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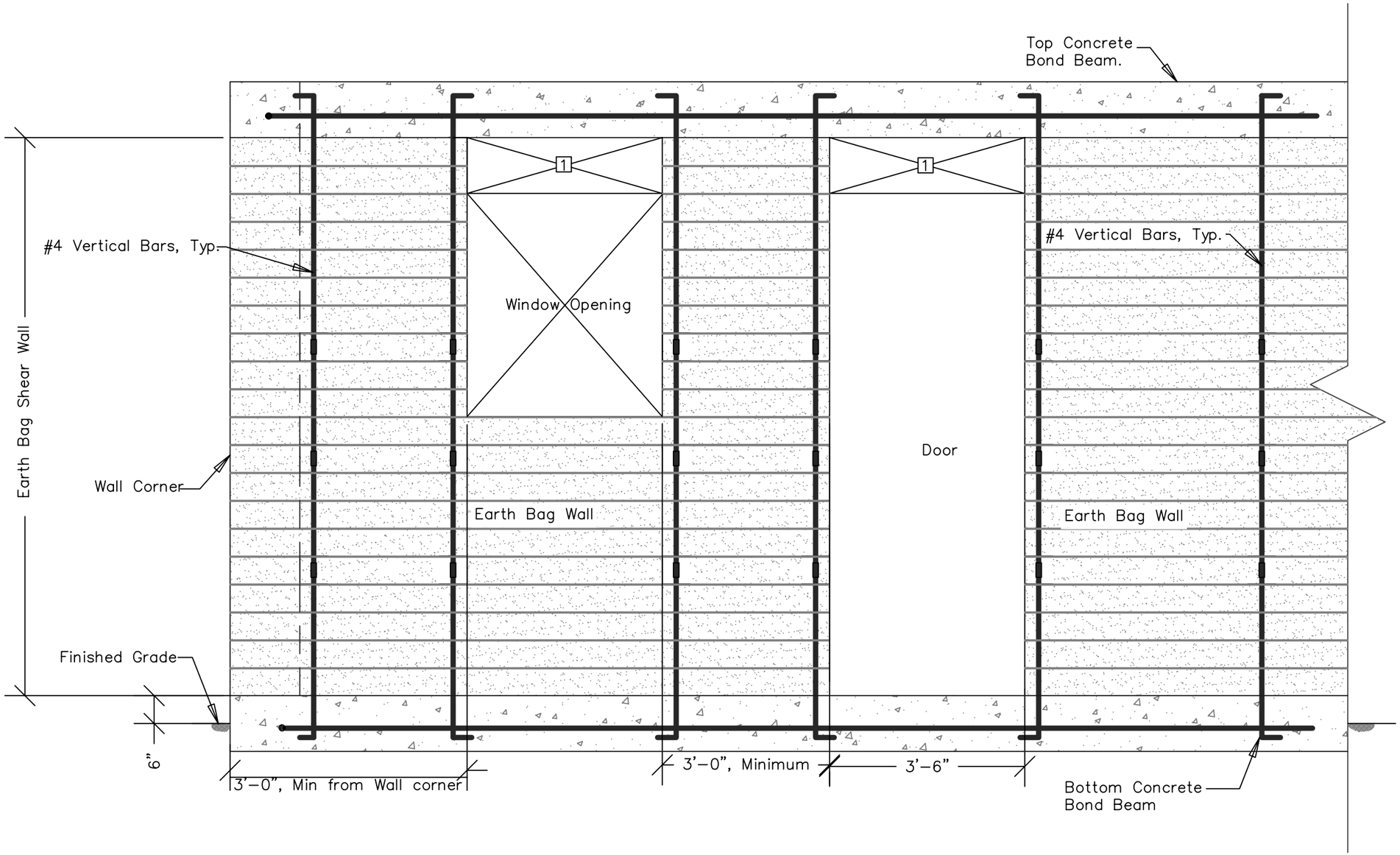

SHEET NOTES:

1. Wood Metal or Plastic Fill

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Project:

Earth Bag Building for Haiti

Client:

Stamp:

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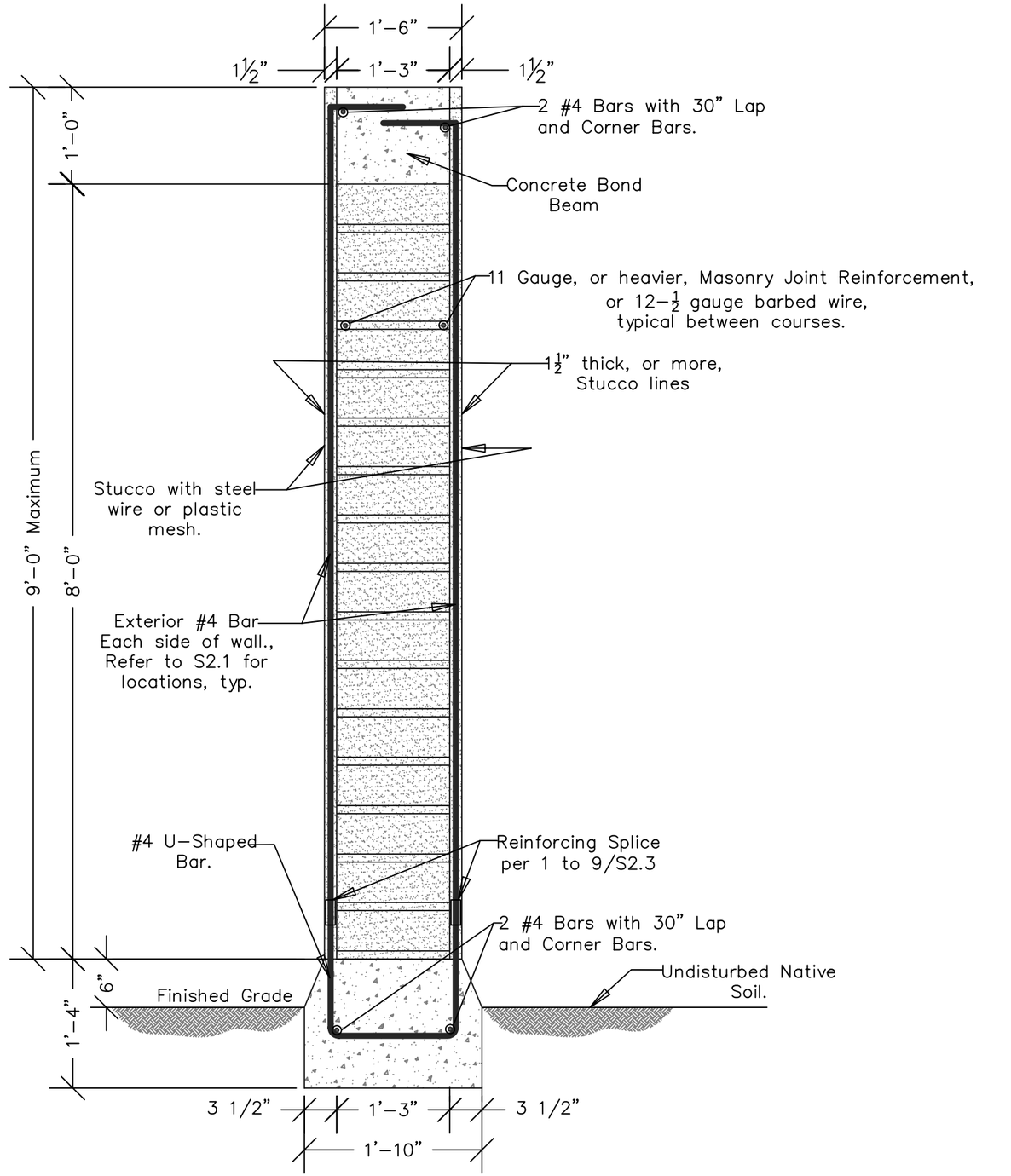
SHEET TITLE: WALL ELEVATION

PAGE NO: S2.1



TYPICAL EARTH BAG WALL SECTION

1 Scale: NTS

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SHEET TITLE: WALL SECTION & DETAILS

PAGE NO: S2.2

1 DETAIL A
SCALE: NTS

2 DETAIL B
SCALE: NTS

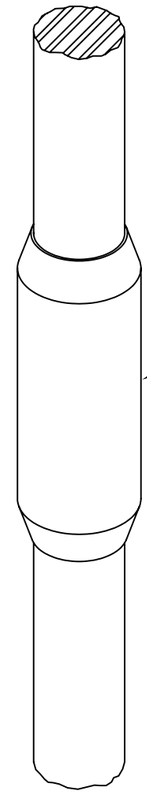
7 DETAIL C
SCALE: NTS

3 DETAIL D
SCALE: NTS

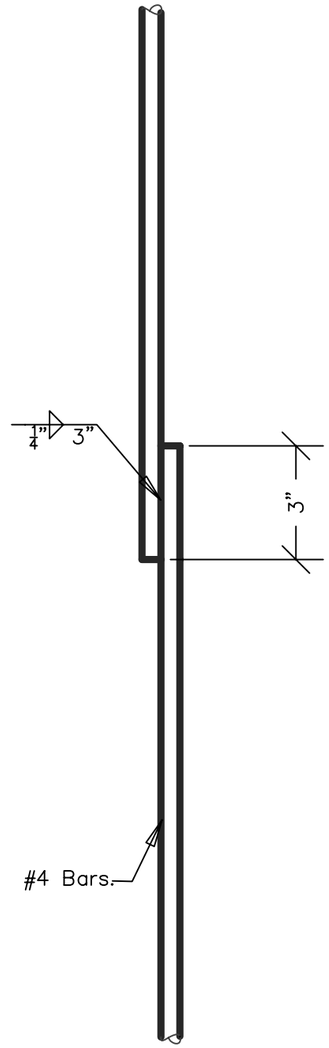
4 DETAIL E
SCALE: NTS

5 DETAIL F
SCALE: NTS

6 DETAIL G
SCALE: NTS



8 DETAIL H
SCALE: NTS



9 DETAIL I
Scale: NTS

SHEET NOTES:

1. Refer to www.erico.com/products.asp Lenton concrete products for additonal Reference.

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SHEET TITLE: SPLICING REBAR DETAILS

PAGE NO: S2.3

STRUCTURAL GENERAL NOTES – APPLICABLE TO ALL CONSTRUCTION UNLESS OTHERWISE NOTED ON THE PLANS

STRUCTURAL NOTES FOR EARTH BAG BUILDINGS:

ERB-1

A.General:

1-Maximum Building height shall be single story.
2-Wall height shall comply with drawing.
3-The general construction of the building shall comply with all provisions of the Local Building Code.
4- Provide "a good hat and a good pair of boots" for your building.

B.Stop work.
The building inspector shall have the authority to issue a "stop work" order if the provisions of this section are not complied with.

C.Lateral Support for wall shall be per the Structural drawings.

D.Openings:
Opening shall not be located within three feet of any corner of the structure.

ERB-2

1. Woven polyproplene sand or grain bags.
2. Typical bag size 18" X 30" measured when empty. These are commonly called 50# grain bags. Larger bags may be too heavy to use and smaller bags have less stability for full - story building walls.
3. When bags are sewn or pinned shut and tamped they will measure about 15" wide by 22"- 24" long by 5" high.
4. Or use woven polypropylene tubes about 18" wide.
5. Avoid large, sharp pieces of rubble in earth bag that could tear the bags.

ERB-3 Construction:

1. Tamp earth - filled earthbags lightly so as not to tear the bags.
2. Start soil - filled earthbags at least 6" or 15 cm abobe finished grade or levels where moisture may cause damage.
3. When each course is complete, tamp earthbags until solid. These is typically a change in tone when soil is well compacted.
4. Stack earthbags in a running bond like masonry. Where each bag overlaps the joint below a minimum of 6" or 15 cm overlap is recommended.
5. Cover top of complete earthbag walls (under the bond beam) with 6 mil polyethylene plastic sheathing that drops down 1" - 2" to prevent earthbag walls from wicking moisture from the bond beam and to prevent water damage in case of roof leaks.
6. Start wall corners, window and doorway openings with the bottom of bags facing out. Pre-tamp these bags as they are being filled to minimize expansion during wall tamping.
7. Always butt top ends of bags against another bag. Never face the top ends of bags toward the exterior, where it could potentially break open.
8. Protect the earthbag walls from rain and excessive sunlight until plastered.
9. Prevent freezing of earthbag walls before fully dried and plastered, because freezing could cause expansion and loosening of soil.

ERb-4 Foundation:

A. General:

Foundation construction shall comply with applicable provision of the local Residential Code and shall have a minimum of two continuous #4 reinforcing bars in a minimum 2500 psi concrete footing. Stem walls shall be the full width of the wall supported above or wider to receive forming systems. Footing shall be a minimum of 12 inches in depth.

ERb-5 Soil Specifications.

A. General:

The soil shall not contain rock more than one - half inch in diameter. The soil shall not contain clay lumps more than on-half inch in diameter. The soil shall be free of all organic matter. The soil shall not contain more than two percent soluble salt.

B. Soil Compressive Strength:

Prior to the start of construction, fully-cured earth bag soil samples shall be tested at an approved testing laboratory for compressive strength. The ultimate compressive strength of all soil, shall be a minimum three-hundred (300) psi. The compressive strength report shall be submitted to the engineer of record before any construction begin. Sample tested shall be representative of soil to be used on this project.

C. Stabilized soil:

The following shall apply to stabilization of Earth Bag soil:

- Asphalt emulsion shall not be used for stabilization of Earth Bag soil. Thorough mixing of additives to the soil may be achieved by any method that assures a complete blending to a uniform color and texture. Stabilized soil is suitable soil that contains six (6) percent or more Portland cement by weight or that passes ASTM D1633-00. Samples tested shall be representative of soil to be used on this project. The compressive strength report shall be submitted to the engineer of record before any construction begin. Laboratory testing shall indicate Earth Bag samples attained a minimum of three hundred (300), psi after seven days.

D. Not- used.

E. Amended soil:

The following guidelines shall apply when amending soils to attain a qualified soil. Soil shall not contain rock greater than one-and one half inch (1½) in diameter. Soil shall not contain clay lumps greater than one-half inch (½) diameter. Soil shall be free of organic mater. Soil shall not contain more than two percent soluble salts. Soil to be mixed shall be sufficiently dry to blend completely to one uniform color and texture. The amended soil shall be tested prior to use as per subsection B above.

F. Not-Used

G.Typical bag fill material for all courses above foundation bags consists of slightly moistened sandy clay soil (about 10% moisture content) that is approximately 75% sandy soil and 25% clay that is free of large roots and organic matter.

H.Placement of material, compaction and curing:

1. Do not place any portland cement stabilized soil after 60 minutes of being mixed.
2. Optimum moisture content as determined to meet minimum compressive strength shall be maintained.
3. Work will progress, course-by-course, until the work approaches bond beam height.
4. Portland cement stabilized walls shall be lightly spray-cured with water at least five spaced times during daylight hours. This procedure shall continue for at least three days starting from the time that the wall is exposed to the elements.

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STRUCTURAL GENERAL NOTES – APPLICABLE TO ALL CONSTRUCTION UNLESS OTHERWISE NOTED ON THE PLANS

ERb-6 Attachments and connections:

A. General: Refer to the structural Drawings.

B. Attachment of load bearing wood or steel frame wall to a Earth bag wall.
A half-inch (½) minimum diameter anchor bolt, set in a linear vertical pattern, a maximum of twenty-four (24) inches on center. The anchor bolt shall be embedded at least twelve (12) inches into the earth wall with the threaded end protruding sufficiently to pass through and attach the adjoining vertical wall stud. With washer and nut shall be tightened just prior to sheathing the frame wall.

C. Attachment of a door or window unit to a Earth bag wall.
See the Drawings.

D. Attachment of rigid insulation to a Earth bag wall.
When rigid insulation board is used, round cap nails shall attach it to the earth bag wall. Cap nails shall have a maximum spacing of sixteen (16) inches from each other. Additionally, cap nails shall secure the rigid insulation boards around the perimeter edges, with nail spaced no less than twelve (12) inches apart. All cap nails shall penetrate a minimum of two (2) inches into the wall when securing rigid insulation board up to two (2) inches in thickness, and three (3) inches when securing insulation board greater than two (2) inches in thickness.

E. Attachment of cabinetry to a Earth bag wall.
Deck screws shall penetrate a minimum of three (3) inches through cabinetry and into a nailers, Ten (10) inches on center maximum, or; deck screws with a least three (5) inch minimum penetration through cabinetry and into the wall. Screws shall be placed horizontally, eight (8) inches suitable for attachment of cabinetry through the wall.

F. Attachment of concrete bond beam to a Earth bag wall.
See structural drawings by PSE.

ERb-7 Bond Beams:
See structural drawings by PSE.

ERb-8 Lintels over openings:
See structural drawings by PSE.

ERb-9 Weather Resistive Barriers:

A. General:
Not used

B. Moisture barrier location:
A moisture barrier shall protect Earth bag walls adjacent to bath and shower enclosures. A moisture barrier shall protect walls at window sills, the top of the parapet, or other exterior wall portions exposed to the elements. A moisture barrier installed over an exposed parapet top of a wall shall lap a minimum of six (6) inches down both sides of the parapet top.

ERb-10 Lath and Plaster:

A. General:
Earth bag walls must cure to a depth of four (4) inches minimum prior to application of an approved exterior finish.

B. Lath.
Where Earth bag walls have a plaster finish, metal lath shall be installed around interior and exterior wall openings and over dissimilar materials.

C. Not Used.

ERB-11 Plumbing:

A. General:
Code compliant plumbing systems may penetrate the wall system, horizontally, provided that such plumbing material is of sufficient strength to withstand the pressure without any rupture or collapse.

ERb-12 Electrical:

A. Electrical system installation:
1.Shall be per Local Building Code.
2.Could be installed within the stucco Thickness.

ERb–13 **Laboratory Testing of the proposed soil:**
A. Sieve analysis/grain size distribution of the proposed soil.
B. Compression testing of cylinders made with the proposed mix design.
C. Shrinkage characteristics of the proposed soil, Atterburg limits of the soil.
D. Compression testing of cylinders made with the actual soil used in the construction shall be collected for each day of work , three minimum.
E. Submit the test results to the engineer of record before starting construction.

1.Cement content:
A. Two to three sacks per cubic yard (4 to 12 percent cement by volume) should be added to the soil mix.

Erb–14 **Construction:**
A. The soil should have enough moisture to lubricate the soil particles as they are rammed into place. A good indicator when the moisture content is right is the way the soil compacts under the head of the rammer. If the mix is too dry, it will not compact, but stay loose and dusty. If the mix is too wet, it will ram down quickly but be spongy. The tamper will leave distinct imprints in the top of the layer. When the moisture is correct, the soil will begin to firm up quickly, normally with just one pass across the top of the layer with the rammer. There will be little dust, yet no shiny or wet areas. During the second pass, the mix will tighten to the point where the sound of compaction will change from a hollow thud to a sharper “ringing”.
B. Each member of the crew must be aware of proper water content, so that improperly moisture soil can be returned to the mix pad before it is placed in the forms.

Erb–15 Source of the above Specifications:
1. New Mexico Code, Earthen Building Material Code,NMAC.
2. Contribution from Kelly Hart and Dr.Owen Geigler.
3. Other Sources
www.greenhomebuilding.com
www.earthbagbuilding.com.

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