ADVANCED RESIDENTIAL PAVER TECHNICIAN COURSE

STUDENT MANUAL

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SECTION 6: Fireplaces, Firepits, Grills and Outdoor Kitchens

Part A. Locations

Outdoor living spaces are becoming increasingly popular where a neglected back yard is transformed to a place of comfort and leisure. In most cases, an outdoor living space is an extension of, or alternative, to indoor spaces like sitting areas, entertainment areas and kitchens. Creating an outdoor living area brings the indoor comforts outside, giving them a definite outdoor flare. Fireplaces, firepits, and grills are natural centerpieces for an outdoor living space.

Figure 6-1: The fireplace is the centerpiece for this outdoor living space.

"The heart of a home is the kitchen," so it makes sense to say that the heart of an outdoor living space is an outdoor kitchen. An outdoor kitchen can be much more than just a barbeque on the patio. Outdoor kitchens can include a grill, a refrigerator, a freezer, a sink with hot and cold running water, and enough counter space to prepare and serve a feast.

Figure 6-2: This outdoor kitchen has everything needed to entertain guests.

When designing an outdoor living area, deciding where to place these elements is dictated by several factors. One factor is convenience. Even though an outdoor kitchen has several conveniences, the indoor kitchen still needs to be easily accessed. Another factor is the distance to utilities. Depending on the outdoor kitchen appliances, it may be necessary to run electrical, natural gas, and water and sanitary drain lines to the outdoor kitchen. Extending these services may be costly, necessitating the proximity of the outdoor kitchen near the house.

Figure 6-3: This fire pit burns only natural gas.

Other factors that affect the design of an outdoor living area are local ordinances and homeowner association covenants. There may be specific regulations about outdoor living spaces, but the regula-

tions to espeically review relate to open flames. These regulations typically look for compliance with the local fire code. In most cases, local regulations exempt structures where the fire is primarily used for cooking, such as a grill. In some areas, outdoor fireplaces and firepits may be completely prohibited, while in other areas, only wood burning fireplaces and firepits are prohibited. Natural gas might be acceptable in these cases. Regulations which specify the minimum distance to any property line, building, structure, tree, hedge, fence, roadway, overhead wire or other combustible article range from 5 ft. (1.5 m) to 15 ft. (5 m).

Some regulations require the fireplace or firepit be located on a non-combustible surface extending beyond the unit to a dimension equal to the height of the unit. Other regulations related to fireplaces require the use of a spark arrestor at the top of the chimney, with the chimney being at least 2 ft. (600 mm) above any surface within 10 ft. (3 m) of the chimney. Some building codes may also require the submission of a structural analysis to obtain a building permit for fireplaces over 6 ft. (2 m) in height. Some local regulations dictate the hours in which outdoor firepits and fireplaces may be used, that a portable fire extinguisher or operable garden hose is available while the unit is in operation, that the owner maintains constant watch and control over the outdoor fireplace from the time of the setting of the fire until the fire is completely extinguished and that smoke from the fireplace or firepit does not create a nuisance.

Finally, task lighting for an outdoor kitchen is a must, and with most outdoor kitchen projects, an electrical line (110V) and circuit breakers are needed. The ability to drain exterior water lines is also important to prevent damage to the pipes during freezing temperatures.

Part B. Heat Materials

Construction of firepits and fireplaces requires specialized heat-resistant materials because of the extreme temperature differences these structures endure. Often, firepits are constructed without regard to heat dissipation. Concrete pavers and SRW units are manufactured from concrete with strengths ranging from 3,000 to 8,000 psi (20 MPa to 55 MPa), and are tested for freeze thaw durability. However, these products are not manufactured or tested for their ability to withstand extreme heat. It is common practice to place a loose fitting metal sleeve inside the firepit to help moderate temperatures. Another method is to line the firepit with fire brick or block designed to withstand high temperatures. However, because of the porous nature of fire bricks, they readily absorb water, which if heated or frozen repeatedly will eventually destroy them.

Figure 6-4: An example of a fire pit lined with a steel sleeve.

Figure 6-5: This fire pit is cast from heat resistant concrete and can be covered with different materials to match the project.

Outdoor fireplaces can be constructed like an indoor fireplace. A firebox is constructed on a non-combustible base. The firebox is shaped to direct heat outwards and channel the smoke upwards through a chimney. For indoor chimneys, a damper is typically installed at the top of the firebox to prevent warm air from being drawn from the room when the fireplace is not in use. A damper is unnecessary for outdoor fireplaces. A metal screen or ceramic glass doors may be used to ensure that the burning wood and sparks stay in the firebox and other items don't accidentally enter.

Fireplace kits, that form the skeletal structure for the fireplace, are available. Fire brick is used to line the inside of the firebox and durable decorative finishes are applied to the exterior, using materials such as concrete pavers, SRW units, clay bricks, natural stone veneer, cast stone veneer, or stucco.

Pre-fabricated fireplaces are shipped to the site and placed on the prepared base. It may be necessary to stack one or two more components to complete the fireplace. A few other components and accessories may need to be installed, but the unit is ready to be used after a minimal installation time. These prefabricated fireplace units are also supported by a full line of other modular components like columns, tables, pizza ovens and water features.

As mentioned earlier, fire brick readily absorbs water and, when heated or frozen, can be damaged. The same applies to vitrified clay flue liners. Consider using a chimney cap with a spark arrestor that helps protect the liner and keeps water out of the chimney. Installing doors or a covering for the fireplace opening to keep water out when not in use is also recommended. Suggest to the client to allow fire brick to dry out before lighting a fire.

When constructing an outdoor fireplace, use a non-combustible material to construct a hearth in front of the fireplace that has a minimum 24 in. (600 mm) from the fireplace opening. When working on a design for the project consider including a space for storing wood near the fireplace or firepit. Additionally, note that it is a good idea to keep combustible materials at least 12 in. (300 mm) away from the sides of the fireplace opening.

Figure 6-6: Precast elements are assembled on site.

Figure 6-7: Fire brick is installed on the interior of the fire box.

Figure 6-8: The exterior of the fireplace is covered in this case with cast stone veneer.

Figure 6-9: Concrete base is prepared as per manufactures directions.

Figure 6-10: First module is placed on base.

Figure 6-11: Chimney module is stacked on top.

Figure 6-12: Additional modules are installed.

Figure 6-13: Hearth module is placed in front of fireplace.

Figure 6-14: The fireplace is completed.

Part C. Utility Hookups

Obvious utilities include electrical, water and sewer. Other services could include telephone, computer, audio, and video, including cable or satellite television. When developing the plan for a project, create a master plan for running utilities and services. For projects that will likely be constructed in phases, it may be appropriate to place additional conduit to handle future additions or repairs.

The local fire, electrical and plumbing codes might not specifically address outdoor living spaces in all locations, but they are being developed and implemented throughout the United States and Canada. For electrical, a licensed electrician may be required to do the work. Ensure that you are running wiring for the proper voltage and wattage. Outdoor light systems may run on 12V DC, but most kitchen appliances require 110V AC. Make sure that the lines running to the outdoor living space are rated for the anticipated loads. Some areas require a licensed electrician install low voltage 12V DC systems. Ensure that the buried electrical cable meets local electrical code requirements. Some codes may require electrical lines are run only in conduit, or they may allow burial of armored cable or even direct burial of the cable. Additionally, the 110V outdoor electrical lines need to be protected with GFCI (ground fault circuit interrupt) outlets to minimize the electrical shock hazard.

For natural gas and propane, a licensed plumber is most likely required. Ensure that the piping meets the current needs of the design and can handle future additions. The owner may find that they love their outdoor living space so much, they decide to install a patio heater so they can enjoy the outdoors in cooler weather.

When installing a water line, a licensed plumber may be required. Typically, only a cold water line is run to the outdoor kitchen. In locations where freezing temperatures occur, include the ability to drain the system during the winter months. If hot water is required, a tankless water heater, available in electric and gas powered models, can be installed. When there are water supply lines, there is also a need for drain lines. For a proper installation, the plumber needs to connect the drain into the appropriate drainage system. This could be a sanitary sewer line, a septic tank or possibly a grey water system.

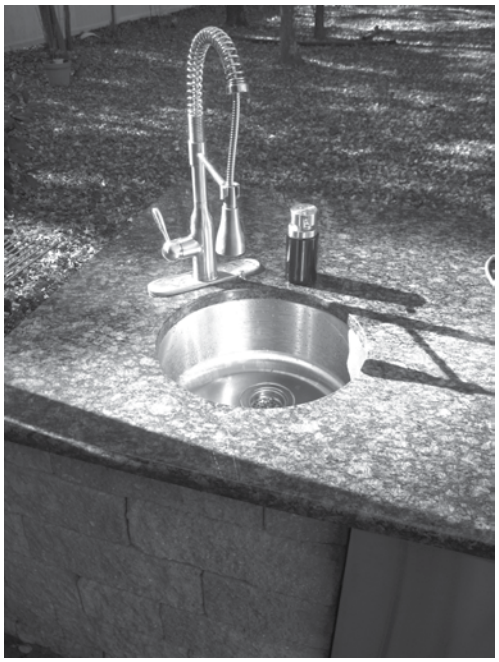

Figure 6-15: Hot water can be provided by a tankless water heater installed under the counter.

Part D. Appliances

Outdoor kitchens require the installation of appliances designed and tested for outdoor use. Besides free-standing grills, there are built-in grills, individual side burners and even over-range hoods. There are refrigerators, ice makers, beverage coolers and draft beer taps. There are also more traditional appliances like stove tops, ovens, microwaves and warming drawers. Some outdoor kitchens also include appliance cabinets for smaller equipment like blenders and drink mixers.

Figure 6-16: Outdoor kitchens can have more than just a grill.

When selecting appliances for an outdoor kitchen, make sure they are rated for outdoor use. Outdoor refrigerators must maintain consistent temperatures in an unstable environment. Keeping food and drinks cool in the heat of summer requires increased insulation and a more powerful compressor than their indoor counterparts. Outdoor refrigerators also need to be weatherproofed against the elements. Most outdoor refrigerators are UL approved for outdoor conditions and will hold up against harsh rains, sleet, and high heat. While outdoor refrigerators are available in a variety of sizes, most models are for under-counter installations.

Figure 6-17: Appliances in an outdoor kitchen must be rated for outdoor use.

Just like indoor kitchen design, outdoor kitchens should be designed with efficiency in mind. The main functions in a kitchen are carried out between the cook top (cooking), the sink (preparation) and the refrigerator (storage). These three points and the imaginary line between them, make up what kitchen experts call the "work triangle." The concept notes that when these three elements are in close proximity to one other, but not too close, the kitchen will run efficiently. Be sure to install enough storage space. Weather-resistant, prefabricated cabinets and drawers are available as modular elements that can easily be incorporated into an outdoor kitchen.

Figure 6-18: Just like it's indoor counterpart, an outdoor kitchen should be designed for ease of use and efficiency.

Constructing a kitchen and installing all the appliances is an expensive project. When working on these projects, work closely with the client, understand their needs and budget. The project budget should be established *before* work starts. If the budget is limited, it may be wise to offer the client a design that will have a phased construction. The first phase could include the underground preparatory work and patio. The second phase could add the major elements like an outdoor grill and counter, fireplace and outdoor lighting. The last phase could add the other appliances and accessories to enhance the project as a luxurious outdoor living area.

Part E. Building Codes

There are several codes that might be related to the construction of outdoor fireplaces, firepits, grills and kitchens. These could include fire codes, plumbing codes and electrical codes. Local bylaws, municipal ordinances and home owner association covenants may also include regulations for outdoor living spaces.

Some building departments require permits for the construction of outdoor kitchens and elements like outdoor fireplaces. To obtain permits, it might be necessary to submit construction drawings, and preparation of these drawings could require the services of a geotechnical, structural and/or mechanical engineer.

HOMEWORK ASSIGNMENT

Discuss with your local building department the specific details they look for when approving construction drawings and inspecting projects. Specific details may include:

- Are outdoor fireplaces or firepits prohibited? _____
- Can outdoor fireplaces or firepits burn wood or only natural gas? _____
- Are there restrictions on the free usage of outdoor fireplaces, firepits or grills? _____
- Are there plumbing code requirements if water and sanitary drain lines are installed in outdoor living areas? _____
- Are building permits required? _____
- Are there electrical code requirements for installing 110V service to an outdoor living area? _____
- Are engineered drawings required? _____
- Minimum distance between top of chimney and any roof: _____
- Minimum distance between a fireplace or firepit and any building, structure, property line, tree, hedge, fence, roadway, overhead wire or other combustible article: _____