

A Homeowner's Guide to
Natural Stone
Countertop Installation



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NATURAL STONE COUNTERTOP INSTALLATION

1. INTRODUCTION

The beauty and permanence of natural stone countertops are enjoyed by many. The full potential of any installation is realized only when the selection, design, fabrication, and installation are completed by, or with the consultation of, qualified and experienced individuals. This document has been prepared and published by the Marble Institute of America to help guide consumers through the process professional fabricators use when using natural stone as a countertop surface.

2. STONE MATERIALS

Varieties. Many varieties of natural stone have been used successfully for countertop surfaces. However, different types of stone have specific properties that offer advantages or disadvantages in various applications. The following is a brief overview of the common varieties of stone used as countertops.

Granites are undoubtedly the most popular stone type used in countertop applications today. This group of stones includes many stone materials that are not true granites by geological definition. However, because their properties are so similar, the American Society for Testing and Materials International (ASTM) lumps them together as 'granite'. These stones are known geologically as gabbro, anorthosite, gneiss, diabase, and diorite, to name a few. Whatever the name, these stones are some of the hardest of the common countertop stones, offering high levels of resistance to abrasion and scratching. The primary minerals in granite are resistant to almost all

chemicals commonly found in a home; however, there may be trace minerals present in some granites and granite-like stones that are vulnerable to some acids.

Marbles, serpentines, and onyxes are traditionally prized for their aesthetic appeal, accentuated by distinct veining and often bold colors. They are relatively softer than granite, although some serpentines are as dense as some granites. Marbles can be scratched by kitchen utensils so it is best to use cutting boards and other protective measures. Use only non-abrasive products when cleaning marble.

Marbles can also be etched by chemical attack. These stones are calcium carbonate-based and are damaged by exposure to acidic solutions such as lemon juice, tomatoes, vinegar, etc. The use of inappropriate cleaning agents may also trigger acidic attack. Acidic solutions can permanently etch the surface of the material. The application of a sealer will reduce, but not eliminate, the vulnerability to acidic attack. For these reasons, your stone dealer may not recommend marble for use in kitchens.

Slates have high resistance to chemicals and have been traditionally used as chemistry laboratory tops. However, slates are softer than granite and therefore vulnerable to scratching and abrasion. Slate has a natural cleft (not a smooth surface). Some suppliers provide slate slabs that are not honed. Be specific about the kind of finish you desire. The same precautions mentioned for marbles with regard to damage should be applied to slates.

Limestones and travertine are calcium based similar to marble. Therefore, they have the same weaknesses as marbles when used as countertops. Abrasion damage is a concern, particularly if the stone is polished. Many varieties of these stone types will absorb

water to some degree and must be sealed to help protect them.

Stone tiles can be used as a countertop surface material. The finished surface will carry the same precautions as the particular stone type from which it is made. The joint filler, whether grout, plastic sealant, epoxy or resin, may have specific requirements for protection and maintenance. Follow the recommendations of the manufacturer of the material.

3. COMMUNICATING WITH YOUR CONTRACTOR

Documentation. As dictated by standard practices of good business, all communications **MUST** be documented in writing.

All natural stones are unique. Some have pits, fissures, cracks, corrosive minerals, or other features that you may find objectionable. These should be acknowledged and pointed out to you when samples and/or slabs are being viewed. You need to be aware that some of these features may become more or less noticeable when the position (vertical or horizontal) of the slab is changed, or when the lighting intensity is changed.

You and Your Subcontractor's Responsibilities. Cabinetry installation, plumbing rough-in, electrical rough-in, etc. are usually required to be completed by you, or by subcontractors coordinated by you. These should be specifically addressed in writing. Your stone contractor will install your stone, not connect electricity or water.

Granite is heavy! Please have a clear path from your driveway to your kitchen so that installation crews can navigate through your home easily. Please have walkways free of ice, snow and clutter. Also, if you have existing countertops, please make sure they

are removed **BEFORE** installation. Also, make sure that your installation date does not conflict with other work being done in your home (wood floor finishing, tile installation, other tradesmen, etc).

Shop Drawings can effectively communicate exact cutting information to you. A shop drawing is a highly detailed document that will identify all aspects of the finished product installation. The shop drawing is prepared by your fabricator, showing the layout of the stone pieces, location and size of all seams, and details clarifying all corner and edge treatment conditions. Some fabricators produce full size templates that are highly detailed. These detailed templates may be considered "full size" shop drawings. Whatever the format, you will review and approve this document prior to the start of fabrication. This is the time to ask questions about seam placement, cutouts, etc.

Stone Slab Layout. When working with highly variegated materials, insist that you participate in the layout of the actual stone slabs. **This is very important and highly recommended so that you can fully understand what can or cannot be done.** Keep in mind that the pricing may change if you decide to have the stone cut in a certain way that causes unnecessary waste.

4. CABINET AND SUBSTRATE REQUIREMENTS

Cabinets and any trim that affects the overall size of the stone countertops must be permanently installed in their final position prior to field measuring for countertops.

Measurement Tolerances. Top surfaces of the stone cabinets must be within 1/8" (3 mm) of flat and level when measured across a distance of 10'-0" (3 m). Wall surfaces to receive stone backsplashes must be plumb

and within 1/8" (3 mm) of a true plane when measured across a distance of 10'- 0" (3 m). When cabinets are not within these tolerances, you (or your Authorized Representative), will be asked for permission to proceed with the installation. Installing cabinetry outside of these tolerances will require excessive shim spaces and wide regions of filler material. Any necessary aesthetic improvements to conceal this condition (e.g., additional wood trim) may be your responsibility.

Subtops. Fragile stone varieties may require a full subtop to support the stone. Generally, sound varieties of granites and marbles can be used in thicknesses of 20 mm (3/4") or greater without the use of a subtop. However, the presence of aesthetically pleasing but unsound veins, cracks, or excessive fissuring will mandate the use of a subtop, regardless of thickness. Appropriate materials for subtops are marine-grade plywood, exterior-grade plywood, waterproofed medium-density particle board, or furring strips. Excessive weight requirements, like that of a heavy cast-iron sink, may require the use of either a subtop or auxiliary framing to carry the weight of the sink and its contents. Water weighs around 8 1/3 lbs. per gallon. Some of the larger sinks can easily hold 10 gallons or more. That's an additional 83 pounds (or more) hanging under your counter!

Cabinet doors, end panels, and hardware must be installed before the field measurements are made. Upper cabinets are usually required prior to installation if a full height backsplash is to be installed. If not, then it is best to position them after the stone installation.

5. FIELD MEASUREMENTS

Cabinet Components. Field measurements are taken once all cabinets have been installed in their permanent

positions. The following related components must be available to the Technician at the time of measurement (templating):

- **Cabinet Doors**
- **End Panels**
- **Cabinet Hardware**
- **Sinks** (and Manufacturer-supplied templates)
- **Plumbing Fixtures**
- **Cook Tops**
- **Exhaust Vents** (when full-height splash is required)
- **Electrical Outlets** (roughed in)
- **Refrigerators** (in some cases)

6. DESIGN CONSIDERATIONS

Joinery Layout (Seam Placement). The layout of the joinery (seams) of the countertops is extremely important to the overall appearance upon completion. Details on drawings RC-001, -002 and -003 show a variety of joinery schemes. Make sure you understand where seams will be and how seams may affect the overall appearance of the stone. This is especially true when installing some of the higher-end varieties with obvious veins and movement.

Spans and Cantilevers. In designs where part of the countertop is spanning between supports, the length of the span shall be limited to 2'- 0" (600 mm) for 3/4" (20 mm) stone thicknesses and 3'- 0" (900 mm) for 1 1/4" (30 mm) stone thicknesses. In designs where the countertop is cantilevered or overhanging the supports, the cantilever shall be limited to 6" (150 mm) for 3/4" (20 mm) thick countertops and 10" (250 mm) for 1 1/4" (30 mm) countertops, but in no case may the cantilevered portion represent more than 1/3 of the width of the countertop. Cantilevered countertops exceeding these dimensions will require corbelled supports beneath the stone. The exposed underside of cantilevered portions of countertops will be

sawn or otherwise unfinished surfaces. Note: Fragile stones may require corbelled supports for cantilevers that are less than those specified.

Sink Mounts. Sinks are supplied in one of several types: Top mount, (or self-rimming), undermount, and “farm-home.” In the case of the top-mounted sinks, the weight of the sink and its contents are transferred to the top surface of the stone counter via the rim of the sink. Undermount sinks can be anchored to the underside of the stone countertop or carried by a subtop. A subtop or auxiliary framing may be required for either design when more fragile stones are used, or when the sink (with contents) is excessively heavy. Refer to details on drawings RC-008 through RC-011 for examples of sink mounting. Note: cast iron sinks will always require the extra support stated above for both top and undermount types.

Edge profiles or silhouettes; add elegance to the finished project. Edge profiles with narrow projections and sharp corners are more susceptible to chipping than those with a larger, curved silhouette. Examples of edge profiles commonly used are included on drawing RC-016. With machinery and tooling available to modern fabrication shops, many custom profiles can be created which are not shown here. Ask your fabricator if you have something special in mind. *Your selection of an edge detail will likely influence the cost of your countertops more than any other decision you make.*

Corner Embellishments. Corners of stone countertops can be cut square, cut to a radius, or projected.

Backsplashes. Partial backsplashes usually range from 4" to 8" high. Full-height backsplashes cover the entire area between the countertop and the upper cabinets.

Backsplashes are normally made of the same thickness as the countertop material. This allows the Fabricator better yield from the slabs, as the narrow strips will aid in the layout efficiency, and it also provides better color match. Mixing materials of two different thicknesses requires using stone slabs sawn from two different blocks, and color variation can be pronounced. However, some Fabricators have the machinery to plane down backsplashes using the same slab or block of material to get a thinner splash and match the rest of the counters. On stones with obvious veining, the vein of the splash should match the countertop below.

Backsplashes are not assumed to be part of the job and must be specified if you want them.

7. QUALITY FABRICATION

METHODS

Finishing Edge Profiles. Professionally finished edge profiles will be a constant thickness and smooth along the entire length. Edges are finished to the same type and quality of surface as the top, unless a contrasting edge surface has been specified for accent purposes. When working with resin treated slabs, exact color match between the edge surface and the top surface may not be achievable.

Cutouts for auxiliary equipment must conform to equipment templates, with allowable tolerances. Please verify that the equipment templates match the equipment you are installing. There have been cases where the supplied manufacturer templates did not match the sink, cooktop, etc. In the interest of safe handling, some cutouts may be partially or completely performed in your home after installing your stone.

8. INSTALLATION METHODS

Dry Assembly. At the project site, it is recommended that all stone pieces be “dry assembled” in place to verify satisfactory fit prior to the application of adhesive.

Shims are commonly employed to level the stone countertops. Shim material may be wood or plastic. Maximum spacing between shims is 2'- 0" (600 mm). Alternatively, longer spacing between shims may be used if the stone is supported with a noncompressible filler material (usually epoxy or polyester resin). This practice is often referred to as “hard packing.”

Adhesive. The stone countertops are secured to the substrate with a nonstaining adhesive. Common construction adhesives or silicone sealant are the most popular materials used.

Final Positioning and Joint Filling.

Final positioning of the stone is done either manually or with the aid of commercially available stone-alignment tools. Filling the seams is normally completed prior to final positioning of the stone units, allowing the filler material to extrude out of the joint as the stones are pulled into alignment. The stone surface may be masked to prevent contact by the filler material.

Sealer Application. After the countertops are installed and the seams are filled, a sealer or impregnator may be applied. Refer to the Reinforcement Techniques section below for further discussion of these applications. Alternatively, some fabricators prefer to apply the sealer or impregnator in the fabrication shop prior to transporting the pieces to the project site.

9. TOLERANCES

The tolerances listed here are achieved using skilled tradesmen following standard industry

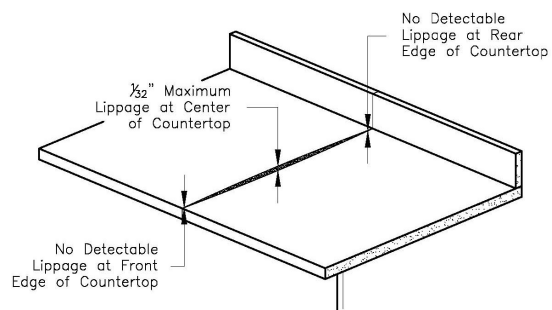
workmanship practices. Due to variations in fabrication equipment and stock availability, these tolerances may not be achievable, or in some cases, closer tolerances may be achievable. Therefore, for any particular project, you and your contractor may agree to tolerances that are more or less stringent than those listed here. Such agreements should be documented in writing. Unless otherwise agreed, the tolerances listed here are acceptable guidelines.

The tolerances in this section pertain to large stone panel-type countertops only.

Tolerances for stone tile countertops are listed below, in Adhesives and Joint Fillers.

Joint (seam) widths between two stone units should equal 1/16" (1.5 mm), with a tolerance of $\pm 1/64$ " (± 0.4 mm). In such cases where a larger joint width has been specified, the tolerance is to be $\pm 25\%$ ($\pm 1/4$) of the nominal joint width. Joint width does not include the dimension of an *arris* (a small chamfer, approximately 1/16" x 1/16") on the stone edge. When an *arris* is used, the perceived joint width may be greater than the actual width due to the seam filler occupying the width of the *arris*.

Lippage. In the stone industry, the term “lippage” refers to the unevenness of the



Allowable Lippage Due to Slab Warp
finished surfaces of two adjacent stone units. Due to the relatively tight seams used in countertop installations, even minor amounts of lippage are noticeable. Lippage may be unavoidable due to permanent warp in the

slab stock. There should be no detectable lippage at the front or rear edge of the countertop. Maximum allowable lippage at the center of the countertop is 1/32" (0.8 mm). See sketch that follows for clarification.

Slab Thickness. The thickness of the stone slabs used in a given project shall not vary by more than 1/8" (3 mm) between the thickest and thinnest slabs.

Exposed edges of adjacent stone slabs must be matched in thickness and properly installed so that neither the top nor bottom surface exceeds lippage tolerances.

Joints at Materials Transition. Visible joints between stone and other materials (e.g., cabinetry, gypsum wall board) shall be 1/8", with a tolerance of $\pm 1/16"$ (± 1.5 mm), and filled with a soft, elastic material. Exceptions to this would be the joint between a full height backsplash and the underside of the upper cabinets, which is to be a nominal 1/4" with a tolerance of $\pm 1/8"$ (± 3 mm). Concealed joints between the stone and other construction materials (e.g., stone-to-wall joint underneath the backsplash) shall be sized to ensure a minimum of 1/8" (3 mm) of cover.

Slab Flatness and Levelness. Individual stone slabs are to be flat within 1/16" (1.5 mm) when measured with a 4'-0" (1.2 m) straight edge. Finished countertop surfaces including multiple stones are to be both flat and level to 1/8" (3 mm) across 10'-0" (3 m).

10. ADHESIVES AND JOINT FILLERS

Types. Adhesives used for stone installation can be either standard construction adhesives or elastic sealants with strong bonding properties to both the stone and the substrate. Construction adhesives will

normally provide greater bond strength, while elastomeric sealants will provide some forgiveness for movement within the cabinet and subtop underneath. Excessive movement of the substrate, regardless of the type of adhesive used, will result in the cracking of seams or the stone itself. Verify that the product used does not stain the stone material.

Seam Filler Materials. Seams in the stone countertop are usually filled to the level of the top surface. The most common filler materials are polyester resin, epoxy resin, elastomeric sealant, and grout. Elastomeric sealants can be made from silicon, polyurethane, or acrylic bases.

11. STONE TILE COUNTERTOP CONSIDERATIONS

Subtops. Stone tile countertops must have a subtop made of minimum 3/4" exterior grade plywood or 1/2" cementitious backer board. Subtop must be flat to within 1/8" in 10'-0".

Edge Treatment. Exposed edges of the countertop may be finished by providing an edge profile strip of stone, wood, or metal. Where stone is employed, it is to be used as an apron to the top surface stone, which limits stress on the countertop/apron joint.

Stone tile tolerances for all stone types must be 1/32" (1 mm) in length, width, and thickness.

Joint Widths. Unless otherwise agreed, joint widths for stone tile countertops must conform to the following: Stone-to-wall joints must be 1/8" (3 mm) in width. Stone-to-stone joints must be 1/16" (1.5 mm) minimum, 3/32" (2 mm) maximum, and uniform from stone to stone. Stone-to-cabinetry joints must be 1/8" (3 mm) in width.

Vein Trend. When using stone tiles with obvious veining, all tiles shall be installed with the vein running in the same direction.

Shading Variation. Stone tiles are subject to manufacturing processes different from structural stone. There is great latitude in the acceptability of shaded stones. Ask the Installers to lay out the stone for your inspection and approval.

Splashes must be stone tile, minimum of 4" high.

Back buttering of all stone tiles is required. This technique applies a portion of the installation material to the back face of the stone. It requires placement of one-half of the setting material in the case of thin-set mortar, epoxy, or non water-soluble adhesive, or a lesser quantity of very rich mortar in the case of Portland cement, to the back of the stone, while the balance of the setting material is applied to the bed. Application should be performed so that one pass is completed in a north-south direction, while the second pass is performed in an east-west direction, thus ensuring, as close as possible, 100% contact of the stone to the installation bed.

Tile Reinforcement. A common reinforcement for fragile stone tiles is to apply a fiberglass mesh to the back surface of the tile. The adhesive used in this application is commonly an epoxy or polyester resin. When this type of reinforcement is adhered to the tiles, the Installer must use a thin-set material that will bond to the resin-impregnated backer. Most often this will require an epoxy-based, rather than a Portland-based, thin-set compound.

12. RESIN-IMPREGNATED SLABS

The application of resin to the surfaces of stone slabs has become an ever-increasing

practice. The intent of this procedure is to fill pits, cracks, and fissures of natural stones with a glossy resin to enhance the appearance of the polished slab. When received, the resin treatment is usually easily detected by viewing the raw edges of the slab. Evidence of excess resin is usually visible on the edges of the slab if the stone has been treated.

Description of Procedure. The process involves evenly applying the resin on the surface of the cleaned, sawn slab. This is frequently done in an automated process, although some suppliers will do this manually. Depending on the equipment used, the slab may be placed over a large vacuum table to draw the resin deeper into the stone. The resin is allowed to cure, which may or may not be accelerated with heat application. Once the resin has cured, the slab is polished. The polishing grinds most of the resin from the stone surface, so that it remains only in depressions and some inter-crystalline regions of the slab. The amount of surface area that remains as resin varies due to the natural features of the material, but it is usually a fraction of one percent (1%).

The resin used in this process is commonly an epoxy, polyester, or acrylic based polymer.

Design Considerations. While the intent of this process is to provide a cosmetically more attractive surface, you should be aware of several characteristics of resined stone:

- **Color.** The resin application normally makes the color of the stone somewhat darker than an untreated slab. This becomes an issue when finishing the edges of the countertop, as the color of the edge will be lighter in appearance than the color of the face surface. Several products are marketed in the industry for darkening the edge, but none have been found to be universally successful.

- **Interaction with Sealers.** There have been cases of incompatibility between a given resin and fabricator-applied sealer combination. This usually results in a “cloudy” or “blotchy” appearance after the sealer product has been applied.
- **Structural Flaws.** The resin process can hide cracks or other blemishes which are structurally influential features of the material. Assessment of the structural worthiness of the material can be made more difficult as a result.
- **UV Light Exposure.** Nearly all of the resins currently in use are vulnerable to color change or surface degradation when exposed to ultraviolet light. These materials are therefore not suitable for exterior applications.

13. REINFORCEMENT TECHNIQUES

As products of nature, stones have varying strength and behavioral properties. Stones of lesser soundness or stones that have had substantial areas removed from the slab (e.g., sink cutouts) will benefit from reinforcement by a variety of techniques.

Fiberglass Mesh. A common reinforcement for stone slabs of limited soundness is to apply a fiberglass mesh to the back surface of the slab. The fabricator completes this process in the shop. The adhesive used in this application is commonly an epoxy or polyester resin.

Liner Blocks. Although not frequently used in stone countertop construction, a liner block of stone material can be adhered to the underside of the stone slabs (when no subtop is used) to reinforce seams or other vulnerable areas. The liner block need not be of the same type of stone material as the countertop.

Splines. Seams, particularly those between narrow stone pieces, are often put together using a steel or stainless steel key.

Commonly, a large washer is used as the spline key. The metal is fully encapsulated with polyester or epoxy resin and fitted to closely cut slots in the stone, similar to the “biscuit” joint reinforcements used in woodworking.

Rodding. A commonly seen method of countertop reinforcement is the technique referred to as “rodding.” Rodding is beneficial to narrow strips of stone material, such as those in front or behind sink or cook top cutouts. This technique requires a shallow *kerf* (a narrow cut or groove) in the underside of the stone slab. The kerf is then closely fitted with a metal or fiberglass rod, which is then fully embedded in epoxy or polyester resin. The rod has greater resistance to bending than the stone and helps prevent the stone from bowing. A strip of fiberglass mesh backing is often applied over the rodded region for additional reinforcement.

14. ALLOWABLE REPAIR

Stone countertops in need of repair require competent, experienced artisans to achieve the desired results. Repairing stone is permitted when the refurbished region is not in a structurally significant area of the countertop, and when it can be accomplished skillfully so that the repair is consistent in color and texture with the rest of the slab.

Fissures occur naturally in many stone types. A fissure is defined by the American Geological Institute as “an extensive crack, break, or fracture in the rock, which may contain mineral-bearing material.” The term “fissure” is used commercially in the stone industry to describe a visible separation along *intercrystalline boundaries* or the voids between mineral crystals. This separation may start

and stop within the field of the stone or extend through an edge. A fissure differs from a crack in that it is a naturally occurring feature in the stone.

Cracks occur in stones as a result of mechanically induced stresses during handling, fabrication, transport, or installation. When cracks are detected in slab material prior to fabrication, the best method is to simply avoid them during the layout process. In stones with lesser soundness properties, this option may not be practical, or possible. When working with such stones it is common practice to repair cracks by cementing them together with epoxy or polyester resin, either with or without dowel reinforcement. Cracks that occur as a result of handling-induced stresses are often more difficult to repair, as they commonly include chipping in addition to the crack. Repair is frequently performed by injection of a penetrating resin adhesive, which may be dyed to match the stone, and then rebuffing the area after curing of the resin. In many cases, the entire stone must be repolished to make the repair unnoticeable. If the repair is attempted but unsuccessful, the stone is to be replaced with a new piece.

Chips can occur in stones either as a result of sawing operations or handling and restraint devices. Particularly in the igneous stone varieties, the exiting portion of the diamond blade will create many small chips. A small chamfer, called an *arris*, of approximately 1/16" x 1/16" (1.5 x 1.5 mm) can be used to eliminate most of these small chips. The use of an *arris* will make the seam appear wider than its actual dimension when filled. Larger chips may be repaired with epoxy or polyester resin if the completed repair is consistent in color and texture with unrepaired areas of the slab. In many materials, the resin used in the repair will appear more natural if it is not dyed.

Pitting of the countertop surface, particularly in granite material, is a commonly seen characteristic on natural stone. Granites are made up of several different minerals, each mineral having a different hardness. Granites contain quartz, feldspars, biotite, amphibole, ferrous titanium oxides, and other mineral combinations. On the Mohs Scale (see insert on page 7), diamonds are the hardest mineral, with a rating of 10. Quartz and feldspar have a hardness of 6.5 to 7 and are very durable. Biotite (also known as *mica*) on the other hand is very soft (2.5) and flakes easily. All true granites have biotite in their composition. Because biotite is relatively soft and flaky, the first few layers are removed during the polishing process, causing pits throughout the slab. Some granites have more biotite throughout their composition than others. The higher the biotite content of the stone, the more pits it will have. Most polished igneous rocks will have varying degrees of pits, depending on the amount of biotite, muscovite, and phlogopite in their composition.

The pits do not make the granite less durable or otherwise inferior, and do not in themselves qualify the slab for replacement. Pits are common in all granites and should be expected when dealing with a natural, polished stone containing several types of minerals of varying hardness. It is usually best to not attempt repair of pits, as most repair techniques will not cosmetically improve the countertop.

15. MAINTENANCE

Application of Sealers. The application of a topical sealer or impregnator is a common step in decreasing the vulnerability of the stone to stains.

Topical sealers cure as a film on the stone surface. Since the material is actually

covering the stone, the appearance of the stone surface may be altered by the application of this type of product. This material will provide somewhat of a sacrificial layer over the stone, and will absorb most of the wear on the countertop. Since the sealer is softer than the stone, normal use of the countertop will result in abrasion of the sealer surface and dictate reapplication to maintain the original luster of the surface. A properly applied topical sealer will normally reduce, although not eliminate, the vulnerability of calcareous stones to attack from mildly acidic solutions.

Impregnators will penetrate the stone and cure a few millimeters below the surface, residing in the microscopic spaces between the minerals in the stone. These products do not actually “seal” the stone, and are more correctly referred to as a repellent rather than a sealer. As such, they are formulated to prevent transmission of liquids, while allowing transmission of vapor (not unlike ‘breathable’ fibers). Since they reside below the actual surface of the stone, the change to the appearance of the stone surface is minimal. Impregnators will be either *hydrophobic*, in that they repel water-based fluids only, or *oleophobic*, repelling both oil and water-based fluids. The Manufacturer of the impregnator product will recommend a reapplication interval.

General Precautions. When any surface protection product is used, care must be taken to read and follow the Manufacturer’s written instructions accurately. This will provide the greatest benefit from the application and will guarantee safe handling of the product.

Care and cleaning practices.

The natural stone you have purchased for your home or office is an investment that will give you many years of beautiful services. Stone is a natural product and simple care

and maintenance will keep it looking beautiful. Make sure you understand which methods are best for your particular stone countertop. Ask your fabricator for the MIA brochure *Care & Cleaning for Natural Stone Surfaces*. For more information visit <http://www.usenaturalstone.com/care/index.cfm>

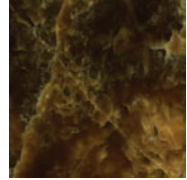
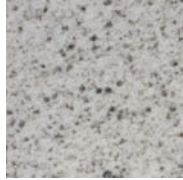
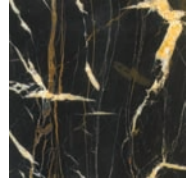
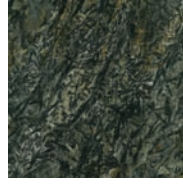
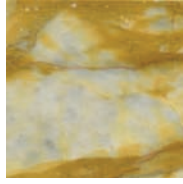
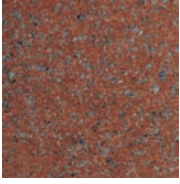


Care & Cleaning
— of —
Natural Stone
Surfaces

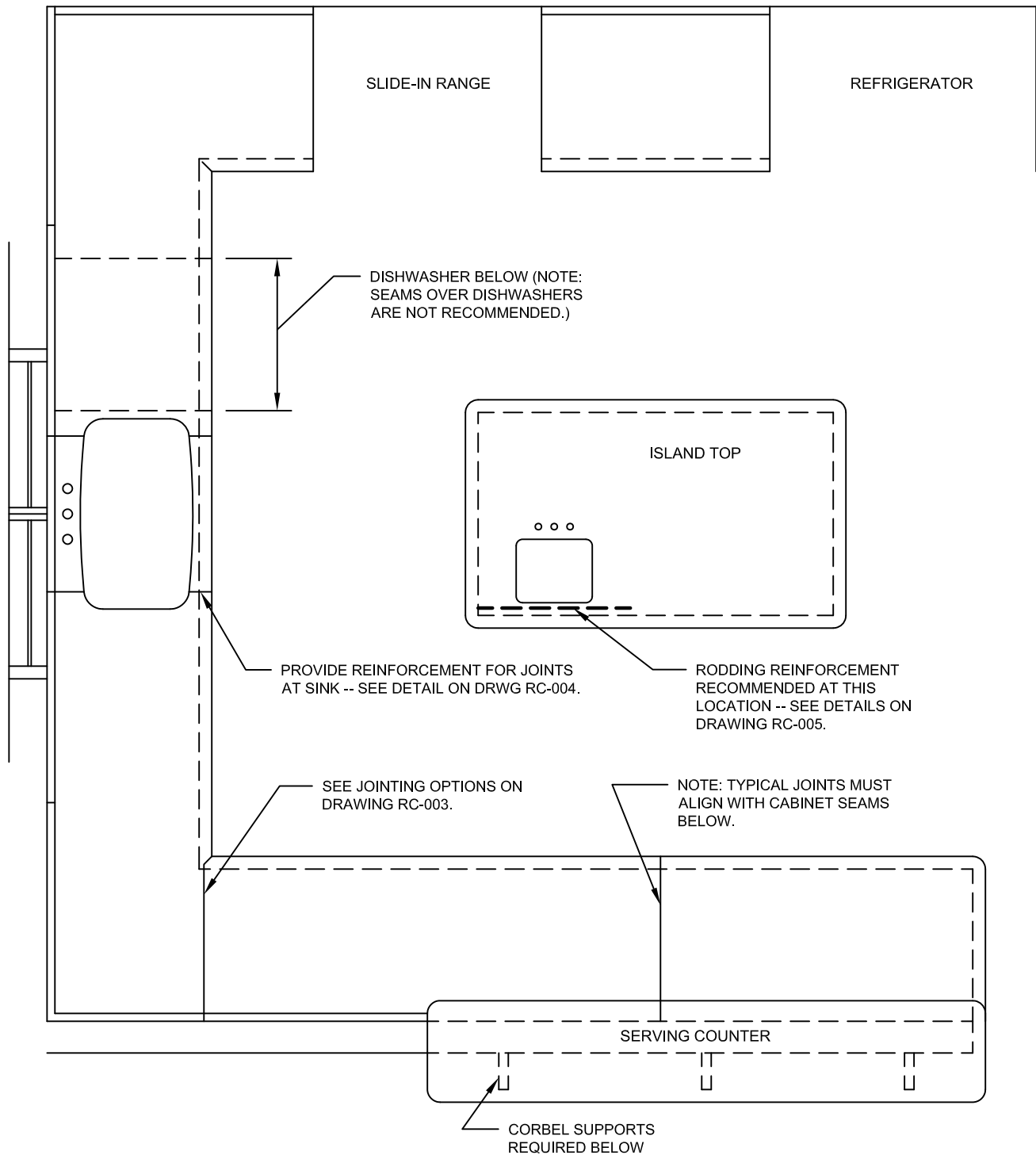
Presented by



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**TYPICAL KITCHEN LAYOUT
(WITH JOINTS AT SINK)**



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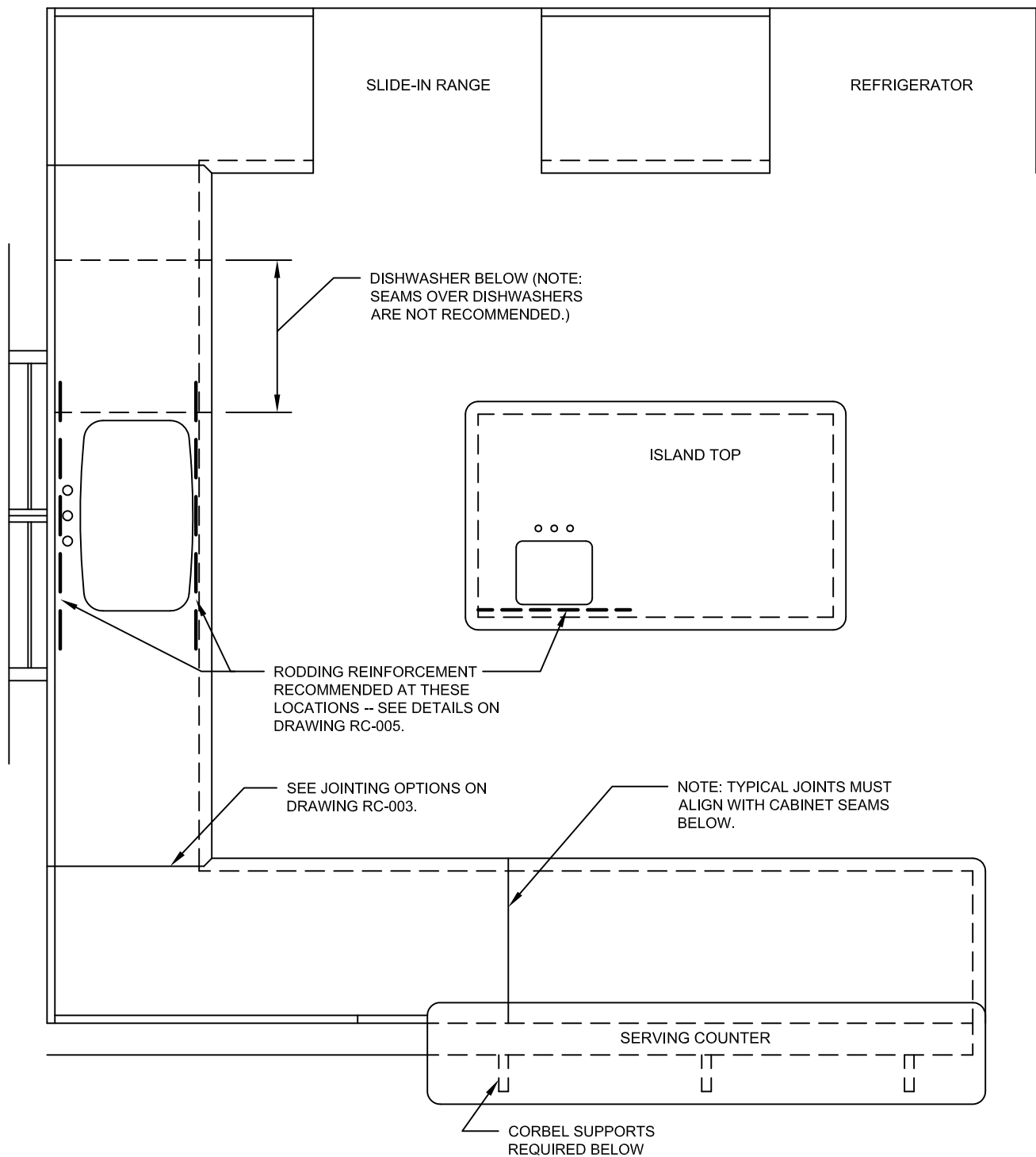
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TYPICAL KITCHEN LAYOUT

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DRWG NO: 1

SCALE:
1/2" = 1'-0"



**TYPICAL KITCHEN LAYOUT
(WITH JOINTS AT CORNERS
IN LIEU OF SINK)**



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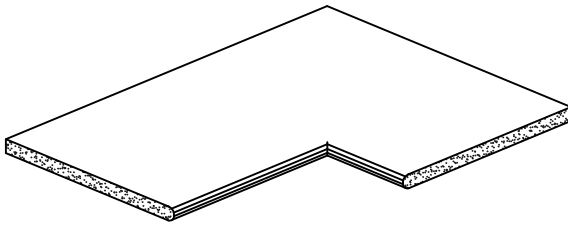
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TYPICAL KITCHEN LAYOUT

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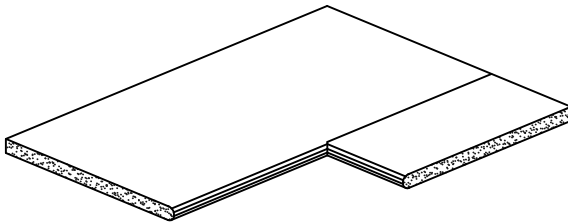
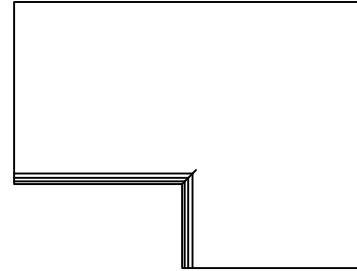
DRWG NO: 2

SCALE:
1/2" = 1'-0"



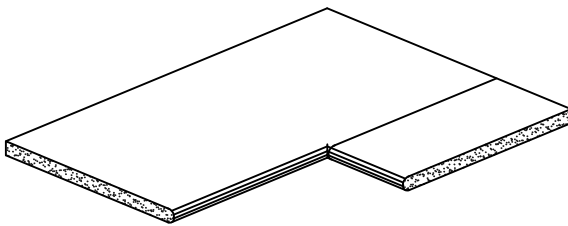
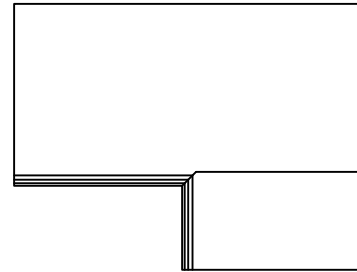
NO JOINT IN CORNER

THIS IS PERHAPS THE MOST PREFERRED DETAIL VISUALLY, AS IT PROVIDES THE CLEANEST-LOOKING RETURN. SOME HAND GRINDING WILL BE REQUIRED AT THE INTERIOR CORNER. THE LOSS OF YIELD IN THE STONE SLAB ADDS TO THE COST OF THE PROJECT. THIS DETAIL IS SOMEWHAT MORE SUSCEPTIBLE TO CRACKING IF THE COUNTERTOP IS NOT SHIMMED UNIFORMLY, OR IF THERE IS MOVEMENT IN THE CABINETS AFTER THE INSTALLATION OF THE COUNTERTOP.



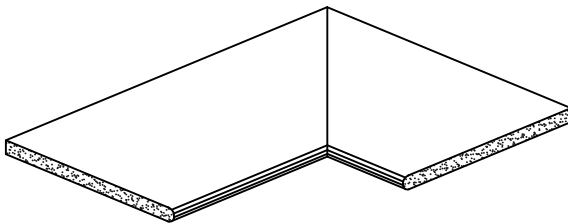
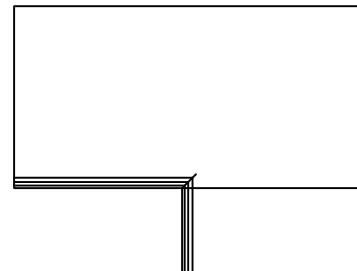
MITER JOINT THROUGH BULLNOSE EDGE DETAIL

THIS DETAIL IS WELL SUITED FOR EDGING MACHINES, AS IT REQUIRES NO HAND GRINDING OF THE BULLNOSE.



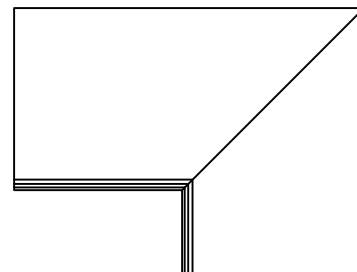
COMMON JOINT WITH BULLNOSE RETURN CORNER

THIS DETAIL WILL REQUIRE SOME HAND GRINDING OF THE BULLNOSE RETURN.



MITER JOINT THROUGH ENTIRE COUNTERTOP SURFACE

THIS DETAIL IS NOT RECOMMENDED. SLAB YIELD IS REDUCED BECAUSE BOTH PIECES NEED TO BE CUT TO FULL LENGTH. THE SHARP CORNERS ARE VERY FRAGILE. LEVELING OF THE COUNTERTOPS IS DIFFICULT DUE TO THE LENGTH OF THE SEAM AND UNACCEPTABLE LIPPAGE OFTEN RESULTS. HOWEVER, THE USE OF A STONE MATERIAL WITH A HEAVY, LINEAR VEINING TREND MAY MAKE THIS DETAIL AESTHETICALLY PREFERABLE TO THE PREVIOUS DETAILS.



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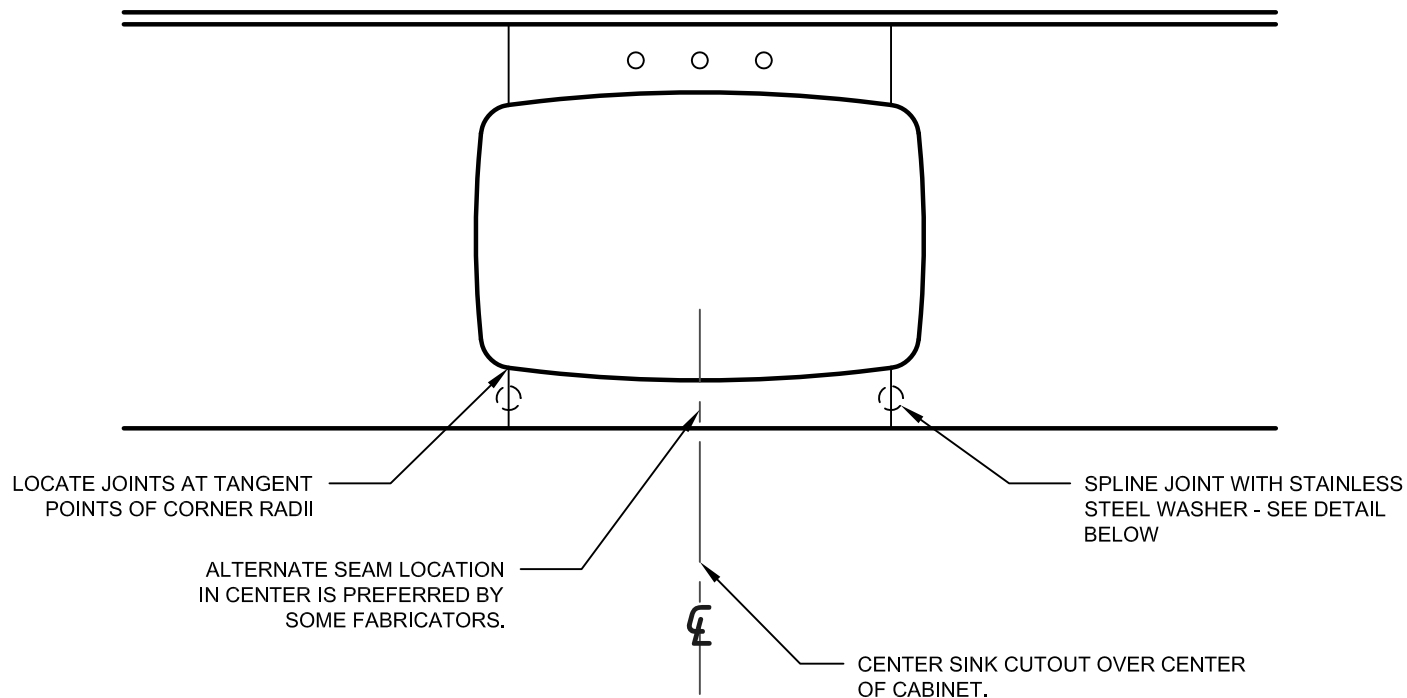
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CORNER JOINERY EXAMPLES

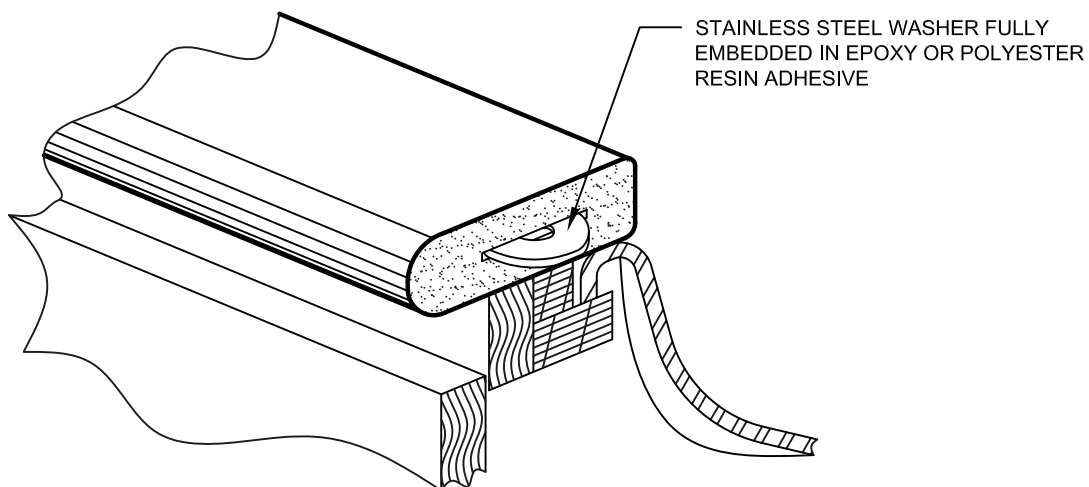
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DRWG NO: 3

SCALE:
1/2" = 1'-0"



PARTIAL PLAN WITH JOINTS LOCATED AT SINK



DETAIL OF SPLINE JOINT REINFORCEMENT



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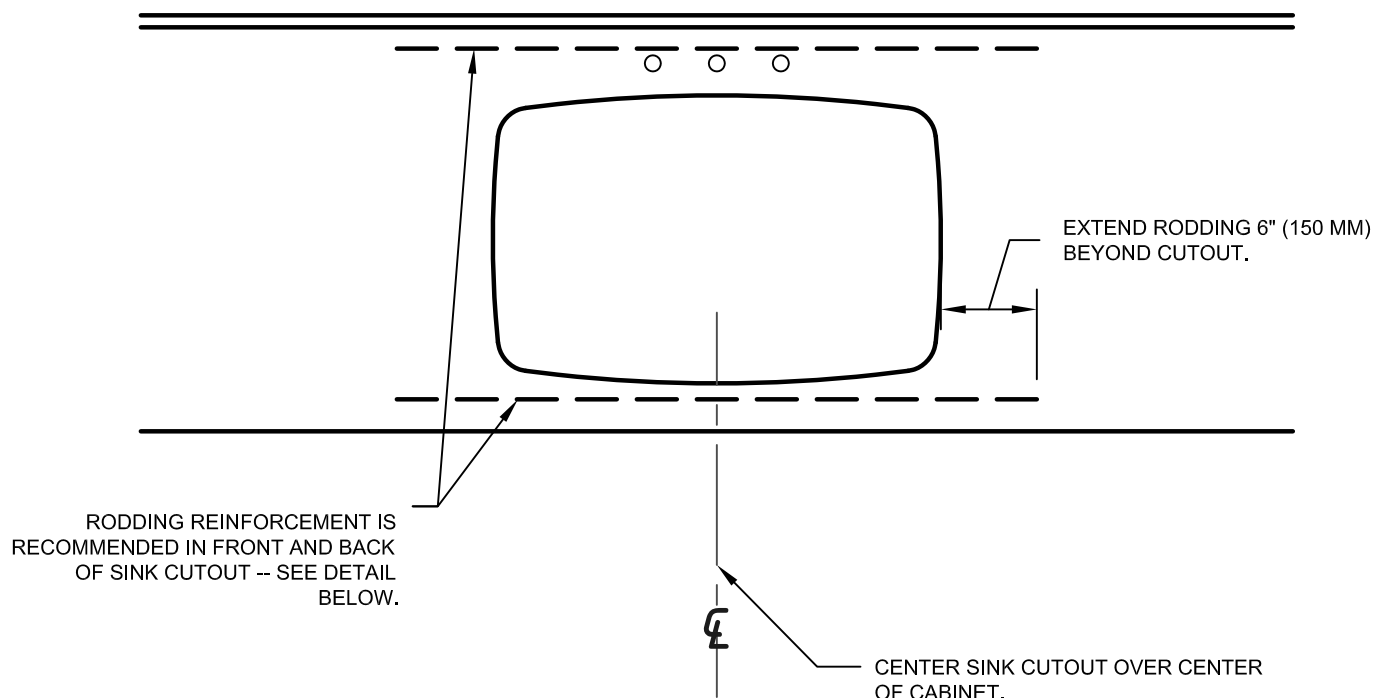
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TYPICAL JOINERY @ KITCHEN SINK

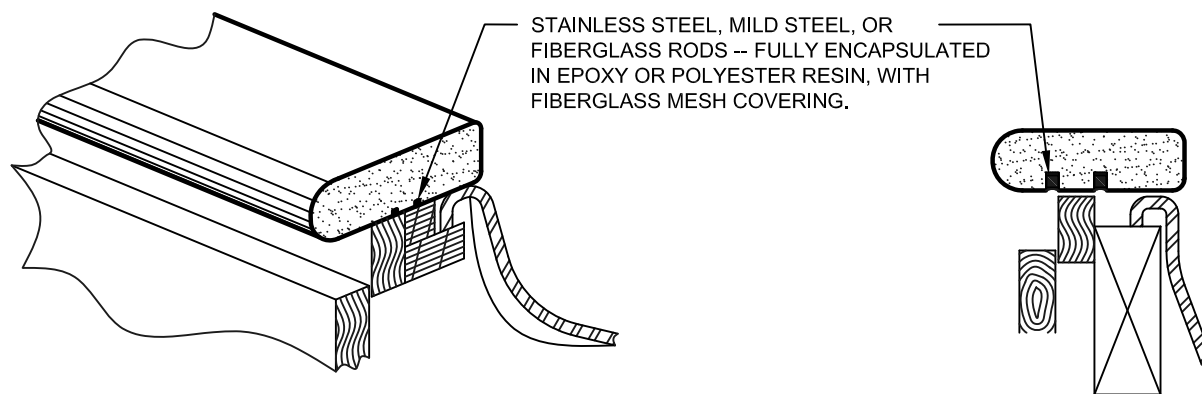
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DRWG NO: 4

SCALE:
1" = 1'-0"



PARTIAL PLAN WITH NO JOINTS AT SINK



DETAIL OF RODDING REINFORCEMENT



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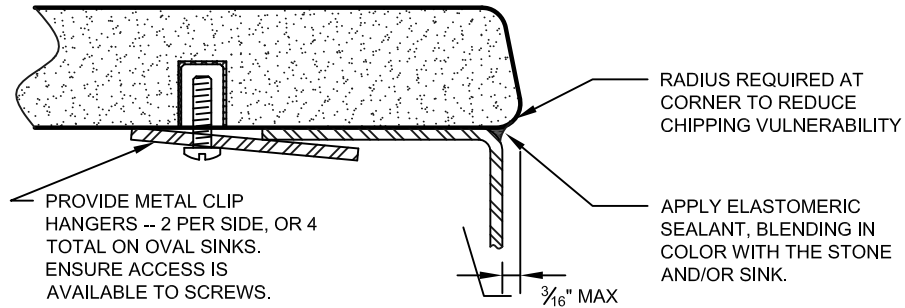
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DETAIL OF RODDING REINFORCEMENT

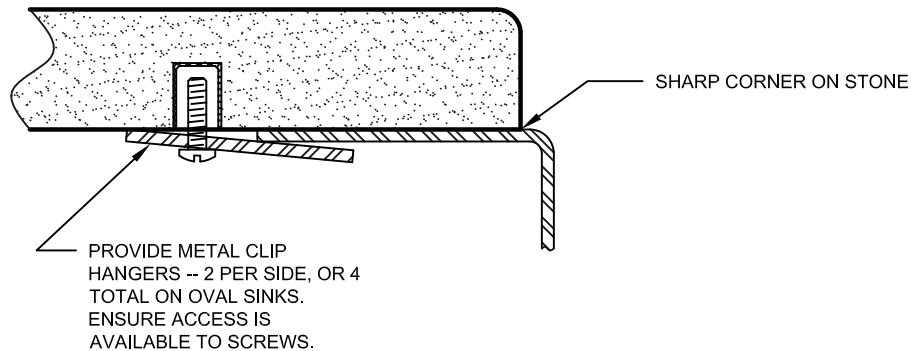
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DRWG NO: 5

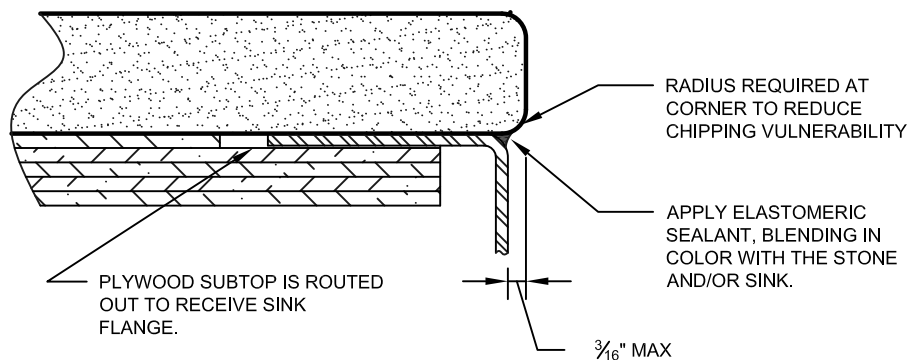
SCALE:
1" = 1'-0"



DETAIL WHEN COUNTERTOP OVERHANGS EDGE OF SINK



DETAIL WHEN COUNTERTOP SETS BACK FROM SINK EDGE



DETAIL OF SUBTOP ROUTED OUT TO RECEIVE SINK FLANGE



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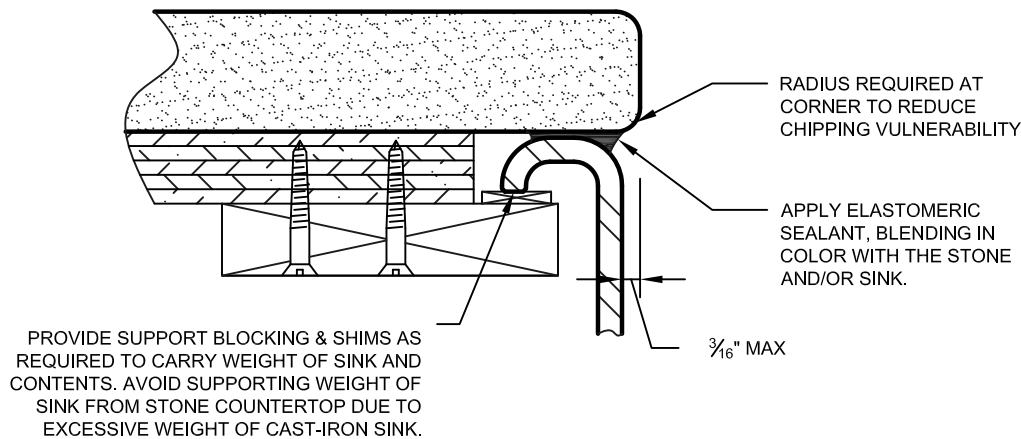
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UNDERMOUNT SINK SUPPORT DETAILS

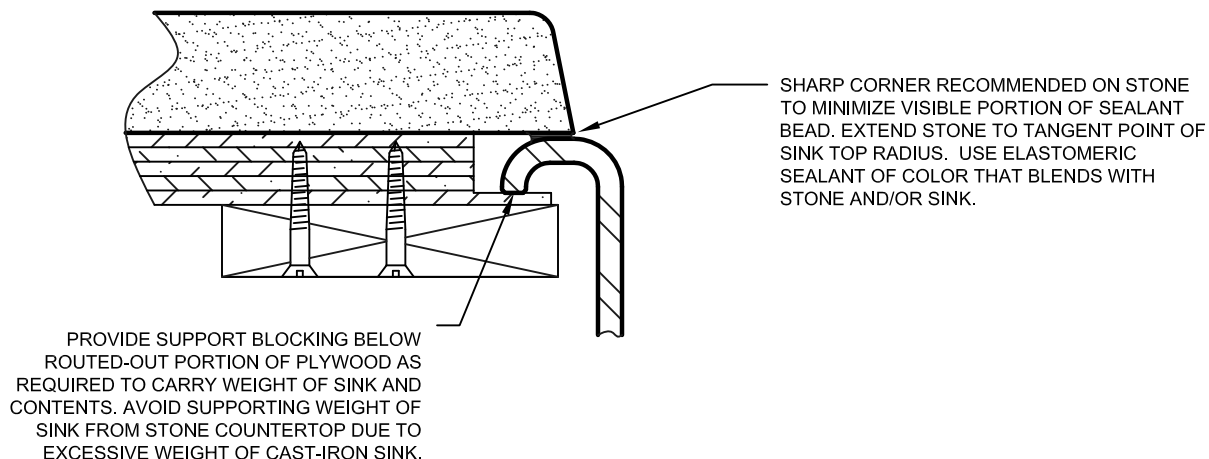
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DRWG NO: 6

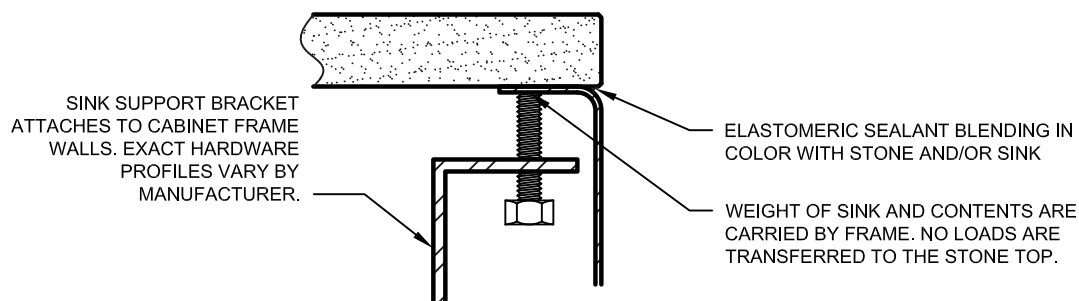
SCALE:
6" = 1'-0"



DETAIL FOR COUNTERTOP OVERHANGING SINK EDGE



DETAIL FOR SINK EXTENDING PAST COUNTERTOP CUTOUT



DETAIL FOR SINK SUPPORTED BY HARDWARE KIT



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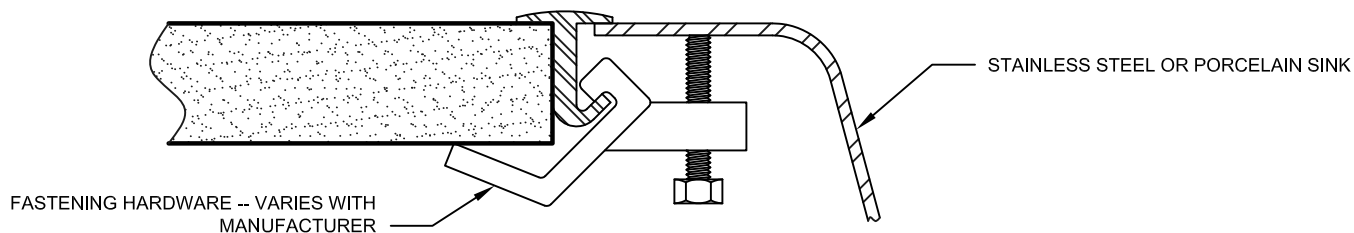
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SUPPORT DETAILS FOR HEAVY (ENAMELED CAST-IRON) SINKS

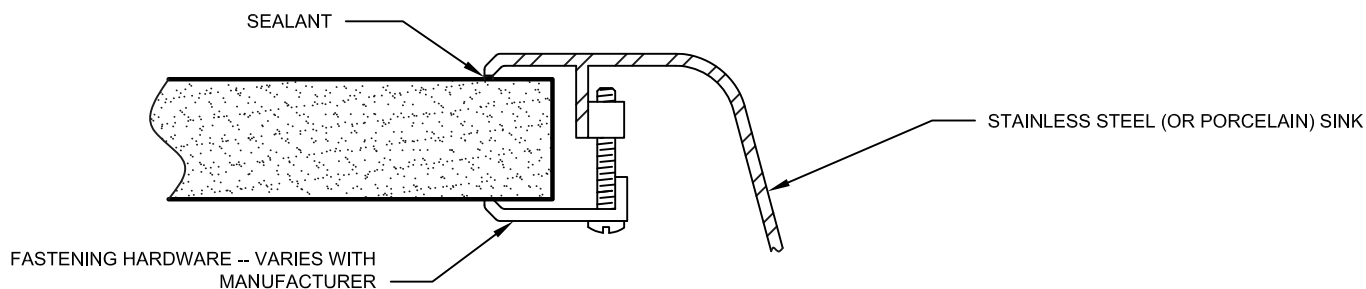
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DRWG NO: 7

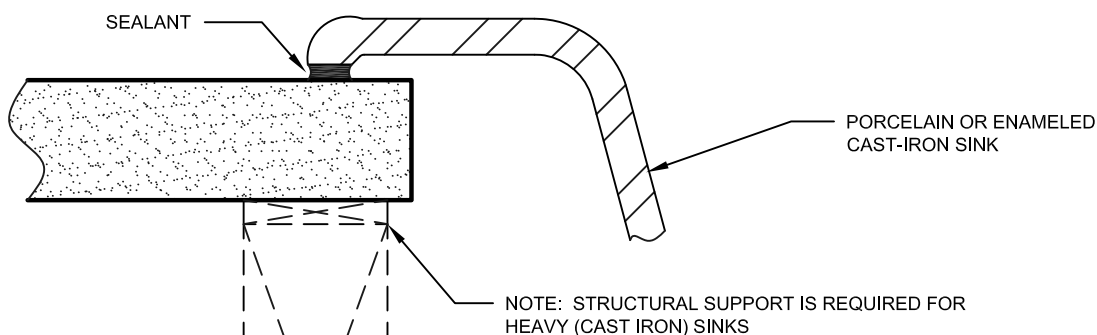
SCALE:
6" = 1'-0"



DETAIL FOR SINK SUPPORTED BY METAL FRAME



TYPICAL DETAIL FOR STAINLESS STEEL SINKS



DETAIL FOR SINK SUPPORTED BY METAL FRAME



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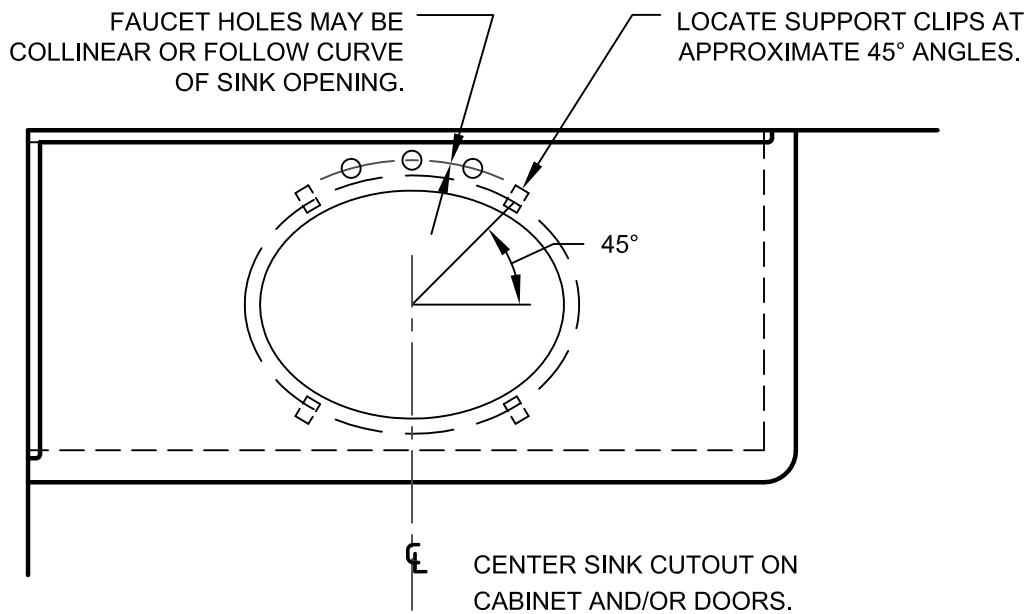
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SUPPORT DETAILS FOR RIMMED OR "DROP-IN" SINK STYLES

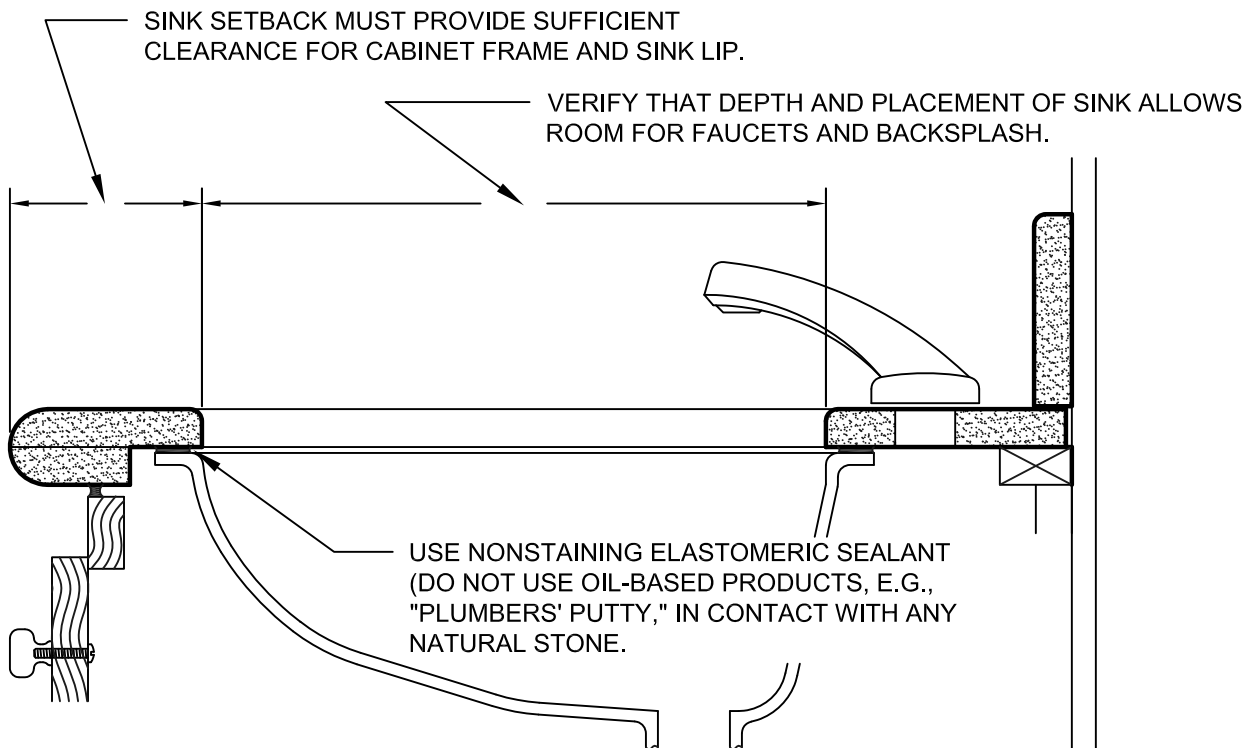
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DRWG NO: 8

SCALE:
6" = 1'-0"



PLAN VIEW OF TYPICAL VANITY



SECTION THROUGH VANITY COUNTER



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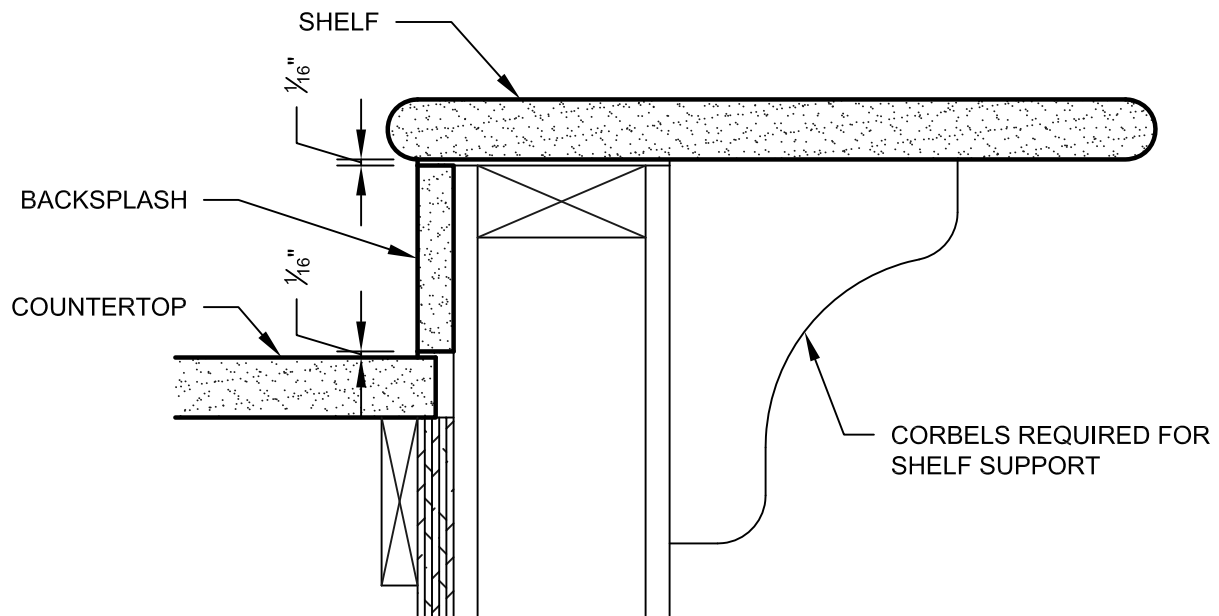
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VANITY TOP DETAILS

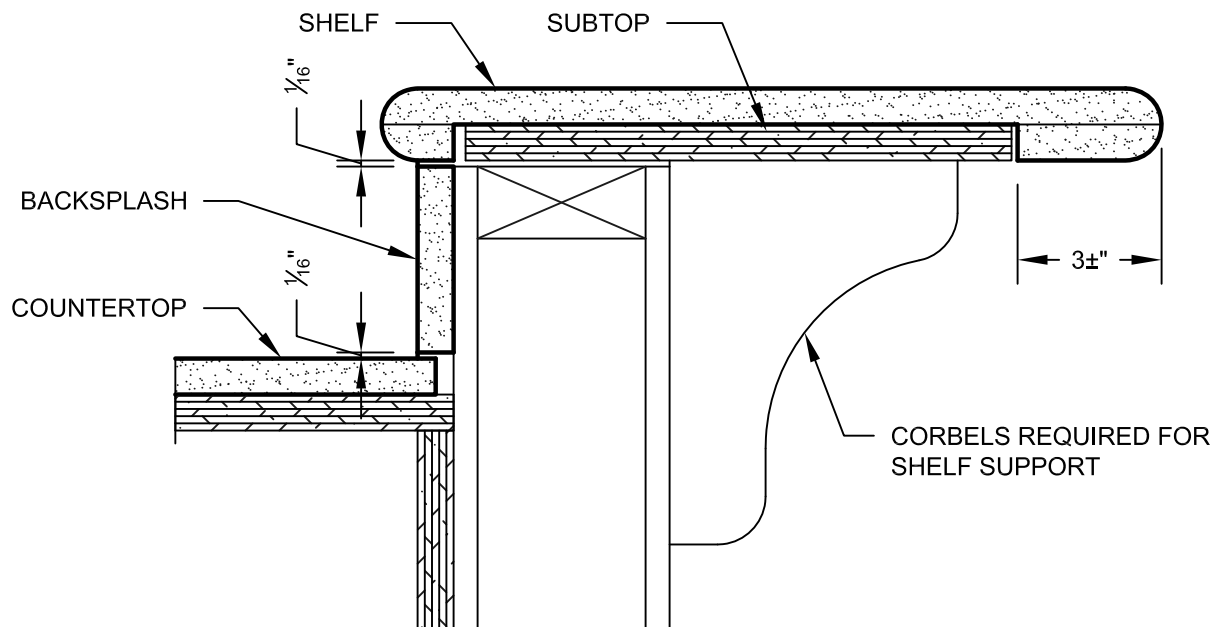
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DRWG NO: 9

SCALE:
 3" = 1'-0"



DETAIL OF STONE SHELF WITHOUT SUBTOP



DETAIL OF STONE SHELF WITH SUBTOP



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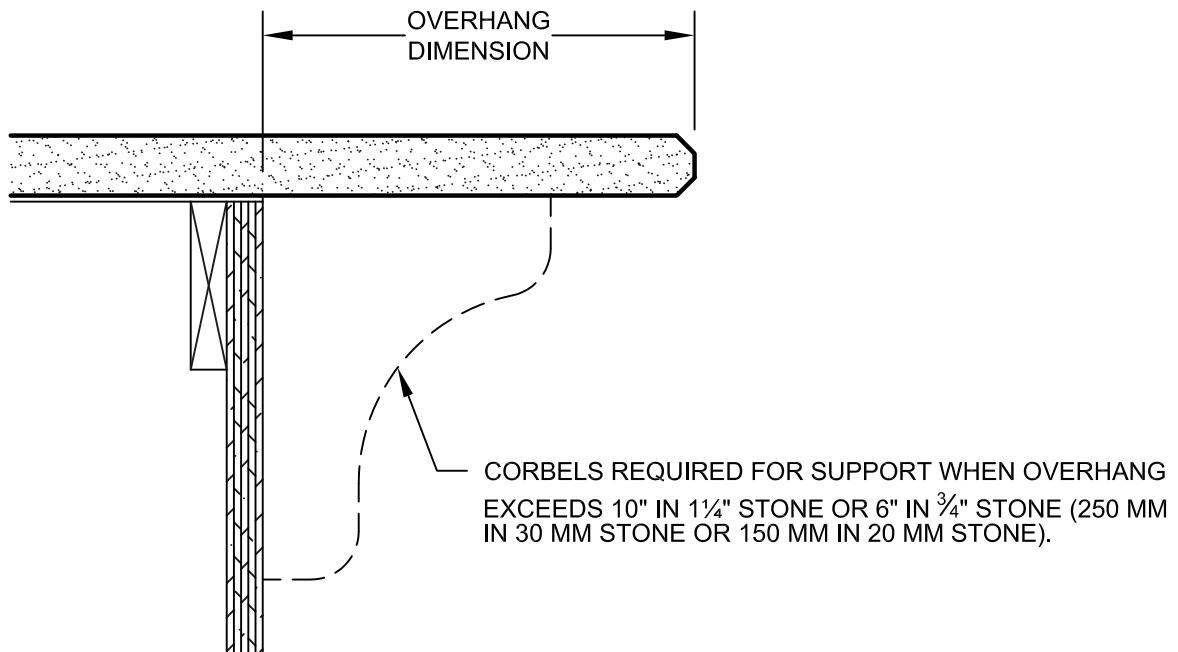
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STONE SHELF DETAILS

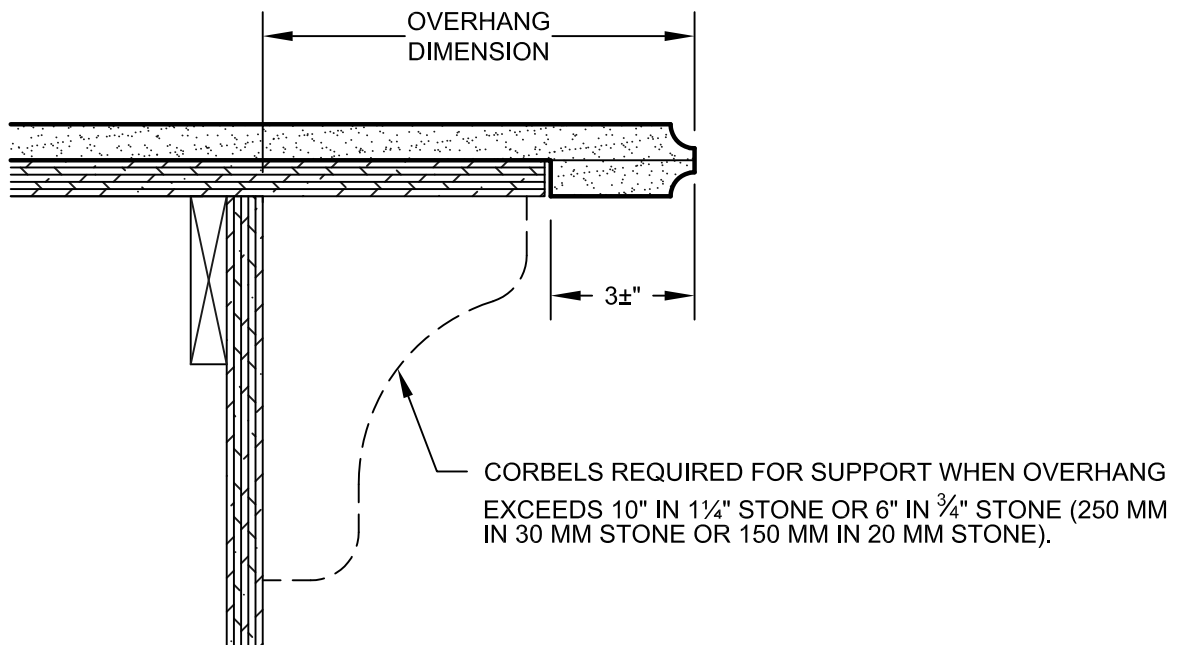
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DRWG NO: 10

SCALE:
 3" = 1'-0"



DETAIL OF COUNTERTOP OVERHANG WITHOUT SUBTOP



DETAIL OF COUNTERTOP OVERHANG WITH SUBTOP



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COUNTERTOP OVERHANG DETAILS

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DRWG NO: 11

SCALE:
 3" = 1'-0"

Straight with Radius Eased Edges (1)	Straight with Chamfer Eased Edges (1)	Pencil Round (2)	Double Pencil Round (2)
Radius (3)	Double Radius (3)	Chamfer (3)	Double Chamfer (3)
Full Bullnose	Half Bullnose	Demi Bullnose	Chiseled or "Rocked"
Ogee	Ogee Roundover	Dupont	Normandy
Cove (3)	Double Cove (3)	Cove Ogee	Cove Dupont
Stair Tread	Waterfall (or Triple Waterfall)	Platner (or Knife Edge)	Laminated (4)

Notes:

1. The term "Eased Edge" more commonly refers to a slightly radiused profile than a slightly chamfered profile, although the use of the term varies regionally and/or with specific fabricators. In either case, the edge treatment is slight, and normally does not exceed $\frac{1}{16}$ " (1.5 mm).
2. "Pencil Round" generally refers to a radius near that of a standard pencil, approximately $\frac{1}{8}$ " to $\frac{3}{32}$ " (3 to 4 mm).
3. Radius, Chamfer, or Cove edge profile can be any dimension. The actual dimension should be specified at the time of sale. Chamfers are most commonly 45°, although not necessarily so.
4. Many of the profiles shown on this drawing can be done with laminated edge details.



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EDGE PROFILE NOMENCLATURE

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DRWG NO: 12

SCALE:
N.T.S.



Butterfly Green Granite

Granite Countertops: #1 in Cleanability!

In a recent study, granite countertops provided the **greatest reduction in bacteria counts of all materials tested!** Six countertop surfaces were contaminated with E. coli bacteria, then washed and rinsed using dish soap and “normal and reasonable” cleaning practices.

Reduction in Bacteria After Washing & Rinsing:

Granite	36,000 to 1*
Stainless Steel	4,000 to 1
Concrete	2,400 to 1
Tile	900 to 1
Wood	500 to 1
Plastic Laminate	285 to 1

A follow-up study evaluated the differences in cleanability of three common unsealed natural stones used for countertop surfaces against an engineered stone. Overall, there was no statistical difference in reduction after wash and rinse for any of the four surfaces.**



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* Source: “The Reduction of E. Coli on Various Countertop Surfaces,” by Dr. O. Peter Snyder, Jr., Ph.D., of the Hospitality Institute of Technology and Management, March 1999.

** Source: “A Study of the Cleanability of Marble and Granite Countertop Materials,” by Dr. O. Peter Snyder, Jr., Ph.D., of the Hospitality Institute of Technology and Management, February 2006.

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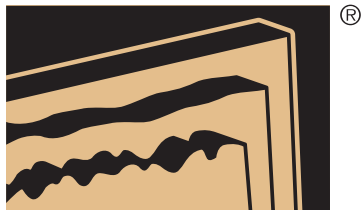
About the MIA

For over sixty years, the Marble Institute of America has served as the authoritative source of information on standards of natural stone workmanship and practice and the suitable application of natural stone products.

Membership in the association is worldwide and includes natural stone producers, exporters/importers, distributors/wholesalers, fabricators, finishers, installers, restoration/maintenance specialists and industry suppliers — all committed to the highest standards of workmanship and ethics.

MIA publishes a monthly newsletter for members, markets a range of technical publications and consumer pamphlets on natural stone, sponsors business and technical meetings and seminars on industry-related topics, provides educational programming for architects and construction specification professionals, and conducts the “Rocky” Advertising Awards and the annual Pinnacle Awards competitions recognizing outstanding natural stone projects worldwide. MIA also sponsors an industry accreditation program for high quality fabricators and commercial installers.

MIA is also a leading promoter of stone usage in the commercial and residential marketplaces. MIA produces a number of consumer education materials on the use of natural stone and its proper care and maintenance and hosts an informative website for consumers at **www.usenaturalstone.com**.



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