SECTION 04 40 13 - Granite\*

ARCHITECTURAL GRANITE

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\*\* NOTE TO SPECIFIER \*\* Swenson Granite Co LLC & Rock of Ages Corporation; architectural granite.
This section is based on the products of Swenson Granite Works, which is located at:
369 N. State St.
Concord, NH 03301
Phone: 603-225-4322
Fax: 603-228-2915
Email:\_\_\_
Web:www.swensongranite.com
and
This section is based on the products of Rock of Ages Corporation, which is located at:
560 Graniteville Rd
Graniteville, VT 05654
Toll Free: 800-875-7353
Phone: 802-476-3121
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Email: \_\_\_
Web:www.rockofages.com
[Click Here] for additional information.
Swenson Granite is a family owned business that has been quarrying and cutting granite in New England since 1883. Founded by Swedish immigrant John Swenson, the company is now headed by the fourth generation of the Swenson Family. For more than a century the Swenson name has remained synonymous with a steadfast commitment to quality and service. It is this commitment, combined with adaptability in the marketplace, that Swenson Granite credits for its longevity, growth and prosperity. When you purchase granite products from Swenson Granite, you are buying directly from the source. Swenson Granite utilizes the most advanced granite cutting technology in conjunction with the irreplaceable beauty of hand-cut craftsmanship. The mixing of these important assets enables the Swenson Company to bring excellent quality along with affordability to the marketplace, whether the item is a high tech industrial product machined to within thousandths of an inch or a Bird Bath created from a natural field or ledge stone. The timeless beauty, appreciating value and affordability of Swenson Granite products make them the premier choice for construction and landscaping.
Rock of Ages' founding fathers couldn't have chosen a more appropriate name for what has become the world's leading granite quarrier and memorial manufacturer. The company was founded in Vermont and today owns quarries in several states and Canada. Those quarries produce the highest combined volume of dimensional granite in North America. Rock of Ages has set the standard in quarried stone and memorialization worldwide. No matter the project, we offer legendary quality, superior service and an unmatched warranty. No one is more experienced in providing the best granite and versatile service than Rock of Ages. No one stands behind its product offerings like Rock of Ages.

1. GENERAL
	1. SECTION INCLUDES
		1. Fabricated granite components, including the following:

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + - 1. Stair treads.
			2. Posts and bollards.
			3. Custom outdoor stone.
			4. Walkways and patios.
			5. Edging.
			6. Copings and caps.
			7. Benches.
			8. Ornamental stone.
			9. Signs.
			10. Interior stone.
			11. Natural stone.
			12. Curbing.
			13. Accessories.
	1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 31 10 00 - Site Clearing.
		2. Section 32 13 16.16 - Roller-Compacted Concrete Paving.
		3. Section 32 91 19.13 - Topsoil Placement and Grading.
	1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section. Add references as required.

* + 1. ASTM International (ASTM):
			1. ASTM A 123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
			2. ASTM C 97 - Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.
			3. ASTM C 119 - Standard Terminology Relating to Dimension Stone.
			4. ASTM C 170 - Standard Test Method for Compressive Strength of Dimension Stone.
			5. ASTM C 615 - Standard Specification for Granite Dimension Stone.
			6. ASTM C 880 - Standard Test Method for Flexural Strength of Dimension Stone.
	1. DEFINITIONS
		1. Definitions: Definitions of terms used in these specifications shall be those published by the National Building Granite Quarries Association, Inc.
		2. Split Face Finish: Surface resulting from breaking stone along a natural cleavage plane. Surface has projections and depressions; edges are not true.
		3. Rock Face Finish: Similar to split face except face of stone at edge is pitched to achieve trued axis lines, thus creating bolder projections from the plane of the axis lines.
		4. Sawn Finish: A rough and uneven surface resulting from splitting, pointing, and/or rough sawing the granite.
		5. Thermal Finish: Finish produced by application of high temperature flame to the surface. Large surfaces may have shadow lines caused by overlapping of the torch.
		6. Cushion Edge Finish: Split face with the edges rounded over and thermalled to blend the flat top into the split sides.
		7. Polished Finish: Mirror gloss, with sharp reflections.
		8. Honed Finish: Dull sheen, without reflections.
		9. Sandblast Finish: Surface produced by blasting with an abrasive.
	2. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		2. Samples: Submit sufficient samples of granite:
			1. Each sample set shall include three samples.
			2. Sample set shall show anticipated range of color to be expected in the final installation. Natural variations in grain structure, inclusions or any other visual characteristic should also be included in the samples, or depicted in an accompanying photograph. In addition, a dated photograph may be issued to illustrate current quarry conditions.
			3. Approved sample sets and/or mock up photographs with meeting minutes shall establish the standard by which stonework will be judged.
		3. Shop Drawings: Show all bedding, bonding, jointing and anchoring details, and the dimensions of each piece of granite:
			1. No final sizing or finishing shall be done until the shop drawings for that part of the work have been approved.
	3. QUALITY ASSURANCE
		1. Supplier Qualifications: All granite shall be obtained from quarries having adequate capacity and facilities to meet the specified requirements. Fabrication shall be by a firm equipped to process the material promptly in accordance with specifications.

\*\* NOTE TO SPECIFIER \*\* Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: Install a mock-up using acceptable products and manufacturer approved installation methods.
			1. Maintain mock-up during construction for workmanship comparison.

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs.

* + - * 1. Remove and legally dispose of mock-up when no longer required.
				2. Incorporate mock-up into final construction upon Architect's approval.
			1. Obtain Architect's acceptance of finish color, texture and pattern, and workmanship standard.
		1. Any piece of granite showing manufacturing flaws upon receipt shall be referred to the design professional for determination as to whether it shall be rejected, patched, or redressed for use.
	1. DELIVERY, STORAGE, AND HANDLING

\*\* NOTE TO SPECIFIER \*\* Granite is highly resistant to staining, but should be protected from certain elements, such as wet (green) wood, oils, mud, rust, construction waste, and asphalt compounds. Contact supplier for proper remedies to staining problems that occur.

* + 1. Store products in manufacturer's unopened packaging until ready for installation (as applicable).
		2. Store granite on timber or platforms at least 3 inches (76 mm) above the ground.
		3. Take care to prevent staining during storage.
		4. Prevent excessive mud, fluid concrete, or other deleterious materials from coming in contact with and affixing to stone materials.
		5. If storage is to be for a prolonged period, place polyethylene or other suitable plastic film between any wood and finished surfaces, and use also as an overall protective covering.
		6. Plug all holes during freezing weather to prevent accumulation of water.
		7. Do not use salt for melting of ice formed in Lewis holes or on pieces, or for any purpose involving its contact with the granite.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: Swenson Granite Co LLC, 369 N. State St, Concord, NH 03301; ASD. Phone: 603-225-4322; Fax: 603-228-2915; Email: \_\_\_\_; Web: www.swensongranite.com.
		2. Acceptable Manufacturer: Rock of Ages Corporation, 560 Graniteville Rd, Graniteville, VT 05654; ASD. Toll Free: 800-875-7353; Phone: 802-476-3121; Fax: 802-476-0390; Email: \_\_\_\_; Web: www.rockofages.com.

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
		2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
	1. GRANITE
		1. Granite shall comply with ASTM C 615 for material characteristics, physical requirements, and sampling for selection of granite.
			1. All granite shall be of standard architectural grade, free of cracks, seams, or starts, which may impair its structural integrity or function.
			2. Color or other visual characteristics indigenous to the particular material and adequately demonstrated in the sampling or mock-up phases will be accepted provided they do not compromise the structural or durability capabilities of the material
			3. Texture and finish shall be within the range of samples approved by the design professional.

\*\* NOTE TO SPECIFIER \*\* Select one or more of the color options below. Delete colors not required.

* + - 1. Color: Woodbury Gray.
			2. Color: Concord Gray.
			3. Color: Bethel White.
			4. Color: Caledonia.
			5. Color: Autumn Pink.
			6. Color: Deer Isle.
			7. Color: Black Diamond.

\*\* NOTE TO SPECIFIER \*\* Select one or more of the application options below. Delete applications not required.

* + - 1. Application: Stair treads.
			2. Application: Posts and bollards.
			3. Application: Custom outdoor stone.
			4. Application: Walkways and patios.
			5. Application: Edging.
			6. Application: Copings and caps.
			7. Application: Benches.
			8. Application: Ornamental stone.
			9. Application: Signs.
			10. Application: Interior stone.
			11. Application: Natural stone.
			12. Application: Curbing.
			13. Application: Accessories.
			14. Application: As indicated on Drawings.

\*\* NOTE TO SPECIFIER \*\* Indicate nominal thickness of material required in inches or mm. The suggested minimum nominal thickness for exterior veneer is determined by analysis of piece size, face finish, anchoring method and location, and structural design load requirements. It's most economical if granite panel thickness coincides with industry standard nominal thicknesses of 4 inches, 3 inches, 2 inches, 1-5/8 inches, or 1-1/4 inches.

* + - 1. Nominal Thickness: \_\_\_\_.

\*\* NOTE TO SPECIFIER \*\* Select one or more of the finish options below. Delete finishes not required.

* + - 1. Finish: Rock Face.
			2. Finish: Split Face.
			3. Finish: Sawn.
			4. Finish: Thermal.
			5. Finish: Cushion Edge.
			6. Finish: Polished.
			7. Finish: Sandblast.
	1. FABRlCATlON
		1. General Requirements:
			1. Mouldings, washes and drips shall be constant in profile throughout their length, in strict conformity with details shown on approved shop drawings.
			2. Dress joints straight and at 90 degree angle to face. Shape beds to fit supports.
			3. Anchor Provision: Cut and drill sink provisions and holes in stone for anchors, fasteners, supports, and lifting devices as indicated or needed to set stone in place.
			4. Allow room for expansion of the anchoring devices where necessary.
			5. Where liners are required on the back of panels, secure by means of mechanical anchors. Comply with referenced standards.
			6. Finish exposed faces and edges of stone, except sawed reveals, to comply with requirements indicated for finish and to match final samples and mockups.
			7. Joint Width: Cut stone to produce uniform joints 3/8 inch (10 mm) or as shown on drawings.
			8. Provide chases, reveals, reglets, openings, and similar features as required to accommodate adjacent work.
			9. Grade and mark stone to achieve uniform appearance when installed. Inspect finished stone units at fabrication plant. Replace defective units.
		2. Beds and Joints:

\*\* NOTE TO SPECIFIER \*\* The minimum recommended joint width is 3/8 inch for pieces with sawn beds and joints. Larger joint widths are required if pieces have split or otherwise rough cut beds and/or joints.

* + - 1. Pieces shall be bedded and jointed as shown on the approved shop drawings, and bed and joint surfaces shall be cut as follows:

\*\* NOTE TO SPECIFIER \*\* Select one of the three paragraphs below, delete paragraphs not required. Select the first paragraph for most applications where a 3/8 inch bed or joint width is used. Select the second paragraph for pieces 4 inches or more in thickness when cost savings may be achieved by eliminating the full sawn specification. Select the third paragraph only for projects with bed and joint widths of 3/4 inches or more where a split face or other rough sawn appearance is specified.

* + - * 1. Bed and joint surfaces shall be sawn through the full thickness of the granite piece. Bed and joint surfaces shall be within +/- 3 inches (76 mm) of 90 degrees to the face of the piece unless otherwise specified.
				2. Beds and joints shall be sawn or cut full square 2 inches (51 mm) back from the face and from that point may fall under square not more than 1 inch in 12 inches (25 mm in 305 mm). Both beds and joints shall be reasonably free of large depressions.
				3. Beds and joints shall be split or rough sawn generally square with the face and may fall under square with the face not more than 2 inches in 12 inches (51 mm in 305 mm).
		1. Backs of Pieces:

\*\* NOTE TO SPECIFIER \*\* Select one of the options below. Delete option not required.
Because of physical characteristics, most granite cannot be split to a thickness less than one-third the lesser face dimension. Consequently sawn backs (the first specification) should be specified for most veneers, and are frequently specified also for thicker ashlar, because of design considerations.
First paragraph below is recommended for most building granite.
Second paragraph below is recommended for structural bridge piers, 4 inch or more split face pieces, or other installations of thicker pieces where a sawn back is not required.

* + - 1. Backs of all pieces shall be sawn to approximately true planes.
			2. Backs of all pieces may be either rough or natural quarry split to provide surfaces, which vary not more than 1 inch in 12 inches (25 mm in 305 mm) from true plane and not more than 2 inches (51 mm) from their specified thickness.
			3. Fabricate stone to maintain minimum clearance of 1 inch (25 mm) between backs of stone units and surfaces behind stone.
			4. A minimum cavity void of approximately 1 inch (25 mm) shall be maintained behind ashlar or dimensional granite used as a veneer. This cavity should be adequately ventilated and wept to eliminate the accumulation of moisture behind the granite veneer.
		1. Incidental Cutting and Drilling:
			1. Panels in excess of 100 pounds (45 kg) may include, at Installer's option, lifting clamp dimples, lewis holes, or other provisions as required to accommodate the lifting device(s) utilized by the installing contractor. Lifting holes in the top beds of panels or other locations where moisture collection is likely to occur shall be filled with non-expanding grout or high-modulus elastomeric sealant after installation and final alignment.
		2. Dimensional Tolerances:

\*\* NOTE TO SPECIFIER \*\* All tolerances listed assume panels 4 inches or less in thickness, not more than 5 feet x 5 feet, and sawn on all six sides. For thicker pieces, very large pieces, or pieces with split, pointed or rough sawn faces, backs, beds or joints, tolerances generally must be increased. Consult with suppliers on tolerances for special pieces.

* + - 1. Panel Thickness 3/8 or 1/2 inch (10 or 13 mm): +/- 1/32 inch (0.8 mm).
			2. Panel Thickness 3/4 to 1-5/8 inch (19 to 41mm): +/- 1/8 inch (3 mm).
			3. Panel Thickness Greater than 1-5/8 inch (41 mm): +/- 1/4 inch (6 mm).
			4. Panel Face Dimensions: +/- 1/16 inch (1.5 mm).
			5. Variation from Rectangular (Maximum out of square) (Non-cumulative): +/- 1/16 inch (1.5 mm).
			6. Heads / Calibrated Edges: +/- 1/16 inch (1.5 mm).
			7. Quirk Miters (Width of Nose) up to 1/4 inch: -0, +25 percent of dimension.
			8. Quirk Miters (Width of Nose) over 1/4 inch: -0, +1/16 inch (1.5 mm).
			9. Location of Back Anchors: +/- 1/8 inch (3 mm).
			10. Depth of Back Anchors: +/- 1/16 inch (1.5 mm).
			11. Location of Holes for Precast Anchors: +/- 1/4 inch (6 mm).
			12. Hole Depth for Precast Anchors: +/- 1/16 inch (1.5 mm).
			13. Anchor Slots - From Face to Centerline of Slot: +/- 1/16 inch (1.5 mm).
			14. Anchor Slots - Lateral Placement: +/- 1/4 inch (6 mm).
			15. Anchor Slots - Width: +/- 1/16 inch (1.5 mm).
			16. Anchor Slots - Depth at Maximum: +/- 1/8 inch (3 mm).
			17. Anchor Holes - From Face to Centerline of Hole: +/- 1/16 inch (1.5 mm).
			18. Anchor Holes - Lateral Placement: +/- 1/8 inch (3 mm).
			19. Anchor Holes - Diameter: +/- 1/16 inch (1.5 mm).
			20. Anchor Holes - Depth: +/- 1/8 inch (3 mm).
			21. Anchor Sinkages - Depth: +/- 1/8 inch (3 mm).
			22. Continuous Kerfs - From Face to Centerline of Kerf: +/- 1/16 inch (1.5 mm).
			23. Continuous Kerfs - Maximum Bow in 4 feet 0 inches (1.2 m): +/- 1/16 inch (1.5 mm).
			24. Continuous Kerfs - Width: +/- 1/16 inch (1.5 mm).
			25. Continuous Kerfs - Depth: -1/16 inch (1.5 mm), +1/8 inch (3 mm).
			26. Rebated Kerf Elevation of Bearing Surface: +/- 1/16 inch (1.5 mm).
			27. Bearing Checks - Elevation of Bearing Surface: +/- 1/16 inch (1.5 mm).
			28. Bearing / Clearance Checks - Lateral Location: +/- 1/2 inch (13 mm).
			29. Bearing / Clearance Checks - Setback from Face: +/- 1/16 inch (1.5 mm).
		1. Flatness Tolerances: Variation from true plane, or flat surface, shall be determined by a 4 foot dimension in any direction on the surface. Such variations on polished and honed surfaces shall not exceed the tolerances listed below or 1/3 of the specified joint width, whichever is greater. On surfaces having other finishes, the maximum variation from true plane shall not exceed the tolerance listed below or 1/2 of the specified joint width, whichever is greater.

\*\* NOTE TO SPECIFIER \*\* All tolerances listed assume panels 4 inches or less in thickness, not more than 5 feet x 5 feet, and sawn on all six sides. For thicker pieces, very large pieces, or pieces with split, pointed or rough sawn faces, backs, beds or joints, tolerances generally must be increased. Consult with suppliers on tolerances for special pieces.

* + - 1. Polished, honed, or fine rubbed finishes: 1/16 inch (1.5 mm).
			2. Sawn finishes: 1/8 inch (3 mm).
			3. Thermal finishes: 3/16 inch (5 mm).
			4. Rough cut finishes: 1 inch (25 mm).
		1. Packing and Loading: Finished granite shall be carefully packed and loaded for shipment using all reasonable and customary precautions against damage in transit. No material which may cause staining or discoloration shall be used for blocking or packing.
1. EXECUTION
	1. EXAMINATION
		1. Do not begin installation until substrates have been properly prepared.
		2. Verify substrate is level, smooth, and capable of supporting stone imposed loads.
		3. Verify grades, contours and elevations of substrate are correct.
		4. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
	2. INSTALLATION
		1. Install in accordance with manufacturer's instructions.
		2. Install in accordance with drawings and using skilled mechanics capable of proper handling of the setting of the stone and able to field cut where necessary with sharp and true edges.
		3. Set stone with joints uniform in appearance and stone edges and faces aligned to tolerances indicated.
		4. Clean surfaces that are dirty or stained. Scrub with fiber brushes, and then rinse with clear water.
		5. Provide expansion, control, and pressure-relieving joints of widths and at locations shown on drawings.
	3. PROTECTION
		1. Protect installed products until completion of project.
		2. Provide boxing or other suitable protection wherever required, but do not use lumber which may stain or deface the granite.
		3. Use only non-corrosive nails.
		4. Protect granite work in progress at all times during construction by use of a suitable strong, impervious film or fabric securely held in place.
	4. CLEANING
		1. Granite shall be shop cleaned at the time of final fabrication.
		2. After installation and pointing or caulking are completed, carefully clean the granite, removing all dirt, excess mortar, weld splatter, stains, and/or other site incident defacements.
		3. Stainless steel wire brushes or wool may be used, but the use of other wire brushes or of acid or other solutions which may cause discoloration is expressly prohibited.
		4. Contact fabricator before using cleaners other than detergents.

\*\* NOTE TO SPECIFIER \*\* Use the following article if a schedule is required to locate different types and sizes of stone materials and their locations for the project. Coordinate the schedule designations with the Drawings.

* 1. SCHEDULES

END OF SECTION