SECTION 04 42 00

STONE CLADDING

PART 1 – GENERAL

1.1 PURPOSE

A. This guideline is intended to provide useful information to the Professional Service Provider (PSP) to establish a basis of design. PSP is to apply the principles of this section such that the University of Texas at Arlington (UTA) may achieve a level of quality and consistency in the design and construction of their facilities. Deviations from these guidelines must be approved by UTA and may require justification through Life Cycle Cost (LCC) analysis and submitted to UTA for approval.

1.2 LESSONS LEARNED AND DESIGN CONSIDERATIONS

A. Stone and mortar may match existing on the Career Development Center's exterior East Entrance or the Science Engineering Innovation Research Building.

B. Provide adequate sized mock-up to ensure the visual properties of the assembly can be fully realized.

1.3 SUMMARY

A. Architectural drawings are diagrammatic. The Architectural details shown are intended as a guide for the aesthetic and interfacing requirements of the various components of the exterior wall to and with other work. The requirements shown by the details are intended to establish basic dimensions of the module and the sight lines, jointing and profiles of members. The Contractor is responsible for the design and engineering of the system within these aesthetic parameters. The drawings are not to be construed as engineering design, or adequate to meet the engineering design requirements.

1.4 SECTION INCLUDES

A. Cut limestone and granite veneer at exterior and interior walls.
B. Metal anchors and supports.
C. Sealing exterior joints.
D. Pointing interior joints.

1.5 RELATED SECTIONS

A. Section 07 62 00 – Sheet Metal Flashing and Trim: Flashings at copings, lintels, and sills.
B. Section 07 92 00 – Joint Sealants: Sealing perimeter and expansion joints in interior stone work and Warranty requirements.

1.6 REFERENCE STANDARDS

A. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; current edition.
B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; current edition.
C. ASTM C119, Standard Terminology Relating To Dimension Stone.
D. ASTM C568 Standard Specification for Limestone Dimension Stone.
E. ASTM C97, Test Methods for Absorption and Bulk Specific Gravity of Building Stones.
F. ASTM C99, Test Method for Modulus of Rupture of Building Stone.
G. ASTM C170, Test Method for Compressive Strength of Building Stone.
H. ASTM C1721, Standard Guide for Petrographic Examination of Natural Stone.
I. ASTM C880, Standard Test Method for Flexural Strength of Dimensional Stone.
J. ASTM C1248, Test Method for Staining of Porous Substrate by Joint Sealants.
K. ASTM C1242, Standard Selection Guide for Selection, Design, and Installation of Dimension Stone Attachment System.
L. ASTM C1354, Strength of Individual Stone Anchorages in Dimension Stone.
M. ASTM C510, Standard Test Method for Staining and Color Change.
N. ASTM D2203, Standard Test Method for Staining from Sealants.
O. ASTM C1528, Standard Guide for Selection of Dimension Stone for Exterior Use.
P. ASTM STP996, New Stone Technology, Design and Construction for Exterior Wall Systems.

Q. ILI (HB) - Indiana Limestone Handbook; current edition.
R. MIA (DSDM) - Dimensional Stone Design Manual; VII, current edition.
S. NBGQA (SPEC) - Specifications for Architectural Granite; Version 14-1, current edition.

1.7 PRE-BID SUBMITTALS
A. Design/Performance Requirements: Exterior Dimension Stone Subcontractors seeking to secure a contract to provide work for this section shall provide proposal drawings showing stone installation methods and relationship to adjacent construction with the bid for the work of this section.
B. Drawings shall be accompanied by previous test reports or other suitable stone quarrier's or fabricator's data which demonstrate stone meets the physical and structural requirements of the specifications. Tests shall have been performed by a laboratory in the United States within the last five years.
C. Submit stone fabricator's instructions for storage, protection and handling at the exterior wall assembly plant or jobsite.
D. Submit quarry survey information for job production and testing materials.

1.8 ADMINISTRATIVE REQUIREMENTS
A. Pre-installation Meeting: Convene four weeks before starting work of this section.

1.9 PERFORMANCE REQUIREMENTS
A. Exterior Dimension Stone shall be tested per ASTM C880 Modified and ASTM C99, and shall meet the minimum requirements of ASTM C119 (General Terminology) and C568 (Limestone). Historical data should not be utilized for structural calculations.
B. Minimum Exterior Stone thickness shall be 3-1/2" or greater for limestone materials-or greater if so designated in the drawings. Provide increased thickness where necessary to meet job conditions and loads.
C. Theoretical structural calculations of Exterior Stone stress shall be based on the lowest average of the each subgroup average, less one standard deviation, for the C880 Modified or C99 tests (whichever provides the lowest value). The working stress values shall have a minimum safety factor of: 8.0 for limestone when compared to this value and are to be based on minimum section thickness tolerance after fabrication.
D. Adequate number and size of anchors for Exterior Stone: Stone retention shall be provided to satisfy the load requirements and design criteria set out in this specification. In any case, anchors shall not be less in size and number than required by code. The ratio of the Exterior Stone anchor ultimate strength to actual load at design pressure shall be: 6.0 for all limestone. A 1/3 increase in allowable stresses for wind is not allowed. Design for seismic loading shall be as required by IBC (or other governing code depending on project location or by site-specific geotechnical survey if applicable).
E. Performance criteria at design pressures and loads for metal members supporting stone shall be as follows:
1. Perpendicular to the plane of the wall, net deflection of members directly supporting the stone panels shall not exceed L/600 or 1/16" whichever is less. Span L is defined as the distance between the anchor points of the member.
2. In the plane of the wall the deflection of the framing members shall not exceed 1/16". This includes rail sag due to dead load.
3. At 1.5 times the design pressure loads supporting the stone, the net permanent deflection of the metal framing members shall not exceed L/1000. There shall be no stone failure and no failures or gross permanent distortion of framing members, anchors, or connections. Stone failure is defined as cracking or the appearance of cracking as well as spalling at anchor points or slippage of anchors exceeding 1/16 inch. Gross permanent distortion is any appearance and or evidence of yielding or permanent displacement of framing members. At connection points of framing members to anchors, combined movement of anchors relative to building structure and framing members relative to anchor shall not exceed 1/16 inch set after load is removed.
F. General: Design stone anchors and anchoring systems according to ASTM C 1242.
1. Stone anchors shall withstand not less than two times the weight of the stone work in both compression and tension.
G. Structural Performance: stone work assembly shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Wind Loading: The complete stone work and their method of attachment to the building structure and supports shall be designed to withstand the positive and negative wind pressures acting perpendicular to the plane of stone as set forth by local building code, but in no case less than 30 psf at corners.
H. Thermal Movements: Provide dimension stone cladding system that allows for thermal movements resulting

from the following maximum change (range) in ambient and surface temperatures by preventing displacement of stone, opening of joints, over-stressing of components, failure of joint sealants and connections, and other detrimental effects. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.

1. Low exterior ambient temperature: -10° F
2. High exterior surface temperature: 180° F for dark colors and 150° for light colors
3. Low interior ambient temperature: 55° F
4. High interior ambient temperature: 100° F

1.10 SUBMITTALS

A. See Division 01 for submittal procedures.

B. Stone Layout Shop Drawings: Confirm fabricator's interpretation of the stone design conforms to the architectural intent, submit shop drawings showing panel layout, dimensions, joint locations and widths, stone types and finishes relative to building primary column lines. Include full plans and relationships with adjacent and adjoining work by others, general support concept, enlarged details of joints, finished ends and other decorative features. Review of this submittal allows engineering of support, anchors, and panel thicknesses to proceed, and coordination of other interfacing work to continue concurrently. Stone cannot be fabricated until after "Stone Erection" shop drawings are completed, submitted and approved.

C. Stone Erection Shop Drawings: Using approved "Stone Layout" shop drawings, complete system engineering to show panel anchors and support back to the building frame. Detail backup support system, locate and label anchor types relative to stone panel edges and primary column lines. Include large-scale details of all connections and anchors, and joints showing tolerances. Add detail references to shop drawings of adjacent work indicating final coordination occurred before submittal. If embedments would be required in masonry and concrete work or weldments would be needed on steel frame members, layouts of these components must be completed and submitted early in a separate set to allow inclusion into the project. Post-installed anchors are not a substitute for late embed planning. Shop drawings shall be signed and sealed by a registered structural engineer in the State of Texas.

D. Engineering Calculations: This Engineer shall be a registered professional engineer experienced in cladding design to design the cladding support and retention system. The system shall include all items required to connect the stone cladding to the substrate/structure as shown in the Construction Drawings. The cladding engineer shall be registered in the state of Texas and shall prepare engineering calculations for the confirming the adequacy of all principal veneer stonework, units, fasteners and anchorage components for compliance with the criteria established in the performance requirements of this section. The sealed calculations shall be submitted to the Architect for review and approval. Analyses shall include seismic criteria as required by the IBC latest edition (or other governing code depending on project location or by site-specific geotechnical survey). Based on the design loads, material properties, and safety factors, the calculations shall include, as a minimum, the following information:

1. Stone loads, stresses and safety factors.
2. Support and anchorage loads, stresses, safety factors, design loads and allowable loads.
3. Stone thickness
4. Support

E. Exterior Dimension Stone Subcontractor shall pay for all work and expenses of Owner, Architect and other Consultants after two submittals per document.

F. Samples: Submit two stone samples 12 x 12 x 3-1/2 inch in size of each stone type, illustrating color range and texture, markings, surface finish.

G. Installation Instructions: Submit stone fabricator's installation instructions and field erection or setting drawings; indicate panel identifying marks and locations on setting drawings.

1.11 QUALITY ASSURANCE

A. Design anchors and supports under direct supervision of a Professional Structural Engineer, registered in the State in which the Project is located.

1. Design anchors to resist positive and negative wind pressures and other loads as required by applicable code.
2. Design anchor attachment to stone with a factor of safety of 5:1.
3. Design each individual anchor with a factor of safety in the vertical dead-load-bearing direction of 4:1 and in the horizontal lateral-load-bearing direction of 2:1.

B. Perform work in accordance with ILI Indiana Limestone Handbook.

C. Perform work in accordance with NBGQA (SPEC).
D. Engage a firm with a minimum of 10 years successful experience in the fabrication and installation of stone of similar sizes, shapes and finishes to the units required for this project, and which has ample production facilities to produce, furnish and supply the quantity of units as required for installation without delay to the work.
   1. Further, to demonstrate the firm's successful performance record and the ability to successfully complete the scope of work for this project the Contractor shall provide references for the following completed within the previous five (5) years:
      a. References for 5 mechanically anchored (engineered) exterior cladding installations typically over 30 feet. Each project should have minimum of 10,000 square feet of dimension stone.
      b. References for 3 commercial building lobbies (e.g. floors, walls, etc.). Each project should have minimum of 3,000 square feet of dimension stone.
      c. References for 5 other installations which can include cladding, site work, walls, paving, or large residential projects.
      d. A reference for one (1) ongoing project available for observation and review by the Owner, Architect or their authorized representative(s). The observation and review will include, but may not be limited to, confirmation of the firm’s conformance with the current Marble Institute of America Dimension Stone Design Manual with regard to industry standards, methods and practices of installation.
      e. The firm shall also provide a letter of surety with bonding capacity confirming the payment and performance bonding level is at least $5 million.
      f. The firm shall provide a copy of its current business license (if applicable).
      g. The firm shall provide a copy of its state contractor license (if required by state).
E. Stone Test Reports: For each stone variety proposed for use on Project, by a qualified testing agency, indicating compliance with required physical properties, other than abrasion resistance, according to referenced ASTM standards. Base reports on testing done within previous three years.
   1. Testing of specified stones shall be performed by the Construction Contractor's independent testing laboratory selected from those listed below. Other laboratories may be proposed and considered by the Architect at the time of bidding.
      a. Hager-Richter Geoscience, Inc., Salem, NH, USA
      b. Construction Testing Sciences, Dallas, TX, USA.
      c. Architectural Testing, York, PA, USA.
   2. Testing is to be completed prior to exterior wall laboratory mock-up testing or fabrication of stone.
   3. The testing samples shall be taken at random locations from at least three different non-adjacent blocks from areas which will be quarried for the project. The Exterior Dimension Stone Subcontractor is responsible for all costs and coordination with the stone fabricator including timely specimen fabrication, preparation, and delivery to the approved lab. Identify and transmit to the independent testing laboratory a record of the samples and quarry locations from which they were taken. Identify finish, surface, rift and other necessary data for proper testing per the test procedures specified. Provide stone samples for each type and finish of stone of sizes and shapes as required by the approved independent testing laboratory for the following tests. Each different finish and stone type must be tested.
   4. The testing laboratory shall inspect the specimens and report all noted deviations on the approved drawings or details. The lab shall be responsible for conducting and reporting the tests, shall state in the report whether the specimens conform to the requirements herein and shall specifically note any deviations. All testing shall be witnessed by the Architect or his consultant as well as any corrections to the specimens or testing apparatuses. The report shall include the date of the test and the report and identification of the specimen by name, finish, fabricator, dimensions, and other pertinent information. The lab report should be sent directly to the Architect or his consultant.
F. Testing Specimens and Procedures:

	Physical Property	Test Method	No. of Tests
1.	Physical Property	Test Method	No. of Tests
2.	Compressive Strength	ASTM C170	3
3.	Modulus of Rupture	ASTM C99	
	a. Tested Dry Parallel		10
	b. Tested Wet Parallel		10
	c. Tested Dry Perpendicular		10
	d. Tested Wet Perpendicular		10
4.	Density	ASTM C97	3

5. Absorption (% of weight) ASTM C97 3
6. Flexural Strength ASTM C880 Modified*
   a. Tested Dry Parallel 10
   b. Tested Wet Parallel 10
   c. Tested Dry Perpendicular 10
   d. Tested Wet Perpendicular 10

   *Modify specimen size to be 9" wide x 38" long x typical job thickness with finished face loaded in flexural tension.

   e. Finish is to be same finish as that used on the project. All different finishes must be tested unless approved by the architect.
7. Anchor Testing per ASTM C1354 “Strength of Individual Stone Anchorages in Dimension Stone”.
   a. Prepare and test a minimum of six 12” x 12” specimens in appropriate project thickness(es) for each type of anchor design proposed in each direction of anticipated load, i.e. tension, shear, etc.. Materials used and fabrication methods shall match those to be used for project production. For precast hairpin anchor testing, provide specimens to the architectural precast subcontractor for casting prior to submittal to the testing lab.
   b. Test set-up and load apparatus shall be submitted to Architect or Consultant for review prior to testing.
   c. The test reports shall identify exact material specifications that were tested and dimensions for all components involved in testing
   d. Load shall be incremented in negative steps at 20 psf increments, to ultimate failure.
   e. Deflections shall be recorded and reported at each load increment. Observation of initial yield shall be reported. Mode of ultimate failure shall be reported as well as load value at failure. Consistent failure mode shall be required for each type of specimen and load category. Deflection values in excess of 0.032" at 150% design load are not allowed.
   f. Performance of each stone anchorage test specimen must exceed 6.0 times the design load without failure.
   g. Any failures less than the specified criteria shall require redesign or increased stone thickness at no cost to the owner or increase in the subcontract.

1.12 MOCK-UP

A. Construct stone mock-up as detailed on the Architectural Drawings.
B. Locate where directed.
C. Mock-up may not remain as part of the Work.
D. Mock-Ups (Wall for quality control purposes)
   1. A mock-up wall shall be constructed only after the Pre-Installation Conference.
   2. Architect shall select a section of exterior wall within the building that shall be used for a wall mock-up to determine quality of workmanship for the entire project. The mock-up shall consist of approximately 50 lineal feet of exterior wall and shall include straight wall, corners, control and expansion joints, window installation, anchors and reinforcing, and flashings. This mock-up shall incorporate all aspects of the accepted masonry sample panel as well including proper cleaning techniques. Cleaning agent manufacturer’s representative shall be on site to observe and instruct the cleaning portion.
   3. Installation of all materials and products into the wall shall be in accordance with all applicable specifications as noted in the project manual and as shown on the drawings.
   4. Upon completion and acceptance of the wall mock-up and quality of workmanship, the wall shall be photographically documented by the Contractor as a record. Provide one copy of photos to each the Owner, the Architect and the Contractor. The wall shall then be incorporated into the project and shall be the standard for all masonry work on the project.
   5. No work shall proceed until the mock-up wall is approved.
   6. Quality control required after first installation mock-up.

1.13 DELIVERY, STORAGE, AND HANDLING

A. Store stone panels vertically on edge, resting weight on panel edge.
B. Protect stone from discoloration.
C. Submit stone fabricator’s quality control procedures regarding documentation of rift or bedding plane direction, thickness measurement, cracks, finishing and other concerns. As a minimum, fabricator’s quality control procedure shall include the following:

1. After slabbing stone, measure and record thickness at four corners and centers at top and bottom of one slab per block.
2. Permanently mark rift or bedding plane direction on back of each slab.
3. After finishing, measure and record thickness at four corners and centers at tops and bottoms of every 20th slab. Remove any slabs that do not meet tolerance criteria specified herein.
4. Examine each slab under bright daylight at an oblique angle to finished surface for evidence of hairline cracks. Remove any slabs containing hairline cracks.
5. Wet surface of every 20th slab and observe while surface dries to find evidence of hairline cracks. Remove any slabs containing hairline cracks.
6. After fabrication, measure and record all dimensions of cuts and drilled holes or slots on every 20th panel. Compare to tolerances specified herein and remove any slabs that do not conform.
7. Owner's representative shall visit and review fabricator's operations and records.
8. Submit all stone repair procedures in a detailed outline of materials and methods one month prior to commencement of job site erection of any panels.

1.14 FIELD CONDITIONS

A. During temporary storage on site, at the end of working day, and during rainy weather, cover stone work exposed to weather with non-staining waterproof coverings, securely anchored.

PART 2 – PRODUCTS

2.1 STONE

A. Stone Cladding: Texas Smooth Limestone by American Limestone Company of Texas.
B. Stone Sizes: Standard Panel, 2'-7 ¾" x 1'-3 ¾".
C. Stone Thickness: Stone veneer thickness shall be 1" thick panels with continuous reveal at top and bottom for attachment. Maintain a minimum of 1" clearance behind stone to any substrate.
D. Pattern: Stone shall be laid in half running bond as shown on drawings.
E. Joints: Joint width shall be ¼".
F. Stone Color: Stone color shall be Texas Limestone as approved by the Architect and Owner.
G. Corners: Provide overlap at all outside corners, unless noted otherwise on the drawings.

2.2 MORTAR

A. Interior Stone to Cement Backer Board:
   1. Polymer modified thin-set: Laticrete; Product - 255 Multimax.

2.3 ANCHOR AND ACCESSORIES

A. Split Tail Anchors and Other Components in Contact with Stone: Stainless steel, ASTM A666, Type 304.
   1. Sizes and configurations: As required for vertical and horizontal support of stone and applicable loads.
   2. Wire ties are not permitted.
B. Support Components not in Contact with Stone: Stainless steel, ASTM A240/A240M, Type 304.
C. Anchor Plate: 0.0598 inch stainless steel continuous anchor plate with 1 inch flange.
D. Setting Buttons and Shims: Plastic type.
E. Flashings: Stainless steel.
F. Damp-proofing: Bituminous.
G. Cleaning Solution: Type that will not harm stone, joint materials, or adjacent surfaces.
H. Continuous double or single anchor at top and bottom of each panel. Provide ¼" neoprene spacer between anchor and substrate to allow for construction tolerances. Anchoring shall be into stud framing and minimum 16" o.c.

2.4 STONE FABRICATION

A. Fabrication Tolerances:
   1. Maximum Variation From Thickness: +/- 1/4 inch.
   2. Maximum Variation From Face Size: +/- 1/16 inch, non-cumulative.
   3. Maximum Variation From Flat: 1/8 inch or 1/3 of the specified joint width, whichever is greater.
B. Fabricate units for uniform coloration between adjacent units and over the full area of the installation.
C. Slope exposed top surfaces of stone and horizontal sill surfaces for natural wash.
D. Cut drip slot in bottom surface of work projecting more than 1/2 inch over wall openings. Size slot not less

than 3/8 inch wide and 1/4 inch deep; full width of projection.

E. Fabricate stone per requirements, as shown on Drawings, and as follows:
   1. Limestone Fabrication: Marble Institute of America (MIA), Dimensional Stone--Design Manual IV and Indiana Limestone Manual.
   2. Stone Fabrication - General: Includes, but not limited to, reveals, recesses for angles, profiled edges, and fabricates stone grills.
F. Arises: Remove the sharp edge from arises to slightly blunt edge and to reduce chipping of the finished edge.
G. Fabricate stone to maintain minimum clearance of 1 inch between backs of stone units and surfaces behind stone.
H. Dress joints straight and at 90 degree angle to face. Shape beds to fit supports.
I. 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.
   1. Allow room for expansion of the anchoring devices where necessary.
   2. Where liners are required on the back of panels, secure by means of a mechanical anchors. Comply with referenced standards.
J. Anchor plates, bolts, pins, dowels, nuts and washers shall be AISI type 302/304 stainless steel, if in contact with concrete or stone.
K. Rubber or neoprene grommets/tubes, shall be of the diameter required to install around dowel pins that anchor into the concrete. Wall thickness of tube is to accommodate the differential volumetric expansion of the stone and concrete.
L. Epoxy Resins: No field application of epoxy is allowed on the project unless approved by the Architect. The Architect may require independent testing.
   1. Epoxy resins shall be selected from the following manufacturers:
      a. Sika
      b. ITW Ramset
      c. Akemi
      d. Bonstone
      e. Ciba Geigy
   2. The epoxy shall have a minimum heat deflection temperature of 125 degrees F. per ASTM D648 (latest edition).
   3. Epoxy used structurally shall only be used in conjunction with 300 series stainless steel mechanical retention mechanisms. Joints shall maintain structural stability under design loads in the event of total adhesion failure.
   4. The epoxy shall not be considered as the primary retaining mechanism. The epoxy may be used to enhance the structural capacity of assemblies.
   5. All such holes or slots must be completely filled with epoxy.
   6. Epoxy manufacturer shall state in writing that the selected epoxy is acceptable for use with the stone and the application for which it is being used.
   7. Polyester based epoxies are prohibited for structural applications. They may be used as fillers for chip repairs only.
M. Shims shall be stainless steel or high impact plastic such as Korolath or approved equal. Shim size shall distribute the loads so point loading does not affect stones performance.
N. Where permanent setting pads are required, use 90 durometer neoprene or Korolath. Use of wood wedges for temporary shims is acceptable if removed after installation is set.
O. Stone kerf details, if used, shall provide a minimum clearance of 1/16" at all metal surfaces within the kerf cut. Stone shall not bear directly against or on metal or in any way bear on the vertical tab of the kerf anchor. No nibs or bulbs on kerf legs shall be allowed. Dead load of stone shall be isolated from metal supports by elastomeric materials. All kerfs shall be sealed with an elastomeric sealant prior to setting of kerf clip into stone kerf. Kerf cut shall be completely filled with sealant.
P. Continuous or clip deadload and wind load anchors supporting stone panels shall be 300 series stainless steel or extruded 6061-T6 aluminum members as required and approved and shall provide a minimum clearance of 1/16" at all surfaces within kerf. Paint aluminum with AAMA 2605 or equivalent coating (Kynar or equal) if utilized for stone materials other than granite. All kerfs shall be sealed with an elastomeric sealant prior to setting of stone support members into stone kerf. Kerf cut shall be completely filled with sealant.
Q. Provide 300 series stainless steel flashing members as indicated or required in relation to handset stonework.
R. Provide vent and weep members at all joint flashings or other necessary conditions at locations approved by the architect, as necessary to properly allow drainage to the exterior. Vent and weep prefabricated assemblies

shall be 1/2" x 1" high and of 316 stainless steel, and shall be set flush to exterior face of stonework.

S. Fasteners:
   1. Any exposed fasteners or fasteners in wet areas, shall be series 300 stainless steel finished to match adjacent materials when exposed to view. Unexposed fasteners in dry areas shall be zinc plating per ASTM F1136-04 <http://webstore.ansi.org/RecordDetail.aspx?sku=ASTM+F1136-04> Standard Specification for Zinc/Aluminum Corrosion Protective Coatings for Fasteners <http://webstore.ansi.org/RecordDetail.aspx?sku=ASTM+F1136-04>. All non stainless fasteners being used in a structural application must meet the minimum requirements of SAE J429 Grade 5. Grade 8.2 fasteners, high strength bolts of non U.S. origin, or high strength bolts that are zinc plated shall not be used. Mill test reports for all structural grade bolts shall be submitted to the Architect for his approval prior to installation of those bolts on the job. Self-drilling fasteners shall be Drill-Flex as manufactured by Elco Industries, Inc. No substitutions accepted. Nuts used at expansion or moving connections shall be designed to provide a positive means of preventing disengagement. Staking of bolts, use of lock washers, or threads being deformed is not acceptable. All fasteners shall employ matched washers and nuts.

T. Finish exposed faces and edges of stone, except sawed reveals, to comply with requirements indicated for finish and to match final samples and mockups.

U. Joint Width: Cut stone to produce uniform joints 1/2 inch.
   1. Leave the following joints open for sealant:
      a. Head joints in top courses, including copings, parapets, cornices, sills, and steps.
      b. Joints in projecting units.
      c. Joints between rigidly anchored units, including soffits, panels, and column covers.
      d. Joints below lugged sills and stair treads.
      e. Joints below ledge and relieving angles.
      f. Joints labeled "expansion joint".
      g. Coordinate joint sizing and movement requirements prior to fabrication.
   2. Pack mortar into joints and work into voids. Neatly tool surface to concave joint.
   3. At joints to be sealed, clean mortar out of joint before it sets. Brush joints clean.

V. Provide chases, reveals, reglets, openings, and similar features as required to accommodate adjacent work.

W. Fabricate molded work, including washes and drips, to produce uniform stone shapes, with precisely formed arises slightly eased, and matching profile at joints between units.

X. Grade and mark stone to achieve uniform appearance when installed. Inspect finished stone units at fabrication plant. Replace defective units.

Y. Apply bituminous damp-proofing to back of stone panels that extend below grade.

2.5 SOURCE QUALITY CONTROL

A. Stone Testing During Production:
   1. Examine the complete range of variation in physical properties of stone supplied so assurance is obtained that job material provides a known minimum level of strength.
   2. The scope of testing is limited to flexural strength testing and the reporting of the results for comparison to original design data.
   3. Take production test specimens from every fifth quarry block, or every 10,000 square feet of slabbed stone whichever is less, for each type of stone supplied to job. After slabbing, prepare and record per ASTM C880, six specimens, measuring 9" x 38" x typical project thickness. Test three wet and three dry for each type of stone supplied to job, per the ASTM C880 modified flexural strength procedure as specified elsewhere herein.
      a. Identify the specimens with the unique quarry block numbers.
      b. Report the individual specimen strengths and the average strength of each group of three.
      c. If any of the test results show the production block average strengths having less than 80% of the minimum design strength from the original data, then additional testing or a reduction in allowed working stress shall be required as directed by the Architect.

B. Metal component product data, by a qualified testing agency, indicating chemical and physical properties of metal.

C. Sealant Compatibility and Adhesion Test Report: From sealant manufacturer complying with requirements in Section 079200 "Joint Sealants" and indicating that sealants will not stain or damage stone. Include interpretation of test results and recommendations for primers and substrate preparation needed for adhesion.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that support work and site conditions are ready to receive work of this section.
B. Verify that items built-in under other sections are properly located and sized

3.2 PREPARATION

A. Clean stone prior to erection. Do not use wire brushes or implements that will mark or damage exposed surfaces.
B. Coat back surfaces of stone with damp-proofing. Allow coating to cure.

3.3 INSTALLATION

A. Install flashings of longest practical length and seal watertight to back-up. Lap end joint minimum 6 inches and seal watertight.
    1. Stone extending below grade:
        a. Provide full grout behind stone.
        b. Install continuous stainless steel flashing at top of stone.
B. Erect stone in accordance with stone supplier's instructions and erection drawings.
C. Set stone with a consistent joint width of 1/2 inch.
D. Install anchors and place setting buttons to support stone and to establish joint dimensions.
E. Joints in Exterior Work: Seal joints with sealant.
F. Joints in Interior Work: Leave perimeter joints and expansion joints open for sealant; fill other joints with pointing mortar; pack and work into voids; tool surface to concave joint.

3.4 TOLERANCES

A. Positioning of Elements: Maximum 1/4 inch from true position.
B. Maximum Variation from Plane of Wall: 1/4 inch in 10 feet; 1/2 inch in 50 feet.
C. Maximum Variation Between Face Plane of Adjacent Panels: 1/16 inch.
D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in any two stories.
E. Maximum Variation from Level Coursing: 1/8 inch in 3 feet; 1/4 inch in 10 feet; 1/2 inch maximum.
F. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.

3.5 CUTTING AND FITTING

A. Obtain approval prior to cutting or fitting any item not so indicated on Drawings.
B. Do not impair appearance or strength of stone work by cutting.

3.6 CLEANING

C. Remove excess joint material upon completion of work.
D. Clean soiled surfaces with cleaning solution.
E. Use non-metallic tools in cleaning operations.
F. Maintain the Exterior Dimension Stone wall work in a reasonably clean condition throughout the construction period so that it will be without any evidence of deterioration or damage other than the effects of normal weathering at the time of final acceptance. Select methods of cleaning which will achieve a uniform appearance and stabilized colors and textures for materials that weather or age with exposure.
G. Provide proper and adequate means for protecting portions of the work which are exposed to likely sources of damage during the remainder of the construction period, including the probable areas of Exterior Dimension Stone breakage or deterioration.
H. Protect Exterior Dimension Stone from edge damage at all time. Exterior Dimension Stone breakage during the guarantee period will be considered a form of faulty material or workmanship unless known to result from vandalism or other causes not related to materials and workmanship.
I. Remove and replace broken, chipped, stained, or otherwise damaged stone, defective joints, and stone work that does not match approved samples and mockups. Damaged stone may be repaired if Architect approves methods and results.
J. In-Progress Cleaning: Clean stone work as work progresses. Remove mortar fins and smears before tooling joints. Remove excess sealant and smears as sealant is installed.
K. Final Cleaning: Clean stone work no fewer than six days after completion of pointing and sealing, using clean water and stiff-bristle fiber brushes. Do not use wire brushes, acid-type cleaning agents, cleaning agents

containing caustic compounds or abrasives, or other materials or methods that could damage stone.

3.7 ACCEPTANCE

A. Each and every piece of stone shall be subject to the Architect's approval, and any piece or pieces may be rejected after having been set or erected if not as per the requirements of Architectural Drawing and Specification requirements. Rejected stones shall be carefully removed and replaced with new suitable stone without delay and without cost to the Owner. Any piece or pieces damaged in the removal and resetting of defective or rejected pieces shall also be removed, with new and acceptable pieces provided and set at no cost to the Owner or increase in the subcontract.

END OF SECTION

2
1

MATERIAL LIST

MANF.	DESCRIPTION
Texas Limestone	Limestone Panels, D 2'-7 $\frac{3}{4}$" x H 1'-3 $\frac{3}{4}$" x W 1"
NA	Limestone Cap, 4" x 8" x 16" (1" Bullnose Corners)
NA	Limestone Cap, 6" x 8" x 16" (1" Bullnose Corners)
NA	Limestone Cap, 8" x 8" x 16" (1" Bullnose Corners)

ALAMO TILE & STONE
848 W. Rhapsody
San Antonio, Tx 78216
P (210) 732-8350
F (210) 732-8386

ISSUE

REV	DESCRIPTION	DATE
	SUBMITTAL	03/18/2016
2	SUBMITTAL	03/21/2016
1	REVISION	03/28/2016

UNIVERSITY OF TEXAS ARLINGTON
Leadership + Career Center Expansion

Owner
University of Texas

Architect
LBL Architects

ALAMO TILE Project Number
16030

Drawn By
SAI

Checked By
LC

Sheet Scale
x" = 1'-0"

Sheet Description
MATERIAL LIST

Stonemark

General Contractor
Vaughn Construction

Sheet Number
ATS-0.1