



**Deputy Chief Thomas J. Pigott – Chief of Technology Management
Office of Technology Management
Bureau of Fire Prevention**



9 METROTECH CENTER – BROOKLYN, NY 11201

TECHNOLOGY MANAGEMENT BULLETIN # 2/2011 (Rev. 4/2016)

Issuance Date: April 14, 2016

Effective Date: Immediately

Purpose: This document establishes guidelines for the submission of the TM-5: Application for Rooftop Access Variance/Plan Review, in accordance with the rooftop access and obstruction requirements set forth in the NYC Fire Code (2014) §FC504.4 and FC512.

Background: This bulletin is a guidance document, intended to help provide a better understanding of the Fire Code requirements for rooftop access and obstructions. **It does not supersede any applicable laws, rules or regulations.** On March 30, 2014 FC512 was added along with a new revision to FC504.4. FC 504.4 sets forth detailed requirements for rooftop access and obstructions. FC504.4 requires that rooftops of buildings **100 feet or less** in height be provided with six foot wide by six foot deep roof access points along sides of the building that are accessible to fire apparatus, and a six foot wide clear path that runs from the front of the building to the rear, from side to side and connects to all required clearances (Rooftop perimeter access areas, rooftop accessible door clearance areas, rooftop accessible fire escape clearance areas, rooftop ladder clearance areas and skylight clearance areas). FC512 sets forth detailed requirements for the design, installation, operation and maintenance of solar panel systems on rooftops. FC512 requires that all solar installations completely comply with FC504.4 for flat roofed buildings 100 feet or less in height. For pitched roofed buildings that have a pitch greater than 20° and are 100 feet or less in height FC512 requires that a 3 foot wide clear access area along the ridge of each slope upon which solar panels are installed be provided and that solar panels shall not be installed closer than 3 feet to the ridge line. This bulletin, in combination with FC504.4, FC512 and the Fire Code Guide should be utilized to better understand the code requirements (Click the link for [Fire Code Guide](#) and open the PDF “Get New York City Fire Code Guide”). **Unless altered as set forth below, any rooftop arrangements existing on July 1, 2008 that are not in compliance with the requirements of the NYC Fire Code will not be required to be brought into compliance.** Alteration of existing rooftops and new rooftop installations after July 1, 2008 trigger compliance obligations for the entire roof. Alterations include any addition to, upgrade of, or modification of the devices, equipment and systems installed, other than repairs or in-kind (like-for-like) replacements in the ordinary course of business. An example of an ordinary repair would be the servicing or replacement of components of an existing installation. Technology upgrades/changes on a non-compliant rooftop must be filed for FDNY approval.

Code

Analysis:

I. FC504.4

The seven major components of the rooftop access provisions of FC504 are as follows:

1. UNOBSTRUCTED ROOFTOP ACCESS LOCATIONS AND LANDINGS

The required number of unobstructed rooftop access locations along any wall fronting on a street or any apparatus accessible exposures is determined by dividing the perimeter wall length by 12, and rounding **down** to the nearest whole number. For example, a wall with a perimeter length of 30 feet would require 2 access locations: $30 \div 12 = 2.5$, which is rounded to 2. Similarly, a wall with a perimeter length of 36 feet would require 3 access locations. Between access openings, a separation distance of at least 12 feet is required. For purposes of this section, the Fire Department considers adjacent parking lots as an exposure accessible to fire apparatus. Examples of typical arrangements which would satisfy the code requirements for access locations are found on page 9, 10 and 11 of this document. There may be instances where a 12-foot separation distance between rooftop access landings is not attainable. These will require the filing of a TM-5 Application. All access landings are required to be a minimum of 6 feet wide by 6 feet deep. Access openings less than 6 feet in width are considered obstructed segments of perimeter access. See **FC504.4.1.1**

2. ROOFTOP ACCESS SIGNS AND MARKINGS

Signage may be required by the Fire Department to indicate the locations along an exposure to indicate the location of open rooftop perimeter access areas that may not be apparent from street level. For example a school with a set back fence that has gates installed to allow for a clear path. Signs that are visible from street level would be required to indicate the location of the gates. Further multiple signs with directional arrows may also be required to indicate the boundaries of an open access area and/or the location of multiple gates in a set back fence. . See **FC504.4.2**

3. SIX (6) FEET WIDE CLEAR PATH

FC504.4.4 states: *“A clear path of not less than 6 feet (1829 mm) horizontal width and 9 feet (2743 mm) in height shall be provided from the front of the building to the rear of the building and from one side of the building to the other for each 100 linear feet (30 480 mm) of rooftop width and depth.”* An example of a building that would require multiple paths due to its width exceeding 100 feet would be a building 220 feet in overall width, this building at minimum would require 2 distinct clear paths from front to rear. A 300 foot wide building would minimally require 3. Clear paths shall be equally spaced apart. **FC504.4.4 continues to state that**

- *Such path shall comply with the following requirements. Such clear path shall be accessible from each rooftop perimeter access landing required pursuant to FC504.4.3.*
- *Such clear path shall afford reasonable access to bulkhead doors, fire escapes, access ladders, cockloft vents, skylights, scuttles and shafts. Such access shall include, to the maximum extent practicable, 3-foot (914 mm) clearance on three sides of the skylight or scuttle.*
- *A conduit or pipe may cross such clear path in accordance with FC504.4.7.*
- *Any lawful fence obstructing such clear path shall be provided with a standard 3-footwide (914 mm) gate, which may be secured by padlock or chain capable of being cut by standard bolt cutters, or secured by other approved device. (Note: gates should*

be inward opening and locks shall not be casehardened)

- *When the main building rooftop has more than one level, a fixed ladder or other approved means shall be provided to afford access along the clear path from one roof level to the next, excluding any height differential between levels exceeding one story or 16 feet (4077 mm), and any level with a rooftop area that is less than 6 feet (1829 mm) in any dimension.*
- *On an “H”-shaped building or other building whose irregular configuration renders a single clear path inadequate to provide access to each wing of the building or other rooftop area, the commissioner may require one or more additional clear paths to provide adequate access to such rooftop areas.*

In the case of multiple rooftop elevations along the clear path a ladder may be required. Though ladders will be considered a part of the clear path, the ladders themselves are not required to be 6 feet wide. All fixed ladders must be noncombustible, have a goose neck, follow OSHA regulations and must be set a minimum of 3 feet away from the rooftop edge.

The Fire Department will not consider any glass rooftop features or solar panels usable for landing areas. These features will also not be considered usable for clear path, they shall be considered obstructions and therefore limit any clear path or access area they encroach upon.

4. ROOFTOP CLEAR PATH PROTECTION

FC504.4.5 states: *“Adequate protection, in the form of a securely affixed protective railing or barrier that is 42 inches (1067 mm) above the roof surface in height along the clear path, shall be provided for any shaft, building perimeter or elevation adjoining the clear path or rooftop perimeter access landing (except the rooftop access landing itself).”* Railing should be placed along the above mentioned features except when height differentials are 6 feet or less. Railings shall not confine rooftop to only one path.

5. ROOFTOP DOOR OPENING AND FIRE ESCAPE CLEARANCE

FC504.4.6 states: *“A minimum clearance of 6 feet (1829 mm) in all directions shall be provided from each door opening onto a rooftop from a dwelling unit, stairway, bulkhead, or other occupied space or means of egress, as measured from the door hinge. A minimum clearance of 3 feet (914 mm) in all directions shall be provided from any fire escape or rooftop access ladder, as measured from each side of the ladder or landing.”* For further clarification on the clearances see example plan on page 10 and page 11 of this document.

Cable trays, conduits or other obstructions shall not obstruct a rooftop fire escape landing/gooseneck landing. The FDNY will not approve any plans where there is an existing or proposed Modification to the rooftop fire escape which does not comply with 1- RCNY, NYS Multiple Dwelling Law, The New York City Building Code and/or the New York City Fire Code unless an explicit approval has been obtained from the Department of Buildings for any work which alters egress to/from a rooftop fire escape landing, gooseneck ladder or the threshold between any roof and a fire escape. .

Important to Note:

1. **Telecommunication antennas that point into any of the above mentioned clearance areas subjects first responders and occupants on the rooftop to harmful radio frequency exposure, which may be in excess of FCC guidelines. Due to this, the antennas are considered to create an obstruction to the clearance for the rooftop**

access areas that they are facing.

- 2. The Fire Department will consider any glass walk ways or solar panels integrated into the rooftop to be an obstruction to any clear path, landing area or other required clearance area that it encroaches on.**

6.ROOFTOP CONDUITS AND PIPING

Conduits, cable trays and piping shall be installed in locations that do not interfere with rooftop perimeter access, clear paths, rooftop door clearances and fire escape clearances along with all other required clearances. In the cases where the conduits, cable trays and or piping cannot avoid these areas all equipment must be installed in a way that minimizes tripping hazards. To minimize the tripping hazards the combined height and width of the conduits, cable trays and piping must not exceed 1 foot in height and/or 24 inches in width. If the obstruction exceeds these dimensions steps or ramps (or platforms with steps, ramps or ladders) shall be provided that are constructed of noncombustible material, equipped with railings, and designed to allow any conduit or piping to be readily traversed. The steps, ramps or platforms shall not be placed in areas that will interfere with any rooftop clearances. An example of a situation where a step over would be required is where two cable trays which are both respectively 1 foot high and 24 inches wide and cross the clear path are placed next to one another. The two cable trays would create an obstruction that is 1 foot high and 4 feet wide making it necessary for a non-combustible crossover to be installed.

All conduits and piping installed must be color- coded with continuous durable waterproof reflective or luminescent markings. The pipes must be labeled in an approved manner to indicate its contents.

The proper color coding's are as follows:

1. High voltage wiring – Red.
2. Low voltage wiring – Orange.
3. Natural gas piping – Yellow.
4. Other compressed gas piping – Yellow, labeled at regular intervals with the type of Gas.
5. Fuel oil piping – Yellow with black stripes.

See FC504.4.7

7.ROOFTOP GARDENS, PERIMETER ACCESS AND CLEAR PATH

Rooftop Gardens and landscaping must be designed and maintained in compliance with the NYC Building Code, Construction Codes and FC504.4. This means that the Rooftop gardens must not encroach upon the clear path, rooftop perimeter access, fire escape clearances, rooftop accessible door clearances and any other required rooftop clearances unless it is in compliance with the following requirements:

- The earth or other landscaping material in such areas shall be securely contained and compacted in such a manner as to ensure a stable, continuous surface with a slope not exceeding the slope of the rooftop
- Vegetation in such areas shall be limited to grass or other plants that do not exceed 12 inches (305 mm) in height and do not constitute a tripping hazard or pitfall.

See 504.4.9 and 504.4.9.2

All rooftop gardens must be maintained and have a proper water supply in accordance with FC318. The water supply must also be used and stored in accordance with the requirements of

FC318. See FC504.4.9.3

II. FC512

The three major components of the rooftop access provisions of FC512 are as follows:

1 SOLAR INSTALLATIONS ON FLAT-ROOF BUILDINGS

All solar panel installations installed on flat- roofed buildings that are 100 feet in height or less shall follow all Fire Code requirements pertaining to buildings with a height of 100 feet or less and a slope of 20 degrees or less See FC504.4 and FC512.2. It shall meet all the same clear path, perimeter access, door and fire escape clearance and all other requirements set forth in FC504.4.

2 SOLAR INSTALLATIONS ON PITCHED-ROOFED BUILDINGS AND STRUCTURES.

For solar panel installations installed on pitched- roofed buildings that are 100 feet in height or less shall follow all Fire Code requirements pertaining to buildings with a height of 100 feet or less and a roof with a slope greater than 20 degrees. See FC512.3 No solar panel shall be installed closer than 3 feet to the ridge lines. Examples can be found on page 12 and 13 of this document. Existing building features such as vents skylights and chimneys may encroach on the ridge line. See FC512.3.1 and FC512.3.2. Further requirements for the installations of photovoltaic solar panel are stated in FC512.4.1: *“Direct current conduit, wiring systems, and raceways for photovoltaic circuits installed on pitched roofs subject to the requirements of FC512.3 shall be located along hips and valleys, away from the ridge, and on outside walls, to maximize ventilation opportunities. Conduit runs between sub-arrays and to direct current combiner boxes shall be installed in a manner that minimizes the total amount of conduit on the roof by taking the shortest path from the array to the direct current combiner box, except as necessary to minimize the tripping hazard. The direct current combiner boxes shall be located such that conduit runs are minimized in the pathways between arrays.”*

Important Note Regarding Interpretation of FC504.4 and FC512

Pending code revision or promulgation of a rule, the Fire Department will interpret FC504.4 and FC512.3 in accordance with the following interim guidelines:

- A one or two-family home with a shallow-pitched roof (a roof slope of not less than 2/12, or 9.5%) shall comply with FC512.3, not FC504.4. This means that these rooftops do not need any of the clearances required in FC504.4 for flat roofs. However these rooftops will have to comply with FC512 which requires them to have 3 foot clearance areas along both sides of the ridge lines.
- A one or two family dwelling that is primarily a flat-roof building shall comply with FC504.4, even if a portion of the roof is shallow-pitched or has a pitch exceeding 20%. For example, a brownstone-type building shall comply with FC504.4, not FC512.3, notwithstanding it having a pitched roof element (such as a mansard) or a penthouse or bulkhead with a pitched roof.

A shallow-pitched or pitched portion of the building rooftop must be kept free of obstructions if it can be traversed to gain access onto, or across, the otherwise flat roof. Owners may request guidance from the Bureau of Fire Prevention as to the appropriate treatment of shallow-pitched or pitched portions of flat-roofed buildings.

- **This interim guideline shall not apply to shallow-pitched roofs on buildings other than one or two family dwellings (Occupancy Group R-3).**

In summary **one or two family dwellings** whose slope is **9.5 degrees or greater** do not have to comply with the requirements FC504.4. they instead must comply with FC512 and provide a 3 foot clear clearance along both sides of the ridge line.

3 PHOTOVOLTAIC SOLAR PANEL INSTALLATION MARKINGS.

FC 512.4.1 states that *“Indoor and outdoor direct current conduit, enclosures, raceways, cable assemblies, junction boxes, combiner boxes, and main service and other disconnects shall have durable, reflective and, if outdoors, weatherproof, markings, in white capital letters with a height of not less than 3/8 inch (9.5 mm) on a red background, reading “WARNING: PHOTOVOLTAIC POWER SOURCE.” Continuous installations, including conduit, raceways, enclosures and cable assemblies, shall be marked every 10 feet (3048 mm), within 1 foot (305 mm) of all turns or bends, and within 1 foot (305 mm) above and below all penetrations of roof or ceiling assemblies and all walls.”*

Code

Compliance:

For rooftop with a proposed alteration whose proposed work and or existing building conditions do not comply with FC504.4 or FC512, there are two options.

OPTION 1

The most desirable option from the Fire Department’s perspective is to alter the existing arrangement and/or design proposed installations of rooftop devices, equipment or systems, so that the rooftop will be in full compliance with the Fire Code. The Fire Department recognizes that in many cases this may not be practical. In such circumstances, **prior** to any proposed work being performed, recourse shall also be made to the second option.

OPTION 2

A TM5 application must be submitted to the Fire Department for review and approval. The application must include design and installation documents (rooftop plan), depict the information required in the manner indicated in this guideline. Approval of variances may require alterations to existing or proposed non-compliant layouts of a given rooftop.

ROOFTOP ACCESS APPLICATIONS CAN BE OBTAINED ON THE FIRE DEPARTMENT’S WEB SITE AT:

http://www.nyc.gov/html/fdny/pdf/fire_prevention/TM5.pdf

Common Compliance Issues:

Listed below are some of the most common reasons for noncompliance with FC504. These include but are not limited to:

1. Clear path width less than 6 feet (specify available width). **See FC504.4.4**
2. Clear path height less than 9 feet (specify available height). **See FC504.4.4**
3. An obstruction crosses the clear path, greater than 1 foot above the roof level and/or 24 inches wide. **See FC504.4.7**
4. Beam crosses the clear path (specify lower and upper beam elevation above roof). **See FC504.4.7**
5. Rooftop door opening clearance less than 6 feet from hinge (specify clearance). **See FC504.4.6**

6. Fire escape clearance less than 3 feet in all directions (specify available clearance). **See FC504.4.6**
7. Rooftop access landing area less than 6 feet by 6 feet (specify available dimensions). **See FC504.4.1.1**
8. Rooftop access landing area not connected to clear path. **See FC504.4.4**
9. Landing area connected to clear path by path less than 6 feet (specify available width) **See FC504.4.4**
10. Total number of rooftop access points (total feet) along building wall less than required (provide details). **See FC504.4.1.1**
11. Required arrangement of rooftop access landings are not as per requirement (show actual arrangement of open and obstructed perimeter areas on plan set). **See FC504.4.1.1**
12. Inadequate clearance around rooftop scuttles/hatches or skylights. **See FC504.4.6**
13. The roof of a bulkhead or penthouse that is not accessible from the frontage space of the building or any other fire apparatus accessible exposure (i.e., where the roof is set well back from the perimeter of the building) generally need not comply with the requirements of §FC504.4. However, there may be instances where the location and/or size of the bulkhead or penthouse are such that it will be treated as a separate rooftop. For example, where the bulkhead/penthouse roof is located at the perimeter of an accessible building exposure and/or occupies a substantial portion of the building rooftop, compliance will be required. The Fire Department often vents stairways and buildings from bulkhead and penthouse roofs, using portable ladders to gain access, and building owners are encouraged to maintain reasonable access for such firefighting operations even if not required by code. **See FC504.4.4**

Preparation of Rooftop Plans:

Two rooftop plans (one of existing conditions, and one of existing conditions and proposed alteration) showing all relevant features, dimensions and distances shall be submitted with the TM-5 Application. Plans must bear the original signature and seal/stamp of the Engineer or Architect of Record, as indicated on the TM-5. **Note: The FDNY logo shall not be reproduced on any submitted documents including the submitted plans.**

Plans shall be formatted (to scale) to the folio size of 11 inches by 17 inches in dimension. The rooftop plan should be drawn to scale and indicate actual dimensions, including a directional compass.

The rooftop plan shall be prepared subsequent to an engineering site survey. The plan shall provide an overhead view layout of all building design features, including the location and labeling of fire escapes, bulkheads and rooftop access points, and the location and labeling of all devices, equipment and systems installed on the roof, including antennas, cable trays, mechanical equipment, solar panels and roof gardens. The location and labeling of any structural supports and platforms for such devices, equipment and systems is also required. This layout shall clearly mark and label the rooftop access network, including rooftop access landings, clear paths and the path from each rooftop access landing to the clear path. Sample plans Example 1 and Example 2 may be found on pages 10 and 11 of this document. Indicate the type of device, equipment or system installed (proposed or existing) that is creating the non-compliant design feature. Assign an individual number designation to each non-compliant feature and identify on the plan, by such number. **All proposed work on rooftop shall be shown in bold typeface.** Presentation of information in tabular form, and the submission of photographs, sketches or elevations to assist in the identification and description of the non-compliant features are required to supplement the application.

Current photographs shall be included in the plan set, for each section of the roof. Each non-compliant feature must be clearly shown in a photograph. **All photographs must be marked with the date the photograph was taken and plans should be marked to indicate the location and direction of the photograph.**

Rooftop plans shall detail the relative location of the building in question, to adjacent buildings on the same side of the street and all streets and parking lots accessible to fire apparatus access. Accessible exposures shall be labeled as such. Indicate different roof levels for the same building and attached buildings, and any fixed ladders, or other means provided to gain access between such roofs.

Indicate all the dimensions as well as the type of obstructions that encroach upon the clear path. Indicate the location and width of all required step-overs in the clear path from the rooftop access area to the clear path. **Note: all proposed step-overs shall be of non-combustible construction, durable, and equipped with railings.**

Indicate cable tray heights and widths, including those that cross over the clear path and those that are located in the path from the rooftop access area to the clear path. If cable trays run adjacently, provide the total width of the adjacent cable trays. The rooftop plan shall also contain a legend, as follows:

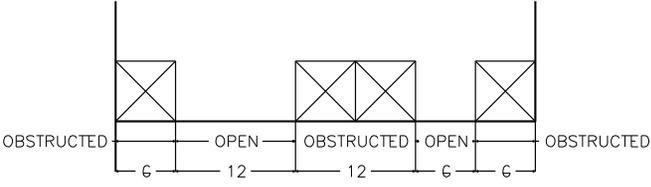
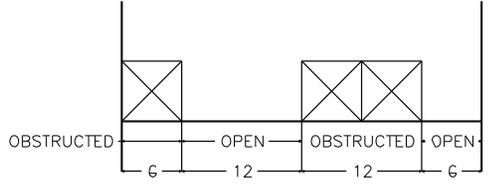
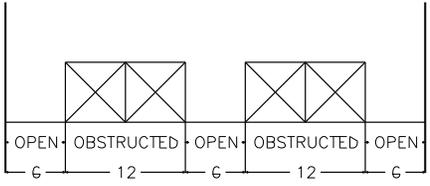
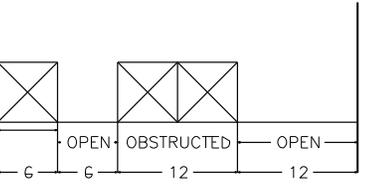
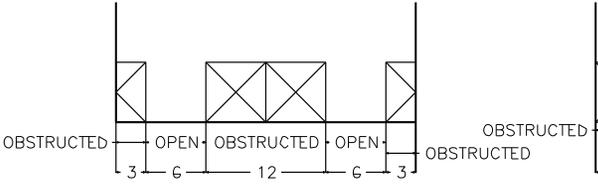
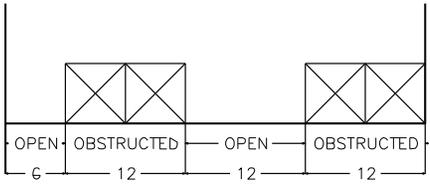
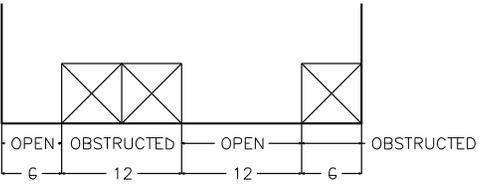
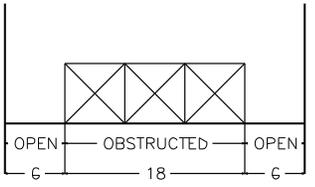
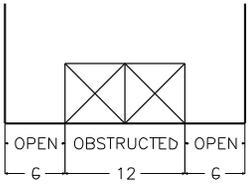
- UNOBSTRUCTED ROOFTOP ACCESS LOCATIONS AND LANDINGS
Rooftop access locations shall be indicated on plans using the symbol ①. The rooftop plan shall be marked to show the actual dimension of each landing. Label all segments along a building's accessible perimeter in linear feet as "open" or "obstructed" on the actual plan.
- CLEAR PATH
Clear paths, front to rear, and side to side shall be indicated using the symbol ②. All clear paths are required to have a minimum width of 6 feet. The rooftop plan shall be marked to show the actual width dimension of the clear path, and any restrictions to it.
- ROOFTOP DOOR OPENING CLEARANCES and Hatches.
 - Door openings shall be indicated on plans using the symbol ③. All rooftop door openings are required to have a minimum clearance of 6 feet, measured as a semi-circle from the hinge side of the door (hinge as the center of the semi-circle). The rooftop plan shall be marked to show the actual dimension available for each door.
 - All rooftop hatches and skylights are required to have a minimum of 3 feet of clearance on three sides of the feature. The rooftop plan shall be marked to show the actual dimension available for each hatch and skylight.
- FIRE ESCAPE CLEARANCES
Fire escape and rooftop ladders shall be indicated on plans using the symbol ④. All fire escape and rooftop ladders are required to have a minimum clearance of 3 feet. This is measured by indicating a 3-foot clearance around each stringer, and then extrapolating a line between the two, 3-foot semi-circular clearances. The rooftop plan shall be marked to show the actual dimension available for each fire escape and rooftop ladder.

24' WIDE BUILDING

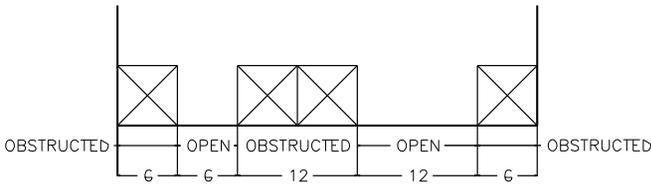
30' WIDE BUILDING

36' WIDE BUILDING

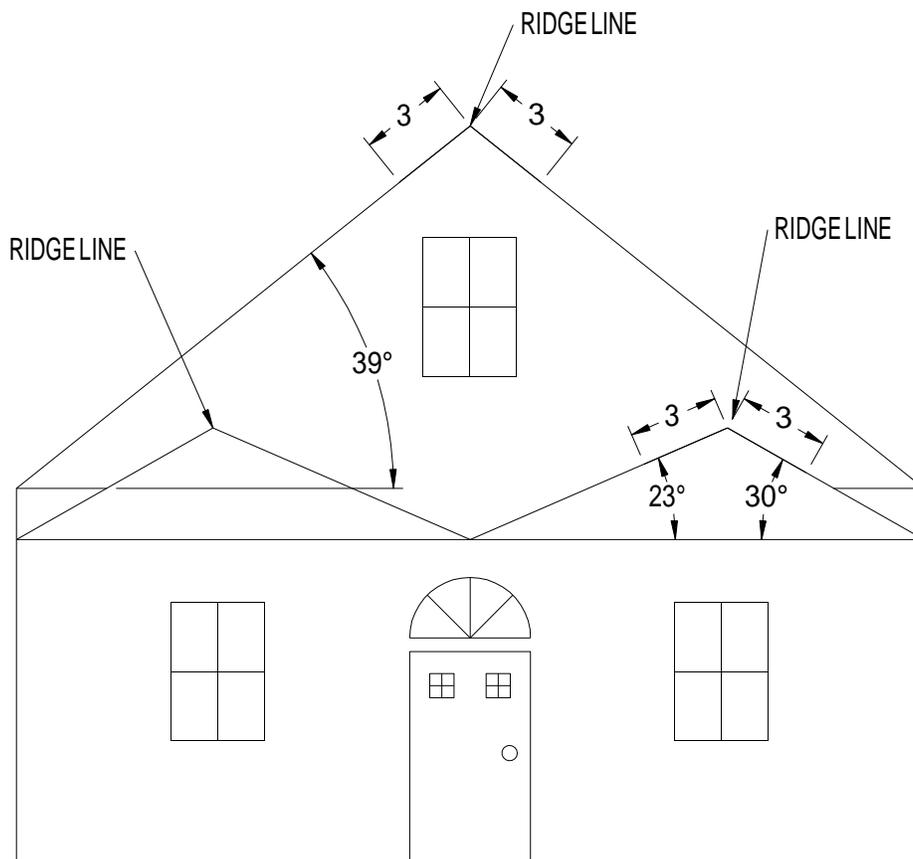
>36' WIDE BUILDING



 **OBSTRUCTED**



Example 3 Elevation View



VIEW A-A

Example 3a Rooftop View

