

# TERRA COTTA RESTORATION SPECIFICATIONS

- PART 1 - GENERAL**
- 1.1 RELATED DOCUMENTS**
- A. Drawings and general provisions of the Contract.
- 1.2 SCOPE**
- A. This Section generally includes the following, as well as those work items not specifically listed herein that are reasonably necessary to accomplish the scope of work:
- Removing organic growth, inappropriate caulking, and asphaltic materials from existing terra cotta.
  - Careful removal of pieces of terra cotta, shown on the drawings.
  - Exposing and examining existing terra cotta support structure including anchoring devices.
  - Installation or repair of new metal support members and anchoring devices for terra cotta.
  - Replace damaged terra cotta units with new units.
  - Reassemble terra cotta units.
  - Repair terra cotta, as shown on drawings.
  - Repointing mortar joints.
- 1.3 SUBMITTALS**
- A. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.
- B. Qualification Data: For restoration specialists and terra cotta manufacturer.
- C. Restoration Program: For each phase of restoration process, provide detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of restoration work including protection of surrounding materials on building and Project site.
- If materials and methods other than those indicated are proposed for any phase of restoration work, provide a written description, including evidence of successful use on comparable projects, and a testing program to demonstrate their effectiveness for this Project.
  - Cleaning Program: Describe cleaning process in detail, including materials, methods, and equipment to be used and protection of surrounding materials on building and Project site, and control of runoff during operations.
- 1.4. QUALITY ASSURANCE**
- A. Restoration Specialist Qualifications: Engage an experienced masonry restoration and cleaning firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance.
- B. Terra Cotta Manufacturer Qualifications: A firm regularly engaged in manufacturing architectural terra cotta units of similar size and complexity as those required for the Work. Manufacturer shall have a minimum of five years experience in the manufacturing of terra cotta products for restoration projects.
- C. Chemical Manufacturer Qualifications: A firm regularly engaged in producing terra cotta cleaners that have been used for similar applications with successful results, and with factory-trained representatives who are available for consultation and Project-site inspection and assistance at no additional cost.
- D. Source Limitations: Obtain each type of material for terra cotta restoration (cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.
- E. Testing Service: The Contractor shall retain an independent testing laboratory acceptable to the Engineer to perform tests to confirm that the Manufacturer's new terra cotta meets all of the physical, chemical, glaze adhesion, and performance qualities herein specified.
- 1.5. PROTECTION**
- A. Protect from damage all adjacent materials, surfaces, and finishes before, during, and after the Work. Restore all damaged materials, surfaces, and finishes to their previous level of appearance and operation to the satisfaction of the Owner and Engineer.
- B. Store restoration materials under cover in a dry place in a manner to prevent damage or intrusion of foreign matter. Store free of ground and cover with straw and tarpaulins. Do not allow materials to get wet.
- 1.6. PROJECT CONDITIONS**
- A. Repoint mortar joints and repair terra cotta only when air temperature is between 40 and 90 deg F (4 and 32 deg C) and is predicted to remain so for at least 7 days after completion of work.
- B. Patch terra cotta only when air and surface temperatures are between and 55 and 100 deg F (13 and 38 deg C) and are predicted to remain above 55 deg F (13 deg C) for at least 7 days after completion of work. On days when air temperature is predicted to go above 90 deg F (32 deg C), schedule patching work to coincide with time that surface being patched will be in shade or during cooler morning hours.
- C. Clean terra cotta surfaces only when air temperature is 40 deg F (4 deg C) and above and is predicted to remain so for at least 7 days after completion of cleaning.
- 1.7. SCHEDULING**
- A. Order replacement materials at earliest possible date, to avoid delaying completion of the Work.
- B. Order sand for repointing mortar immediately after approval. Take delivery of and store at Project site a sufficient quantity of sand to complete Project.

- PART 2 - PRODUCTS**
- 2.1.TERRA COTTA MATERIALS**
- A. General: Provide new terra cotta units to match existing terra cotta units in compressive strength, color, gloss, surface texture, thickness and composition of surface glaze, composition of body, profile, and dimensions.
- B. Types
- Anchor-type: Hollow-core units; wall and web thicknesses of approximately 1-5/8 inches with ribs projecting on back.
  - Adhesion-type: solid units with ribs or groves on the back.
- C. Material: Burned clay product and integral glaze of the best quality.
- Compressive strength: Conform to the standards of ASTM C67.
  - Absorption: Conform to the standards of ASTM - C67.
  - Tolerances: Comply with tolerance requirements of ASTM C212.

- D. Finish
- Color and texture of glaze shall match existing terra cotta.
  - The ceramic glaze shall cover all exposed surfaces and be thoroughly fired into the body.
  - The coefficient of expansion of the glaze shall equal or closely approximate the coefficient of the clay body.
  - Resistance to crazing: Shall be in conformance with ASTM C126.
  - Resistance to fading: Shall be in conformance with ASTM C126.
- E. Fabrication
- Machine-cast or hand make each unit as required to provide accurate size, detailing, and finish.
  - Construct the replacement units so as to receive metal anchors as required.
- 2.2 MORTAR MATERIALS**
- A. Portland Cement: ASTM C 150, Type I or Type II.
- Provide white cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Quicklime: ASTM C 5, pulverized lime.
- D. Factory-Prepared Lime Putty: Screened, fully-slaked lime putty, prepared from pulverized lime complying with ASTM C 5.
- E. Mortar Sand: ASTM C 144, unless otherwise indicated.
- Color: Provide natural sand of color necessary to produce required mortar color.
  - For pointing mortar, provide sand with rounded edges.
  - Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands, if necessary, to achieve suitable match.
- F. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars.
- G. Water: Potable.
- 2.3 TERRA COTTA RESTORATION MORTARS**
- A. These are proprietary products that shall be equal in quality to the John Restoration Mortars, manufactured and distributed by Cathedral Stone Products, Inc.
- A prerequisite to the use of the John products is that the contractor either have his terra cotta subcontractor pass a training course to become certified in its use, or else utilize a subcontractor who has previously passed the training course and is certified to use the John products.
- 2.4 CLEANING MATERIALS**
- A. Equal to ProSoCo's Sure Clean Restoration Cleaner; ProSoCo, Inc.
- B. Water for Cleaning: Potable.
- 2.6 MISCELLANEOUS MATERIALS**
- A. Terra Cotta Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching terra cotta, is vapor- and water permeable, exhibits low shrinkage, and develops high bond strength to all types of masonry.
- B. Terra Cotta Glaze Replacement: A high-solids, waterborne polyurethane coating intended for exterior use as terra cotta glaze replacement. Product is custom mixed by manufacturer to match color and gloss of existing terra cotta glaze.
1. Products:
- Edison Coatings, Inc.; Aquathane UA-210.
- C. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, and polished stone surfaces from damaging effects of acidic and alkaline masonry cleaners.
- D. Terra Cotta Support Anchors: Type and size indicated or, if not indicated, to match existing anchors in size and type. Fabricate anchors and dowels from Type 316 stainless steel.
- E. Dowel Pins: Stainless steel, type 316.
- F. Terra Cotta Repair Anchors: Type 304 stainless-steel spiral rods designed to anchor to backing.
- Provide driven-in anchors designed to be installed in drilled holes and relying on screw effect rather than adhesive to secure them to backup.
  - Product: Helifix North America Corp., Helifix Dryfix Masonry Repair Anchors.
- G. Joint Sealant: One-part or two-part liquid polysulfide sealant; color to match existing mortar.
- 2.5 MORTAR MIXES**
- A. Preparing Lime Putty: Slake quicklime and prepare lime putty according to appendix to ASTM C 5 and manufacturer's written instructions.
- B. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.
- Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.
- C. Colored Mortar: Produce mortar of color required by using selected ingredients. Do not alter specified proportions without Architect's approval.
- Mortar Pigments: Where mortar pigments are indicated, do not exceed a pigment-to-cement ratio of 1:10 by weight.
- D. Do not use admixtures of any kind in mortar, unless otherwise indicated or approved by Engineer.
- E. Mortar Proportions: Mix mortar materials in the following proportions:
- Pointing Mortar for Terra Cotta:
    - 1 part white portland cement
    - 1 part lime
    - 6 parts sand.
  - Add mortar pigments to produce mortar colors required.

- PART 3 - EXECUTION**
- 3.1 UNUSED ANCHOR REMOVAL**
- A. Remove masonry anchors, brackets, wood nailers, and other extraneous items no longer in use unless identified as historically significant or indicated to remain.
- Remove items carefully to avoid spalling or cracking masonry.
  - If item cannot be removed without damaging surrounding masonry, cut off item flush with surface and core drill surrounding masonry and item as close around item as practical.
  - Patch holes where items were removed unless directed to remove and replace units.
- 3.2 TERRA COTTA REMOVAL AND REPLACEMENT**
- A. At locations indicated, remove terra cotta units to expose existing support structure and anchorage devices. Carefully remove entire units from joint to joint, without damaging surrounding terra cotta, in a manner to permit replacement with full-size units.
- B. Support and protect remaining terra cotta that was supported by removed units. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.
- C. Notify Engineer of unforeseen detrimental conditions including voids, cracks, bulges, and loose masonry units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.
- D. Clean masonry surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.
- E. Repair or replace existing support structure if necessary.

- F. Set replacement units in a full bed of mortar with both horizontal and vertical joints of same width as existing units. Replace existing anchors with new anchors of size and type indicated.
- Embed anchors in and fill voids behind units with grout.
  - Tool exposed mortar joints in repaired areas to match joints of surrounding existing terra cotta.
  - Rake out mortar used for laying terra cotta before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing masonry, and at same time as repointing of surrounding area.
- 3.3 TERRA COTTA UNIT PATCHING**
- A. Patch the following terra cotta units:
- Units indicated to be patched.
  - Units with holes.
  - Units with chipped edges or corners.
  - Units with small areas of deep deterioration.
- B. Remove and replace existing patches, unless otherwise indicated or approved by Engineer.
- C. Patching Terra Cotta:
- Remove deteriorated material as determined by sounding with a small hammer. Use chisel or saw to produce square or undercut edges on area to be patched. Remove additional material so patch will not have feathered edges and will be at least 1/4 inch (6 mm) thick, but not less than recommended by patching compound manufacturer.
  - Where mortar joints adjacent to patch are open, fill back of joints with pointing mortar and allow to cure before patching terra cotta. Leave space for pointing joints according to "Repointing Terra Cotta" Article.
  - Mask surrounding mortar joints or rake out for repointing if patch will extend to edge of unit.
  - Rinse surface to be patched and leave damp, but without standing water.
  - Brush-coat surfaces with slurry coat of patching compound according to manufacturer's written instructions.
  - Place patching compound in layers as recommended by patching compound manufacturer, but not less than 1/4 inch (6 mm) or more than 2 inches (50 mm) thick. Roughen surface of each layer to provide a key for next layer.
  - Do not apply patching compound over mortar joints. If patching compound bridges mortar joints, cut out joints after patching compound hardens.
  - Trowel, scrape, or carve surface of patch to match texture, details, and surface plane of surrounding terra cotta. Shape and finish surface before or after curing, as determined by testing to best match existing terra cotta.
  - Keep each layer damp for 72 hours or until patching compound has set.
  - After final layer of patching compound has cured, apply glaze replacement according to manufacturer's written instructions. Apply two or more coats, as needed, to match glaze of adjacent terra cotta units.
- 3.4 CLEANING TERRA COTTA**
- A. General
- Do not use wire brushes or brushes that are not resistant to chemical cleaner being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemical cleaner being used.
  - Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage masonry.
  - Follow manufacturer's instructions for cleaning terra cotta surfaces.
- 3.5 REPOINTING TERRA COTTA**
- A. Rake out and repoint mortar joints to the following extent:
- All joints in areas indicated.
  - Joints where mortar is missing or where they contain holes.
  - Cracked joints where cracks are 1/8 inch (3 mm) or more in width and of any depth.
  - Joints where they are worn back 1/4 inch (6 mm) or more from surface.
  - Joints where they are deteriorated to point that mortar can be easily removed by hand.
- B. Do not rake out and repoint joints where not required.
- C. Rake out joints as follows:
- Remove mortar from joints to depth of 2 times joint width, but not less than 1/2 inch (13 mm) or not less than that required to expose sound, unweathered mortar.
  - Remove mortar from terra cotta surfaces within raked-out joints to provide reveals with square backs and to expose terra cotta for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
  - Do not spall edges of terra cotta units or widen joints. Replace or patch damaged masonry units as directed by Engineer.
- a. Cut out mortar by hand with chisel and mallet. Do not use power-operated grinders without Engineer's written approval based on submission by Contractor of a satisfactory quality-control program and demonstrated ability of operators to use tools without damaging terra cotta. Quality-control program shall include provisions for supervising performance and preventing damage due to worker fatigue.
- D. Notify Engineer of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.
- E. Point joints as follows:
- Rinse terra cotta-joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen terra cotta-joint surfaces before pointing.
  - Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
  - After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch (9 mm). Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing terra cotta have worn or rounded edges, slightly recess finished mortar surface below face of unit to avoid widened joint faces. Take care not to spread mortar over edges onto exposed terra cotta surfaces or to featheredge mortar.
  - When mortar is thumbprint hard, tool joints to match original appearance of joints. Remove excess mortar from edge of joint by brushing.
- F. Cure mortar by maintaining in thoroughly damp condition for at least 72 hours including weekends and holidays.
- Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.
  - Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.
- G. Where repointing work precedes cleaning of existing terra cotta, allow mortar to harden at least 30 days before beginning cleaning work.
- 3.6 CLEAN - UP**
- A. Clean, as work progresses, all exposed faces of terra cotta. Clean with fiber brushes and water, never metal tools.
- B. Clean the site at the end of each day's activity.
- 3.7 FIELD QUALITY CONTROL**
- A. Engineer's Project Representatives: Engineer will assign Project representatives to help carry out Engineer's responsibilities at the site, including observing progress and quality of portion of the Work completed. Allow Engineer's Project representatives use of scaffolding, as needed, to observe progress and quality of portion of the Work completed.

## RECOMMENDATIONS FOR REPAIRING DETERIORATED ARCHITECTURAL TERRA COTTA

- GLAZE SPALLS:** Following cleaning, glaze spalls may be in-painted using either an elastomeric masonry coating such as MAB Acryliclastic series coatings or a breathable masonry coating such as Breathable Masonry Coating II as made by PROSOCO, Inc., custom-colored to match the existing weathered slip glaze finish.
- SHALLOW CLAY BODY SPALLS:** Shallow clay body spalls may be patched using a composite patching mortar. Following preparation, which includes cutting square shoulders at the perimeter of the spalled area, a custom-tinted composite patching mortar such as Jahn M100 Terra Cotta and Brick Repair Mortar as made by Cathedral Stone Products, Inc or Custom System 45 as made by Edison Coatings, Inc.
- DEEP CLAY BODY SPALLS:** Deep clay body spalls may be patched the same as shallow clay body spalls, except 1/4 inch diameter stainless steel all-thread dowels set in epoxy adhesive should be used to mechanically anchor the composite patch.
- CRACKS - VERTICAL FACE OF UNITS:** Where wide enough, patch face of crack using composite patching mortar as outlined for shallow clay spalls. Seal cracks using applicable cementitious injection grout as made by Cathedral Stone Products, Inc. At hung assemblies, mechanically re-anchor each terra cotta fragment using a retrofit stainless steel helical anchor. Patch entry holes and injection grout ports using composite patching mortar.
- CRACKS - SOFFIT OF HUNG ASSEMBLIES:** Cracks occurring in soffit units may be repaired as outlined for cracks at vertical face of units, except for each unit fragment, install 2 helical retrofit anchors at opposite angles (cross-stitched).
- FAILED ROLL JOINT COVERS OF UPPER PIECE (CYMATIUM) OF CORNICHE ASSEMBLY:** Because of the unusual detail, a permanent repair of the joint cover is very difficult. As an interim repair, cut out any hard mortars and replace with caulk. This solution requires constant monitoring and reapplication of caulk as necessary.
- MODILLIONS (BRACKETS):** Mechanically re-anchor loose modillion units and modillions that occur above building entrances, balconies, or site paths. Re-anchor as described for cracks - soffit of hung assemblies.
- MORTAR DETERIORATION:** Failed pointing mortar is widespread, and should be removed and replaced with a relatively soft Portland cement/lime/sand mortar. Where stress is indicated in surrounding terra cotta units, sound joints that are pointed with an excessively hard Portland cement mortar should also be cut out and repointed.
- HOLES AND/OR BANNER ANCHORS IN TERRA COTTA UNITS:** Holes or anchors should be permanently sealed with an acrylic latex caulk or similar material to prevent water from entering the terra cotta unit.
- BALUSTRADES:** Replace failed units with Precast Conc. or fiberglass reinforced polyester replicate assemblies. For minor deterioration (spalls, chips, etc.), balustrade units may be repaired as outlined in Items 1 through 3 above.
- DISCOLORATION AND STAINING:** Clean terra cotta units with water and a restoration and stain remover such as OneRestore as made by EaCo Chem, Inc. using a low-pressure sprayer and a natural or nylon bristle brush as necessary.
- DETERIORATED CAULK JOINTS:** Remove deteriorated caulk and replace.

## PAINTING OF WOOD RECOMENDATIONS

- Where painter's work is being done, protect adjacent work areas and surfaces from defacement. Any damage resulting from neglect of this requirement shall be repaired at the Contractor's expense to the complete satisfaction of the Owner.
- Paints shall be the finest quality exterior grade oil or latex products manufactured by one of the following: a. Pittsburgh Plate Glass b. M. A. Bruder & Sons c. Benjamin Moore d. Sherwin-Williams
- Color of finish coat of paint shall match color of existing wood trellis members. Submit color selection to the Owner for approval prior to start of painting.
- Finish coat of paint to be semi-gloss.
- Prior to start of painting, examine all surfaces to be painted. If any defects are discovered, notify Engineer of conditions prior to commencing work with work.
- Remove all loose paint from surfaces by scraping and sanding. Where paint exhibits signs of improper bond (including crazing, peeling, wrinkling, and/or blistering) between previous coats of paint layers, remove affected areas down to next sound layer of paint. Sand all edges of remaining paint. If paint exhibits no bond (including peeling, cracking, and alligating) between the wood and any previous layer of paint, remove all existing layers of paint. Using an environmentally safe detergent and water, wash all surfaces where paint has been removed. Remove all excessive build-up paint from surfaces. Make sure all surfaces to receive paint are clean, dry, and completely in conformance with the paint manufacturer's recommendations.
- Putty or spackle all open joints and nail holes in wood.
- Do not paint in rainy, snowy, damp, or frosty weather, nor until all surfaces are thoroughly dry. Paint when temperatures are 45 degrees F. or higher.
- Allow paints to dry at least 48 hours between coats. Sand lightly between coats with No. 00 sandpaper and dust well before succeeding coat is applied. Allow additional time if conditions warrant, to assure that all coats are completely dry before applying succeeding coats.
- At the completion of work of other trades, touch-up and restore all damaged surfaces.
- Clean work area at completion.

## BRICK AND STONE MASONRY RESTORATION AND REPOINTING

GENERAL NOTES:  
1. Follow the Specifications for Terra Cotta Restoration except as noted below.

**PART 1 - SCOPE**  
This Section generally includes the following, as well as those work items not specifically listed herein that are reasonably necessary to accomplish the scope of work:

- Repairing cracks and voids in brick and stone construction.
- Repointing mortar joints in brick and stone construction.
- Replacing damaged bricks.
- Cleaning of brick and stone construction.

**PART 2 - PRODUCTS**  
**2.1. BRICK AND STONE MATERIALS**  
A. General: Provide new brick and stone units to match existing units being replaced in compressive strength, color, gloss, surface texture, thickness and dimensions.

**PART 3 - EXECUTION**  
**3.2 BRICK AND STONE UNIT REMOVAL AND REPLACEMENT**  
A. At locations indicated, carefully remove entire brick or stone units from joint to joint, without damaging surrounding materials, in a manner to permit replacement with full-size units.

B. Remaining section same as "Terra Cotta Removal and Replacement" Article.

**3.3 BRICK AND STONE UNIT PATCHING**  
A. Patch the following units:  
1. Units indicated to be patched.  
2. Units with holes.  
3. Units with cracks larger than 1/16".  
4. Units with voids larger than 1/8".

B. Use products as indicated in Terra Cotta Repair Notes 1, 2, & 3.

**3.4 BRICK AND STONE UNIT REPOINTING**  
A. General  
1. Follow instructions in "Repointing Terra Cotta" section of Terra Cotta specifications.  
2. Adjust color of Portland cement (white or gray) and color of sands used in mortar mix to best match the color of the existing or original mortar in each area of work (verify with Engineer).  
3. Follow mortar mix notes in Terra Cotta specifications.

## GENERAL NOTES

**GENERAL CONDITIONS:**  
1. The Contractor shall verify all existing conditions and dimensions prior to starting work. Notify Engineer immediately of any discrepancies.  
2. Contractor shall take all precautions to not damage the existing building. Precautions should also be taken to protect the building when welding.  
3. The contractor shall be responsible for complying with all safety precautions and regulations during the work. All work shall be in accordance with local building codes.  
4. Contractor is responsible for determining whether lead-safe work practices must be applied. Engineer has not tested any materials for the presence of lead paint.  
5. All shoring and temporary bracing during demolition and construction is the sole responsibility of the contractor.  
6. The engineer shall not be responsible for the methods, techniques and sequences of procedures to perform the work. The supervision of the work is the sole responsibility of the contractor.  
7. All backfill shall be granular material, deposited and compacted in 8" maximum layers. Compaction shall have a minimum 95% of maximum density at optimum moisture content, in accordance with ASTM D 1557 (Modified Proctor) Method D.

## WOOD REPAIR NOTES

- Remove hardware, etc., as necessary to access all areas for repair.
- Clean and remove dirt from affected wood surface.
- Remove existing paints with a water-soluble, non-flammable, and non-acidic gel chemical stripper such as Super Bio Strip Gel as made by American Building Restoration Products, Inc.
- Repair areas of wood deterioration. Use WoodEpoxy or LiquidWood as made by Abatron, Inc. Follow manufacturer's instructions.
- Prep and paint surfaces at repairs - see Paint Notes.
- Reinstall hardware, etc.
- Submit data sheets for approval for all substitutes.

**HISTORY COLORADO**

COLORADO HISTORICAL SOCIETY  
1200 BROADWAY  
DENVER, COLORADO 80203

**GRANT HUMPHREYS MANSION FACILITIES IMPROVEMENTS**  
DENVER, COLORADO

CHS PROJECT NO. M - 13050  
**EXTERIOR REPAIRS & MAINTANANCE**

**G. H. WEAVER, PE**

CONSULTING STRUCTURAL ENGINEER  
3 E. MINER ST. WEST CHESTER, PA 19382  
610 - 429 - 4879

## REVISIONS

ISSUED FOR CONSTRUCTION

Title:  
**Specifications & Notes**

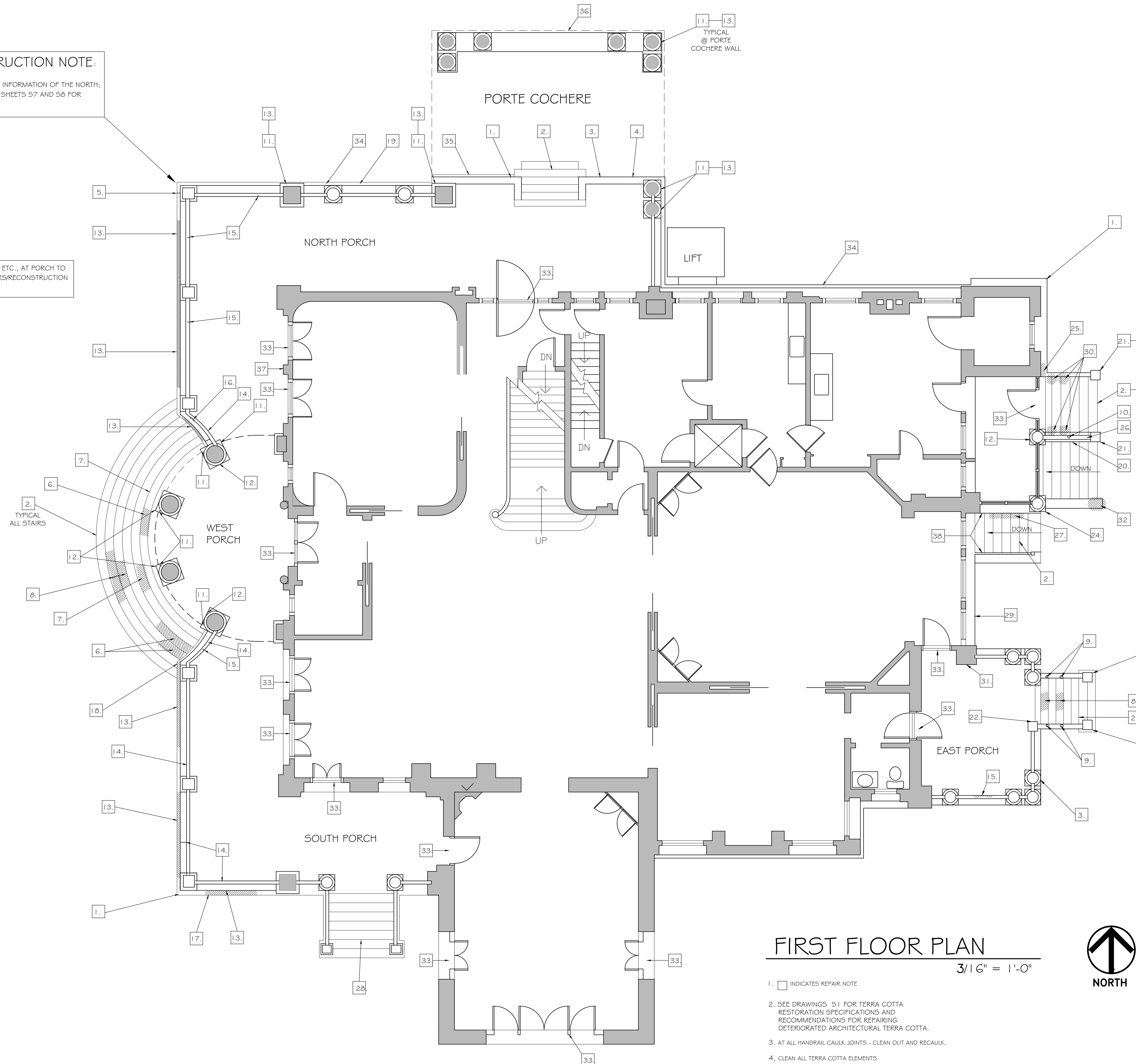
Issue Date:  
**20 MAR 14**  
Project #:  
**2013-024**

**SI**

**PORCH RECONSTRUCTION NOTE:**

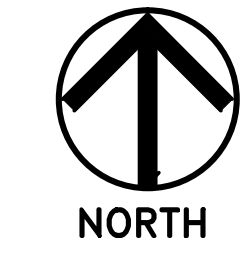
FOR RECONSTRUCTION AND REPAIR INFORMATION OF THE NORTH, WEST & SOUTH PORCH AREAS. SEE SHEETS S7 AND S8 FOR ADDITIONAL INFORMATION.

NOTE: ALL TERRA COTTA, HANDRAILS, ETC., AT PORCH TO BE RESET AFTER PORCH REPAIRS/RECONSTRUCTION ARE COMPLETED



**FIRST FLOOR PLAN**  
3/16" = 1'-0"

- 1. □ INDICATES REPAIR NOTE
- 2. SEE DRAWINGS S1 FOR TERRA COTTA RESTORATION SPECIFICATIONS AND RECOMMENDATIONS FOR REPAIRING DETERIORATED ARCHITECTURAL TERRA COTTA.
- 3. AT ALL HANDRAIL CAULK JOINTS - CLEAN OUT AND RECAULK.
- 4. CLEAN ALL TERRA COTTA ELEMENTS.
- 5. REPAIR AND PAINT ALL SCREEN DOORS AT FIRST FLOOR.



**REPAIR NOTES**

1. DETERIORATED STONE AT BASE OF WALL - REPAIR/REPLACE.
2. CLEAN OUT JOINTS AND RECAULK JOINTS AT STEPS - TYP.
3. DETERIORATED / MISSING MORTAR AT JOINTS OF WALL. CLEAN OUT JOINTS AND REPLACE W/ NEW MORTAR.
4. MISSING MORTAR IN JOINT OF TERRA-COTTA WALL CAP. CLEAN OUT JOINT AND REPLACE MORTAR.
5. VERTICAL CRACK IN MASONRY WALL - REPAIR.
6. SURFACE DETERIORATION OF STONE STEPS - REPAIR OR REPLACE.
7. CORNER OF STONE STEPS BROKEN OFF - REPLACE.
8. STONE STEPS STAIRS - REPLACE.
9. BALUSTRAD BASE CRACKED - REPAIR.
10. BALUSTRAD MISSING - REPLACE.
11. CRACKS/CHIPS IN COLUMN BASE - REPAIR.
12. SEVERE PITTING AND SURFACE FINISH LOSS AT COLUMN BASE - RESURFACE.
13. PITTING AND SURFACE FINISH LOSS AT TERRA-COTTA CAP AT TOP OF WALL - REPAIR.
14. SEVERE PITTING AND SURFACE FINISH LOSS AT HANDRAIL BASE - REPAIR.
15. CRACKS IN HANDRAIL BASE - REPAIR.
16. CHIP IN TOP RAIL OF HANDRAIL - REPAIR.
17. OLD & NEW CRACKS IN TERRA-COTTA CAP AT TOP OF WALL - REPAIR OR REPLACE.
18. CRACK IN VERTICAL MORTAR JOINT AT CORNER OF WALL. CLEAN OUT JOINT AND REPLACE W/ NEW MORTAR.
19. REPAIR CRACKS, SPALLS, CHIPS, ETC. IN TERRA COTTA CAP ALONG TOP OF WALL AT NORTH PORCH.
20. DETERIORATED BRICK - REPAIR OR REPLACE. REPAIR PARGE COAT (BELOW).
21. CORNER OF NEWEL POST CHIPPED - REPAIR.
22. CRACKS IN BASE OF NEWEL POST - REPAIR.
23. SURFACE FINISH LOSS AT NEWEL POST - REPAIR.
24. CRACKS IN COLUMN AT AREA WHERE HANDRAIL ATTACHES - REPAIR.
25. PITTING AND SURFACE FINISH LOSS AT PILASTER - REPAIR.
26. LOOSE BALUSTER - RESET.
27. REPLACE DETERIORATED BRICK.
28. REMOVE AND REPLACE STEPS (ALL).
29. REPOINT WALL BELOW WATER TABLE.
30. STONE STEPS CRACKED - REPAIR.
31. CRACK IN HALF-CAPITAL (TOP) - REPAIR.
32. RESET STONE AT TOP OF WALL.
33. REPAINT EXTERIOR DOORS. MAKE ANY NECESSARY REPAIRS.
34. REPAIR ISOLATED DEFECTS IN WATER TABLE AND LINTELS BELOW. REGLAZE ALL TYP ALONG NORTH ELEVATION.
35. CAULK ALONG BASE OF WALL.
36. RESURFACE TERRA COTTA AT TOP OF WALL, INCLUDING COLUMN BASES. TYP AT PORTE COCHERE WALL.
37. DETERIORATED BRICK AT BASE OF WALL (TYP ALONG WEST WALL) - REPAIR.
38. CLEAN OUT JOINTS AND CAULK BETWEEN STEPS AND WALL.

**HISTORY COLORADO**  
COLORADO HISTORICAL SOCIETY  
1200 BROADWAY  
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**GRANT HUMPHREYS MANSION  
FACILITIES IMPROVEMENTS**  
DENVER, COLORADO  
CHS PROJECT NO. M - 13050  
**EXTERIOR REPAIRS & MAINTANANCE**

**G. H. WEAVER, PE**  
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610-429-4879

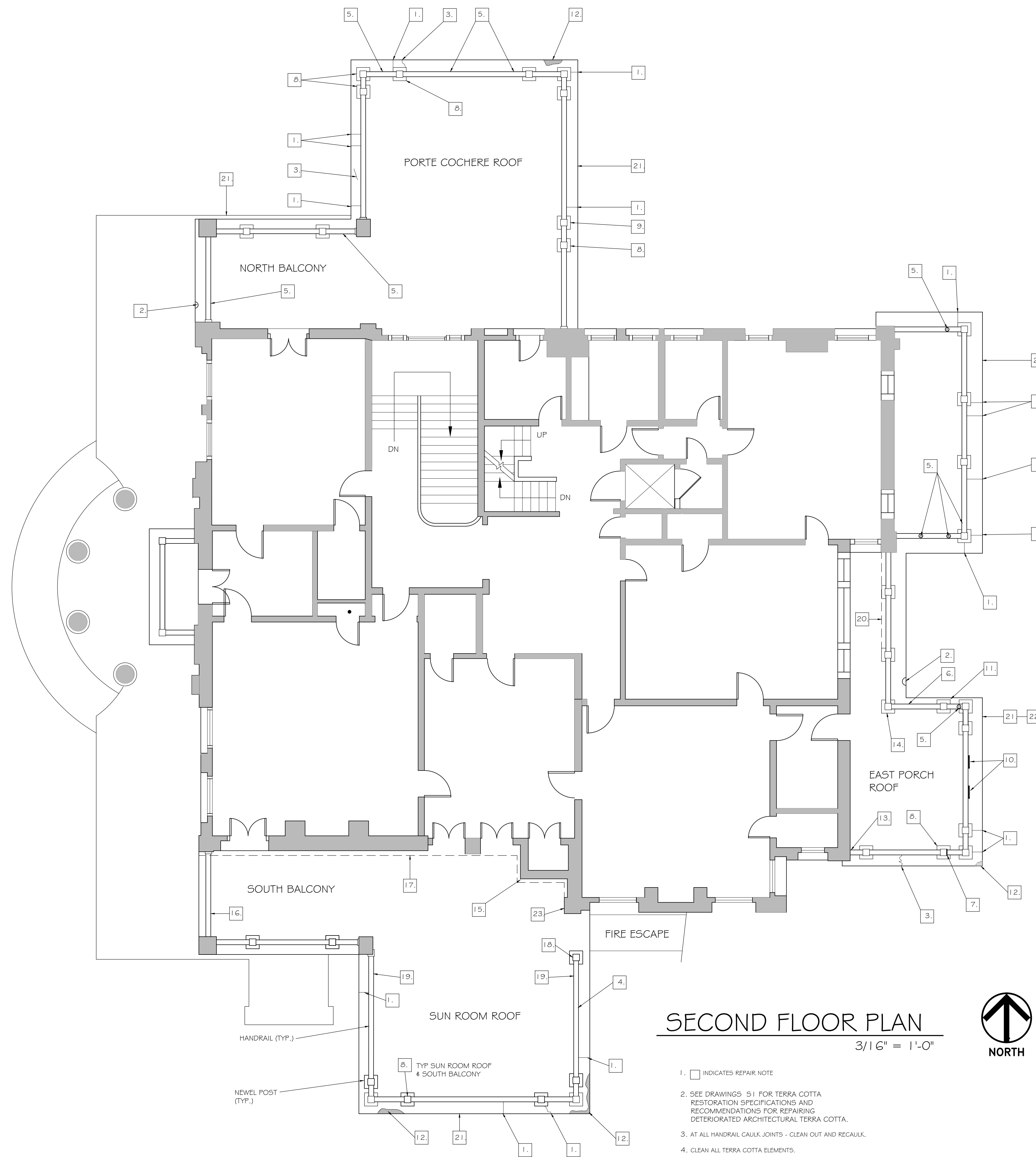
**REVISIONS**

ISSUED FOR CONSTRUCTION

Title:  
**FIRST FLOOR PLAN**

Issue Date:  
**20 MAR 14**  
Project #:  
**2013-024**

**S2**  
Sheet : 2 of 8



**SECOND FLOOR PLAN**  
3/16" = 1'-0"

- 1.  INDICATES REPAIR NOTE
- 2. SEE DRAWINGS S1 FOR TERRA COTTA RESTORATION SPECIFICATIONS AND RECOMMENDATIONS FOR REPAIRING DETERIORATED ARCHITECTURAL TERRA COTTA.
- 3. AT ALL HANDRAIL CAULK JOINTS - CLEAN OUT AND RECAULK.
- 4. CLEAN ALL TERRA COTTA ELEMENTS.

**REPAIR NOTES**

- 1. CRACK IN JOINT COVER OR PROJECTING TERRA COTTA CORNICE ELEMENT - CLEAN & CAULK.
- 2. CHIPPED / SPALLING AT EDGE OF PROJECTING TERRA COTTA CORNICE ELEMENT - REPAIR.
- 3. CRACK IN TOP SURFACE OF PROJECTING TERRA COTTA CORNICE ELEMENT - REPAIR.
- 4. HANDRAIL BALUSTRADES ARE LOOSE - REPAIR OR REPLACE AS NECESSARY TO SECURE HANDRAIL.
- 5. SURFACE DETERIORATION AT TOP OF HANDRAIL - REPAIR.
- 6. CHIPPED / SPALLING AT TOP OF HANDRAIL - REPAIR.
- 7. DETERIORATED CAULK AT HANDRAIL JOINTS. REMOVE DETERIORATED CAULK. CLEAN AND REPLACE WITH NEW CAULKING.
- 8. PITTING / SURFACE DETERIORATION AT NEWEL POST - REPAIR AND REGLAZE. REPOINT AS NECESSARY.
- 9. CHIPPING / SPALLING AT TOP OF NEWEL POST - REPAIR.
- 10. CRACKS AT HANDRAIL BASE - REPAIR OR REPLACE.
- 11. CRACK AT BASE OF NEWEL POST - REPAIR.
- 12. PITTED SURFACE LOSS AT TOP OF PROJECTED TERRA COTTA CORNICE ELEMENT - REPAIR.
- 13. CRACK IN ENGAGED COLUMN WHERE HANDRAIL MEETS COLUMN - REPAIR.
- 14. LOSS OF SURFACE FINISH AT BASE OF FINIALS ATOP NEWEL POST - REPAIR.
- 15. DETERIORATED WOOD AT EDGE OF LOW ROOF PROJECTION - REPAIR & PAINT.
- 16. REPLACE MISSING WOOD TRIM AT INTERIOR OF CEILING BELOW SOUTH BALCONY.
- 17. RECAULK ROOFING JOINT.
- 18. REPLACE MISSING BALL AT TOP OF NEWEL POST FINIAL.
- 19. REPLACE DETERIORATED OLD PATCH AT HANDRAIL BASE.
- 20. RECAULK ROOF FLASHING AT HANDRAIL BASE.
- 21. CLEAN, REGLAZE, AND REPOINT TERRA COTTA CORNICE ELEMENTS OF ENTABLATURE AT ENTIRE ROOF PERIMETER OF NORTH BALCONY, PORTE COCHERE ROOF, SOUTH BALCONY, SUN ROOM ROOF, EAST PORCH ROOF, AND REMAINING LOW ROOF AT EAST ELEVATION.
- 22. CLEAN ENTIRE TERRA COTTA ENTABLATURE AT SOUTH BALCONY AND EAST PORCH ROOF (EXTERIOR AND INTERIOR).
- 23. REGLAZE ENGAGED COLUMN.

**HISTORY COLORADO**  
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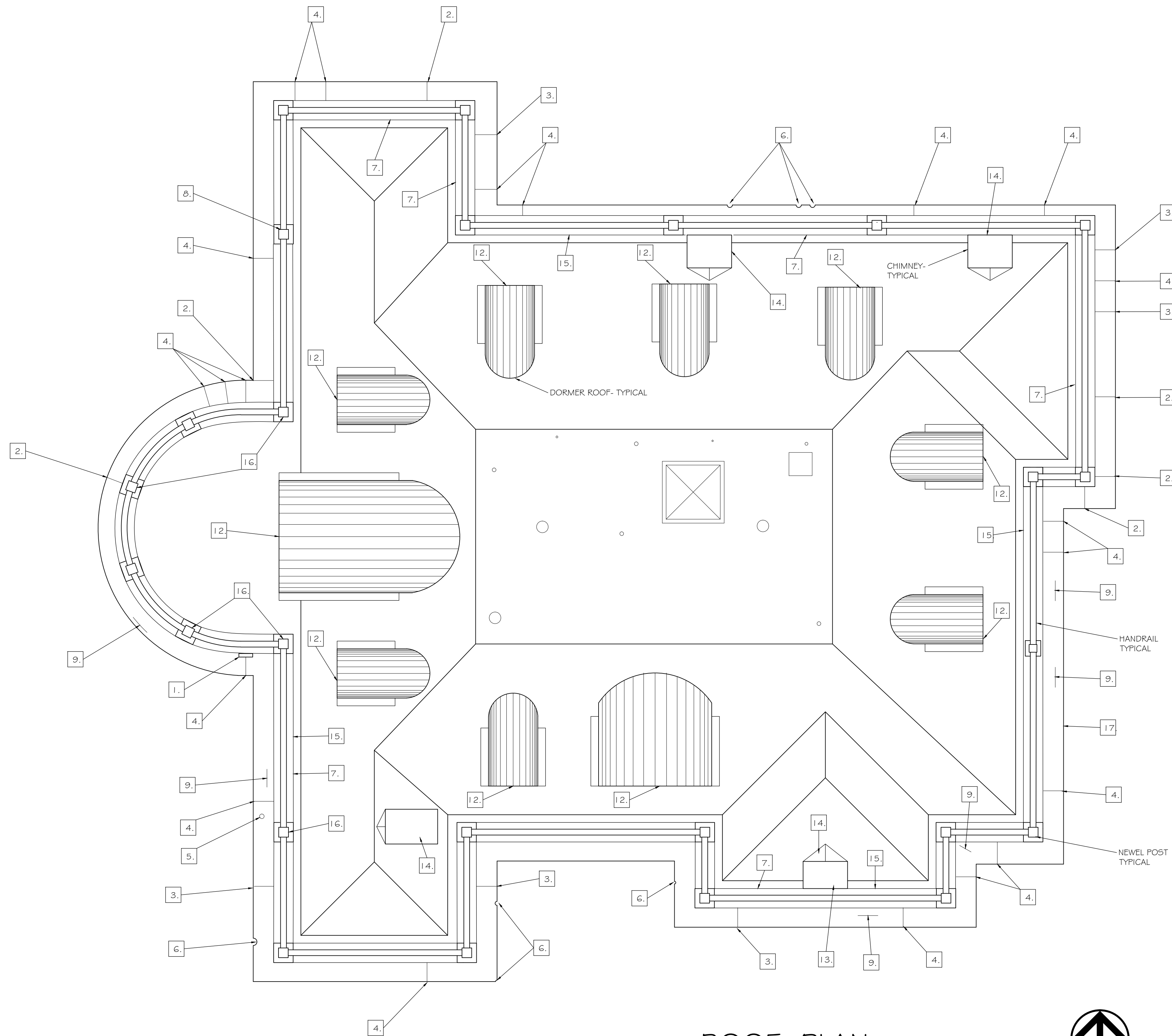
**REVISIONS**

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Title:  
**SECOND FLOOR PLAN**

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**20 MAR 14**  
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**53**  
Sheet : 3 of 8



ROOF PLAN

3/16" = 1'-0"



- 1. □ INDICATES REPAIR NOTE
- 2. SEE DRAWINGS S1 FOR TERRA COTTA RESTORATION SPECIFICATIONS AND RECOMMENDATIONS FOR REPAIRING DETERIORATED ARCHITECTURAL TERRA COTTA.
- 3. AT ALL HANDRAIL CAULK JOINTS - CLEAN OUT AND RECAULK.
- 4. CLEAN ALL TERRA COTTA ELEMENTS.

REPAIR NOTES

- 1. LARGE HOLE IN TOP SURFACE OF PROJECTING TERRA COTTA ELEMENT - REPAIR/PLUG HOLE.
- 2. CRACK IN JOINT COVER OR PROJECTING TERRA COTTA ELEMENT - CLEAN & CAULK.
- 3. SPALLED AND BROKEN JOINT COVER OF PROJECTING TERRA COTTA ELEMENT - REPAIR
- 4. DETERIORATED CAULKING AT JOINT COVER OF PROJECTING TERRA COTTA ELEMENT - REMOVE DETERIORATED CAULK, CLEAN & REPLACE WITH NEW CAULK.
- 5. SMALL HOLE IN TOP SURFACE OF PROJECTING TERRA COTTA ELEMENT - REPAIR/PLUG HOLE.
- 6. CHIPPED / SPALLING AT EDGE OF PROJECTING TERRA COTTA ELEMENT - REPAIR .
- 7. GAP IN CAULK IN FLASHING AT BACKSIDE OF HANDRAIL BASE - CLEAN AND RECAULK AT ENTIRE PERIMETER OF ROOF. ALTERNATE ADDITIONAL REPAIR: ADD COUNTER FLASHING
- 8. DETERIORATED CAULK AT HANDRAIL CONNECTION TO NEWEL POST - REMOVE DETERIORATED CAULK. CLEAN AND REPLACE WITH NEW CAULKING.
- 9. SMALL CRACK IN TOP SURFACE OF PROJECTING TERRA COTTA ELEMENT - REPAIR.
- 10. SURFACE FINISH LOSS AT HANDRAIL BASE - REPAIR.
- 11. SEVERE PITTING AND SURFACE FINISH LOSS AT PROJECTING TERRA COTTA ELEMENT - REPAIR.
- 12. PAINT FINISH DETERIORATION AND POSSIBLE WOOD DETERIORATION AT BASE AND FRONT OF PROJECTING WING OF DORMER - REPAIR DETERIORATED WOOD & PAINT COMPLETE ASSEMBLY, INCLUDING REPAIRS AND PAINTING OF WINDOWS AND DOORS.
- 13. REPLACE CONCRETE CAP AT CHIMNEY.
- 14. REPAIR TERRA COTTA ELEMENTS AT CHIMNEY. REPOINT TERRA COTTA AND BRICK AS NEEDED.
- 15. REPAINT INSIDE SURFACE OF HANDRAIL BASE AT ENTIRE PERIMETER OF ROOF.
- 16. REPAINT FINIAL AT TOP OF NEWEL POST.
- 17. CLEAN, REGLAZE, AND REPOINT TERRA COTTA CORNICE ELEMENTS OF ENTABLATURE AT ENTIRE PERIMETER OF ROOF.

**HISTORY COLORADO**  
 COLORADO HISTORICAL SOCIETY  
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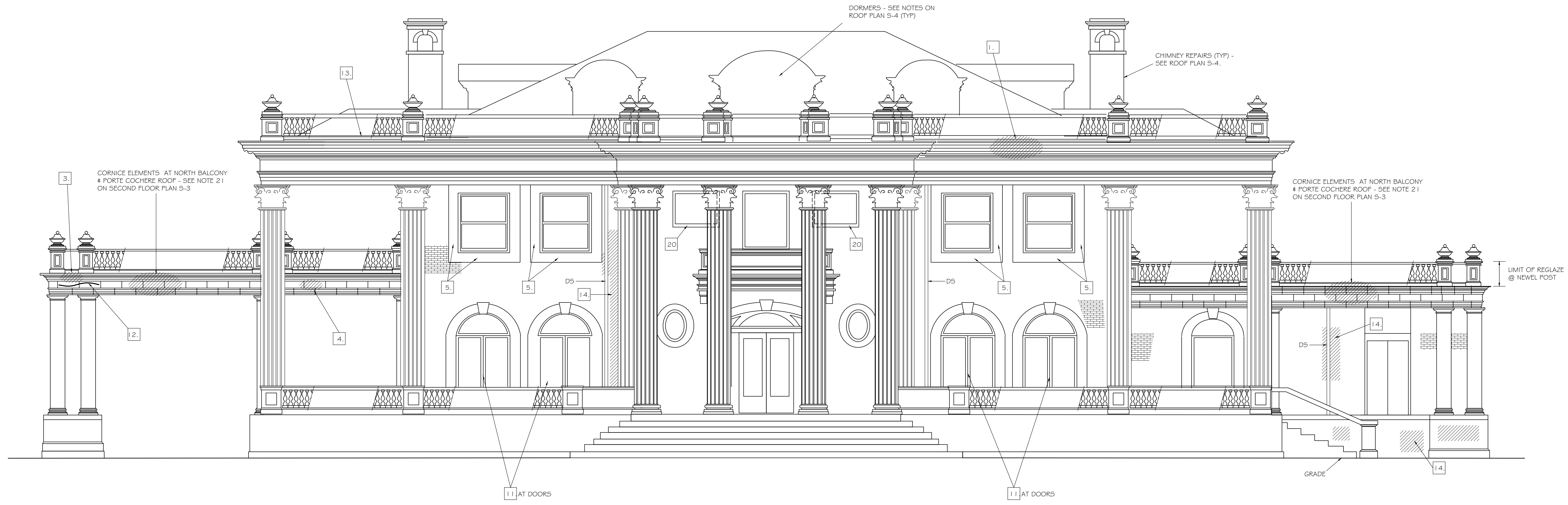
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 ROOF PLAN  
 Issue Date:  
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 2013-024

**S4**  
 Sheet : 4 of 8



**WEST ELEVATION**  
 3/16" = 1'-0"

**CONTRACTOR NOTES:**

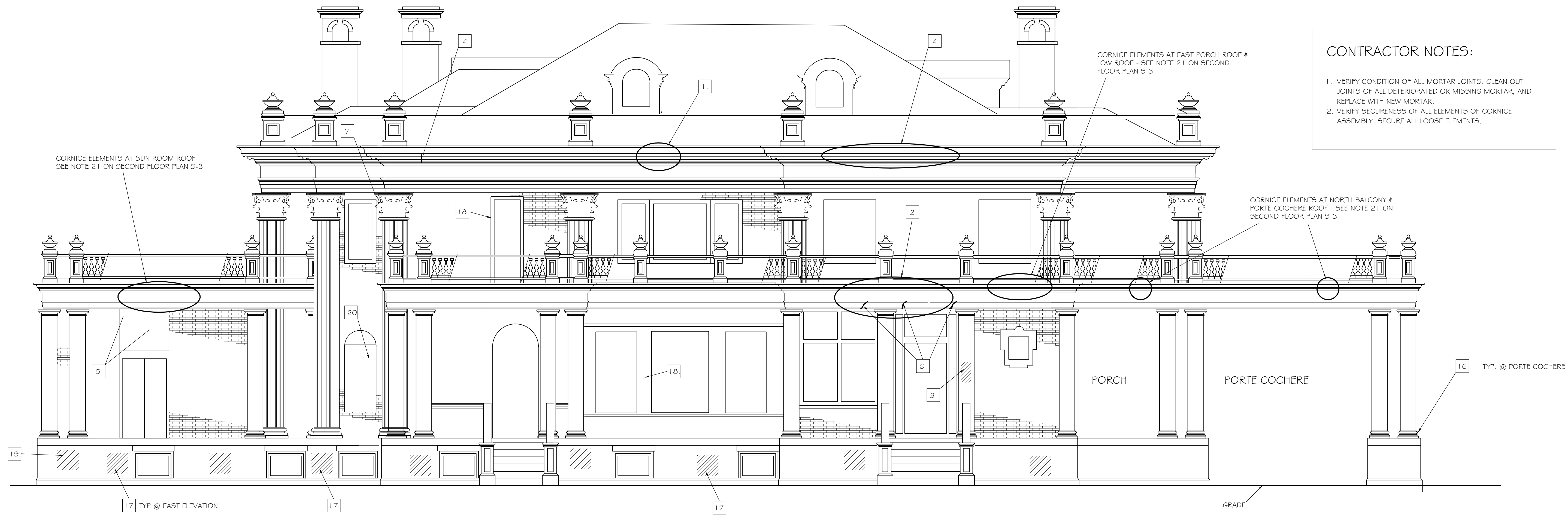
1. VERIFY CONDITION OF ALL MORTAR JOINTS. CLEAN OUT JOINTS OF ALL DETERIORATED OR MISSING MORTAR, AND REPLACE WITH NEW MORTAR.
2. VERIFY SECURENESS OF ALL ELEMENTS OF CORNICE ASSEMBLY. SECURE ALL LOOSE ELEMENTS.

- REPAIR NOTES**
1. CLEAN, REGLAZE, AND REPOINT TERRA COTTA CORNICE ELEMENTS OF ENTABLATURE AT ENTIRE PERIMETER OF ROOF.
  2. DETERIORATED OR MISSING MORTAR IN JOINTS AT SIDE OF BRACKET. REMOVE DETERIORATED MORTAR, CLEAN JOINT, REPLACE WITH NEW MORTAR.
  3. PITTED SURFACE/ SURFACE FINISH LOSS AT UPPER PIECE OF TERRA COTTA ASSEMBLY - REPAIR.
  4. PITTED SURFACE/ SURFACE FINISH LOSS AT UPPER PIECE OF TERRA COTTA ASSEMBLY - REPAIR.
  5. REPOINT AND CLEAN TERRA COTTA SURROUNDS INCLUDING SILLS AS NECESSARY AT WINDOWS AND DOORS.
  6. DISCOLORIZATION OF TERRA COTTA ASSEMBLY - CLEAN.
  7. CHIPPED IN LOWER PORTION OF TERRA COTTA ASSEMBLY - REPAIR.
  8. DISCOLORIZATION AT INSIDE SURFACES OF TERRA COTTA ASSEMBLY - CLEAN.
  9. DISCOLORIZATION OF SURFACE FINISH AT NEWEL POSTS - CLEAN.
  10. DETERIORATED CAULK JOINT AT HANDRAIL JOINT - REPAIR AND INSTALL NEW CAULK.
  11. PAINT FINISH DETERIORATION AND POSSIBLE WOOD DETERIORATION AT LOWER SECTION OF SCREEN DOORS - REPAIR DETERIORATED WOOD & PAINT COMPLETE ASSEMBLY.
  12. CRACK IN TERRA COTTA ASSEMBLY - REPAIR.
  13. REGLAZE BALUSTRAD BASE AT FAILED SURFACES - TYP AT PERIMETER OF ROOF.
  14. CLEAN OUT AND REPOINT DETERIORATED MORTAR JOINTS.
  15. REPAIR/REPLACE DETERIORATED BRICK.
  16. REPAIR/REPLACE TERRA COTTA.
  17. CLEAN AND PAINT BALCONY RAILING.
  18. CLEAN, REPAIR AND PAINT WINDOWS AND DOORS.
  19. REMOVE ANCHORS AND PATCH MASONRY.
  20. REPOINT TERRA COTTA SILL.



**SOUTH ELEVATION**  
 3/16" = 1'-0"

1.  INDICATES REPAIR NOTE
2. SEE DRAWINGS S-1 FOR TERRA COTTA RESTORATION SPECIFICATIONS AND RECOMMENDATIONS FOR REPAIRING DETERIORATED ARCHITECTURAL TERRA COTTA.
  3. AT ALL HANDRAIL CAULK JOINTS - CLEAN OUT AND RECAULK.
  4. CLEAN ALL TERRA COTTA ELEMENTS.
  5. DS INDICATES DOWN SPOUT.



**EAST ELEVATION**  
3/16" = 1'-0"

**CONTRACTOR NOTES:**

1. VERIFY CONDITION OF ALL MORTAR JOINTS. CLEAN OUT JOINTS OF ALL DETERIORATED OR MISSING MORTAR, AND REPLACE WITH NEW MORTAR.
2. VERIFY SECURENESS OF ALL ELEMENTS OF CORNICE ASSEMBLY. SECURE ALL LOOSE ELEMENTS.



**NORTH SIDE ELEVATION**  
3/16" = 1'-0"

**REPAIR NOTES**

1. CLEAN, REGLAZE, AND REPOINT ENTIRE CORNICE ELEMENTS OF ENTABLATURE AT ENTIRE PERIMETER OF ROOF.
2. BULGE IN TERRA COTTA ASSEMBLY - RESET.
3. SURFACE DETERIORATION AT ENGAGED COLUMN - REPAIR.
4. DETERIORATED OR MISSING MORTAR IN JOINTS OF BRACKET AT TERRA COTTA CORNICE ASSEMBLY. REMOVE DETERIORATED MORTAR, CLEAN JOINT, REPLACE WITH NEW MORTAR.
5. DETERIORATED AND MISSING MORTAR IN JOINTS - REPAIR AND INSTALL NEW MORTAR.
6. CRACK IN TERRA COTTA ASSEMBLY - REPAIR OR REPLACE ELEMENT.
7. SPALLED CORNER OF COLUMN CAPITAL - REPAIR.
8. SPALL AT SIDE OF BRACKET OF TERRA COTTA ASSEMBLY - REPAIR.
9. SURFACE DETERIORATION OF BRICK - REPAIR/REPOINT.
10. CRACK IN TERRA COTTA ASSEMBLY - REPAIR OR REPLACE ELEMENT.
11. FITTING, SURFACE EROSION, AND SPALLING OF TERRA COTTA AT WINDOW SURROUND - REPAIR.
12. EXISTING ANCHOR INSERT HOLE IN BRICK - REPAIR/PATCH.
13. SPALLED SURFACE AT TERRA COTTA ASSEMBLY - REPAIR.
14. DISCOLORATION OF TERRA COTTA AT BACKSIDE OF COLUMN - CLEAN.
15. SPALLED AREA OF TERRA COTTA AT OLD ANCHOR INSERT - REPAIR.
16. SURFACE DETERIORATION AND CHIPPING AT COLUMN BASE - REPAIR.
17. REPOINT BRICK (BELOW WATER TABLE).
18. CLEAN TERRA COTTA WINDOW/DOOR SURROUNDS. TYP ALL WINDOWS & DOORS.
19. REPAIR/REPLACE DETERIORATED BRICK.
20. CLEAN, REPAIR, AND PAINT WINDOW.

**NOTES:**

1. [ ] INDICATES REPAIR NOTE
2. SEE DRAWINGS S1 FOR TERRA COTTA RESTORATION SPECIFICATIONS AND RECOMMENDATIONS FOR REPAIRING DETERIORATED ARCHITECTURAL TERRA COTTA.
3. AT ALL HANDRAIL CAULK JOINTS - CLEAN OUT AND RECAULK.
4. CLEAN ALL TERRA COTTA ELEMENTS.

**HISTORY COLORADO**  
COLORADO HISTORICAL SOCIETY  
1200 BROADWAY  
DENVER, COLORADO 80203

**GRANT HUMPHREYS MANSION**  
FACILITIES IMPROVEMENTS  
DENVER, COLORADO  
CHS PROJECT NO. M-13050  
**EXTERIOR REPAIRS & MAINTANANCE**

**G. H. WEAVER, PE**  
CONSULTING STRUCTURAL ENGINEER  
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610-429-4879

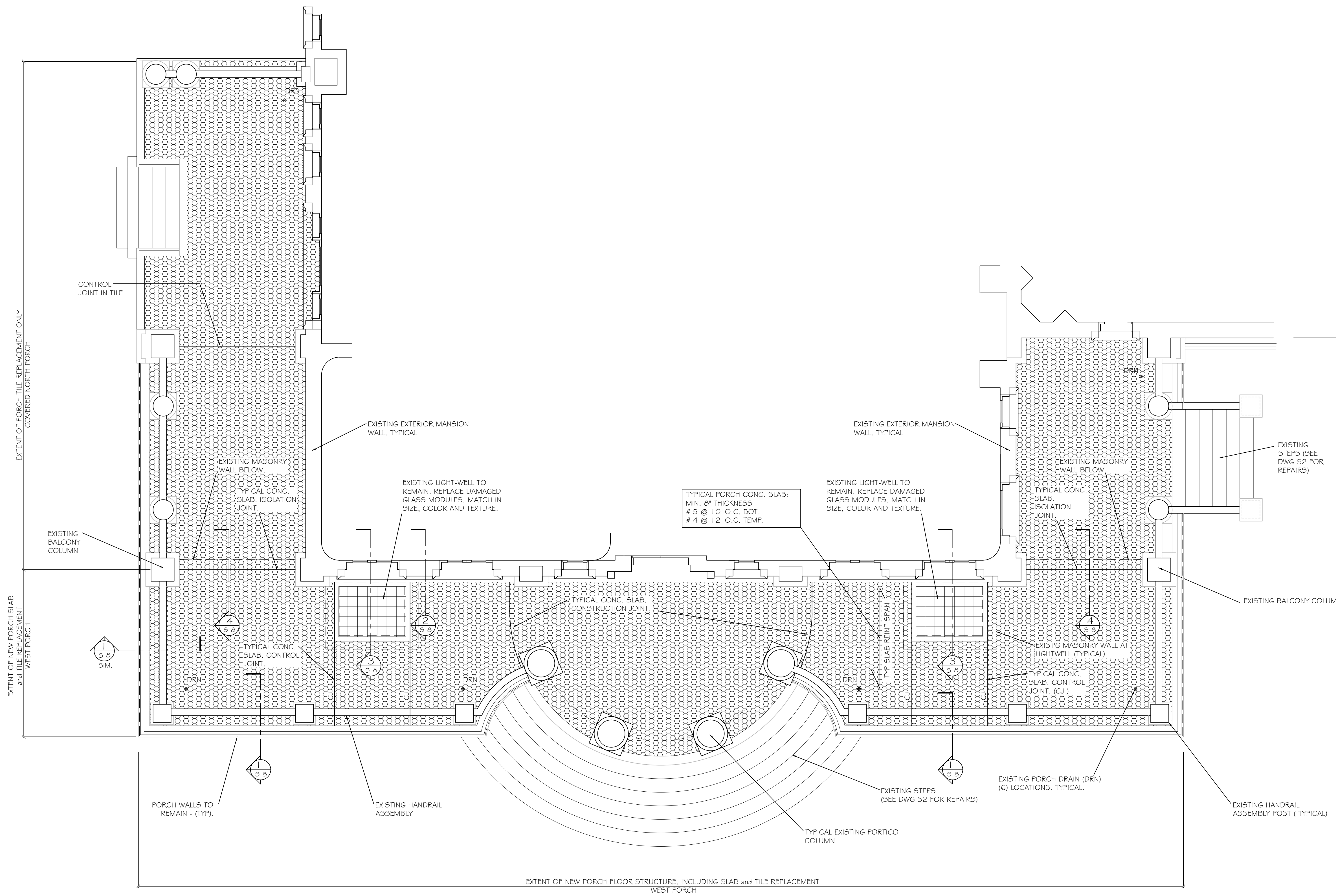
**REVISIONS**

NO.	DESCRIPTION

Title:  
**East & North Elevations**

Issue Date:  
**20 MAR 14**  
Project #:  
**2013-024**

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**PORCH PLAN**  
SCALE: 1/4" = 1'-0"

1. CAREFULLY DISMANTLE HANDRAIL ASSEMBLY AT PORCH AS NECESSARY TO REMOVE EXISTING PORCH FLOOR STRUCTURE AND TO INSTALL NEW PORCH FLOOR STRUCTURE & FINISH.
2. REPAIR OR REPLACE ANY HANDRAIL ELEMENTS OR TERRA COTTA WALL CAP PIECES THAT MAY HAVE BEEN DAMAGED DURING THE PROCESS OF DEMOLITION AND CONSTRUCTION.
3. REPLACE ANY LOOSE OR MISSING GROUT AT JOINTS OF TERRA COTTA PIECES OR BRICK.
4. CLEAN ALL EXISTING TERRA COTTA PIECES THAT ARE TO BE RETAINED FOR REINSTALLATION.
5. ALL NEW FLOOR TILE SHALL MATCH EXISTING TILE IN SIZE, SHAPES, COLOR, PATTERN AND FINISH. SUBMIT SAMPLE FOR APPROVAL. SAMPLES TO BE APPROVED BY THE COLORADO HISTORICAL SOCIETY.
6. ALL GROUTS, EPOXY MORTARS, AND WATERPROOF MEMBRANES SHOULD BE SUBMITTED FOR APPROVAL TO ENGINEER.
7. VERIFY CONDITION OF EXISTING PORCH DRAINS. REPLACE WITH MATCHING DRAIN FIXTURE UNIT OF LIKE KIND IF DETERIORATED OR DAMAGED DURING DEMOLITION OR CONSTRUCTION.
8. PITCH NEW SLAB TO DRAIN. SLOPE SLAB TO EXTERIOR EDGES.
9. FOR TERRA COTTA SPECIFICATIONS AND ADDITIONAL NOTES. SEE DRAWING S1.
10. FOR TERRA COTTA REPAIRS, SEE DWGS S2, S5, & S6.
11. FOR TYPICAL SLAB CONSTRUCTION OR CONTROL JOINT DETAILS SEE DWG S8.
12. FOR TYPICAL EXTERIOR TILE INSTALLATION DETAIL SEE DWG S8.

CAREFULLY REMOVE EXISTING PORCH SLAB, BRICK ARCHES, AND STEEL SUPPORT BEAMS - WEST PORCH ONLY



**GENERAL NOTES**

- GENERAL CONDITIONS:
1. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO STARTING WORK. NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
  2. CONTRACTOR SHALL TAKE ALL PRECAUTIONS TO NOT DAMAGE THE EXISTING BUILDING DURING DEMOLITION AND CONSTRUCTION.
  3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL SAFETY PRECAUTIONS AND REGULATIONS DURING THE WORK. ALL WORK SHALL BE IN ACCORDANCE WITH LOCAL BUILDING CODES.
  4. ALL SHORING AND TEMPORARY BRACING DURING DEMOLITION AND CONSTRUCTION IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
  5. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR THE METHODS, TECHNIQUES AND SEQUENCES OF PROCEDURES TO PERFORM THE WORK. THE SUPERVISION OF THE WORK IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
  6. ALL WORK MUST BE COMPLETED IN ACCORDANCE WITH THE ENGINEER'S DRAWINGS OR WRITTEN INSTRUCTIONS.
  7. ALL BACKFILL SHALL BE GRANULAR MATERIAL, DEPOSITED AND COMPACTED IN 8" MAXIMUM LAYERS. COMPACTION SHALL HAVE A MINIMUM 95% OF MAXIMUM DENSITY AT OPTIMUM MOISTURE CONTENT, IN ACCORDANCE WITH ASTM D 1557 (MODIFIED PROCTOR) METHOD D.

- CONCRETE:
1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE, ACI 318 AND ACI 301. CONCRETE POURED IN HOT WEATHER SHALL BE IN ACCORDANCE WITH ACI 305. CONCRETE POURED IN COLD WEATHER SHALL BE IN ACCORDANCE WITH ACI 306.
  2. CONCRETE SHALL BE READY-MIXED IN ACCORDANCE WITH ASTM C-94.
  3. CONCRETE MATERIALS:  
PORTLAND CEMENT: ASTM C 150, TYPE I (UNLESS NOTED OTHERWISE)  
FLY ASH: ASTM C 618, CLASS F (LIMIT CONTENT TO 25 PERCENT OF CEMENTITIOUS MATERIALS).  
NORMAL WEIGHT AGGREGATES: ASTM C 33.  
WATER: SHALL BE POTABLE AND FREE OF DELETERIOUS MATERIALS.
  4. ADMIXTURES SHALL BE CERTIFIED BY THE MANUFACTURER TO CONTAIN NOT MORE THAN 0.1 PERCENT WATERSOLUBLE CHLORIDE IONS BY MASS OF CEMENTITIOUS MATERIAL AND TO BE COMPATIBLE WITH OTHER ADMIXTURES AND CEMENTITIOUS MATERIALS.  
AIR-ENTRAINING ADMIXTURE: ASTM C 260.  
WATER-REDUCING ADMIXTURE: ASTM C494, TYPE A.  
HIGH RANGE, WATER-REDUCING ADMIXTURE: ASTM C494, TYPE F.  
WATER-REDUCING AND ACCELERATING ADMIXTURE: ASTM C 494, TYPE E.  
WATER-REDUCING AND RETARDING ADMIXTURE: ASTM C494, TYPE D.
  5. CONCRETE SHALL CONFORM TO THE FOLLOWING COMPRESSIVE STRENGTH, SLUMP AND WATER/CEMENT RATIO REQUIREMENTS:  
CONCRETE MIN. F C (28 DAYS) : 4000 PSI  
SLUMP = 2" TO 4"  
W/C RATIO = .44  
\*AT CONTRACTOR'S OPTION, AN APPROVED ADMIXTURE MAY BE USED TO PRODUCE FLOWABLE CONCRETE. MAXIMUM SLUMP SHALL NOT EXCEED 10 INCHES.\*
  6. THE CONTRACTOR SHALL SUBMIT TEST RESULTS OF THE PROPOSED CONCRETE MIXES ALONG WITH THE MANUFACTURER'S TECHNICAL DATA FOR APPROVAL PRIOR TO POURING OF CONCRETE.
  7. ALL CONCRETE TO BE PERMANENTLY EXPOSED TO WEATHER SHALL BE AIR ENTRAINED TO 5% (+-1%) WITH AN ADMIXTURE THAT CONFORMS TO ASTM C-260.
  8. ALL REINFORCING STEEL SHALL CONFORM TO ASTM A-615. GRADE 60 AND ALL WELDED WIRE FABRIC SHALL CONFORM TO ASTM A-185.
  9. ALL REINFORCING STEEL SHALL BE SET AND TIED IN PLACE PRIOR TO POURING OF CONCRETE. DO NOT FIELD BEND BARS PARTIALLY EMBEDDED IN HARDENED CONCRETE UNLESS SPECIFICALLY INDICATED OR APPROVED BY THE ENGINEER.
  10. REINFORCING STEEL, INCLUDING HOOKS AND BENDS, SHALL BE DETAILED IN ACCORDANCE WITH ACI 315. ALL REINFORCING INDICATED AS BOTTOM REINFORCING TO BE ONE PIECE (NO SPLICES). REINFORCING INDICATED AS TEMP REINFORCING TO BE CONTINUOUS AND SPLICED AS NECESSARY BY LAPPING REINFORCING A MIN OF 24"
  11. THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH DOCUMENTATION THAT ALL MATERIALS CONFORM TO THE QUALITY STANDARDS SPECIFIED.

DESIGN CRITERIA :  
1. PORCH FLOOR LIVE LOAD = 100 PSF

**HISTORY COLORADO**  
COLORADO HISTORICAL SOCIETY  
1200 BROADWAY  
DENVER, COLORADO 80203

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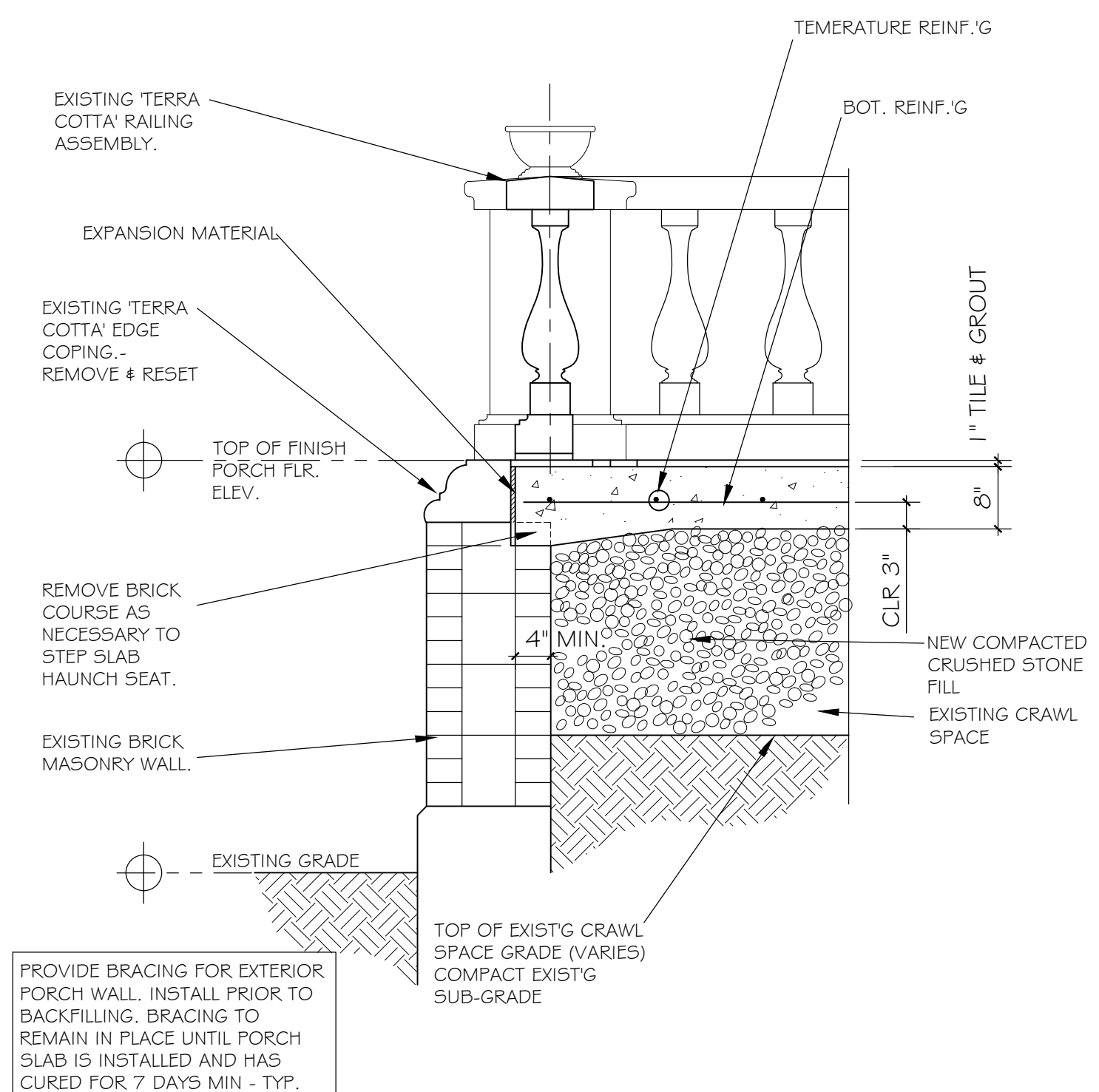
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**REVISIONS**  
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Title :  
**PORCH PLAN and NOTES**

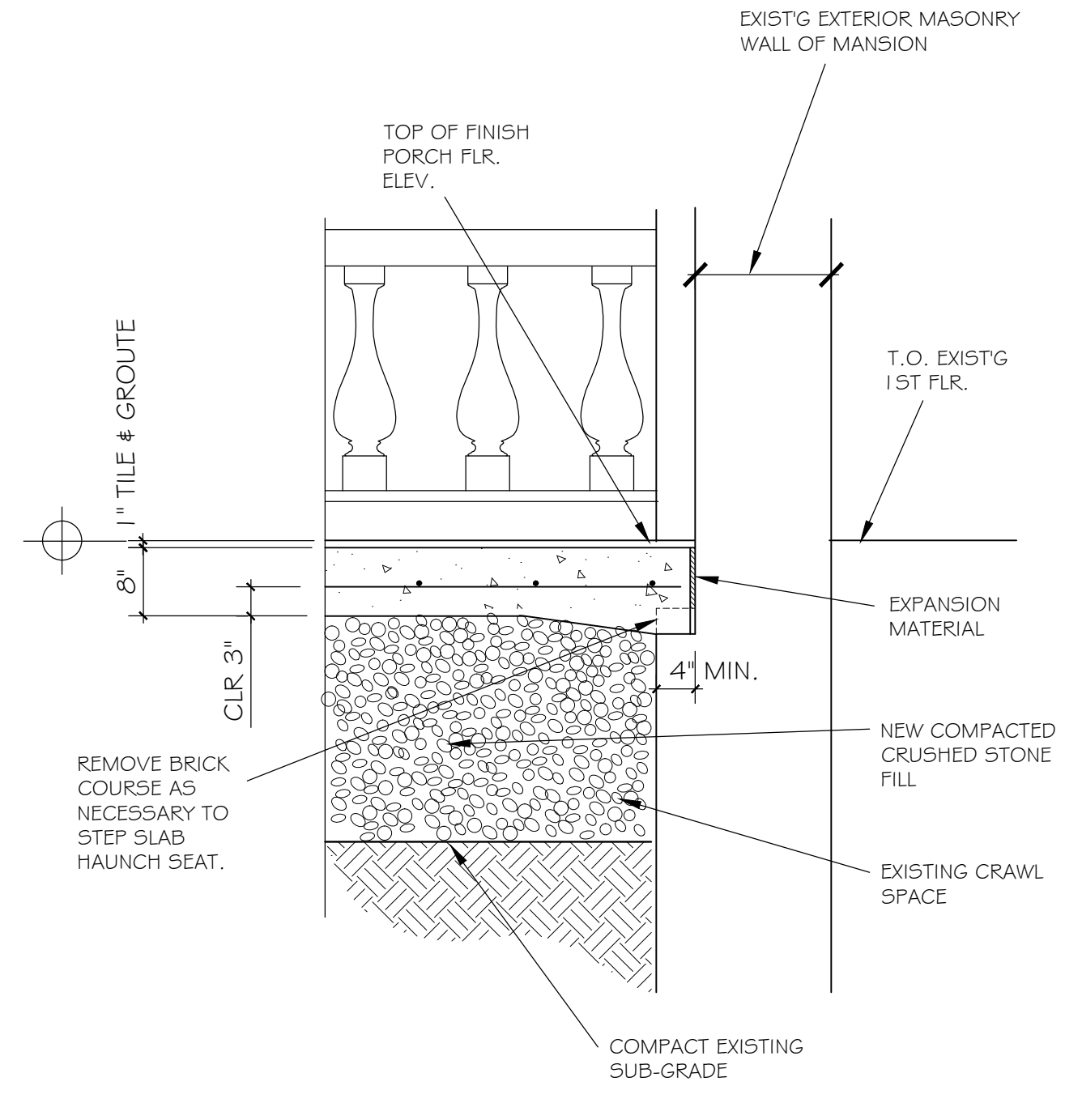
Issue Date:  
**20 MAR 14**  
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Sheet : 7 of 8

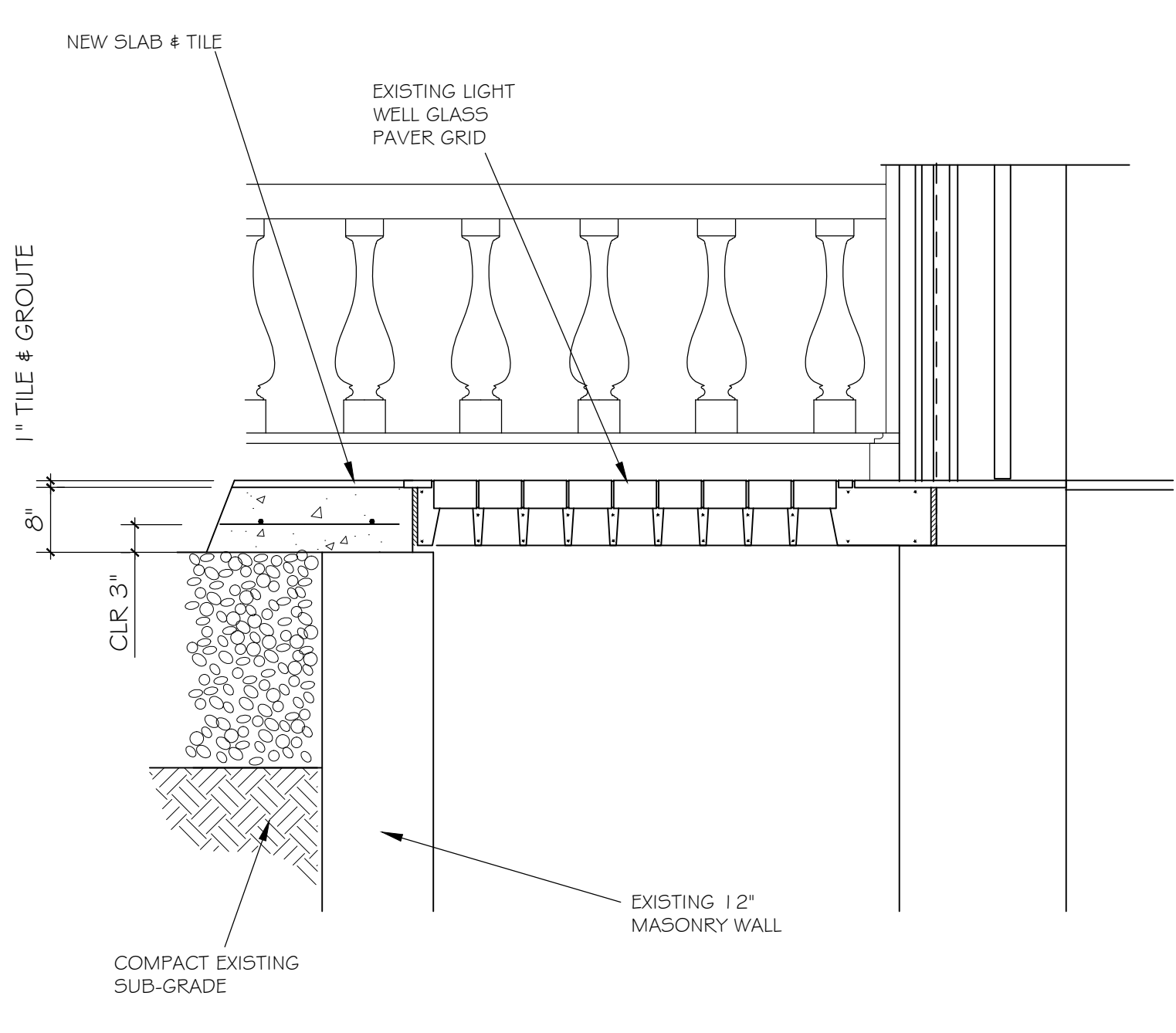


1 SECTION @ EXTERIOR CONC. SLAB EDGE  
SCALE: 3/4" = 1'-0"

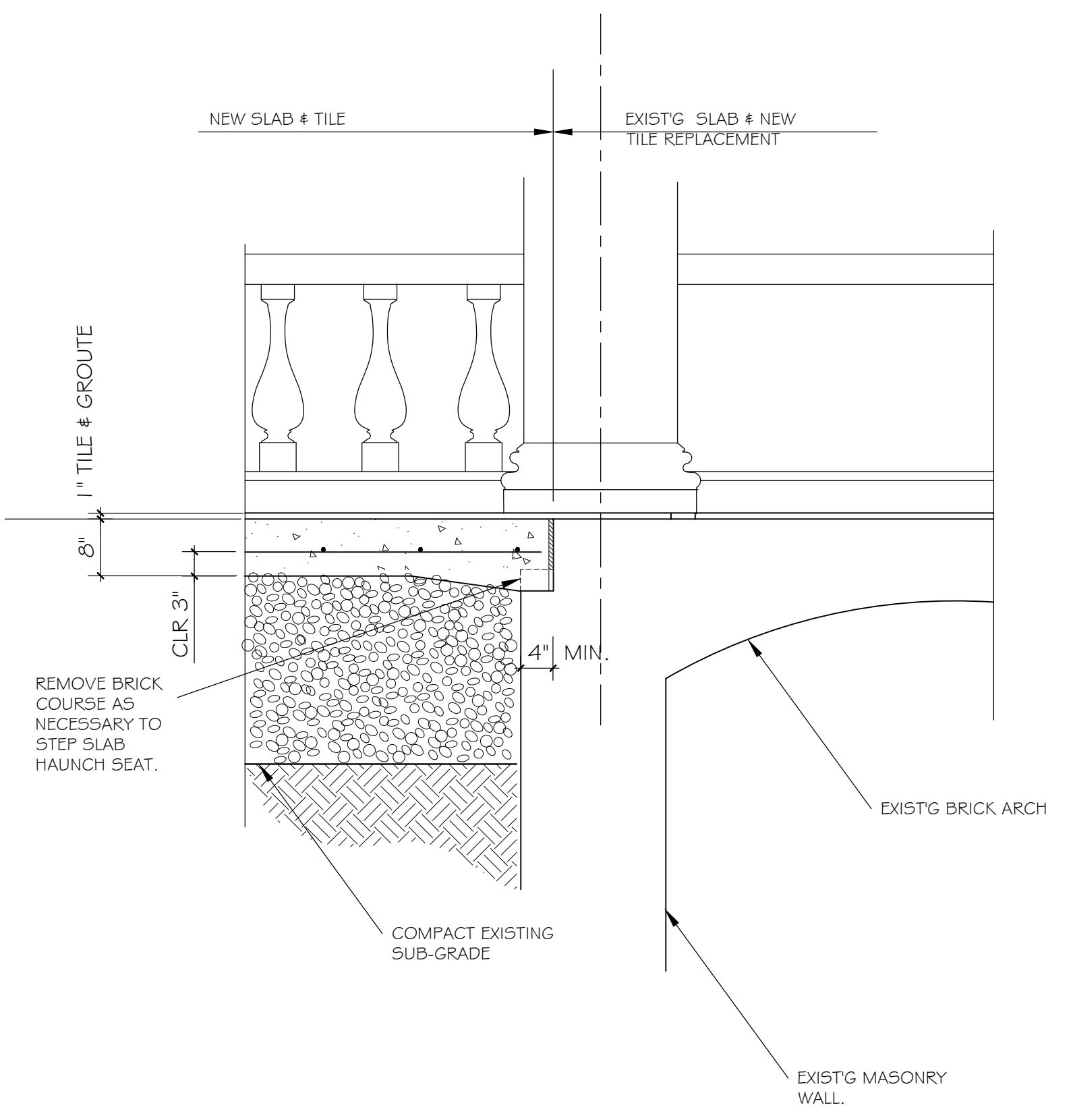
PROVIDE BRACING FOR EXTERIOR PORCH WALL. INSTALL PRIOR TO BACKFILLING. BRACING TO REMAIN IN PLACE UNTIL PORCH SLAB IS INSTALLED AND HAS CURED FOR 7 DAYS MIN - TYP.



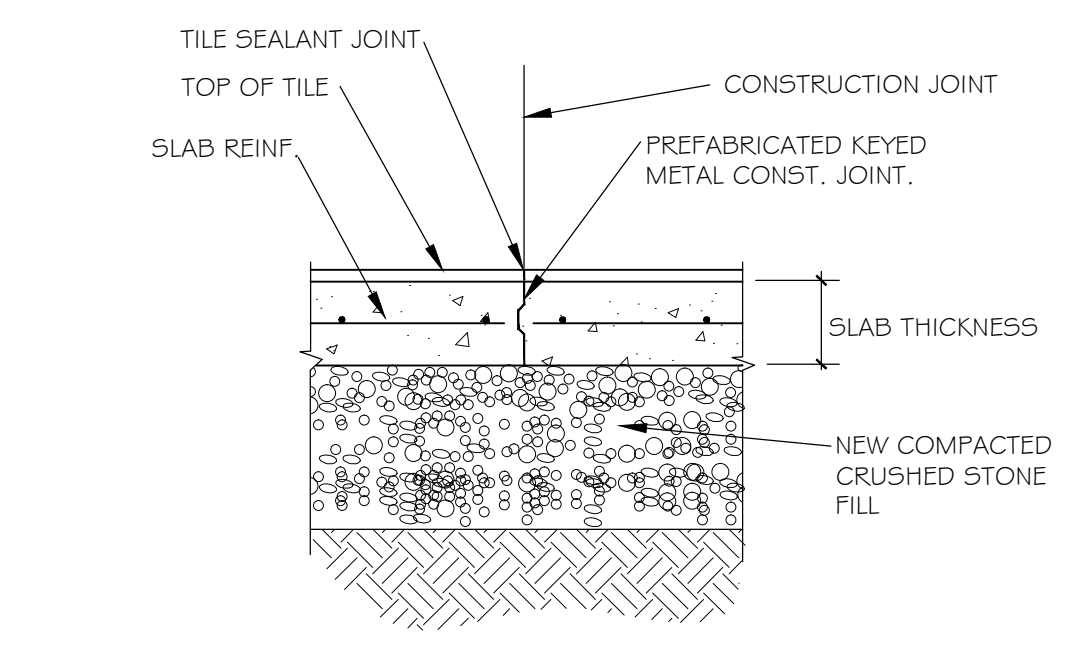
2 SECTION @ INTERIOR CONC. SLAB EDGE  
SCALE: 3/4" = 1'-0"



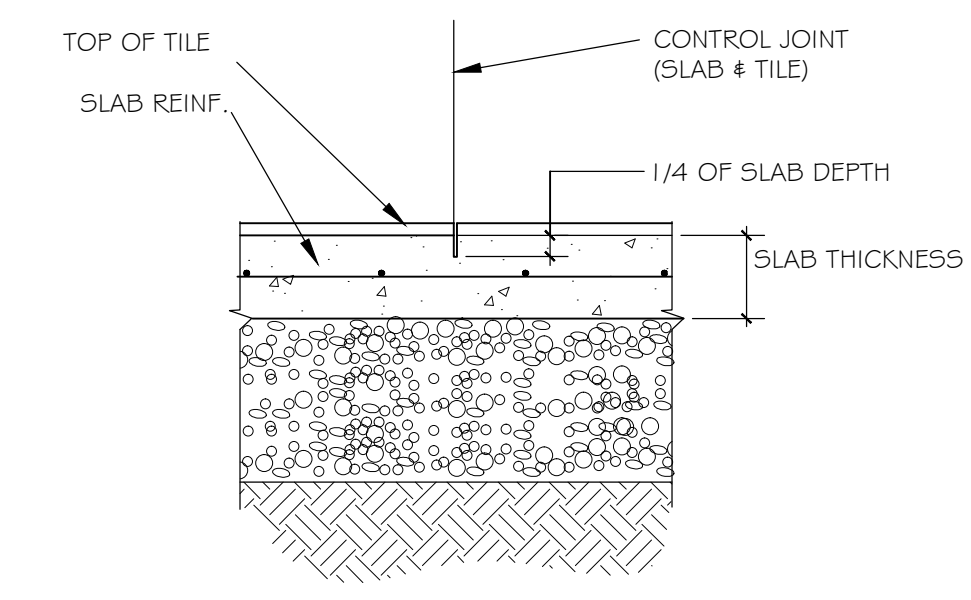
3 SECTION @ EXTERIOR GLASS PAVER LIGHTWELL  
SCALE: 3/4" = 1'-0"



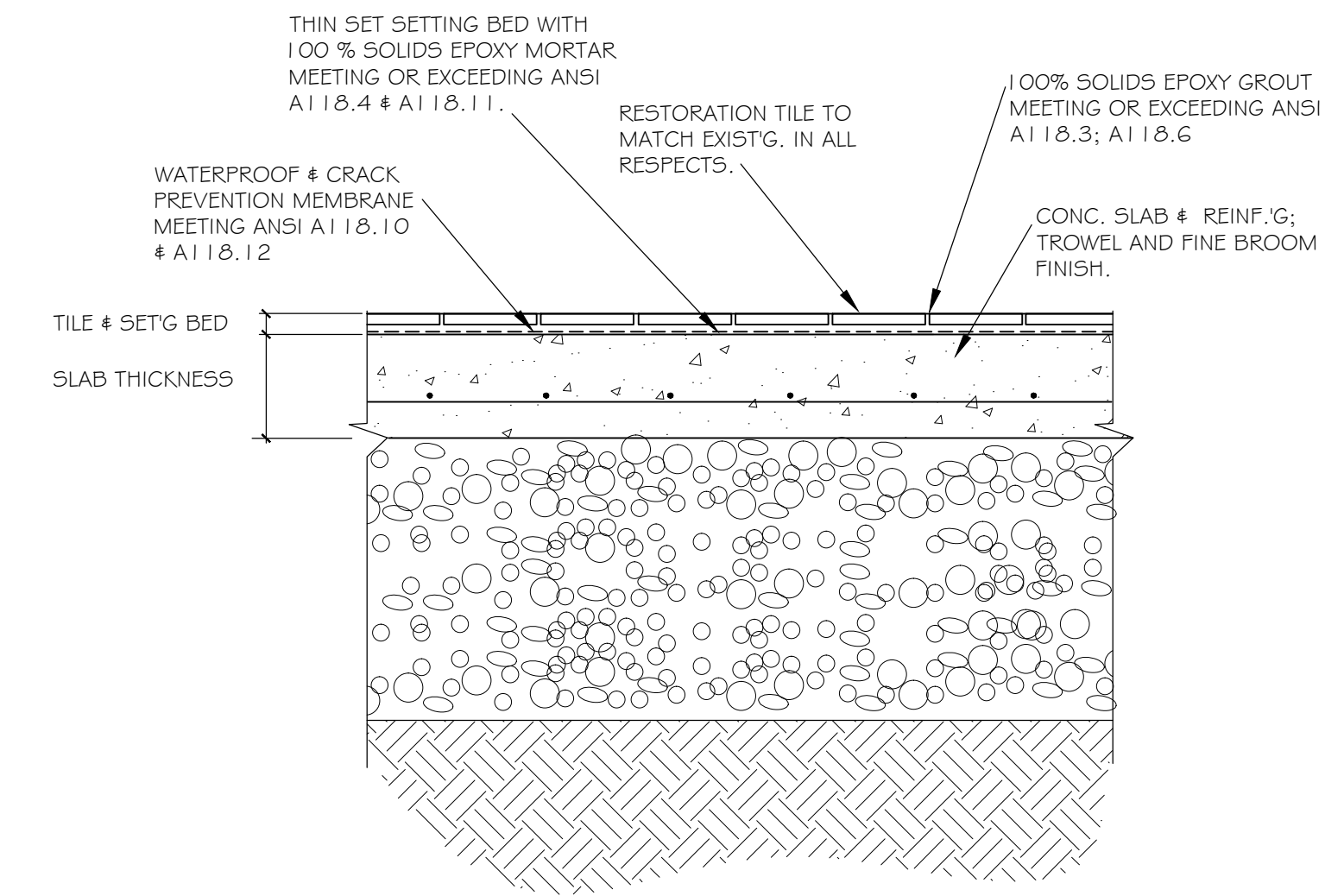
4 SECTION  
SCALE: 3/4" = 1'-0"



5 TYPICAL SLAB CONSTRUCTION JOINT - OPTIONAL CONTROL JOINT.  
SCALE: 1" = 1'-0"



6 TYPICAL SLAB CONTROL JOINT  
SCALE: 1" = 1'-0"



7 TYPICAL EXTERIOR TILE INSTALLATION DETAIL  
SCALE: 1 1/2" = 1'-0"

**HISTORY COLORADO**  
COLORADO HISTORICAL SOCIETY  
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**SECTIONS & DETAILS**  
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