GRENIER ENGINEERING, INC.

Structural and Civil Engineering Consultants

A VISION GROUP COMPANY

March 15, 2017

Canyon Building and Design
4750 N. La Cholla Blvd.
Tucson, AZ 85705

Attn: Mr. Les Martin, Project Manager

Re: Structural Feasibility Report: The Indian Trading Post – 72 E. Congress, Tucson, AZ
GEI Project 17021

Dear Les:

Per your request, on behalf of Bourn Companies, LLC (Building Owner), and in accordance with our agreement dated February 20, 2017, we are providing you with this Feasibility Report for the above referenced building. The purpose of this report is to provide a structural assessment of the building in its current condition, based on visual observations and limited preliminary analysis, to determine the structural integrity of the building. We will also evaluate the extent of deficiencies that the building may have with respect to the International Existing Building Code (IEBC), and applicable portions of the 2012 International Building Code (IBC). This will be required since the building has been vacant (not occupied) for an extended period of time, and, the owner desires to convert the building to restaurant use (change of use from the original office use).

Building Description

The building was reported to us to be +/- 120 years old, making the original construction circa 1890's or early 1900's. It is two stories above grade and has a full basement. Per preliminary drawings prepared by Secrest Architecture dated 10/24/16, each level has approximately 3,600 square feet, for a total of 10,300 SF. The following is a description of each floor level.

Basement:

1. The depth of the basement measures 9'-6" from the underside of the floor decking above, to the top of the existing concrete slab on grade. This slab was core drilled by your staff, and we were told the thickness of concrete varies from 2" to 4" thick, and we are assuming that this slab had been added sometime after the building was first built (was not part of the original construction).

2. The basement perimeter walls are a stone rubble retaining wall on all sides. Certain sections of the basement wall appear to have been shotcrete covered on the interior face with a layer of concrete estimated at 1" to 2" thick based on a small section that has spalled off.

3. The width of the stone wall is assumed to be at least 16" to carry the four wythe brick wall above. The mortar used in the original construction of these walls is severely deteriorated and loose, assumedly due to years of moisture wicking thru the wall.

4. There is an existing stair on the northwest corner of the building, and another stair at the southeast corner. There is no existing elevator.

Ground Floor:

1. The height of the ground floor measures 16'-9" from the top of the existing floor decking to the underside of the floor joists above, and 18'-0" from ground floor to top of the second floor deck.

2. The walls were observed to be +/- 16" thick at several locations, consisting of four, 4" thick wythes of clay brick mortared together. These walls are classified as unreinforced masonry (URM) bearing walls as defined in the IEBC. The mortar quality on both the exterior and interior is in poor condition.

3. With a floor to floor height of 18' from the ground floor to the top of the second floor above, a 16" thick wall would have a h/t ratio of 13.5; and a 12" thick wall (assuming one wythe is not providing any value) is 18. For this seismic zone, the IEBC allows a maximum h/t of 20, provided the mortar meets certain quality requirements and is tested in place.

4. There are very wide window and door openings on both the east and north walls of the ground floor, with only short piers in between the opening. We observed several cracks in these areas that are a major concern.

5. The floor framing consists of 2 layers of straight wood decking (in extremely poor condition) spanning to 2" wide x 14-1/2" deep wood joists spaced at +/- 18" on center. These joists are pocketed into the rubble basement walls on the east and west sides, and span east to west onto a wood girder at approximately the middle of the building. The girder is built with seven of the 2 x 14-1/2 wood joists, connected together forming a 14" wide x 14-1/2" deep beam. The girders have four spans in the north south direction, and bear on three large (+/- 36" square) brick piers / columns. We were not able to observe any foundations. It was observed that there is fire damage with significant char to several joists and to the wood girder.

6. At the south end of the building, there is an approximate 370 SF mezzanine sitting over the top of a concrete vault. The framing was not clearly observable, but we suspect it is concrete topping over steel deck and steel bar joists. This most likely would have been built after the original building was constructed. The headroom above this mezzanine to the underside of the second floor framing above is very tight (less than 7' as required by current building code).

Second Floor:

1. The height of the second floor measures +/- 13'-0" from the top of the existing floor decking to the where the underside of some original ceiling joists were originally installed (the joists have been removed some time in the past as can be seen by the old joist pockets into the brick walls). From the bottom of the old ceiling joists to the bottom of the roof trusses is another approximate 4'-6".

2. The walls were observed to be +/- 12" thick up to the old ceiling joist level, and consist of triple wythes of 4" thick clay brick mortared together. The walls step back 4" at the old ceiling joist level to be 9" thick (double wythe) up to the top of the wall. The mortar quality on both the exterior and interior is also in poor condition.

3. There are numerous window openings on all the walls with narrow (+/- 16" wide) piers in between the openings. We observed several cracks along with numerous areas where mortar is missing.

4. The floor framing is similar to that of the ground floor, except the joist spacing appears to be 16" on center and not 18". These floor joists are pocketed into the brick walls on the east and west sides, and also span east to west onto a wood girder at approximately the middle of the building. The girder at the second floor is built with six 2 x 14-1/2 wood joists, connected together forming a 12" wide x 14-1/2" deep beam. The girders at this level are supported on wood columns.

5. At the southern end of the building, a steel beam was installed under the wood girder (we assume this was done after the original construction when the mezzanine was added). The steel beam spans and bears on the north edge of the mezzanine (and not the brick pier in the basement below). This allowed the wood post that was originally on top of the brick pier to be removed.

Roof Framing:

1. The roof framing consists of what we believe is 1x wood planking spanning to site built wood trusses at 24" to 28" on center, that clear span the entire building and bear on the 4" ledge formed by the step from 12" to 9" in the brick walls. The roof trusses are in severely bad condition with water damage, numerous broken bottom chord members, and visibly excessive deflection.

2. The original ceiling joists appear to have been connected to some steel wall anchors (as observed). These anchors are obviously no longer attached to anything and this may leave the upper walls without a connection to the roof diaphragm.

Preliminary Structural Analysis:

The following items have been reviewed for this building: a) what are the implications of the anticipated change of use from office space to restaurant / assembly space; b) a review to see if the requirements of IEBC section 101.4.1 "Building not previously occupied" apply, in which case the building must be brought up to current code meeting the IBC requirements; and c) a review of the structural capacity of some of the main elements of the building.

1. The City of Tucson (authority having jurisdiction) currently has adopted the 2012 IBC which is the governing code for this building. Chapter 34 "Existing Structures", section 3401.6 "Alternative Compliance" states that the IEBC can be used to meet the requirements of Chapter 34.
2. The IEBC has provisions and procedures that deal with a change of occupancy, such as what is proposed for this building, as well as alterations and correcting dangerous conditions. Moving forward, we believe the 2012 IEBC will be the governing code. Please note however, that any new components that are introduced into the building must meet the requirements of the IBC.
3. The original use of the building is assumed to have been either office space (live load of 50 psf and 100 or 80 psf at corridors), and possibly retail space on the ground floor (live load of 100 psf). The proposed space is an assembly use with a live load of 100 psf (no reductions based on tributary area is allowed). We ran some preliminary calculations on the framing using a 100 psf live load and discovered the following: a) the floor joists appear to be adequate if we assume they are Douglas – Fir select structural grade, and if they are not distressed; b) the girders at the middle of the building are not adequate and will need to be strengthened or replaced.
4. The preliminary Secrest Architecture drawings list out a total of 7,286 SF of occupiable space (not counting the mezzanine). For assembly space, code requires 7 SF per occupant. This gives us a total occupant load of 1,040. This puts this building into a Risk Category III, and must be considered as a substantial change of use for this building.

5. We did not perform any calculations on the lateral load resisting system, since based on our experience and our observations there are obvious deficiencies in an appropriate lateral load path (excessive openings and insufficient sections of wall on the east and west faces). In addition, based on the number of occupants anticipated as discussed in #4 above, along with the very poor condition of the existing brick walls, it is our opinion that a completely new lateral load resisting system (braced frames and moment frames) must be installed for the building. Putting 1000 lives at risk in an unreinforced brick building should not be considered an option. Because of this position, we are not recommending any testing of the existing brick walls (push tests and compression tests), since this information will not be needed for the new lateral system. Moving forward in an actual design phase however, we will need to meet with the Building Official to see what testing (if any) they will require for the mortar in the brick walls in order to allow us to use IEBC Table (B) A1-B (allowable height to thickness ratios). It should be noted that an added benefit of installing a new lateral frame system, is the vertical loads will be removed from the brick walls.
6. The stone rubble basement walls are extremely deteriorated, and in our opinion should be considered unsafe and will need to be strengthened.
7. The roof trusses are extremely deteriorated and in many cases broken. We did not analyze the trusses since it is our opinion that they must be replaced.

Discussion / Recommendations:

While the building has some elements with serious distress and deficiencies that must be repaired and or replaced, it is our opinion that it may be feasible to alter the building to allow the intended restaurant use, provided the following items be addressed.

1. The basement stone rubble walls must be strengthened. We have attached detail CS1 that show a possible solution using a 12" thick shotcrete concrete wall and footing. The base of these walls would be braced by a new reinforced concrete slab cast on top of the existing thin slab. The top of these walls would be braced by the ground floor level framing. An option to the shotcrete wall would be a 12" thick solid grouted CMU wall with #6 bars each face at 8" on center.
2. The ground floor framing is recommended to be strengthened as shown on the attached concept ground floor level framing plan. The existing 2 x 14-1/2 joists can remain in place, with additional LVL joists added wherever needed. We are recommending adding new steel girders at the middle of the building that would bear on new steel columns and new concrete spread footings. This allows the loads to be carried on new footings (the existing brick piers are of unknown quality and capacity), and the new columns would extend up to the second floor and the roof to carry those loads.
3. The attached concept second floor framing plan show our recommendations for strengthening that level. We are calling for new steel columns and beams around the perimeter of the building that will carry the floor joists (thus taking the vertical load off the brick walls) as well as provide the new lateral load bracing resisting members (braced frames and moment frames). These beams would be attached to the walls (thru bolts and washers on the exterior face of the brick walls) that will brace the brick walls for both wind and earthquake out of plane loads. A review of the wall openings should be conducted, and new lintels and possible jamb members may be required.
4. The roof is in such distress it must be considered dangerous and must be replaced. We are recommending on our concept plan to install new light gauge steel trusses that form a mansard type roof that creates a mechanical well that can be used to support the required mechanical units. See attached detail CS2. The trusses as we are proposing will also attempt to match the original roof lines of the building that may be a consideration with respect to the historical aspects of the building.
5. All of the mortar for the brick walls must be pointed on both the interior and exterior faces. The existing cracks that were observed will need to be repaired.

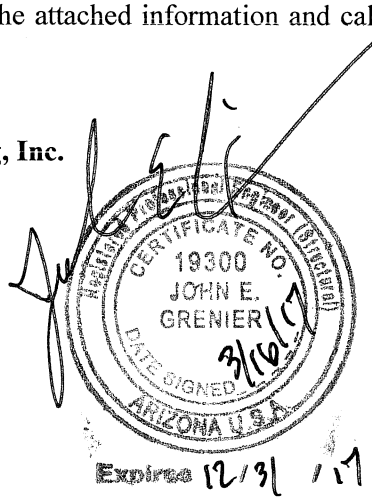
6. The attached concept plans have notes of additional items that should be considered in the design moving forward. These items pertain to floor plan and architectural issues, and pose questions that may have a cost impact for the project. Subsequent design phases will undoubtedly discover additional items and issues not known at this time.

Qualification:

The opinions and recommendations in this report are for the purpose of providing an opinion of the feasibility of altering the existing building identified in this report to allow for a new use and an extensive alteration and remodel of the building.. Grenier Engineering Inc. did not perform a complete analysis and only performed preliminary structural calculations on the elements noted herein, and did not inspect the building for signs of distress other than those items discussed in the report. Our investigation was limited to visual observations and preliminary calculations for the exposed structure only. As with any existing building, the structural integrity cannot be warranted and no warranty is given, either expressed or implied. The owner (current and future) assumes the responsibility for correcting deficient items brought to their attention and for performing ongoing monitoring to assure the structure is maintained, and signs of deterioration and distress are evaluated and corrected immediately as items occur. It should be assumed that there will be additional items that we did not discuss or observe that could add additional costs to the project if and when the design moves forward. In addition, we are not offering any opinions on any non-structural items (mold, electrical, plumbing, termites, etc). It should also be very clearly understood that are some conditions in this building that must be considered dangerous, and the owner must take appropriate measures to keep the public out of and away from the building.

Please review all of the attached information and call to setup a meeting between all of the appropriate parties to discuss. Thank you.

Sincerely,
Grenier Engineering, Inc.



John E. Grenier, P.E.
President

Attachments:
Concept Strengthening Plans
Photos
Preliminary Calculations

Figure 1 - Stone Rubble Basement Wall and Floor Joists

Figure 2 - Built Up Wood Girder and Post Below Second Floor Level

Figure 3 - Floor Framing

Figure 4 & 5 - Broken Roof Trusses & Original Ceiling Joist Pockets

Figure 6 – More Broken Trusses & Original Ceiling Joist Pockets

Figure 7 – Floor Decking

Figure 8 – Wood Post At Floor Framing

Figure 9 – Second Floor Girder and Broken Joist

Figure 10 – Vertical Crack at Window Pier

Figure 11 – Brick Wall at Window Opening

Figure 12 – Southeast Corner

Figure 13 – North Wall

Figure 14 – West Wall

Figure 15 – West Wall

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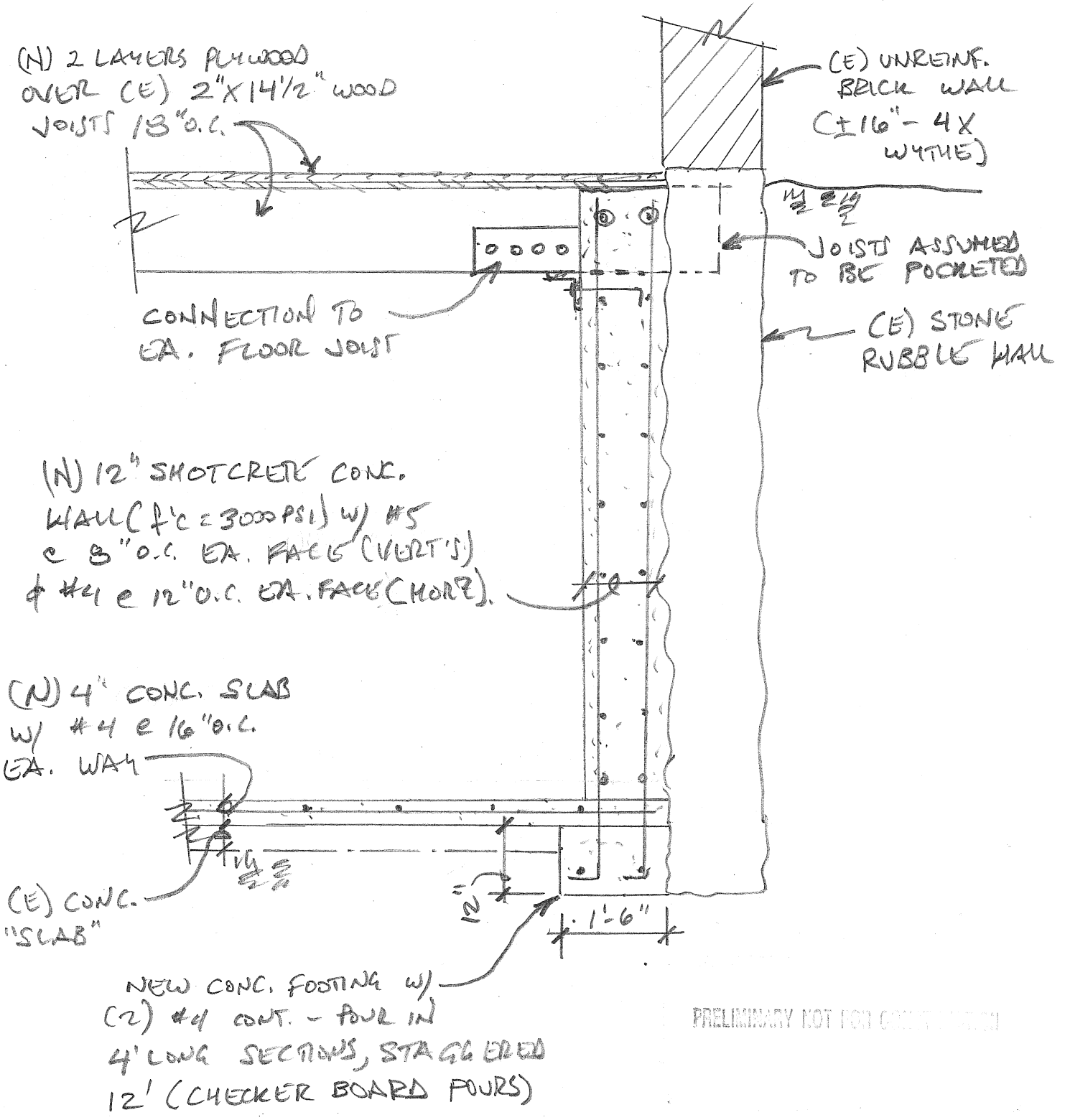
PROJECT: ITP FEASIBILITY SHEET NO. ____
JOB NO. 17021 DATE: 3/17
BY: JCG



SC1 NEW BASEMENT WALL STRENGTHENING

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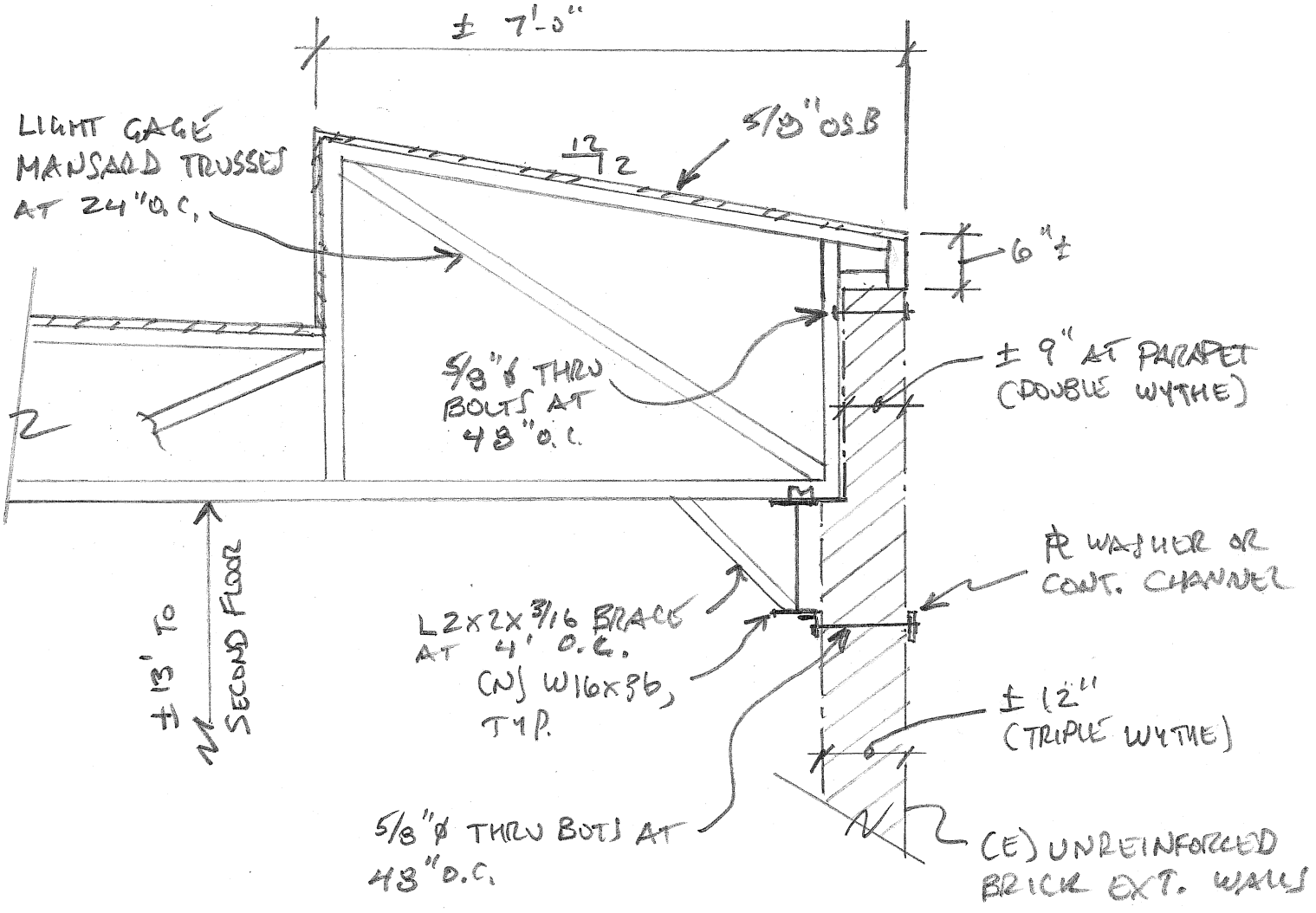
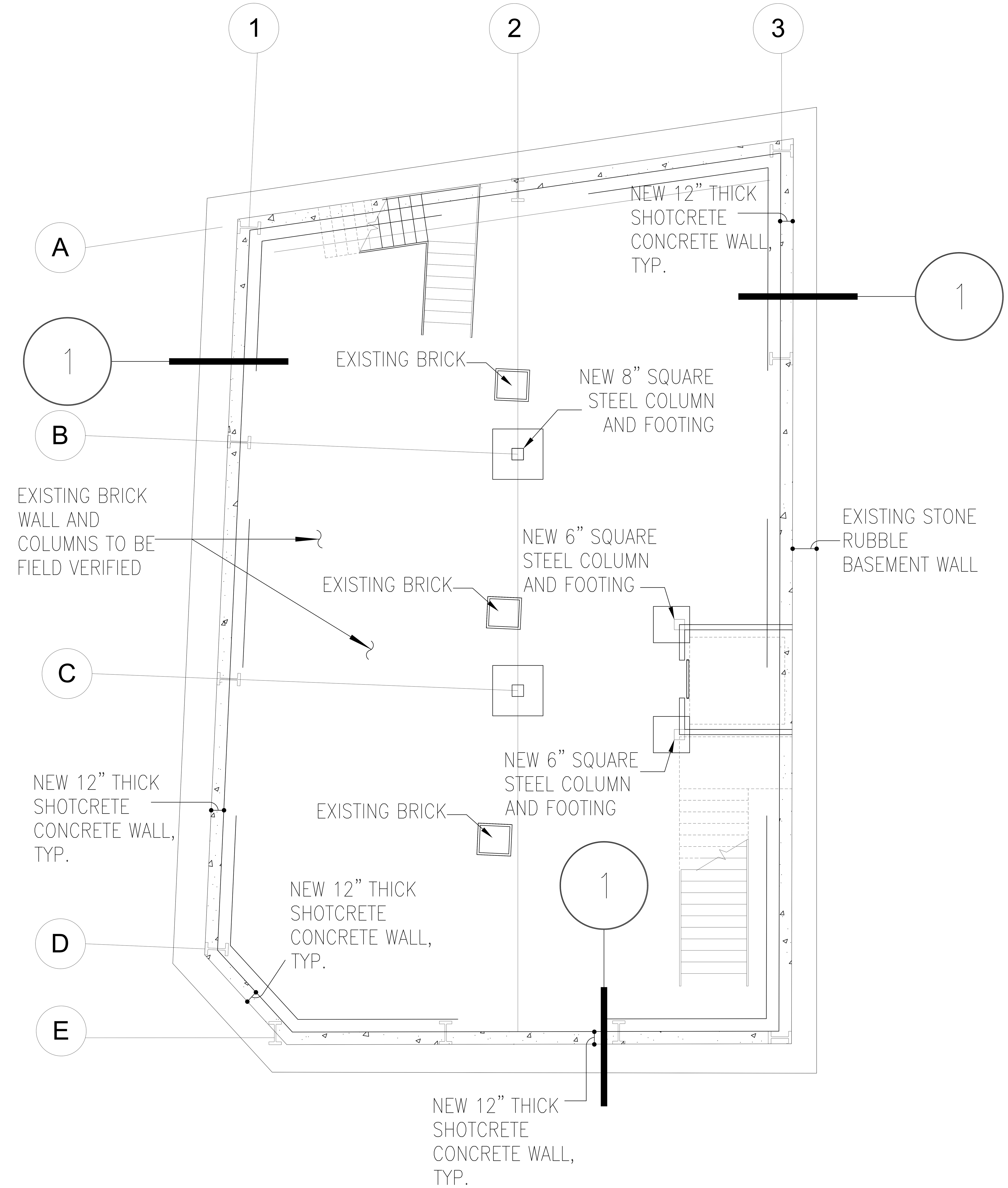
PROJECT: ITP FEASIBILITY
JOB NO. 17021
SHEET NO. ____
DATE: 3/17
BY: JEG



REMOVE EXIST. ROOF IN 8' MAX SECTIONS (NORTH TO SOUTH) SO AS TO NOT LEAVE EXISTING BRICK WALLS UNBRACED.

(SC2) NEW ROOF FRAMING



1 SCHEMATIC BASEMENT FOUNDATION PLAN
1/4" = 1'-0"
NORTH

REVISIONS
NO. DATE

Secrest Architecture LLC
ARCHITECTURE INTERIORS PLANNING

PROGRESS PRINT
(SCHEMATIC)
NOT FOR CONSTRUCTION

INDIAN TRADING POST
72 E. CONGRESS ST.
TUCSON, ARIZONA

ISSUE DATE 10/24/16
PROJ. NO.
DRG. SCALE

SHEET
S1

Grenier Engineering, Inc.
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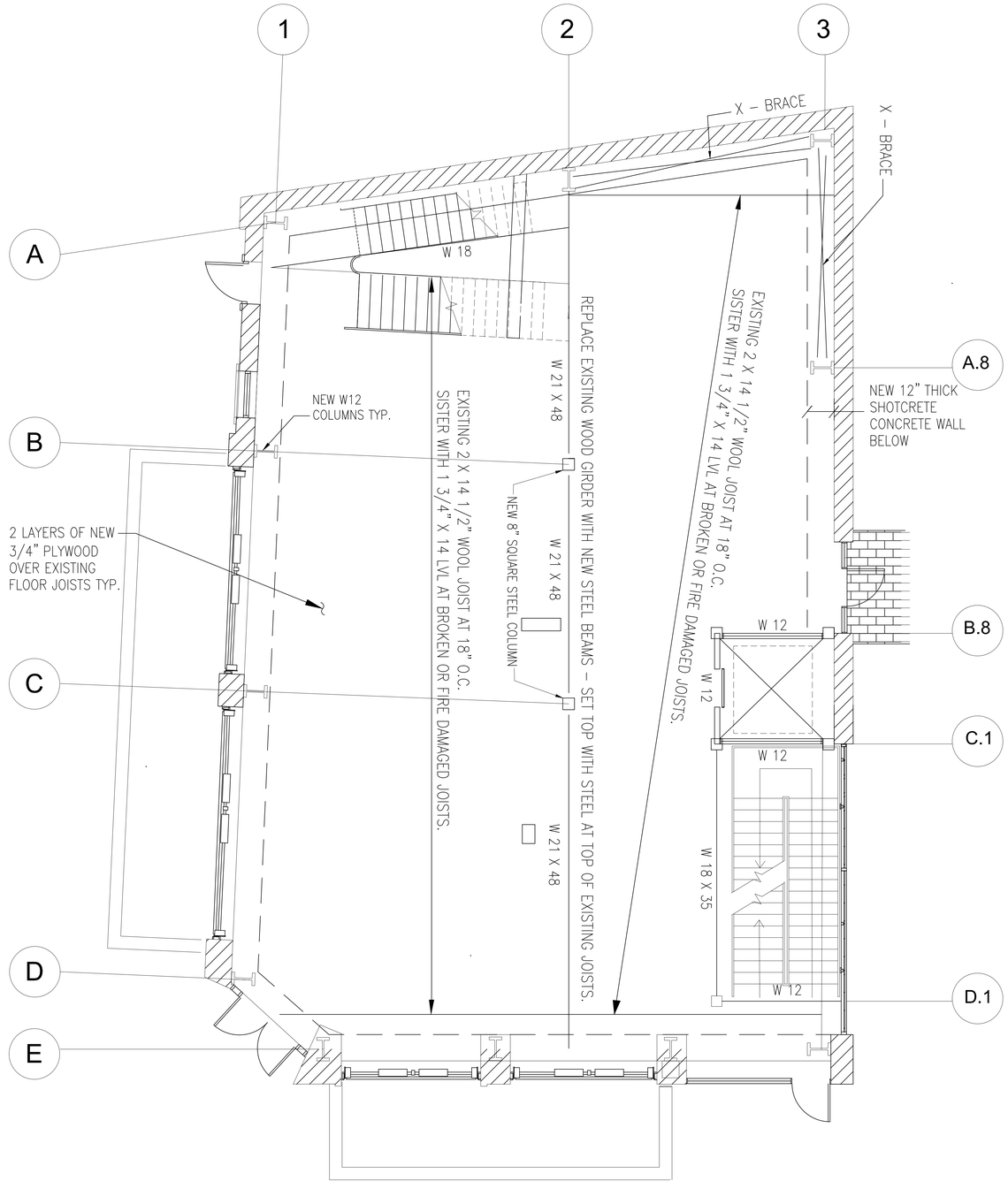
5524 E. 4th STREET TUCSON, ARIZONA 85711 TEL: (520) 326-7082 FAX: (520) 326-7508

ISSUES TO CONSIDER

1. ELEVATOR PIT AND STAIR NEED TO BE MOVED AWAY FROM EDGE OF BUILDING TO ALLOW NEW SHOTCRETE WALL TO RUN FULL LENGTH.
2. VERIFY IF 7' HEAD ROOM IN BASEMENT BELOW IS REQUIRED ALONG GRID 2– ADDED COLUMNS AND W12 BEAMS CAN BE USED TO DECREASE BEAM DEPTH. FLOOR PLAN SHOULD CONSIDER THIS ISSUE.
3. ALL MORTAR JOISTS (INTERIOR AND EXTERIOR) IN THE EXISTING BRICK WALLS MUST BE SCRAPED OUT (1 1/2" MIN. OR DOWN TO SOUND MATERIAL) AND REPOINTED.



E. CONGRESS STREET

1 CONCEPT GROUND FLOOR FRAMING PLAN
1/4" = 1'-0"

NORTH

REVISIONS
NO. DATE

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ISSUE DATE 10/24/16
PROJ. NO.
DRG. SCALE

SHEET
S2

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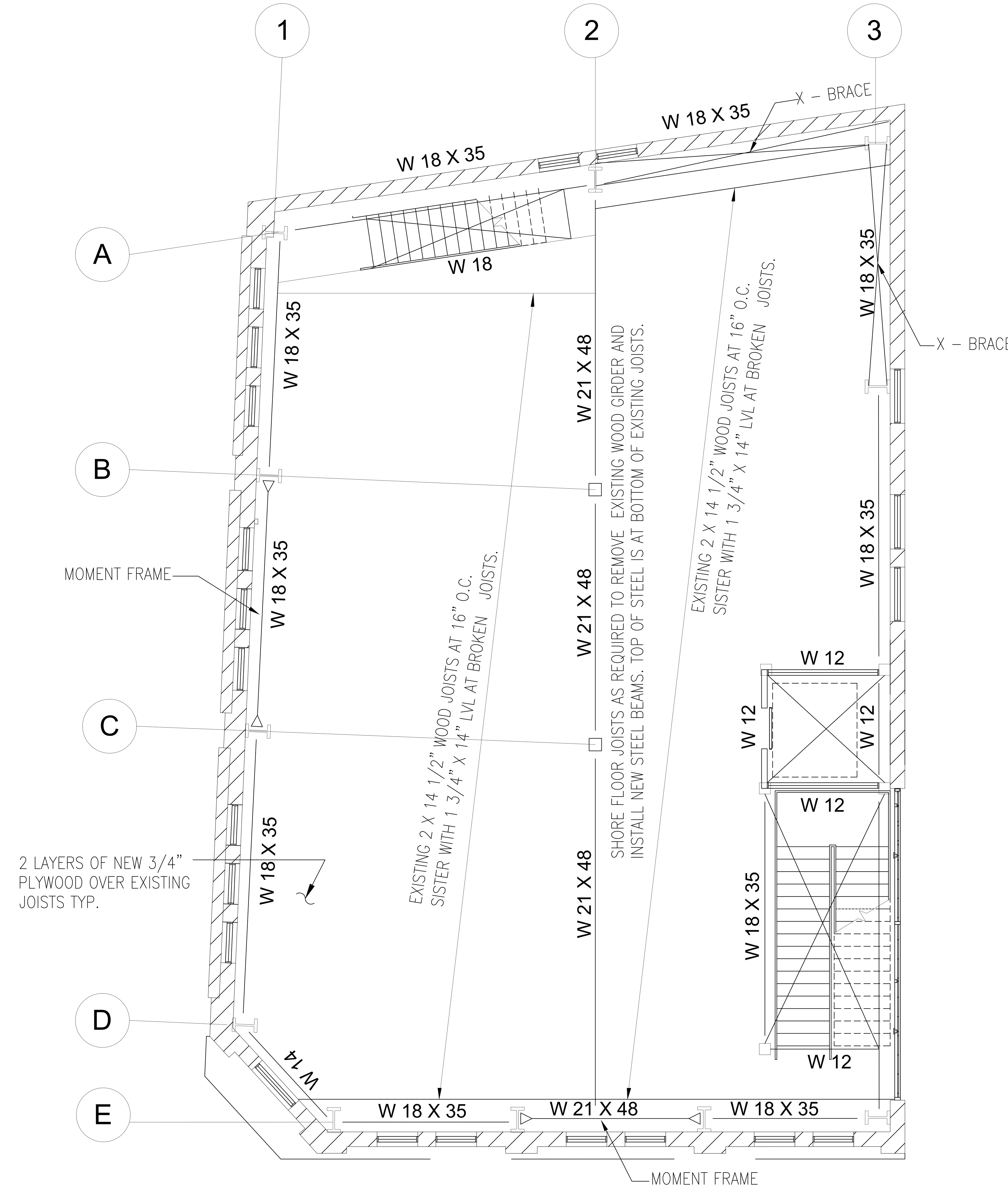

TERMS TO CONSIDER

1. DO WE DEMOLISH AND REMOVE THE EXISTING MEZZANINE TO ALLOW ROOM FOR NEW KITCHEN EQUIPMENT (HOODS, ETC.)? THE EXISTING HEADROOM FROM THE MEZZANINE TO BOTTOM OF 2ND FLOOR JOISTS IS TIGHT. (LESS THAN 7' REQUIRED BY CODE).
2. ADD NEW 1 3/4" X 14" LVL'S REQUIRED AT ANY NEW KITCHEN EQUIPMENTS. (HOODS; EXHAUST FANS, ETC.).

1 CONCEPT SECOND FLOOR FRAMING PLAN

1/4" = 1'-0"

REVISIONS

NO. DATE

Secrest Architecture LLC

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S3

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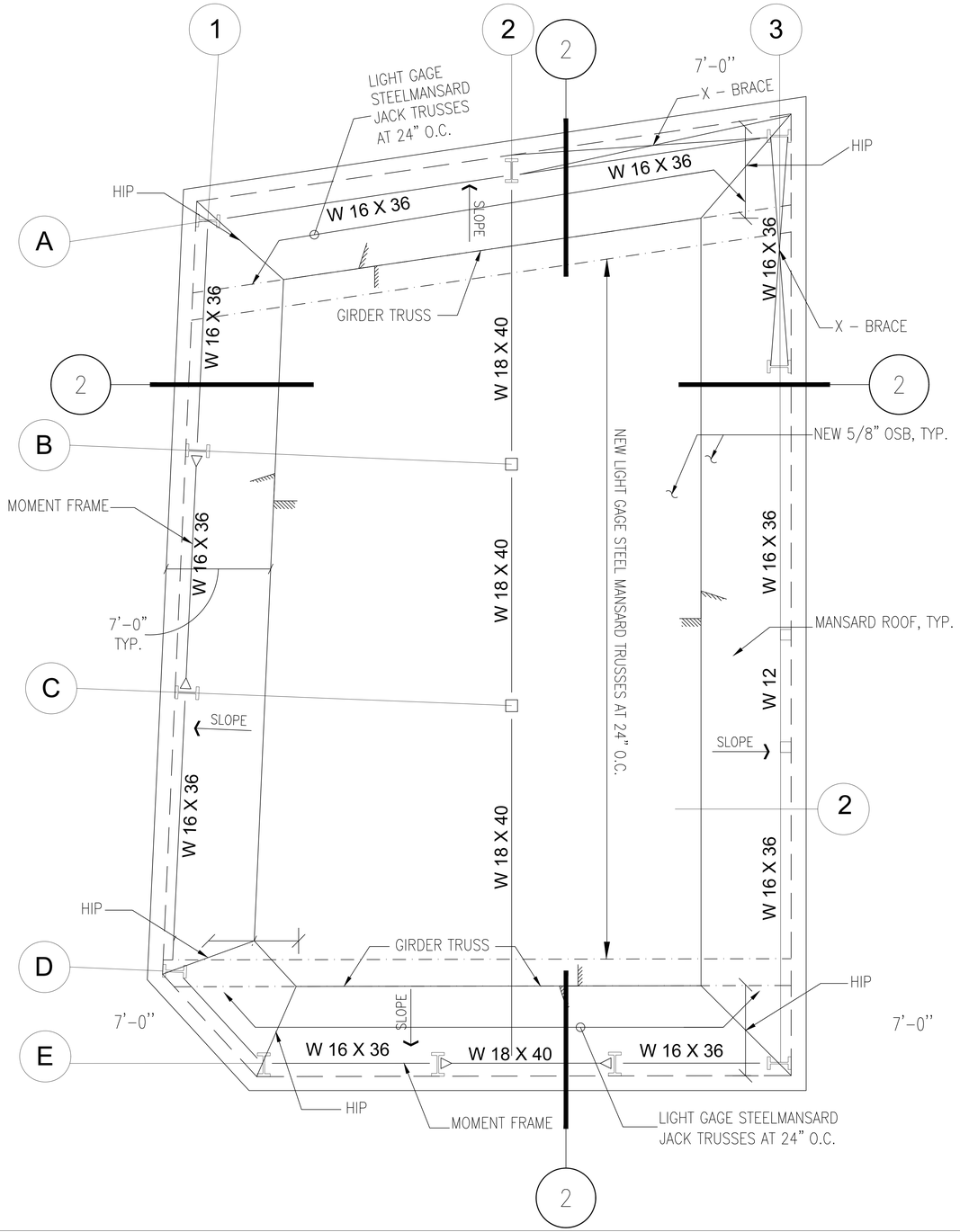
ISSUES TO CONSIDER

1. CAREFUL COORDINATION OF PHASING IS REQUIRED ON HOW TO INSTALL NEW ROOF FRAMING AND REMOVING EXISTING ROOF TRUSSES. DO NOT REMOVE ENTIRE EXISTING ROOF AT ONE TIME SINCE THIS WILL LEAVE THE EXISTING UNREINFORCED BRICK WALLS UNSUPPORTED.
2. THIS PROPOSED MANSARD ROOF PROVIDES SUBSTANTIAL SPACE FOR NEW MECHANICAL EQUIPMENT.
3. A ROOF ACCESS LADDER AND HATCH WILL NEED TO BE PROVIDED.
4. COORDINATION OF ELEVATOR OVER RUN AND HOIST BEAM WILL BE REQUIRED.



1 CONCEPT ROOF FRAMING PLAN
1/4" = 1'-0"

NORTH

REVISIONS
NO. DATE

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72 E. CONGRESS ST.
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SHEET
S4

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5564 E. 4th STREET TUCSON, ARIZONA 85711 TEL: (520) 326-7332 FAX: (520) 326-7508 PROJECT NO. 17051