

Fred H. Schott & Associates

CIVIL AND STRUCTURAL ENGINEERS

City of Lompoc
Attn: Craig Dierling, P.E.
100 Civic Center Plaza
Lompoc, CA

January 11, 2013

Re: Structural Observation of Lompoc Theater, 112-118 North H Street, Lompoc, Ca.

Dear Craig,

On December 13, 2012, a site visit was performed for the Lompoc Theater to determine the existing conditions, structural sufficiency, and structural deterioration, then make recommendations to rehabilitate each roof structure to meet current code. Each area of the theater was examined and the following was found:

The Fly-Tower roof structure has multiple holes in a large roof hatch which are allowing water and pigeons to get inside the stage area. Based on our previous inspection in 1993, the fly-tower roof has 1x6 straight sheathing boards which can not transfer shear loads. There is also no shear connection between the roof and the walls. The exterior concrete walls have a few minor cracks, but are in good shape. The beams beneath the stage floor appear to be undamaged and the majority of the ceiling beneath the stage does not have water damage so the joists are most likely not damaged either. Towards the north end of the stage, the ceiling beneath shows substantial water damage and mold growth. The joists at this location may be damaged also. The floor sheathing on the stage area has been exposed to weather and pigeon droppings, but appears to be solid. Further opening of the stage may expose mold or rotten wood.



Figure 1



Figure 2



Figure 3



Figure 4

Figure 1: Holes in roof hatch above the stage.

Figure 2: Framing beneath stage; small crack in basement wall.

Figure 3: Water damage and mold on ceiling below stage at low point.

Figure 4: Top of basement wall at South stage door.

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The Auditorium Barrel Roof has been leaking along the North and South sides. The roof sheathing, roof joist, and ceiling joists along the exterior walls have been damaged by the water and show signs of rot. Large pieces of plaster have fallen from the ceiling to expose wood lath with signs of water exposure. The steel bowstring trusses that support the roof have surface rust due to the roof leaks, but do not appear to be rusted enough to be structurally compromised. The roof has 1x6 sheathing boards which are unable to transfer shear loads to the side walls and there is no positive shear connection between the roof and sidewalls. Based on our previous inspection in 1993, there is no blocking between the roof joists above the trusses. A large evaporative cooler sits on the barrel roof near the fly-tower. The orchestra pit in front of the stage has an excavated area beneath the pit cover. The joists and sheathing covering the pit show signs of water damage.



Figure 5



Figure 6

Figure 5: Barrel Roof looking east with evaporative cooler and fly-tower beyond.

Figure 6: Barrel roof looking west.



Figure 7



Figure 8

Figure 7: Water Damage at North Wall.

Figure 8: Water Damage at South Wall.



Figure 9



Figure 10

Figure 9: Surface rust on bottom chord of bowstring truss.

Figure 10: Exposed ground at excavation in orchestra pit.

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The Marquee over the sidewalk consists of a wood frame with a thin sheet metal exterior held up by three rods which are connected to the concrete wall. There are numerous holes in the top of the marquee and the exposed wood frame shows serious water damage and rot. There does not appear to be a drain for the water that gets caught in the marquee. The rods and metal front show some minor surface rust.



Figure 11



Figure 12

Figure 11: Bottom of the Marquee.

Figure 12: Interior Framing of the Marquee.



Figure 13



Figure 14

Figure 13: Water damage and holes in Marquee wood frame.

Figure 14: Rods connecting Marquee to concrete wall.

The first floor roof structure over the commercial space did not show any damage from above. Based on our previous inspection in 1993, this roof has 1x6 straight sheathing above the roof rafters and 1x6 diagonal sheathing above the ceiling joists. The concrete walls are not tied back into the diaphragm. Our previous inspection also indicated a sagging beam that had been propped up with a cross support. There currently is no standing water at the sag location on the roof.



Figure 15



Figure 16

Figure 15: South side of 1st story roof.

Figure 16: North side of 1st story roof.

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The second story roof over the office space had at least three active leaks during our site visit. The roof rafters and ceiling joists did not show signs of rot. While most of the 1x6 roof sheathing boards appeared to have gotten wet at some point, this may have been caused by past leaks which have since been fixed. One of the leaks is at the tile roof on the northwest corner of the pop-up roof. The 1x6 straight sheathing boards in this location appear to have some water damage. There is also a leak at the top of the stairs and a leak in the south office. Both of these are under the flat tar and paper roof. The 1x6 straight sheathing is not able to transfer shear to the exterior walls; there is no positive shear connection. There is no blocking or straps in the roof, ceiling, or parapet wall for the pop-up roof area. The ceiling joists appear to have a slight sag at the center which we confirmed by previous water damage to the ceiling at this low point. The leak that caused this damage appears to have been fixed. The concrete walls have some cracks. There are large cracks extending from the window corners on the south side of the building. The west side of the building has thin cracks through all of the columns at the lower level.



Figure 17



Figure 18

Figure 17: Roof rafters and 1x6 straight sheathing beneath tile roof.

Figure 18: Active leak in hallway at top of stairs.



Figure 19



Figure 20

Figure 19: Active leak at edge of pop-up in tile roof.

Figure 20: Active leak at edge of pop-up in tile roof from attic.



Figure 21



Figure 22

Figure 21: Cracks in exterior concrete wall.

Figure 22: Small cracks through each column at front of theater.

Recommendations:

Before construction or rehabilitation in excess of minimal interim patching occurs, all the plaster needs to be removed from the ceilings. Falling plaster is a safety hazard and has caused numerous deaths in other buildings.

The marquee is also a safety hazard and should be taken down immediately. It can be supported from below to disconnect the rods, then removed from the building. The wood framing in the Marquee is rotten and deteriorating. The sheet metal front can probably be salvaged and reattached with new framing during rehabilitation of the building.

The large evaporative cooler should be removed from the barrel roof over the auditorium.

1. Fly-Tower Structure:

To prevent further deterioration, the holes in the roof hatch need to be fixed. It will need a temporary new plywood cover with flashing and waterproofing or a new smoke hatch cover (both roof hatches will need new smoke hatch covers to bring it up to code).

To bring this portion of the building up to current code, plywood will need to be added over the existing roof framing and a bent plate will need to be added to connect the exterior walls to the roof diaphragm. Blocking and straps will also be required each side of the existing roof hatches. Once these items are added the entire roof will need to be waterproofed.

*The concrete walls in the fly-tower will need to be supplemented at mid-height with a steel beam on three sides and connected to the barrel roof diaphragm on the other side. Any cracks in the concrete walls will need to be filled with epoxy. The stage will need to be opened and any damaged framing will need to be replaced.

* can be preformed after re-roofing is complete

2. Auditorium Barrel Roof Structure

To prevent further deterioration and rusting, the north and south edges of the roof need to be sealed. Due to water damage, the roof rafters, ceiling joists, and 1x6 straight sheathing needs to be replaced for 4 feet along these walls then covered with a waterproof membrane. Currently, the bowstring trusses have surface rust and do not appear to need supplementation at this time. If left exposed to the elements, the trusses will continue to rust. Painting the trusses with a rust-inhibitor will also help prevent further rusting.

To bring this portion of the building up to current code, plywood will need to be added over the existing roof framing and a bent plate will need to be added to all four edges to connect the concrete walls to the roof diaphragm. Blocking will also be needed between rafters along each of the five bowstring trusses along with ties to the concrete wall at each end. Braces and ties need to be added at the east end of the roof to connect it to the fly-tower concrete wall. Once these items are added the entire roof will need to be waterproofed.

Any cracks in the concrete walls will need to be filled with epoxy. The excavated portion of the pit wall needs to be filled with a sand-cement slurry and any damaged joists or plywood covering the pit will need to be replaced.

3. Marquee over Sidewalk

The marquee had an asphalt emulsion over the joists which prevented us from viewing the connections, but the joists that were exposed showed substantial water damage and rot. In this weakened state, the marquee could break free (or pieces of it) from the building and fall on the sidewalk below. It currently is a safety hazard and should be taken down immediately. It can be supported from below to disconnect the rods then the marquee can be safely removed from the building. The sheet metal front can probably be salvaged and reattached during rehabilitation of the building. The wood framing will have to be completely replaced with new joists, plywood, a ledger or angle for shear transfer and a waterproof membrane.

4. 1st Floor Roof Structure over Commercial Space

To bring this portion of the building up to current code, seismic ties and blocking will need to be added to connect the concrete walls to the roof diaphragm. The sagging beam will need to be properly supplemented and the cross support removed. These additions will be made from below and should not disturb the waterproof membrane if re-roofing is done before these items are implemented.

The wall to the west of this roof which supports the second story roof will need plywood added to its exterior to transfer shear loads down from the roof. It may be beneficial to install this prior to re-roofing to ensure a watertight seal where the wall meets the roof.

*Our previous inspection noted a decorative tile masonry wall on the ground floor in the commercial space. This wall will either need to be removed or upgraded to meet current code.

* can be preformed after re-roofing is complete

5. 2nd Floor Roof Structure over Office Space

To prevent further water damage the existing leaks need to be fixed.

To bring this portion of the building up to current code, plywood will need to be added over the existing roof framing for the flat (east) portion of the roof. The outside of the parapet wall separating the raised tile roof from the flat roof will also require plywood. A steel beam will be added above the roof to support the overloaded joists below. It will sit on two new 4x6 posts with new footings which line up with existing walls. The parapet wall will then be furred out to cover the new beam with diagonal 2x4s and plywood. A continuous angle or bent plate will need to be added to the roof edges to connect the concrete walls to the roof diaphragm. The north and south concrete walls need blocking and ties to the roof diaphragm. A strap will need to be installed along the east side of the flat roof above the

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commercial space then attach to blocking for 20 feet into the diaphragm at the reentrant corner. The architectural feature on the upper roof will be removed. Once these items are implemented, the flat portion of the roof will need a new waterproof membrane.

*The remainder of the required structural upgrades can be completed after re-roofing has occurred. The west portion of the roof has Spanish tile roofing. To avoid disturbing the tile, plywood is required on top of the ceiling joists, in the attic space. The portion of the parapet wall in the attic space will also need plywood and blocking to transfer shear loads. A continuous angle or bent plate will need to be added along the front wall to connect it to the new ceiling diaphragm. Steel struts will connect the front concrete wall to the flat roof diaphragm. Below, the second floor joists will need ties and blocking to connect the second floor diaphragm to the concrete walls on the east and west sides. The existing nailer at these locations will also need additional fasteners to transfer shear loads into the concrete walls. The north and south walls will need a continuous angle or bent plate connecting the floor diaphragm to the walls. Blocking and drag-ties need to be added at each side of the stairs and at various locations where stairs have been removed. As noted above, the wall between the upper and lower roofs needs plywood installed on its exterior. The lower portion of the wall which overlaps the lower roof can be installed on the inside of the wall. This wall will then require stucco or some other form of exterior finish. Two steel moment frames with new footings are required at the ground floor along the front of the building to resist seismic loads. The existing cracks in the concrete walls will need to be filled with epoxy.

Conceptual level best estimate of the construction costs and schedule for the recommended structural rehabilitation:

The following estimate from J.M. Reiss Consulting, Inc. only includes the seismic work, roofing and some sheet metal work. It includes covering the exterior wall between the 1st floor roof and second floor roof with a plaster finish to waterproof it after plywood is added to the existing wall.

Excluded from the estimate are Building Permits and fees, inspection and testing costs, interior or exterior finishes (painting, drywall, doors, windows, auditorium seating, flooring, etc.), and electrical, plumbing, and HVAC work. The estimate does not include any patching of any other finishes that need to be removed to perform the structural work and does not include removing the concrete block wall inside the commercial space.

The clean-up of the debris in the auditorium, stage and along the edges of the barrel roof is not included in the estimate.

The estimate is based on prevailing wages and includes markups for supervision, general conditions, contingency fee, General Liability Insurance and a Performance and Payment Bond.

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1. Fly-Tower Roof Structure

a	Fix Holes in Roof Hatches with New Hatches	\$ 35,119
b	-or Fix Holes in Roof Hatch with Plywood	\$ 4,634
c	Retrofit Roof Items and Re-roof	\$ 58,088
d	*Install Steel Support Beams	\$ 53,227
e	*Remainder of Retrofit items	\$ 7,662

Total (a, c, d, e): \$ 154,096

2. Auditorium Barrel Roof Structure

a	Remove Plaster and Evaporative Cooler	\$ 38,660
b	Fix Holes along North and South Walls	\$ 32,877
c	-or Fix Holes, Retrofit Roof Items and Re-roof	\$ 140,343
d	*Fill Cracks in Concrete walls with Epoxy	\$ 115,682
e	*Fill and Repair Orchestra Pit	\$ 6,194
f	*Remainder of Retrofit items	\$ 19,365

Total (a, c, d, e, f): \$ 320,244

3. Marquee over Sidewalk

a	Remove Marquee	\$ 4,694
b	*Install Refurbished/New Marquee	\$ 20,000

Total (a, b): \$ 24,694

4. 1st Floor Roof Structure over Commercial Space

a	Remove Plaster from Ceiling	\$ 11,013
b	Retrofit Wall above ¹ and Re-roof	\$ 40,184
c	-or Retrofit Wall above ¹ after Lower Re-roofing	\$ 17,442
d	*Remainder of Retrofit items	\$ 211,439

Total (a, b, d): \$ 262,636

¹part of two story structure

5. 2nd Floor Roof Structure over Office Space

a	Remove Plaster from Ceiling	\$ 13,952
b	Fix Active Leaks	\$ 8,492
c	-or Retrofit Roof Items and Re-roof	\$ 113,185
d	*Remainder of Retrofit items	\$ 36,289

Total (a, c, d): \$ 163,426

* can be preformed after re-roofing is complete

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Best Estimate Totals:

Minimum to remove marquee, patch leaks and prevent further damage until Roof Retrofits & Re-roofing can be completed. (1b+2b+3a+5b)	Total: \$ 50,697
Roof Retrofits & Re-roofing (1a+1c+2a+2c+3a+4a+4b+5a+5c)	Total: \$ 455,238
* Remainder of Retrofit Items that can be performed after re-roofing is complete.(1e+1d+2d+2e+2f+3b+4d+5d)	Total: \$ 469,858

Best Estimate for All Work Complete

Total: \$ 925,096

The recommended structural rehabilitation for the Lompoc Theater will take 10 months to complete.

* can be performed after re-roofing is complete

Engineering Proposal

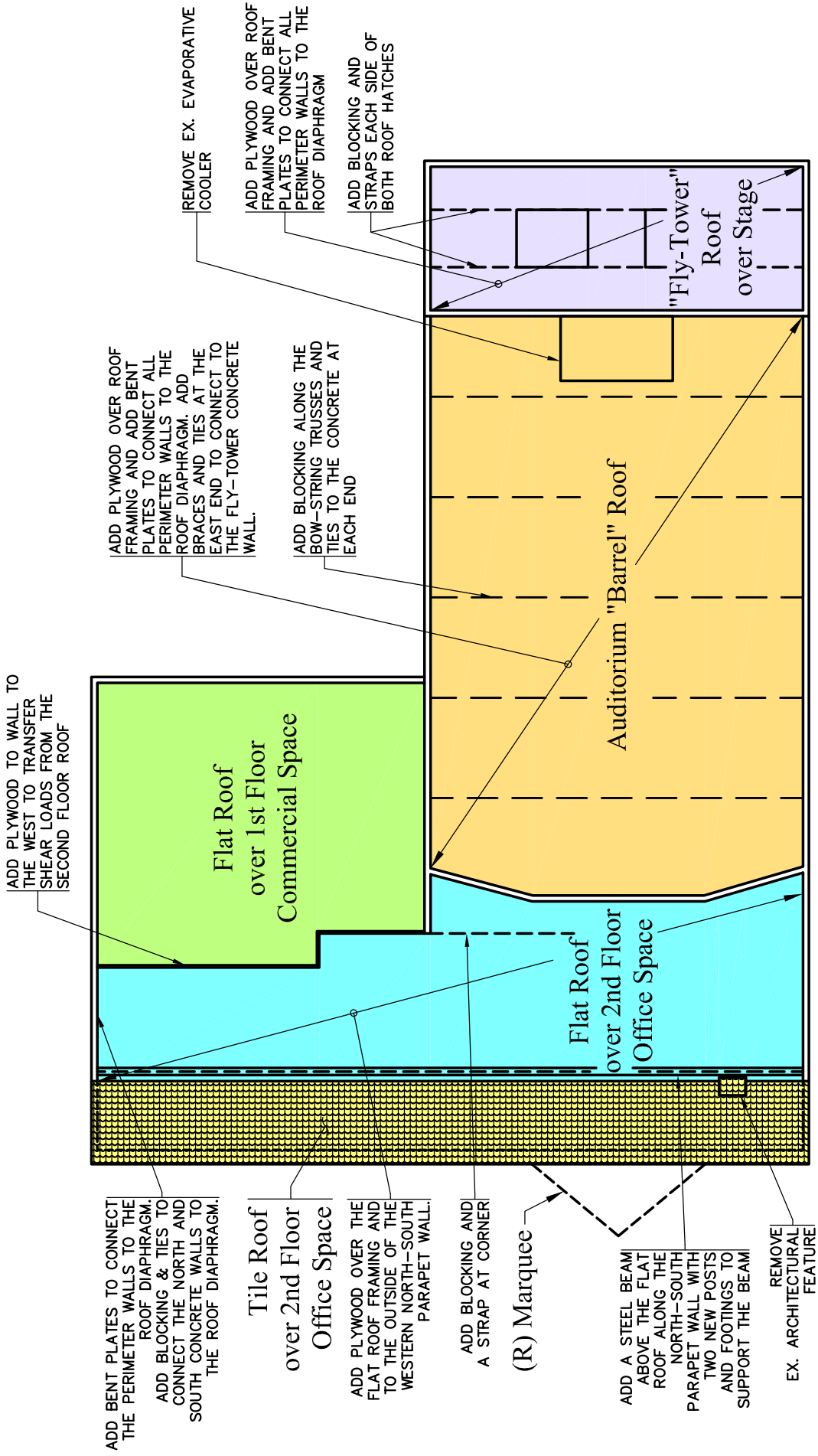
Fred H. Schott & Associates will prepare complete Structural Plans and details for the structural rehabilitation and re-roofing of the Lompoc Theater to satisfy current codes. We will include Structural Notes (Specifications) for the structural portion of the project, as well as, the Structural Calculations. Our proposal includes all design submittals necessary to complete the building permit plan check and review of the contractor's submittals during construction. We expect the design to require 6 to 8 weeks and can be done for a fee of \$26,000-\$33,000.

Structural inspections and/or observations are not included since they greatly depend on the contractor's scheduling.

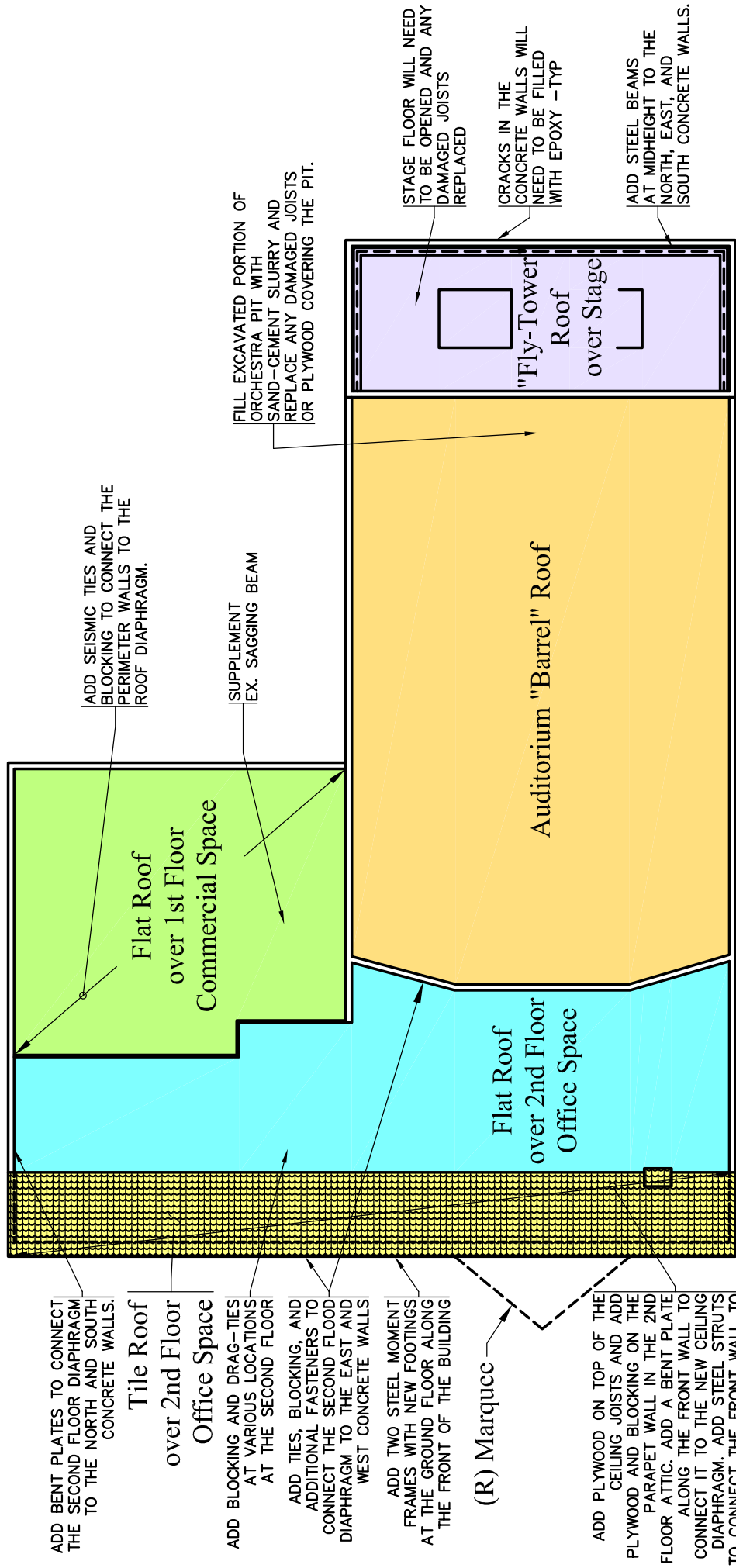
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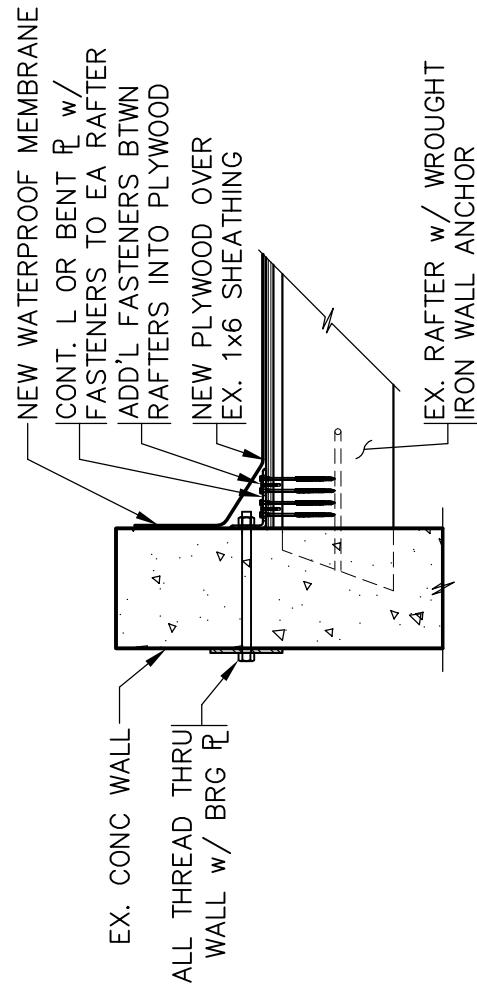
Fred Schott, S.E., P.E., SECB



B Pre-Reroofing Structural Rehabilitation Work to bring Lompoc Theater Roof Structures up to Current Code Requirements



C Post-Reroofing Structural Rehabilitation Work to bring Lompoc Theater Roof Structures up to Current Code Requirements



D Typical Bent Plate Connection

3/4" = 1'-0"