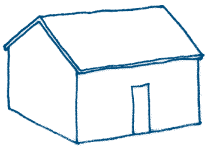
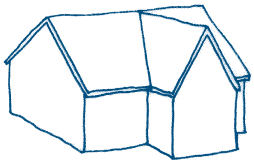
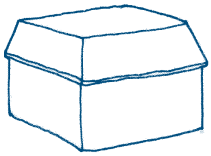
TOWN OF RYE
HISTORIC DISTRICT COMMISSION
Roofing


Front Gable


Side Gable


Cross Gable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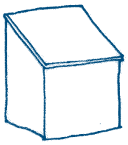
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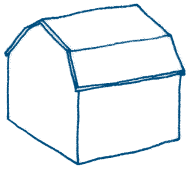
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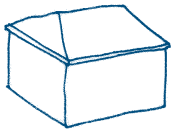
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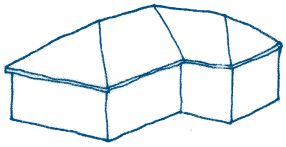
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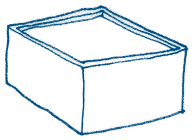

Flat with Parapet

ROOFING

A building's roof provides the first line of defense against the elements while its form and design can greatly affect the building's overall appearance. In addition, Rye's roofs include a number of features that enhance the overall appearance of their respective building. These features may include chimneys, dormers and cupolas, as well as bell towers and steeples. As a result, a building's roof and associated features are also a typical indicator of its architectural style, a reflection of both its climate and its history.

The following functional and aesthetic concerns should be evaluated when considering a new roof or roof alteration:

- Weather-tight roofing preserves a building and provides shelter from storm water, wind and sun
- The form, color, texture and material of the roof and its associated features affect the scale and massing of the building

These *Guidelines* were developed in conjunction with the Town of Rye's Historic District Commission (HDC). Please review this information during the early stages of planning a project. Familiarity with this material can assist in moving a project forward -saving both time and money. The Building Department is available for informal meetings with potential applicants who are considering improvements to their properties.

Guidelines and application information are available at the Rye Town Hall and on the Commission's website at www.town.rye.nh.us/historic-district-commission. For more information, to clarify whether a proposed project requires HDC review, or to obtain permit applications, please call the Building Department at (603) 964-9800.

- Roofing and roof features help define a building's character, silhouette and architectural style, with variations adding visual interest along a streetscape and the Town's skyline
- Retaining historic roof features and accessories can enhance a roof's overall character and appearance
- Non-historic elements on a roof, such as roof decks and mechanical equipment can have a negative visual impact and should be minimized and shielded from view

Roof Forms

The historic form of a roof is critical to the understanding of a building's type and architectural style. Certain roof forms are linked with specific styles, such as Mansard roofs with Second Empire style. Alterations to a roof's shape can have a negative impact on the building's historic authenticity and appearance and can lead to drainage problems or water infiltration.

Roof forms can have various pitches and be combined in different manners to provide varied roof types. Some of the most common roof forms found in Rye are illustrated above. Often, the most successful additions to historic buildings utilize similar or compatible roof forms and slopes. (Refer to *Building Form and Massing, Guidelines for Additions and New Construction*, page 07-03).

In addition to its role in defining a building type or architectural style, a roof's pitch or slope, as well as climatic conditions, such as snow loads and high winds, functionally define the appropriate materials for a roof. Low-pitched to flat roofs depend on a continuous or nearly continuous roof surface to minimize moisture infiltration, while moderately to steeply sloped roofs may be roofed with unit materials such as slate and asphalt shingles.

Gambrel roof forms are relatively rare in Rye. However, chimneys are often located at or near the roof ridge.

Investigating Historic Roofing

Some investigation may be needed to determine the historic sloped roof material for a building. A good place to start is in the attic. New roofs are often installed on top of older roof surfaces. Between rafters, older roofs can sometimes be seen. Another area of review is the roof framing, strapping, and sheathing. Because of its weight, slate requires more substantial roof framing, with larger rafters and narrower spacing than wood or asphalt shingle framing. If the original strapping is visible, there are variations in lath spacing that relate to standard sizes for slate, wood shingles, and other materials. Finally, wood sheathing was often needed in metal and asphalt roof installations, while strapping or boards was used in slate and wood installations.

If physical evidence is not available, investigating documentary evidence such as historic photographs, speaking to neighbors or looking at similar buildings in the area might provide clues about original roof materials. Local resources such as the Rye Historical Society and Town Museum can offer valuable resources.

Life-Cycle Cost of Roofing Materials

With regular maintenance, traditional historic roofing materials perceived as "more expensive" (such as slate) often have substantially longer lifespans than other forms of roofing. As a result, they do not require replacement as often and may have a lower life-cycle cost than less expensive materials such as asphalt. Full life-cycle costs are also key when considering a building's sustainability goals. **A material's longevity, sustainability and aesthetic qualities often add to a property's value.**

Substitute Materials

Care is recommended when using substitute materials because they might not have the longevity advertised, can potentially damage historic building fabric, and may not meet the *Secretary of the Interior's Standards*.

Roofing Materials

Historically, roofing materials were selected based upon practical and aesthetic criteria, including pitch, weather conditions and the availability of materials and craftsmen. The popularity of architectural styles, from the use of wood shingles for Early Colonial and Federal style buildings to the use of slate for Victorian styles and masonry buildings, also had a great impact on the selection of roof material. With industrialization at the beginning of the 20th century, new roofing materials were introduced, including asphalt and asbestos-based shingles, as well as varieties of rolled or built-up roofing for flat installations. The variety of metal roofing expanded to include copper, tin and galvanized sheet steel, particularly at secondary buildings such as barns and carriage houses.

Each material provides a specific color, texture and pattern to a roof surface. Wood shingles and slate provide a modulated surface with variations in color, pattern, texture, veining, graining, and thickness while metal roofing can provide a ribbed or smooth surface.

More recently, a larger variety of substitute roofing materials intended to simulate historic materials has been developed, some more successful than others. These include architectural asphalt-composition shingles and fiberglass, metal, tile or recycled rubber shingles intended to evoke the appearance of slate and wood shingles. The most common roofing materials in Rye include slate, asphalt, metal and flat roofing systems.

Roof forms can provide a dramatic building silhouette against the sky. In this case, the Mansard roof, typical of Second Empire buildings, has deep projecting eaves and two, symmetrically placed chimneys, as on the historic "Cable House" above.

Slate roofing is often found on Rye's older buildings. Also note the massive central chimney.

Slate

Slate was a common roofing material on buildings constructed in the Colonial and Federal periods through Colonial Revival buildings of the 20th century. During the Victorian period, slate roofing could include slates of a variety of shapes and colors, installed in decorative patterns on roof slopes.

A slate roof can last 60 to 125 years, depending on the roof slope, stone properties, formation, installation quality, and regularity of maintenance. Failing slate often slowly delaminates, chips, and absorbs moisture, causing the deterioration process to accelerate over time. Problems with slate roofs are typically the result of localized failure, since many of the roof accessories and fasteners do not have the same 100-year lifespan as the slate itself. To extend the serviceable life of a roof, property owners are encouraged to address localized problems as they become apparent, using a qualified slate roofer.

Typical localized problems and possible repairs for slate:

- Loosening or corrosion of fasteners for slate or accessories - *Reattach or replace fastener*
- Split or cracked slate - *Install sheet metal under shingle, fill split or hole with roofing cement*
- Missing or damaged slates or roof accessories - *Replace to match original*

If over 20% of the roof slates are damaged or missing, replacement of the roofing might be warranted; in this case, property owners are strongly encouraged to make every attempt to match decorative patterns with replacement materials. When replacing sections of a slate roof, it may be possible to salvage and reuse some of the existing slate. Imitation slate products have unknown reliability and lifespan and the HDC recommends retaining slate roofs or, if necessary, replacing them in-kind. It is critical to select a flashing material with a lifespan similar to or longer than the new roofing.

Asphalt

Asphalt became a popular roofing material at the beginning of the 20th century providing a relatively inexpensive and easily installed roofing material. Early asphalt roofing was generally made of asphalt-saturated felts in a variety of shapes, styles, textures and colors. Today, asphalt shingles are made with fiberglass, generally as 3-tab, "architectural" or "dimensional" shingles, which include multiple layers of material with simulated shadows suggesting slate or wood shingles.

An asphalt shingle roof can be expected to last from 15 to 25 years with "architectural" or "dimensional" shingles lasting longer due to their multiple layers. Over time, asphalt shingles can curl, lose their mineral coating, be dislodged by wind or become brittle.

Typical localized problems and possible repairs for asphalt:

- Split or puncture - *Install sheet metal under shingle, fill split or hole with roofing cement*
- Missing or damaged shingles or roof accessories - *Replace to match original*
- Moss or fungi on surface - *Trim back adjacent trees to allow sun to dry out roof surface*

If over 20% of the asphalt shingles on a roof slope are damaged or missing, replacement of the roofing might be warranted. Property owners are encouraged to install architectural asphalt shingles to match the color and pattern of original slate or wood shingles when replacement to match the original material is not feasible.

This 3-tab asphalt shingle roof has exceeded its useful life. Given the unevenness of the surface, it would be prudent to have the underlying framing and sheathing reviewed by an architect or engineer prior to re-roofing.

Ridge Vents

A ridge vent, installed along the majority of the ridge line, allows the passage of air through the attic or cathedral ceiling. The air movement can reduce heat build-up and potential moisture in attics and within roof framing.

Ridge vents are commonly included at asphalt roof installations, and can be covered with matching asphalt shingles to minimize their visibility.

Metal

Metal became a popular material for roofing after sheet metal production was expanded following the mid-19th century and can be found on commercial and industrial buildings, as well as residences and outbuildings. Traditional sheet roofing metals include lead, copper, zinc, tin plate, terne plate (rust-preventive coated steel), and galvanized iron. Some historic metal roofs require regular painting, with traditional colors including silver, grey, or green, to minimize the potential for corrosion. While historic metal roofs were typically formed by craftsmen on-site, newer metal roofs are often made from factory-formed components allowing for less labor-intensive installation that may not match historic detailing. Every effort should be made to select preformed components that mimic historic installations.

On shallow pitch roofs, such as those of porches, cupolas or dormers, small rectangular pieces of flat seam metal roofing were installed with edges crimped together and soldered to form a weather-tight surface. On steeper pitched roofs, long continuous seams were used, typically in a standing seam configuration, providing regular ridges down roof slopes. Corrugated or other paneled metal roofing was also common on commercial and industrial buildings as well as outbuildings, such as sheds and barns, but is not appropriate for historic residences.

Deterioration of the metal surface tends to occur from wearing of the protective painted or galvanized surface, chemical action, rusting, pitting or streaking, airborne pollutants, rain or material acids, or galvanic action. Galvanic action occurs when dissimilar metals chemically react against each other and corrode, and can come from adjacent metals, such as fasteners or non-adjacent metals (such as roof cresting), via rainwater.

If the roof is generally rusting, splitting, pitted, severely buckled or warped, or many of the seams or edges are open or disfigured, replacement of the roofing might be warranted. If considering replacement, applicants are encouraged to make every attempt to match the material and seam patterns with the replacement material.

Typical localized problems and possible repairs for metal:

- Worn paint, galvanizing or coating - *Repaint*
- Slipping sheet, panel, open seam or open solder joint - *Refasten and/or re-solder*
- Isolated rusting or holes - *Replace to match original*

Copper is a traditional metal roofing material that does not require painting. The standing seams, as shown in this example, create a regular pattern along the roof surface.

Rubber roofing systems can crack, eventually forming leaks. Significant cracking of this roof suggests replacement might be prudent.

Flat Roofing Systems

Although very few roofs are truly "flat", low-sloped roofs, generally defined as a pitch less than 3:12 (3-inch rise for 12-inch run), require a watertight roofing system. There are a variety of flat or low-slope roof systems including: metal roofing, built-up roofing, single-ply roofing, and modified bitumen roofing. By contrast steeper pitched roof systems generally employ shingles that shed storm water.

Typical localized problems for flat roofs include:

- Splits, punctures, or cracking of surface
- Standing water or poor drainage

Although flat roofs that are not visible from a public way are not subject to HDC review, it is recommended when selecting roofing materials that the materials and design address the building's drainage and specific details of the existing conditions including attachment, substrate and weight limitations. The installation of light-colored roofing to minimize solar heat gain is also recommended.

Most low-sloped roofs include a parapet and/or cornice, particularly along street elevations, providing a visual termination to the building wall. These components and parapets were often decorative and reflect the building's style.

Parapet: The portion of a wall that projects above an adjacent roof surface.

Cornice: The projecting horizontal moldings toward the top of the building wall at the roof edge.

Dormers

Dormers, also known as dormer windows, were traditionally used to let light and ventilation into the attic and to create habitable space. At the exterior, they protrude from sloped roof surfaces and visually break up large roof surfaces. Dormers can have various roof shapes, but in Rye they typically have a gable, hip or less often, a shed roof form. Historically, the overall height and proportions of dormers is determined by the building style, with upper floors tending to have smaller windows than lower floors.

When considering a new dormer, particularly on historic buildings, property owners are encouraged to review historic dormers at comparable buildings of the same style and period. It is important to keep in mind a poorly scaled or detailed dormer can drastically change the appearance of an otherwise well-proportioned house and have an adverse impact on the roof form and historic character. This may necessitate the installation of a custom egress window if the space it to be used as a bedroom.

Gable roof dormers can typically be found at early Federal and Greek Revival, and Colonial Revival buildings. This example is pedimented and includes 8/8 windows. Cheek walls on dormers typically have wood clapboard cladding. Also note the massive, central brick chimney and metal ice shield along the eave.

Chimneys

Chimneys were designed to complement the style of a building and period of construction. In Rye, most are constructed of brick or masonry, some of which have been covered by stucco. The rhythm and placement of chimneys typically reflect the internal organization of a building and represent an important building feature. Most building types and styles have square or rectangular chimney shafts, sometimes with molded tops. Victorian period chimneys may include decorative detailing including corbelling, varied patterns, undulating and molded surfaces, and decorative terra cotta chimney pots. Though routine maintenance and repair of a historic chimney does not require a Certificate of Approval (COA) from the HDC, removal of historic chimneys is only approved by the HDC if they are structurally deficient. The use of veneer brick chimneys is only appropriate in unique circumstances and is strongly discouraged.

Roof features, such as bell towers, can often be found on institutional buildings.

Roof Features and Accessories

Roof features are functional and sometimes decorative elements that define the profile of a roof against the skyline and should be appropriate to the building's style. Historic rooftop features include cresting, finials, roof hatches, flashing, gutters, downspouts, weather vanes and bell towers. More recent additions include skylights, solar panels as well as mechanical and television equipment. In its review of new roof features and accessories, the HDC considers the appropriateness to the building, existing features and accessories, level of visibility, as well as the visual impact to the roof character and appearance. Property owners considering installation of new roof features or accessories should make every effort to minimize their visibility and the appearance of clutter in order to improve the likelihood of approval.

Rooftop Additions

When a property owner is considering adding habitable space at the roof level, such as a bedroom, office, bathroom, kitchen facilities, or a roof deck, it is considered a rooftop addition. Refer to the *Guidelines for Additions and New Construction* for additional information regarding additions.

Flashing

Flashing is typically made of thin sheet metal formed to prevent water from entering a building at joints, intersections and changes of pitch. It is installed around chimneys, parapets, dormer windows, roof valleys, vents and intersections of porches, additions and projecting bays. Flashing often fails before roof surfaces, particularly with durable roofing such as wood shingles or slate. Failures result in interior leaks and deterioration of framing. If the flashing deteriorates, it is possible for a qualified roofer to replace it without replacing the entire roof.

When replacing flashing or installing a new roof, it is important to select a flashing material that has an anticipated lifespan similar to or longer than the roofing. Copper, terne, steel, lead, and aluminum are all used for flashing. The longevity of each material is based upon its thickness, its propensity for deterioration from environmental conditions, and whether it is galvanized, treated, or coated. Generally, copper or lead-coated copper has the longest lifespan, followed by stainless steel, with aluminum being highly susceptible to punctures, tears and galvanic reaction with other metals and some roofing materials. It is important to verify that flashing materials are sympathetic and compatible with existing roofing materials, including fasteners, to prevent premature deterioration.

The skylight has a low profile and parallel to the roof slope, minimizing its visibility. Also note the stepped copper flashing at the brick chimney.

Skylights and Roof Hatches

Skylights were historically used in commercial and warehouse buildings. Advancements in technology allowed them to be installed at residences. Similar in form to a skylight, a roof hatch can provide access to a roof for snow removal and maintenance, as well as provide a means of ventilating attic spaces. The installation of new skylights and roof hatches should minimize alteration of the roof structure with the long dimension oriented down the roof slope. Skylights and roof hatches should be hidden or minimally visible from public view, and should not disturb historic roof materials such as slate, nor require the significant modification of existing roof framing.

Snow Guards

Snow guards are typically cast metal or bent wire devices arranged in a staggered pattern near an eave to prevent large masses of snow from sliding off a roof slope. Another form of a snow guard is spaced brackets supporting metal rods above the roof surface. Both types of snow retention can protect eaves, cornices and gutters, and take advantage of the insulating effect of snow.

Snow guards prevent snow from sliding off a roof and are usually installed along a roof edge and are more prevalent above entrance doors.

Gutters

Gutters typically are located near or along the bottom edge of a roof slope to collect rainwater. Although many of Rye's early buildings were not designed with gutters, installing them can significantly reduce water damage to building walls and foundations. Built-in gutters are often not visible from the ground, and are typically within or behind architectural features such as cornices or parapets. Pole gutters are located near the bottom edge of a roof slope and project perpendicularly to the roof surface. Both built-in gutters and pole gutters are formed of flashing materials typically wrapped around or within wood enclosures.

Hanging gutters are located just under the roof slope edge and are usually metal with half-round or profiled cross sections. Similar to flashing, gutter materials have different lifespans. Generally, copper has the longest potential lifespan, galvanized metal, followed by steel, with aluminum being highly susceptible to punctures, tears, dents and galvanic reaction to other metals. When installing or reinstalling gutters, property owners should reproduce any special or historic molding, strap or bracket used to support or attach a gutter to a building and repair or replace wood eave detailing and trim. The HDC encourages the use of half-round gutters facing the street.

The half-round gutter collects stormwater as it runs down the roof surface.

This downspout was painted to match the wall color, minimizing its visibility.

Downspouts

Downspouts, also known as rainwater conductors, conduct a gutter's water down the face of the building to the ground or a drainage system via a cast iron boot and are generally surface mounted to a building's exterior. Similar to gutters, downspouts can be fabricated of copper, galvanized metal or aluminum, in a round or rectangular profile. An advantage of a lead-coated copper or galvanized metal downspouts is that they can be painted to match the building colors.

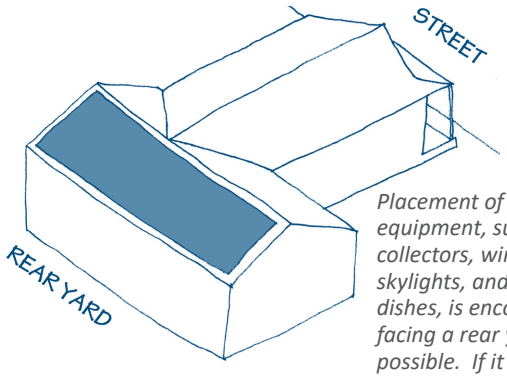
When adding downspouts to a structure for the first time, they should be arranged in an orderly fashion and mounted to the building rather than a porch post or column.

Rain barrels can collect storm water for future use in the garden, reducing run-off into the river. Property owners are encouraged to select neutral colors and shield rain barrels from public view with plantings to the extent possible.

Green Roofs and Rain Barrels

Much of the rain that falls on a roof surface is typically diverted to a gutter, then a downspout and, from there, discharged at the perimeter of a building or into a storm sewer. Reducing the amount of water that reaches the gutter or collecting the water as it is discharged from the downspout prevents the soil around a building from becoming saturated, potentially impacting the foundation. In addition, the sewer system is less likely to become overwhelmed in a significant storm.

One of the means of controlling the quantity of water diverted to a gutter system is installing a green roof so that the planted material is not visible from the public way. An option for flat and sloped roofs is installing rain barrels at the bottoms of downspouts. Rain barrels collect storm water discharged from downspouts. They typically include a spigot near the bottom for a hose hook-up, allowing the collected storm water to be used for watering gardens and lawns.



Placement of roof-mounted equipment, such as solar collectors, wind turbines, skylights, and television dishes, is encouraged facing a rear yard wherever possible. If it is not possible, placement as far back on a side roof slope as possible is preferred.

Roof Mounted Equipment

Roof mounted equipment, including mechanical equipment, vents, television dishes and antennae and mobile telecommunication equipment, are all examples of modern roof-mounted mechanical equipment and penetrations that can affect the historic integrity of a building. Although it is understood that some roof penetrations are required for items such as plumbing vents, property owners are encouraged to limit the amount of rooftop equipment and penetrations, and minimize the overall appearance of clutter. For more information on additions that change the appearance of an existing roof, refer to the *Guidelines for Additions and New Construction*.

Renewable Energy

Solar collectors provide a renewable energy source. The Town of Rye encourages solar collectors for space heating, hot water and electricity. However, property owners are encouraged to locate solar collectors where they are hidden or minimally visible from public view. To minimize their visibility, the frame and panels should be the same color as the roof structure and located parallel to and as close to the roof structure as possible. The proximity and seasonal shading characteristics of adjacent and neighboring trees and structures should also be considered to ensure sufficient year-round solar exposure to justify the expense of installation. (Refer to *Roof-Mounted Equipment* diagram above for placement.)

Similarly, wind turbines are a renewable energy source. Since turbines need to be located to benefit from consistent breezes, they are often taller than adjacent buildings and highly visible. Similar to solar collectors, the visibility of wind turbines should be minimized from public view.

An "invisible" form of renewable energy is geothermal heating and cooling. Geothermal systems use the thermal energy generated and stored in the earth to heat/cool a building through a series of pipes bored into the ground. Typically, the only component of the system that is visible at the exterior of a building is a valve access cap, generally located flush with the ground.

Roof Repair or Replacement

The HDC recommends:

- Maintaining a building's roof slope appropriate to the architectural style at primary and ancillary structures
- Designing additions or new buildings with a roof slope similar to existing buildings and neighboring construction
- Selectively replacing damaged or missing elements in-kind, so as to match the material, size, shape, texture and other visual characteristics of the original
- If the level of damage or deterioration is beyond repair, completely replacing damaged or missing materials in-kind to match the material, size, shape, texture, pattern and other visual characteristics of the original
- If replacement in original material is not possible, replacing damaged or missing materials with new modern material of similar size, shape, texture, pattern and other visual characteristics of the original
- Installing roofing rather than typical wall materials on the steep slopes of mansard roofs
- Maintaining, cleaning and/or repairing of roofing, roof accessories and rooftop features including chimneys
- Installing stone or cast stone chimney caps
- Securely installing fasteners and flashings with a similar expected lifespan to the roofing material
- Regular repainting of metal components susceptible to rust and wood elements susceptible to rot and deterioration
- Regular cleaning of gutters and downspouts
- Retaining original drainage system and appearance
- Installing half-round gutters rather than a profiled K-gutter facing the street, which often competes with building features
- Installing solar collectors, mechanical and other roof-mounted equipment in a manner that is preferably not visible or is minimally visible from the public right-of-way
- Minimizing the visibility of a skylight or roof hatch by using components that are relatively flat, sympathetic to and compatible with the existing roofing materials
- Inspection of attics after a storm or freeze to catch small leaks early, thereby minimizing potential interior damage

The HDC discourages:

- Modification of the roof plane for the installation of insulation or any other purpose
- Installing multiple or oversized dormers that essentially alter the roof form
- Removing roof features such as chimneys, dormers, cupolas, weathervanes, finials, etc.
- Removing or altering historic drainage systems
- Adding or altering rooftop features or equipment at areas visible from a public way that change roof configuration including skylights, television antennas or dishes, solar collectors, mechanical equipment, roof decks, chimney stacks and dormer windows
- Adding false historical rooftop features such as weathervanes, cupolas or wood shingles on an originally slate roof, without supporting physical or documentary evidence
- Installing new roof-mounted equipment in a manner that is visible from the public right-of-way or visually prominent or highly reflective equipment
- Replacing a historic masonry chimney with a framed chimney covered with brick or stone veneer

Additional Areas of Consideration

- Roofing work is potentially dangerous and should be left to professionals
- All roofers are not experienced in all materials; obtain references and verify that roofers have appropriately completed comparable work
- Verify the extent of both the material and installation warranties and company histories
- Verify whether removal of existing roofing is required before installation of new roofing; too much weight can damage structural elements
- Verify the condition of the substrata for rot or decay and make necessary repairs, including the sheathing or lath, and structural elements
- Use substratum appropriate for roof material and provide adequate ventilation under roof surface
- Ensure all portions of the roof are sloped to drain
- Use appropriate underlayment including building paper, rosin paper and/or ice shield
- Use a single type of metal compatible with roofing as fasteners, flashing, gutters and downspouts to avoid galvanic action
- Select a flashing material with a longer or comparable lifespan to the roofing material
- Reference industry standards such as SMACNA, *Copper and Common Sense* and *Slate* for roofing information

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