 2.68             | 11.16%       |
| smoke detector                       | 0.010                       | 60                                     | 21.03               | 2.97             | 12.39%       |
| horn/strobe 75cd                     | 0.148                       | 20                                     | 20.93               | 3.07             | 12.80%       |
| horn/strobe 75cd                     | 0.148                       | 15                                     | 20.87               | 3.13             | 13.05%       |
| horn/strobe 75cd                     | 0.148                       | 15                                     | 20.82               | 3.18             | 13.24%       |
| horn/strobe 75cd                     | 0.148                       | 34                                     | 20.75               | 3.25             | 13.55%       |
| horn/strobe 30cd                     | 0.102                       | 20                                     | 20.72               | 3.28             | 13.65%       |
| horn/strobe 30cd                     | 0.102                       | 15                                     | 20.71               | 3.29             | 13.69%       |

## PARTIAL VOLTAGE DROP CALCULATIONS

NO SCALE

<SIGNATURE AREA>

|   |  |            |
|---|--|------------|
| Project Name  | Diamond Plating  |            |
| Project Address   | 2312 Westwood Avenue   |            |
| Master's Name   | Robert Duce  |            |
| Master's Card No.   | 2733-012345  |            |
| Company Address<br>Phone (804) 555-1234<br>Fax (804) 555-4321 | Duce Electric Co.<br>900 East Broad Street<br>Richmond, VA 23222 | <b>FA4</b> |

# Annex B: FA5 - Fire Alarm Matrix

**ABBREVIATIONS**

- ALT. ALTERNATE
- DET. DETECTOR
- ELEV. ELEVATOR
- FLR. FLOOR
- RM. ROOM

**SYSTEM INPUTS**

|                                     | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |
|-------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 AREA/ROOM SMOKE DETECTOR          | ● | ● | ● | ● | ● | ● |   |   |   |   | ● | ● |   |   |   |   | ● |
| 2 DUCT SMOKE DETECTOR               | ● | ● |   | ● | ● |   |   |   |   | ● | ● |   |   |   |   |   |   |
| 3 WATER PRESSURE SWITCH             | ● | ● | ● |   | ● | ● |   |   |   |   | ● | ● |   |   |   |   |   |
| 4 MANUAL PULL STATION               | ● | ● | ● |   | ● | ● |   |   |   |   | ● | ● |   |   |   |   |   |
| 5 SMOKE DET. ELEV. LOBBY            | ● | ● | ● |   | ● | ● |   |   |   |   | ● | ● |   |   |   |   |   |
| 6 SMOKE DET. ALT. FLR. ELEV. LOBBY  | ● | ● | ● |   | ● | ● |   |   |   |   | ● | ● |   |   |   |   |   |
| 7 ELEV. MACHINE RM. SMOKE DET.      | ● | ● | ● |   | ● | ● |   |   |   |   | ● | ● |   |   |   |   |   |
| 8 ELEV. MACHINE RM. HEAT DET. 135°F | ● | ● | ● |   | ● | ● |   |   |   |   | ● | ● |   |   |   |   |   |
| 9 MONITOR SWITCH (VALVE ETC.)       |   |   |   |   | ● |   |   |   |   |   | ● | ● |   |   |   |   |   |
| 10 ANY DEVICE OR CIRCUIT TROUBLE    |   | ● |   |   | ● |   |   |   |   |   | ● | ● |   |   |   |   |   |
| 11 MAN. SMOKE CONTROL INITIATION    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | ● |

<SIGNATURE AREA>

|                      |                       |
|----------------------|-----------------------|
| Project Name         | Diamond Plating       |
| Project Address      | 2312 Westwood Avenue  |
| Master's Name        | Robert Duce           |
| Master's Card No.    | 2733-012345           |
| Company Address      | Duce Electric Co.     |
| Phone (804) 555-1234 | 900 East Broad Street |
| Fax (804) 555-4321   | Richmond, VA 23222    |

**INPUT/OUTPUT MATRIX**

NO SCALE

**FA5**

# Annex B: FA6 - Battery Calculations

## FIRE ALARM SYSTEM SECONDARY BATTERY-SET CALCULATION WORKSHEET

| ITEM   | DESCRIPTION              | STANDBY CURRENT PER UNIT (AMPS) | QUANTITY | TOTAL STANDBY CURRENT PER ITEM | ALARM CURRENT PER UNIT (AMPS) | QUANTITY            | TOTAL ALARM CURRENT PER ITEM |               |
|--|--------------------------|---------------------------------|----------|--------------------------------|-------------------------------|---------------------|------------------------------|---------------|
| FACP   | FIRE ALARM CONTROL PANEL | 0.2500                          | X 1 =    | 0.2500                         | X 0.5000                      | X 1 =               | 0.5000                       |               |
| ANN  | ANNUNCIATOR              | 0.1250                          | X 1 =    | 0.1250                         | X 0.2500                      | X 1 =               | 0.2500                       |               |
| SMOKE  | SMOKE DETECTOR           | 0.0001                          | X 24 =   | 0.0024                         | X 0.0010                      | X 100 =             | 0.0010                       |               |
| HEAT   | HEAT DETECTOR            | 0.0000                          | X 10 =   | 0.0000                         | X 0.0000                      | X 10 =              | 0.0000                       |               |
| PULL   | PULL STATION             | 0.0000                          | X 14 =   | 0.0000                         | X 0.0000                      | X 10 =              | 0.0000                       |               |
| BELL   | FDC BELL                 | 0.0000                          | X 3 =    | 0.0000                         | X 0.0500                      | X 1 =               | 0.0500                       |               |
| HORN   | HORN                     | 0.0000                          | X 0 =    | 0.0000                         | X 0.0500                      | X 20 =              | 1.0000                       |               |
| STROBE   | STROBE                   | 0.0000                          | X 14 =   | 0.0000                         | X 0.1000                      | X 40 =              | 4.0000                       |               |
| H/S  | HORN/STROBE              | 0.0000                          | X 26 =   | 0.0000                         | X 0.1500                      | X 20 =              | 3.0000                       |               |
| 0  | 0                        | 0.0000                          | X 0 =    | 0.0000                         | X 0.0000                      | X 0 =               | 0.0000                       |               |
| 0  | 0                        | 0.0000                          | X 0 =    | 0.0000                         | X 0.0000                      | X 0 =               | 0.0000                       |               |
| 0  | 0                        | 0.0000                          | X 0 =    | 0.0000                         | X 0.0000                      | X 0 =               | 0.0000                       |               |
| 0  | 0                        | 0.0000                          | X 0 =    | 0.0000                         | X 0.0000                      | X 0 =               | 0.0000                       |               |
| <b>TOTAL SYSTEM</b>  |                          |                                 |          | <b>STANDBY CURRENT (AMPS)</b>  | <b>0.3774</b>                 | <b>TOTAL SYSTEM</b> | <b>ALARM CURRENT (AMPS)</b>  | <b>8.9000</b> |
| <b>REQUIRED STANDBY TIME (HRS) NFPA 72-2010 10.5.6.7.1</b> |                          |                                 |          |                                |                               |                     |                              |               |
|  |                          | 24                              | X        | 0.3774                         | =                             | 9.0576              | X                            | 0.083         |
| <b>REQUIRED ALARM TIME (HOURS) NFPA 72-2010 10.5.6.3.1</b> |                          |                                 |          |                                |                               |                     |                              |               |
|  |                          |                                 |          |                                |                               |                     |                              | 0.083         |
| <b>REQUIRED STANDBY CAPACITY (AMP-HOURS)</b>               |                          |                                 |          | <b>9.06</b>                    | X                             | <b>0.7387</b>       | =                            | <b>9.7963</b> |
| <b>REQUIRED ALARM CAPACITY (AMP-HOURS)</b>                 |                          |                                 |          | <b>0.7387</b>                  |                               | <b>9.7963</b>       | +                            | <b>20%</b>    |
| <b>TOTAL CAPACITY (AMP-HOURS)</b>                          |                          |                                 |          | <b>9.7963</b>                  |                               | <b>9.7963</b>       |                              | <b>12</b>     |
| <b>REQUIRED STANDBY CAPACITY (AMP-HOURS)</b>               |                          |                                 |          | <b>9.7963</b>                  |                               | <b>9.7963</b>       |                              | <b>20%</b>    |
| <b>TOTAL CAPACITY (AMP-HOURS)</b>                          |                          |                                 |          | <b>9.7963</b>                  |                               | <b>9.7963</b>       |                              | <b>20%</b>    |
| <b>REQUIRED ALARM CAPACITY (AMP-HOURS)</b>                 |                          |                                 |          | <b>0.7387</b>                  |                               | <b>0.7387</b>       |                              | <b>0.7387</b> |
| <b>TOTAL CAPACITY (AMP-HOURS)</b>                          |                          |                                 |          | <b>0.7387</b>                  |                               | <b>0.7387</b>       |                              | <b>0.7387</b> |

<SIGNATURE AREA>

|   |  |
|---|--|
| Project Name  | Diamond Plating  |
| Project Address   | 2312 Westwood Avenue   |
| Master's Name   | Robert Duce  |
| Master's Card No.   | 2733-012345  |
| Company Address<br>Phone (804) 555-1234<br>Fax (804) 555-4321 | Duce Electric Co.<br>900 East Broad Street<br>Richmond, VA 23222 |

## BATTERY CALCULATION

NO SCALE

**FA6**

# Annex B: FA7 - UL Rated Fire Stop Detail

System No. C-AJ-1013

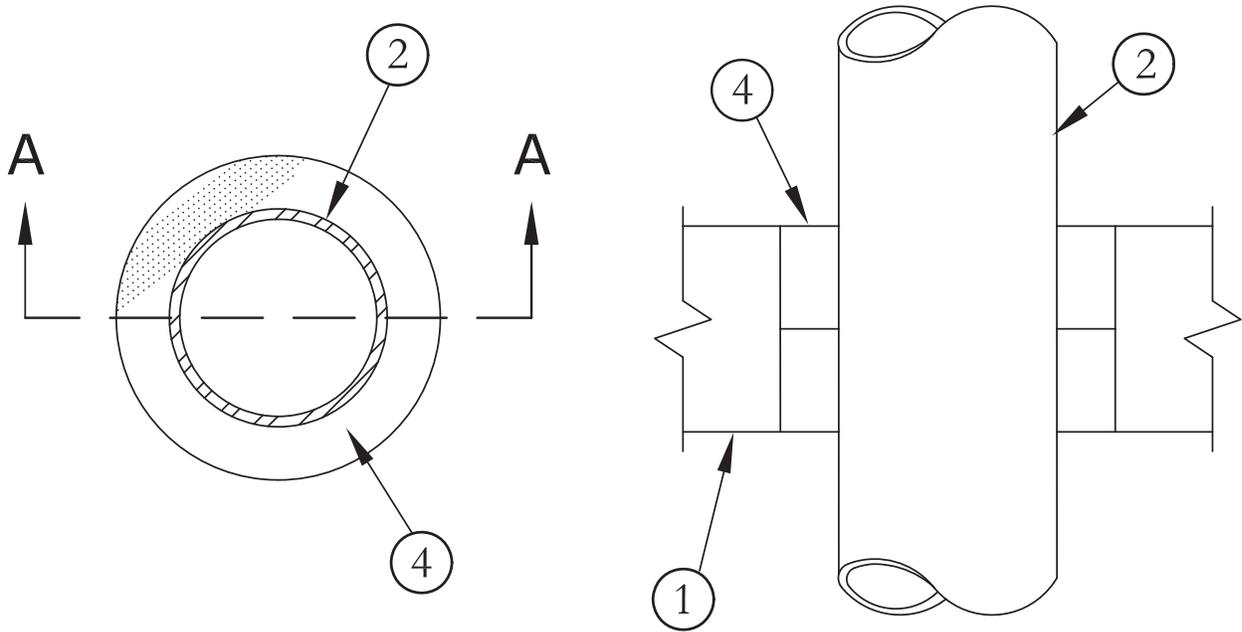
May 09, 2013

F Rating – 1 Hr

T Rating – 0 Hr

L Rating At Ambient – Less Than 1 CFM/sq ft

L Rating At 400 F – Less Than 1 CFM/sq ft



**SECTION A-A**

1. **Floor or Wall Assembly** – Min 5 in. (127 mm) thick reinforced normal weight (140-155 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 6 in. (152 mm).  
See **Concrete Block** (CAZT) category in the Fire Resistance Directory.
2. **Through Penetrants** – One metallic pipe, or conduit to be centered within the firestop system. Pipe or conduit to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or conduits may be used:
  - A. **Steel Pipe** – Nom 4 in. (102 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe. A nom annular space of 3/4 in. (19 mm) is required within the firestop system.
  - B. **Conduit** – Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or steel conduit. A nom annular space of 3/4 in. (19 mm) is required within the firestop system.
3. **Packing Material** – (Not Shown) – Nom 1 in. (25 mm) diam open cell polyurethane foam backer rod friction-fitted into the opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.
4. **Fill, Void or Cavity Material\* – Sealant** – Min 3/4 in. (19 mm) thickness of fill material applied within annulus, flush with top surface of floor or with both surfaces of wall.

**3M COMPANY** – Types FB-1000 NS, FB-1003SL (floors only), FB-2000 or FB-2000+.

Bearing the UL Classification Mark



<SIGNATURE AREA>

|                      |                       |            |
|----------------------|-----------------------|------------|
| Project Name         | Diamond Plating       |            |
| Project Address      | 2312 Westwood Avenue  |            |
| Master's Name        | Robert Duce           |            |
| Master's Card No.    | 2733-012345           |            |
| Company Address      | Duce Electric Co.     | <b>FA7</b> |
| Phone (804) 555-1234 | 900 East Broad Street |            |
| Fax (804) 555-4321   | Richmond, VA 23222    |            |

# Annex C: UL Fire Resistance Directory

## USING THE UL FIRE RESISTANCE DIRECTORY The Fire Resistance Directory Utilizes an Alpha-Numeric Numbering System

### Through Penetrations

|  |  |  |   |
|--|--|--|---|
| <p>The first represents what is being penetrated:</p> <p>F = Floors<br/>W = Walls<br/>C = Floors Or Walls (Combined)</p> | <p>The second letter(s) provide more info about the floor or wall:</p> <p>A. Concrete floor 5” or less<br/>B. Concrete floor greater than 5”<br/>C. Wood or framed floors<br/>D. Steel decks in marine vessels<br/>E. Floor-ceiling assemblies consisting of concrete with membrane protection<br/>F thru i. Not used at present time<br/>J. Concrete/masonry walls 8” or less<br/>K. Concrete/masonry wall greater than 8”<br/>L. Framed walls<br/>M. Bulkheads in marine vessels<br/>N. Composite panel walls<br/>O thru z. Not used at present time</p> | <p>The four digit number describes the penetrating item:</p> <p>0000-0999 no penetrating items<br/>1000-1999 metallic pipe, conduit or tubing<br/>2000-2999 nonmetallic pipe, conduit or tubing<br/>3000-3999 electrical cables<br/>4000-4999 cable trays with electrical cables<br/>5000-5999 insulated pipes<br/>6000-6999 miscellaneous electrical penetrants such as busducts<br/>7000-7999 miscellaneous mechanical penetrants such as air ducts<br/>8000-8999 groupings of penetrations including any combination of items listed above<br/>9000-9999 not used at present time</p> | <p>Example: caj 1226</p> <p>C = floor or wall<br/>A = concrete floor 5” or less<br/>J = concrete or block wall 8” or less<br/>1226 = metallic pipe, conduit or tubing</p> |
|--|--|--|---|

### Joint systems

|   |   |  |   |
|---|---|--|---|
| <p>The first two letters identify type of joint:</p> <p>FF floor-to-floor<br/>WW wall-to-wall<br/>FW floor-to-wall<br/>HW head-of-wall<br/>BW bottom-of-wall<br/>CG wall-to-wall joints intended for use as corner guards</p> | <p>The third letter signifies the movement of the joint system:</p> <p>S = no movement (static)<br/>D = allows movement (dynamic)</p> | <p>The four digit number describes the nominal joint width:</p> <p>0000 – 0999 less than or equal to 2”<br/>1000 – 1999 greater than 2” and less than or equal to 6”<br/>2000 – 2999 greater than 6” and less than or equal to 12”<br/>3000 – 3999 greater than 12” and less than or equal to 24”<br/>4000 – 4999 greater than 24”</p> | <p>Example: hwd 0003</p> <p>Hw = heat of wall<br/>D = allows movement (dynamic)<br/>0003 = less than or equal to 2”</p> |
|---|---|--|---|

**Firestop system:** A specific construction consisting of a fire-rated wall or floor assembly, a penetrating item or items passing through an opening in the assembly, and the materials designed to help prevent the spread of fire, toxic gases and smoke through the openings.

**ASTM E-814:** “Standard Method of Fire Tests of Through-Penetration Firestops.”

**UL 1429:** “Fire Tests of Through-Penetration Firestops.” (Equivalent to ASTM E-814)

**UL 2079:** “Tests for Fire Resistance of Building Joint Systems.” (ASTM E1966)

**Annular Space:** The distance from the inside edge of the opening (floor/wall) to the outside of the penetrating item.

**Point of Contact:** When listed on UL system drawing, allows penetrating item to “touch” edge of opening.

**Backing Material:** Material used in Firestop systems (e.g. mineral wool, backer rod, CF 128 foam) to set the depth and provide support for the fill/void or cavity material.

**“F” Rating:** A rating usually expressed in hours indicating a specific length of time that a fire-resistive barrier can withstand fire before being consumed or before permitting the passage of flame through an opening in the assembly as determined by ASTM E-815 and UL 1479.

**“T” Rating:** A rating usually expressed in hours indicating the length of time that the temperature on the non-fire side of a fire-rated assembly does not exceed 325F above ambient temperature as determined by ASTM E-84 and UL 1479.

**“L” Rating:** Amount of air leakage through a penetration, measured in cubic feet per minute. The test is administered at ambient and 400F for validity due to variances in performance of firestop systems at different temperatures.

**Intumescent:** A term describing materials which are designed to expand significantly (typically 2 to 10 times original volume) and when exposed to sufficient heat. Intumescent materials are often used as firestops, particularly around combustible penetrants.

# Annex D: Fire Alarm Plan Review Requirements Checklist to Submit to City of Richmond

Project Address: \_\_\_\_\_

**Make sure to check “✓” each box for all applicable items below that relate(s) to the above project. This checklist is required for plan review. Submit either on the plans or as a separate PDF document.**

| Section A: General Requirements for All Projects |    |    |    |    |    |    |    |    |    |
|--|----|----|----|----|----|----|----|----|----|
| 01   | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 |
| 11   | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21   | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31   | 32 |    |    |    |    |    |    |    |    |

| Section B-1: General Requirements |    |    |    |    |    |    |    |    |    |
|-----------------------------------|----|----|----|----|----|----|----|----|----|
| 01                                | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 |
| 11                                | 12 | 13 | 14 | 15 |    |    |    |    |    |

| Section B-2: General Plan Requirements |    |    |    |    |    |    |    |    |    |
|--|----|----|----|----|----|----|----|----|----|
| 01                                     | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 |
| 11                                     | 12 |    |    |    |    |    |    |    |    |

| Section C-1: Detection Devices |    |    |    |    |    |    |    |    |    |
|--------------------------------|----|----|----|----|----|----|----|----|----|
| 01                             | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 |
| 11                             | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21                             | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31                             | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41                             | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |

| Section C-2: Fire Safety Control Functions |    |    |    |    |  |  |  |  |  |
|--|----|----|----|----|--|--|--|--|--|
| 01   | 02 | 03 | 04 | 05 |  |  |  |  |  |

| Section C-3: Zones |    |    |    |    |    |  |  |  |  |
|--------------------|----|----|----|----|----|--|--|--|--|
| 01                 | 02 | 03 | 04 | 05 | 06 |  |  |  |  |

| Section C-4: Manual Pull Boxes |    |    |    |  |  |  |  |  |  |
|--------------------------------|----|----|----|--|--|--|--|--|--|
| 01                             | 02 | 03 | 04 |  |  |  |  |  |  |

**Annex D: Checklist to Submit to City of Richmond (Cont.)**

**Section C-5: 24 Hour Monitoring**

|          |          |          |          |  |  |  |  |  |  |
|----------|----------|----------|----------|--|--|--|--|--|--|
| 01 _____ | 02 _____ | 03 _____ | 04 _____ |  |  |  |  |  |  |
|----------|----------|----------|----------|--|--|--|--|--|--|

**Section D-1: Audible Devices**

|          |          |          |          |          |          |          |          |          |  |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|--|
| 01 _____ | 02 _____ | 03 _____ | 04 _____ | 05 _____ | 06 _____ | 07 _____ | 08 _____ | 09 _____ |  |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|--|

**Section D-2: Visual Devices**

|          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 01 _____ | 02 _____ | 03 _____ | 04 _____ | 05 _____ | 06 _____ | 07 _____ | 08 _____ | 09 _____ | 10 _____ |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|

**Section E-1: General Miscellaneous Requirements**

|          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 01 _____ | 02 _____ | 03 _____ | 04 _____ | 05 _____ | 06 _____ | 07 _____ | 08 _____ | 09 _____ | 10 _____ |
| 11 _____ | 12 _____ | 13 _____ | 14 _____ | 15 _____ | 16 _____ | 17 _____ | 18 _____ |          |          |

**Section E-2: IBC Requirements**

|          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 01 _____ | 02 _____ | 03 _____ | 04 _____ | 05 _____ | 06 _____ | 07 _____ | 08 _____ | 09 _____ | 10 _____ |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|

|   |                                       |
|---|---------------------------------------|
| <p><b><u>Contractor/Master Electrician Sign-off:</u></b></p> <p><b>Contractor License #:</b> _____</p> <p><b>Master License #:</b> _____</p> <p><b>Print Name:</b> _____</p> <p><b>Signature:</b> _____</p> <p><b>Date:</b> _____</p> | <p><b>Engineer's Signed/Seal:</b></p> |
|---|---------------------------------------|

**Annex E: Plan Intake Sheet**



**FILLED IN BY APPLICANT – All boxes in this section must be completed if applicable**

|                  |                 |                   |
|------------------|-----------------|-------------------|
| <b>Date -</b>    | <b>Plan # -</b> | <b>Permit # -</b> |
| <b>Address -</b> |                 |                   |

|   |  |
|---|--|
| Responsible Contractor or Permit Holder - |  |
| Contact Person -                          | Phone -  |
| Fax -                                     | Email -  |
| Number of Sets Submitted -                | *If only partial sets are submitted you may be required to insert them into record sets* |
| Revision Description -                    |  |
|   |  |
|   |  |

**FOR OFFICE USE ONLY**

|            |                   |              |                  |
|------------|-------------------|--------------|------------------|
| Building   | Zoning            | Public Works | Public Utilities |
| Planning   | Storm water Mgmt. | Mechanical   | Sprinkler        |
| Hood       | Fire Suppression  | Electrical   | Security         |
| Fire Alarm | Plumbing          | Gas Piping   | Miscellaneous    |

|   |           |    |                                   |     |   |                               |     |    |     |    |
|---|-----------|----|-----------------------------------|-----|---|-------------------------------|-----|----|-----|----|
| Date Received -                                   | Time In - |    | Intake Person -                   |     |   |                               |     |    |     |    |
| Revised due to plan review comments               | Yes       | No | Revised due to inspector comments | Yes | No  | Revised due to design changes | Yes | No |     |    |
| Has permit been issued                            | Yes       | No | Original permit fee - \$          |     |   |                               |     |    |     |    |
| Cost increase per changes (if any) - \$           |           |    | 10% Revision fee required         | Yes | No  | Increase fee paid             | Yes | No |     |    |
| If no revision fee is required (please explain) - |           |    |                                   |     |   |                               |     |    |     |    |
| For revised plans, are the changes clouded        |           |    | Yes                               | No  | Are the plans signed and sealed (if applicable) |                               |     |    | Yes | No |
| Comments  |           |    |                                   |     |   |                               |     |    |     |    |
|   |           |    |                                   |     |   |                               |     |    |     |    |
|   |           |    |                                   |     |   |                               |     |    |     |    |

**Revision - Resubmittal Plan Intake Sheet**  
 Department of Planning and Development Review  
 Bureau of Permits and Inspections  
 900 East Broad Street, Room 110  
 Richmond, VA 23219