ADDENDUM NO. 03
March 29, 2019
TO THE CONTRACT DOCUMENTS FOR
DIXON MIDDLE SCHOOL RENOVATION
FOR THE
DIXON UNIFIED SCHOOL DISTRICT

NOTICE TO BIDDERS

This Addendum forms a part of the Contract and modifies the original bidding documents dated 11/12/18. It is intended that all work affected by the following modifications shall conform to related provisions and general conditions of the Contract of the original drawings and specifications. Modify the following items wherever appearing in any drawings or sections of the specifications. Acknowledge receipt of Addendum No. 03 in the space provided on the Bid Form. Failure to do so may subject to disqualification.

PRE-BID RFI CLARIFICATIONS

P-B RFI NO. 1  Q: Specification 105100 Lockers: 2.01.A.2 Basis of Design is Penco Defiant. Some specs are in conflict with Penco Defiant. Do we follow the spec’s for Penco Defiant?

A: Follow Specification 105100 Lockers which use as Basis of Design the Penco Defiant.

P-B RFI NO. 2  Q: Specification 105100 Lockers: 2.01.A.3 Please confirm DeBourgh all welded lockers are approved if equal to basis of design.

A: Proposed substitution was not submitted using 012500.01 Substitution Request form A - Prebid for review and approval. See 012500 Substitution Procedures. Use specified product / materials.

P-B RFI NO. 3  Q: Specification 105100 Lockers: 2.02.B.4 calls for a hat shelf in the 3 tier 24” high Student lockers. This is highly unusual. And cuts opening in half. Are hat shelves required for the Student lockers?

A: See 2.02B. Hat shelf is NOT required in Student lockers (3 tier 24” high). See 2.02A Hat shelf is required at full height lockers in teachers / coaches’ rooms.

P-B RFI NO. 4  Q: Specification 105100 Lockers: 2.02.C calls for phenolic benches. Over 95% of the N CA projects use standard Maple benches. Do we price Maple or phenolic benches?

A: Provide phenolic benches per drawings and specifications.

P-B RFI NO. 5  Q: Specification 105100 Lockers: 2.03.A calls for ASTM A653/A653M SS GRADE 33/230 with G60/Z180 coating. The standard for Penco welded lockers is: “All Penco standard lockers are constructed using prime grade mild cold-rolled sheet steel free from surface imperfection meeting ASTM A1008 and capable of taking a high-grade enamel powder coat finish”. Do we provide the standard without the G60/Z180 coating? I would suggest using the Penco option of 2 ml Powder coat thickness instead.

A: Penco Enamel powder coat finish is acceptable.
P-B RFI NO. 6  Q: Specification 105100 Lockers: 2.03.A calls for baked enamel finish. Do we provide Powder coat per Penco standard? This is superiors to baked enamel.

A: Penco Enamel powder coat finish is acceptable.

P-B RFI NO. 7  Q: Specification 105100 Lockers: 2.03.D.1 calls for a 14 gage door outer face. Penco Defiant also has an 18 gage inner face reinforcement channel. It is available in 3-1/2" wide for the vertical option or with a horizontal option that enclosed the recess cup and lock assembly. Do we provide the vertical or horizontal 18 ga inner face door reinforcement? I would recommend the Classic horizontal reinforcement.

A: Horizontal reinforcement is acceptable.

P-B RFI NO. 8  Q: Specification 105100 Lockers: 2.03.E calls for 2 or 3, 14 gage hinges. This is not available on Penco Defiant. Please confirm standard continuous 16 ga piano hinges are acceptable.

A: 16 ga piano hinge is acceptable.

P-B RFI NO. 9  Q: Specification 105100 Lockers: 2.03.I calls for ADA designation on the number plates. This is typically done with 3”x3” ISA approved stickers mounted to the face of the locker. Please confirm this is acceptable.

A: 3”x3” ISA is acceptable. Decals must be permanently affixed to lockers.

P-B RFI NO. 10  Q: AMP11.0 Detail 4 Shows Existing wood flooring. What type of wood flooring is existing? Based on the type of wood floor the board layout could transfer back through and be visible through the Pulastic System.

AMP 11.0 Detail 3 and 1 shows a slope at the perimeter of the Activity room and at the doors. The Robbins Pulastic Sport Flooring is a Pad underlayment with a poured 2mm wear layer. The 2mm layer is a liquid pour that hardens. This product when poured, with the slope specified will go to the lowest point?

Please request clarity in regard to the above questions.

A: Existing flooring is a sprung wood sports floor, unknow species, but likely maple. Overlay flooring must be placed to meet accessible threshold transitions at all doors meeting code. Shock pad will require forming to create transition. Installation means and methods are per contractor. Specified Versashield material underlay and pad thickness to address overlay of existing flooring system. Pulastic system may use a hostapulp additive to thicken material to reduce tendency to travel to lowest point.

P-B RFI NO. 11  Q: When patching existing T bar area’s per plans is it going to be required to bring that area to current codes per DSA Requirements?

A: DSA IR 25-2.13 indicates that areas of repair less than 10% of the total area are not required to be installed if certain existing conditions are met. Refer to the attached Reference Document: DSA IR 25-2.13 for full language. Contractor must field verify existing conditions. It is currently anticipated that the area of work is under 10% for any given area of modification (with the exception of Building A, Administrative suite, which requires entirely new ceiling grid). There is no available record information to identify if the (e) lateral bracing meets the ‘exceptions’ allowed by DSA; field verification is required.
Following is an Excerpt from DSA IR 25-2.13

4. CEILING SYSTEM ALTERATION: The entire ceiling in the affected space shall be upgraded to meet the current requirements of the CBC if any portion of the grid system is cut or altered and the ceiling has no lateral bracing assemblies (4-way splay wires and compression post) or has lateral bracing assemblies spaced more than 12 feet on-center.

Exception: If the ceiling has lateral bracing assemblies spaced no more than 12 feet on-center, a ceiling upgrade will only be required if the area cut or altered exceeds 10 percent of the entire ceiling area.

Notes:
- The “entire” ceiling in the affected space is defined as the area of ceiling bounded by four walls or a combination of walls and expansion joints or seismic separation joints.
- With DSA concurrence, other existing lateral bracing systems may be deemed equivalent to a 4-way splay wire and compression post lateral force bracing system.

4.1 Where the ceiling grid is not cut or altered, and the scope of work includes only the following:
- replacement of existing ceiling panels with like panels of equal or lesser weight
- replacement of light fixtures and/or terminals with like units (units of equal size and of equal or lesser weight) placed in the same location no upgrade to the ceiling grid, suspension system or lateral force brace assemblies is required.

4.2 Re-Use of Existing Ceiling Hanger Wires and Bracing Wires: Existing ceiling hanger and bracing wires may be reused provided they comply with the following:
- a. The gauge and spacing of the wires must comply with the current applicable codes and this IR.
- b. If a new wire is to be spliced to an existing wire, the architect or structural engineer in general responsible charge must submit to DSA for approval a detail and specification describing how the splice is to be made. Acceptable wire splice details are provided in Appendix A.
- c. See Section 7 of this IR for testing requirements for the re-use of existing hanger and bracing wire assemblies.

P-B RFI NO. 12 Q: Is the existing 12” x 12” ceiling tile ½” or 5/8” thick? Glued on to gyp board or nailed on to furring Strips?

A: Unknown existing tile thickness, assume 5/8”. As-built documents appear to indicate that the tile is adhesively applied; substrates vary by location and by building. Contractor field verification will be required.

P-B RFI NO. 13 Q: Page AA2.3 Ceiling legend calls for Armstrong Ultima ceiling panels Acoustical Specs 095100 2.02 # 8a calls for Armstrong Dune which one?

A: Basis of Design: Armstrong Ultima. Revise 095100 2.02 #8 to Ultima.

P-B RFI NO. 14 Q: Plan Sheet 9.2 Detail # 6 shows Shadow mold # 7877 Spec Section 095100 2.03 C1 calls for # 7800 wall angle Which one?

P-B RFI NO. 15  Q: Plan Sheet AG12 Lobby Vestibule shows all 12” x 12” tile to be removed sheet AG2.2 shows small amount of patch work at existing ceiling Which one?

A: Demolish stained and/or damaged tiles. Install new as indicated on AG2.2.

P-B RFI NO. 16  Q: Mold remediation – site visit shows mold remediation has begun, is it complete? Plans have a general note for contractor but it is unquantifiable at this time. Recommend including an allowance to ‘deal’ with any mold/dry rot conditions not identified on the plans.

A: The mold, asbestos and lead remediation of the campus is complete. If unforeseen conditions are discovered, an Owner’s Allowance will be used to manage additional scope that may arise. If further mold, asbestos or lead are discovered, the District may direct the contractor to remediate with the use of a licensed hazmat removal company through a change order process.

Refer to specification section 012100 Allowances. Each bidder shall include a separate line item in their bid in the amount of $200,000 which shall constitute the Allowance (District’s contingency fund). The Allowance is for the use of the Contractor, as approved by the District, to pay for miscellaneous work items which are required to complete the Project. The Contractor shall obtain written approval from the District prior to using the Allowance funds. If on Final Completion of the Project, funds are remaining, such funds shall remain unspent and allocated to the District as the District sees fit to use, or amount will be returned to the District through Change Order.

P-B RFI NO. 17  Q: At new receptacles/data outlets is wire mold acceptable or do we have to open up walls and patch?

A: Where existing wire mold is in place, reuse or match in kind to the greatest extent possible for convenience outlets in classrooms as noted in contract documents. At teaching walls, where future OFOI television will be installed, the electrical and low voltage must be installed in wall cavities and related finishes patched. In locations of new construction (like Building A, Administrative suite, Gymnasium locker rooms, etc.) all electrical to be installed in wall cavities as new.

P-B RFI NO. 18  Q: Fire sprinkler specifications provided but no drawings. Confirm there is no work to the existing fire sprinkler system and NO new system.

A: Minor Fire Sprinkler modification may be necessary in limited existing areas. There are small sections of stand-alone fire sprinkler coverage in the hallway between Building A and Building B, small stand along fire sprinkler in Building C. There is no intent to add sprinklers, or upgrade to sprinkler the entire building system. See ‘Sprinkler Information’ on FA0.00 of contract documents.

CHANGES TO SPECIFICATIONS

ITEM NO. 1  Add Specification 012100 Allowances
ITEM NO. 2  Replace Specification 060573 Wood Treatment

REFERENCE DOCUMENTS

DSA IR 25-2.13
END OF ADDENDUM NO. 03
SECTION 012100
ALLOWANCES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Owner Contingency allowance.

1.02 CONTINGENCY ALLOWANCE
   A. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Owner Contingency Allowance.
   B. Funds will be drawn from the Owner Contingency Allowance only with Owner authorization via Change Order.
   C. At closeout of Contract, funds remaining in Owner Contingency Allowance will be credited to Owner by Change Order.

1.03 ALLOWANCES SCHEDULE
   A. Owner Contingency Allowance: Include the stipulated sum/price of $200,000 (Two Hundred Thousand dollars) for use upon Owner's instructions.

PART 2 PRODUCTS - NOT USED
PART 3 EXECUTION - NOT USED

END OF SECTION 012100
SECTION 060573
WOOD TREATMENT

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Site applied termiticide for wood materials.
   B. Site applied termiticide for other building materials.
   C. Tent fumigation on buildings.

1.02 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide technical data on application instructions.
   C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner’s name and registered with manufacturer.
      1. Termiticide Treatment Report:
         a. Date and time of application.
         b. Quantity of undiluted termiticide used.
         c. Dilutions, methods, volumes used, and rates of application.
         d. Areas of application.
         e. Areas not accessible.

1.03 DELIVERY, STORAGE, AND HANDLING
   A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

1.04 WARRANTY
   A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
   B. Site Applied Termiticide and Mildicide: Correct defective Work within a five year period after Date of Substantial Completion.
      1. Standard form, signed by Applicator and Contractor, certifying that termite control work, consisting of applied termiticide treatment, will prevent infestation of subterranean and Formosan termites. Installer agrees to re-treat structure with termiticide treatments, and repair or replace damage where subterranean and Formosan termite activity is discovered during warranty period as directed by warranty.
      2. Provide annual inspection of termite control work.

1.05 QUALITY ASSURANCE
   A. Installer Qualifications: A specialist who is licensed per regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located and who employs workers trained and approved by manufacturer to install manufacturer's products.
   B. Regulatory Requirements: Formulate and apply termiticides per the EPA-Registered Label.
   C. Source Limitations: Obtain termite control products from single source from single manufacturer.

PART 2 PRODUCTS

2.01 SITE APPLIED WOOD TREATMENT
   A. Manufacturers:
      1. Treated Wood: Nisus Corporation; Bora Care Commercial: www.nisuscorp.com/#sle.
      2. Substitutions: See Section 016000 - Product Requirements.
   B. Site Applied Termiticide for Wood, Steel and Concrete: Borate mineral salt based, spray applied termiticide formulated for use on wood, steel, concrete and other building materials.
      1. Active Ingredient: 40% minimum disodium octaborate tetrahydrate (DOT).
PART 3 EXECUTION

3.01 PREPARATION

A. Remove dust, dirt and other contaminants from treatment surfaces. Remove tarpaulins, drop cloths, strippable protective films, etc., from areas to be treated. Move equipment and stored materials that block or prevent product application.

3.02 INSTALLATION - GENERAL

A. Provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

B. Coordinate application of termiticide treatment of structure with access to all structural wood members and foundations. Install termiticide during the dried-in phase after all structural framing and sheathing is in place and prior to installation of drywall, insulation, mechanical systems and electrical wiring.

3.03 SITE APPLIED WOOD TREATMENT

A. Comply with manufacturers written mixing and installation instructions.

B. Termiticide application at all the following buildings: Stadium Grand Stands and Ticket Booth.

Apply to foundations, structure, substructure, crawl space and other items as follows:

1. All structural wood and sill plates within 24 inches, minimum, of point of contact with foundation.

2. All wood, wood based and cellulosic sheathing within 24 inches, minimum, of point of contact with foundation.

3. Concrete foundations 2 inches, minimum, from sill plate.

4. All pipe and plumbing penetrations up to 24 inches, minimum, above slab and slab surface within 6 inches, minimum, of pipe or penetration.

5. Concrete or masonry or wood crawlspace walls / posts up to 24 inches, minimum, from top of soil.

6. Concrete or masonry or wood basement walls / posts up to 24 inches, minimum, from top of soil.

7. Six inches, minimum, on either side of control joints and construction joints in slabs and joints between slabs and abutting material.

8. Underside of all wood floor and structural wood members exposed to crawl space.


   a. Tarp and seal all structure for fumigation with chemical toxicant VIKANE to exterminate dry wood termites. The removal of antennas and/or plants close to the structure will be performed by the Contractor.

END OF SECTION 060573
PURPOSE: The purpose of this Interpretation of Regulations (IR) is to provide guidelines for the design and installation of metal suspension systems for lay-in ceilings on projects submitted under the 2013 California Building Code (CBC). For projects submitted to the Division of the State Architect (DSA) for review under the 2007 or 2010 CBC, see DSA IR 25-2.07 or IR 25-2.10, respectively.

1. GENERAL REQUIREMENTS: CBC Section 1616A.1.20 (1616.10.16*) requires the design and installation to be in compliance with ASTM C635, C636, and E580, Section 5, with modifications.

   Note: Amendments in CBC Section 1616A.1.20 (1616.10.16*) replace and append ASCE 7, Section 13.5.6.

The requirements in this IR apply to flat and level ceiling systems whose total weight, including ceiling mounted air terminals, services and light fixtures, does not exceed four (4) psf. Heavier systems, systems that are not flat and level, those supporting lateral loads from partitions, and free floating ceilings supported by chains or cables are beyond the minimum requirements of this IR and will require special design and details.

2. CEILING DESIGN & INSTALLATION REQUIREMENTS:

2.1 Ceiling System Components:

   a) Shall comply with ASTM C635 and Section 5.1 of ASTM E580.

   b) The ceiling grid system must be rated heavy duty as defined by ASTM C635.

   c) Main runners, cross runners, splices, expansion devices and intersection connectors shall be designed to carry a mean ultimate test load of not less than 180 lbs. in compression and tension per ASTM E580 Section 5.1.2.

   d) Ceiling wire shall be Class 1 zinc coated (galvanized) carbon steel conforming to ASTM A641. Wire shall be #12 gauge (0.106" diameter) with soft temper and minimum tensile strength = 70 ksi. The maximum allowable (ASD) tension load for wire meeting this specification is 350 lbs.

      - Four (4) turns of the wire within 1.5" will develop the wire allowable load.
      - Three (3) turns of the wire within 3" is assumed to develop no more than 50 percent of wire allowable load.

2.2 Suspension System Installation:

   a) Shall comply with ASTM C636 and Section 5.2 of ASTM E580.

   b) #12 gauge hanger wires may be used for up to and including a 4 foot by 4 foot grid spacing and shall be attached to main runners. Splices in hanger wires shall develop 50 percent of the wire allowable load.

   c) Provide #12 gauge hanger wires at the ends of all main and cross runners within eight (8) inches of the support or within one-fourth (1/4) of the length of the end tee,
whoever is least, for the perimeter of the ceiling area. Perimeter wires are not required when the length of the end tee is eight (8) inches or less.

d) Ceiling grid members shall be attached to two (2) adjacent walls per ASTM E580, Section 5.2.3. Ceiling grid members shall be at least 3/4 inch clear of other walls. If walls run diagonally to ceiling grid system runners, one end of main and cross runners should be free, and a minimum of 3/4 inch clear of wall.

e) The width of the perimeter supporting closure angle shall be not less than two (2) inches. Use of angles with smaller widths in conjunction with proprietary perimeter clips may be acceptable in accordance with Section 5 of this IR.

f) At the perimeter of the ceiling area, where main or cross runners are not connected to the adjacent wall, provide interconnection between the runners at the free end to prevent lateral spreading. A metal stabilizer or a #16 gauge wire with a positive mechanical connection to the runner may be used and placed within eight (8) inches of the wall. Where the perpendicular distance from the wall to the first parallel runner is eight (8) inches or less, the stabilizer or #16 gauge wire is not required.

2.3 Lateral Force Bracing Assembly Installation:

a) Lateral force bracing assemblies consisting of a compression strut and four (4) #12 gauge splayed bracing wires oriented 90 degrees from each other are required for all ceiling areas.

   Exception: Lateral force bracing may be omitted for suspended acoustical ceiling systems with a ceiling area not to exceed 144 square feet, for all values of $S_{0s}$, when perimeter support is provided in accordance with Section 2.2 of this IR and perimeter walls are designed to carry the ceiling lateral forces.

b) Lateral force bracing assemblies shall be spaced per Table 1 for all values of the component importance factor ($I_p$) of the ceiling.

c) There shall be a brace assembly a distance of not more than one-half (1/2) of the above spacing from each surrounding wall, expansion joint and at the edges of any ceiling vertical offset. For example, where the brace spacing is 8' x 12', the edge distance shall be 4 feet in the direction of the 8 foot spacing and 6 feet in the direction of the 12 foot spacing.

d) The slope of bracing wires shall not exceed 45 degrees from the horizontal plane and wires shall be taut. Splices in bracing wires shall develop the wire allowable load.

e) Compression struts shall meet the following requirements:
   - The strut shall be sized to adequately resist the vertical component force induced by the ceiling bracing wires and have a maximum kl/r not to exceed 300. The struts listed in Appendix A meet this requirement for ceilings complying with the general requirements of this IR.
   - The strut shall not be more than one (horizontal) in six (vertical) out of plumb.
TABLE 1
LATERAL FORCE BRACE ASSEMBLY SPACING

<table>
<thead>
<tr>
<th>Design Spectral Acceleration Parameter, $S_{DS}$</th>
<th>Brace Assembly Spacing (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>z/h ≤ 0.5&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>$S_{DS} \leq 1.15$</td>
<td>12 x 12</td>
</tr>
<tr>
<td>$1.15 &lt; S_{DS} \leq 1.73$</td>
<td>12 x 12</td>
</tr>
<tr>
<td>$S_{DS} &gt; 1.73$</td>
<td>8 x 12</td>
</tr>
</tbody>
</table>

Footnotes:

a. Where, as defined in ASCE 7, Section 13.3.1:
   $z =$ height in structure of point of attachment of ceiling with respect to the base.
   $h =$ average roof height of the structure with respect to the base.

b. It shall be permitted to use the brace assembly spacing for “z/h > 0.5” for the full building height.

2.4 Attachment of Hanger and Bracing Wires:

a) Fasten hanger wires with not less than three (3) tight turns in three (3) inches.
   Hanger wire loops shall be tightly wrapped and sharply bent to prevent any vertical movement or rotation of the member within the loops (see ASTM E580, Section 5.2.7.2).

b) Fasten bracing wires with not less than four (4) tight turns in one and one-half (1-1/2) inches.

c) Hanger and bracing wire anchorage to the structure shall be installed in such a manner that the direction of the anchorage aligns closely with the direction of the wire (e.g. bracing wire ceiling clips must be bent as shown in the details and rotated as required to align closely with the direction of the wire, screw eyes in wood must be installed so they align closely with the direction of the wire, etc.).

d) Separate all ceiling hanger and bracing wires at least six (6) inches from all unbraced ducts, pipes, conduit, etc.

e) Hanger and bracing wires shall not attach to or bend around obstructions including but not limited to: piping, ductwork, conduit and equipment. Provide trapeze or other supplementary support members at obstructions to allow typical hanger spacing. Brace assemblies must be configured and/or located in order to avoid obstructions in addition to maintaining the required brace assembly spacing.

f) Provide additional hangers, struts and brace assemblies as required at all ceiling breaks, soffits or discontinuous areas.

g) Hanger wires that are more than one (horizontal) in six (vertical) out of plumb shall have counter-sloping wires.

   **Note:** See ASTM C636, Figure 1, for counter-sloping methods.

h) Attachment of the bracing wires to the structure above and to the main runners shall be adequate for the load imposed. The weight ($W_p$) shall be taken as not less than four (4) psf for calculating seismic forces ($F_p$).

i) Post-installed anchors (e.g. expansion anchors, screw anchors and power actuated fasteners) shall have a current Evaluation Report acceptable to DSA in accordance with DSA IR A-5.
j) Power actuated fasteners in concrete are not permitted for bracing wires.

k) DSA approval of a construction plan is required prior to installing post-installed anchors in prestressed concrete. The construction plan shall demonstrate how the location of existing prestressing tendons and strands will be located and denoted as necessary to avoid interference.

2.5 Expansion Joints, Seismic Separation Joints:

a) Expansion joints shall be provided in the ceiling at intersections of corridors and at junctions of corridors and lobbies or other similar areas.

b) For ceiling areas exceeding 2,500 square feet, a seismic separation joint shall be provided to divide the ceiling into areas not exceeding 2,500 square feet in accordance with ASTM E580, Section 5.2.9.

2.6 Ceiling Fixtures, Terminals and Devices:

a) All fixtures, terminals and other devices shall be mounted in a manner that will not compromise ceiling performance in accordance with Section 13.5.6.2.2 Item 5 of ASCE 7 as amended by CBC Section 1616A.1.20 (1616.10.16*) and ASTM E580 Sections 5.3 and 5.4.

b) Ceiling panels shall not support any light fixtures, air terminals or devices.

c) Penetrations through the ceiling for sprinkler heads and other similar devices that are not integrally tied to the ceiling system in the lateral direction shall have a two (2) inch oversized ring, sleeve or adapter through the ceiling tile to allow free movement of one (1) inch in all horizontal directions. Alternatively, per ASTM E580, Section 5.2.8.5, a flexible sprinkler hose fitting that can accommodate one (1) inch of ceiling movement shall be permitted to be used in lieu of the oversized ring, sleeve or adapter.

d) Slack safety wires shall be considered hanger wires for installation and testing requirements.

2.6.1 Light Fixtures:

a) All light fixtures** shall be positively attached to the ceiling suspension systems by mechanical means per California Electrical Code (CEC) Article 410.36 to resist a horizontal force equal to the weight of the fixture. A minimum of two screws or approved fasteners are required at each light fixture, per ASTM E580, Section 5.3.1.

**See Section 3.1 of this IR for pendant-mounted light fixture support and bracing requirements.

b) Surface-mounted light fixtures shall be attached to the main runner with at least two positive clamping devices on each fixture. The clamping device shall completely surround the supporting ceiling runner and be made of steel with a minimum thickness of #14 gauge. Rotational spring catches do not comply. A #12 gauge slack safety wire shall be connected from each clamping device to the structure above. Provide additional supports when light fixtures are eight (8) feet or longer or exceed 56 lbs. Maximum spacing between supports shall not exceed eight (8) feet.

c) Light fixtures weighing less than or equal to 10 lbs. shall have a minimum of one (1) #12 gauge slack safety wire connected from the fixture housing to the structure above.
d) Light fixtures weighing greater than 10 lbs. but less than or equal to 56 lbs. may be supported directly on the ceiling runners, but they shall have a minimum of two (2) #12 gauge slack safety wires connected from the fixture housing at diagonal corners to the structure above.

**Exception:** All light fixtures greater than two by four feet weighing less than 56 lbs. shall have a #12 gauge slack safety wire at each corner.

e) All light fixtures weighing greater than 56 lbs. shall be independently supported by not less than four (4) taut #12 gauge hanger wires (one at each corner) attached from the fixture housing to the structure above or other approved hangers. The four (4) taut #12 gauge wires or other approved hangers, including their attachment to the structure above, shall be capable of supporting four (4) times the weight of the fixture.

### 2.6.2 Services within the Ceiling:

a) All flexible sprinkler hose fitting mounting brackets, ceiling-mounted air terminals or other services shall be positively attached to the ceiling suspension systems by mechanical means to resist a horizontal force equal to the weight of the component. Screws or approved fasteners are required. A minimum of two attachments are required at each component.

b) Ceiling-mounted air terminals or other services weighing less than or equal to 20 lbs. shall have one (1) #12 gauge slack safety wire attached from the terminal or service to the structure above.

c) Flexible sprinkler hose fittings, ceiling-mounted air terminals or other services weighing more than 20 lbs. but less than or equal to 56 lbs. shall have two (2) #12 gauge slack safety wires (at diagonal corners) connected from the terminal or service to the structure above.

d) Flexible sprinkler hose fittings, ceiling-mounted air terminals or other services weighing more than 56 lbs. shall be supported directly from the structure above by not less than four (4) taut #12 gauge hanger wires attached from the terminal or service to the structure above or other approved hangers. The four (4) taut #12 gauge wires or other approved hangers, including their attachment to the structure above, must be capable of supporting four (4) times the weight of the unit.

### 2.6.3 Other Devices within the Ceiling:

All lightweight miscellaneous devices, such as strobe lights, occupancy sensors, speakers, exit signs, etc., shall be attached to the ceiling grid per Section 2.6.2 a) of this IR. In addition, devices weighing more than 10 lbs. shall have a #12 gauge slack safety wire anchored to the structure above per Section 2.6.1 b) of this IR. Devices weighing more than 20 lbs. shall be supported from the structure above using details provided by the registered design professional.

### 3. ADDITIONAL REQUIREMENTS:

#### 3.1 Pendant-Mounted Light Fixtures:

a) Where pendant-mounted light fixtures are to be installed in areas with a suspended ceiling, the construction documents shall include complete support details complying with this IR and DSA IR 25-2.13 (rev 11-09-17).

b) Support pendant-mounted light fixtures directly from the structure above with hanger wires or cables passing through each pendant hanger and capable of supporting two
(2) times the weight of the fixture.

c) If a pendant-mounted light fixture is directly and independently braced below the ceiling (i.e., aircraft cables to walls), then a brace assembly is not required above the ceiling.

d) If a pendant-mounted light fixture is free to swing 45 degrees from vertical in all directions, and is not directly and independently braced below the ceiling, then a bracing assembly is only required where the pendant hanger penetrates the ceiling. Special details are required to attach the pendant hanger to the bracing assembly to transmit the horizontal and vertical forces.

Exception: Where the weight of the fixture is less than 20 lbs., the vertical component of the brace force need not be considered so no compression strut/post is required.

e) Rigid conduit shall not be used for attachment of the fixtures.

3.2 Fire Rated Ceilings:

a) Provide a detail and tested assembly number for rated ceiling assemblies from an authorized testing agency. The components and installation details must conform in every respect with the listed detail and number. Details shall clearly depict all components, including insulation materials, framing and attachment of the design so that the assembly can be constructed and inspected accordingly.

b) Pop rivets, screws or other attachments are not acceptable unless specifically detailed in the listed construction detail(s), or an approved listing by a State Fire Marshal (SFM) recognized laboratory.

3.3 Acoustical Ceiling Tile Panel Installation:

For ceiling installations utilizing acoustical tile panels of mineral or glass fiber, it is not mandatory to provide 3/4 inch clearance between the acoustical tile panels and the wall on the sides of the ceiling which are free to slip.

3.4 Other Panel Types:

Panels weighing more than one-half (1/2) psf, other than mineral fiber and glass fiber acoustical tile, and all metal and wood panels shall be positively attached to the ceiling suspension runners by mechanical means, such as bolts, screws or rivets, and each attachment shall have the allowable design strength to support 100 percent of the weight of the panel acting in any direction. A minimum of two attachments are required for each panel. For ceiling installations utilizing panels other than mineral or glass fiber, 3/4 inch clearance shall be provided between the ceiling panel and the wall on the sides of the ceiling area which are free to slip, unless otherwise justified by seismic qualification indicated below.

The use of other types of attachment, such as clips, snap-in devices, perforated lips, clamping devices or spring loaded devices or hooks, shall be listed per DSA IR A-5 and identified for use with the type of ceiling framing members and panels. The listing shall be seismically qualified in accordance with ASCE 7 Section 13.2.5 or 13.2.6.

An alternate means of compliance per California Administrative Code (CAC), Section 4-304 may be proposed and reviewed on a project-by-project basis when using unlisted means of attachment. The alternate means of attachment shall have the allowable design strength to support 100 percent of the weight of the panel acting in any direction and shall be capable of maintaining that strength if the ceiling grid is distorted or out of level.
It is also alternately permitted to provide a secondary means of connecting the panel to the grid or structure to retain the panel in case of panel dropout, ceiling grid distortion and ceiling grid becoming out-of-level. The secondary attachment shall have the allowable design strength to support two (2) times the weight of the panel acting in any direction, such as a slack wire or cable.

Special attachment details complying with one of the methods outlined above, such as screws or cables, shall be provided at the perimeter of the ceiling, where panels are cut or altered, or where non-standard panel sizes or edge conditions occur.

3.5 Exitways:

Exitways of essential services buildings shall be installed in accordance with Section 13.5.6.2.2 Item 1 of ASCE 7 as amended by CBC Section 1616A.1.20 (1616.10.16*). A main or cross runner shall be installed on all sides of each piece of tile, board or panel and each light fixture or grill. Splices or intersection of such runners shall be attached with through connectors such as pop rivets, screws, pins, plates with end tabs or other approved connectors.

3.6 Free Floating Ceilings:

Free floating ceilings (ceilings not attached to any walls) supported by wires in accordance with this IR shall be braced in accordance with this IR, regardless of the ceiling area, unless it can be demonstrated the anticipated ceiling movement will not cause failure of the ceiling components or failure of mechanical, electrical, plumbing and fire and life safety components/systems within the ceiling area and within the area of anticipated movement.

The perimeter of free floating ceilings shall be supported by a continuous runner which is spliced in accordance with ASTM E580 Section 5.1.2.

4. CEILING SYSTEM ALTERATION:

The entire ceiling in the affected space shall be upgraded to meet the current requirements of the CBC and this IR if any portion of the grid system is cut or altered and the ceiling has no lateral bracing assemblies (4-way splay wires and compression post) or has lateral bracing assemblies spaced more than 12 feet on-center.

**Exception:** If the ceiling has lateral bracing assemblies spaced no more than 12 feet on-center, a ceiling upgrade will only be required if the area cut or altered exceeds 10 percent of the entire ceiling area.

**Notes:**

1. The “entire” ceiling in the affected space is defined as the area of ceiling bounded by four walls or a combination of walls and expansion joints or seismic separation joints.

2. With DSA concurrence, other existing lateral bracing systems may be deemed equivalent to a 4-way splay wire and compression post lateral force bracing system.

4.1 Where the ceiling grid is not cut or altered, and the scope of work includes only the following:

- replacement of existing ceiling panels with like panels of equal or lesser weight
- replacement of light fixtures and/or terminals with like units (units of equal size and of equal or lesser weight) placed in the same location

no upgrade to the ceiling grid, suspension system or lateral force brace assemblies is...
4.2 **Re-Use of Existing Ceiling Hanger Wires and Bracing Wires:** Existing ceiling hanger and bracing wires may be reused provided they comply with the following:

a) The gauge and spacing of the wires must comply with the current applicable codes and this IR.

b) If a new wire is to be spliced to an existing wire, the architect or structural engineer in general responsible charge must submit to DSA for approval a detail and specification describing how the splice is to be made. Acceptable wire splice details are provided in Appendix A.

c) See Section 7 of this IR for testing requirements for the re-use of existing hanger and bracing wire assemblies.

5. **DSA ACCEPTANCE OF EVALUATION REPORTS:** Ceiling grid systems or components, with valid evaluation reports issued by qualified evaluation agencies, in accordance with DSA [IR A-5](https://example.com), are accepted by DSA, provided the system or component meets the requirements of CBC Section 1616A.1.20 (1616.10.16*), ASTM C635, C636 and E580. Where a qualified evaluation report is utilized, the installation shall comply with all the requirements specified in the evaluation report, i.e., connections, member sizes, perimeter details, special clips to wall angles, etc.

In accordance with DSA IR A-5, DSA will accept OSHPD Preapproved Details (OPD) “2013 CBC Standard Suspended Ceiling Details for Acoustical Tile or Lay-in Panel Ceilings.”

6. **CONSTRUCTION DOCUMENTS:** The construction documents shall clearly identify all suspended ceiling systems, support details, and lateral bracing.

6.1 **General Requirements:** The items listed in this section are required to be provided in the construction documents where applicable to the project scope. This list includes items common to most projects but is not complete for all projects. Additional information and/or details may be required on the construction documents for a specific project for specialty conditions, configurations, products, etc.

Except as indicated in both Section 6.2 and Appendix A of this IR, it is not permitted to reproduce this IR on the construction documents as a means to meet these requirements.

6.1.1 **Ceiling Systems.** A list of acceptable grid systems must be shown on the construction documents. Each system specified must be classified as heavy duty and shall have a valid evaluation report in accordance with DSA IR A-5. The construction documents shall specify the following for each acceptable grid system: the manufacturer, product name, evaluation report number, main and cross runner catalog number, and if used, seismic wall clip. When manufacturer specific information (proprietary seismic wall clips, etc.) is provided in the specifications, details on the construction drawings shall be provided and/or coordinated to reflect the same manufacturer specific information.

6.1.2 **Ceiling Suspension System.** The ceiling suspension system and its anchorage to the structure shall be fully detailed.

Where accepted proprietary devices, clips, wall angles, etc. are utilized, the details on the construction documents shall clearly indicate the installation details necessary to show compliance with all evaluation report requirements.

6.1.3 **Ceiling Lateral Force Bracing.** The ceiling lateral force bracing system, including the bracing wires and compression strut, and the bracing system anchorage to the
structure shall be fully detailed on the construction documents. The bracing assembly spacing at each floor and roof level must be clearly indicated.

6.1.4 **Expansion Joints and Seismic Separations Joints.** Expansion joints and seismic separation joints shall be fully detailed and the location shall be shown on the ceiling plans.

6.1.5 **Ceiling Fixtures, Terminals and Devices Anchorage and Bracing.** Details of construction for all fixtures, terminals, flexible fire sprinkler hose fittings and other devices must be provided as required to comply with this IR.

6.1.6 **Pendant-Mounted Light Fixtures.** Where pendant-mounted light fixtures are to be installed in areas with a suspended ceiling, the construction documents shall include complete support details complying with this IR and DSA IR 16-9.

6.1.7 **Supplementary Support Members.** Trapeze or other supplementary support members provided so typical hanger spacing can be maintained while avoiding obstructions shall be shown on the construction documents.

6.1.8 **Partition Bracing.** Partition bracing shall be shown on the construction documents and be braced independent of the ceiling system.

6.2 **Ceiling Notes and Details in Appendix A:** The ceiling notes and details provided in Appendix A are deemed to meet the general requirements of this IR. These notes and details shall not be used for construction or inspection except when incorporated in DSA approved construction documents.

Use of the notes and details is not mandated by DSA; they are provided only as a convenience to the registered design professional for incorporation into the construction documents.

Use of other notes and details created by the registered design professional is always acceptable provided they comply with the CBC and this IR. While these notes and details do not cover every condition that may occur on every project, they are intended to cover conditions common to many projects, and it is anticipated their use will facilitate the design, plan review and construction process.

Electronic drawing files of the details created using Revit LT™ 2015 are available for download at [http://www.documents.dgs.ca.gov/dsa/pubs/DSA-IR_25-2-13_CeilingDetails_2017_0310_R3.zip](http://www.documents.dgs.ca.gov/dsa/pubs/DSA-IR_25-2-13_CeilingDetails_2017_0310_R3.zip). DSA is providing these electronic drawing files to the registered design professional for convenience only and DSA is not responsible for issues of compatibility with particular computer systems or conversion to other file formats. The requirements of this IR are in no way changed or modified by providing the registered design professional with the electronic drawing files. The files may not be currently up to date or in conformance with the published IR and the registered design professional shall verify and coordinate the information with the latest published IR. Information contained in the files may be changed or updated by DSA, and DSA shall have no responsibility to notify or supply the registered design professional with these changes.

6.2.1 **Conditions for Use of Ceiling Notes and Details.** The conditions and requirements for use of the ceiling notes and details in Appendix A are as follows:

a) The details give no consideration to suitability for use in a specific application, compatibility with other building systems, appropriate use of materials or design, appearances, etc. The registered design professionals listed on the plan review application shall review all such qualities, features and/or properties to ensure code compliance, appropriate integration with other building systems, and proper
design for the project-specific conditions and installation.

b) When the details in the Appendix are used, they shall be incorporated into the construction drawings submitted for DSA approval. Incorporation by reference alone is not permitted. Only the notes and details applicable to the scope of the project shall be incorporated in the construction documents (e.g., do not incorporate wood connection details in the construction drawings for a concrete structure, do not include essential services building details in the construction documents for a school project, etc.).

c) Provided the content of the details is not changed, it is left to the discretion of the registered design professional(s) to reconfigure (renumber, resize, etc.) the details for integration into the construction drawings.

Exception: The registered design professional(s) is required to provide additional information on a detail where brackets [ ] are indicated. The brackets and notes to the registered design professional shall be removed from the details and replaced with the applicable requirements.

d) These details submitted as part of the construction documents during the plan review process will be subject to plan review as follows:

- It is expected no DSA plan review comment will be made on a detail incorporated into the construction documents that is unaltered and found applicable to the project for which it is submitted.
- Where a detail requires the designer to provide additional information to complete the detail before applying it to the drawings, plan review will be limited to the following:
  - A review of only the additional information provided.
  - A review to determine if the detail, with the additional information, is applicable to project for which it is submitted.
- Where a detail incorporated into the construction documents has been altered beyond that indicated in c) and d) above, it will be subject to a full review for both detail content and applicability to the project for which it is submitted.

e) Where conditions not covered by the details in Appendix A occur, project-specific design and details will be required. This includes, but is not limited to, pendant light fixtures, projector supports, projector screens, ceiling fans and free-floating ceilings.

7. TESTING: All field testing must be performed in the presence of the project inspector or a special inspector.

7.1 New Installations:

Post-installed anchors in concrete used to support hanger wires shall be tested at a frequency of 10 percent. Power actuated fasteners in concrete shall be field tested for 200 lbs. in tension. All other post-installed anchors in concrete shall be tested in accordance with CBC Section 1913A.7.

Post-installed anchors in concrete used to attach bracing wires shall be tested at a frequency of 50 percent in accordance with CBC Section 1913A.7.

7.2 Re-Use of Existing Ceiling Hanger Wires and Bracing Wires:

a) All existing ceiling hanger wire/anchor assemblies must be field tested to 200 lbs.

b) All existing bracing wire/anchor assemblies must be field tested to 440 lbs.
c) Where a new wire is spliced to an existing wire, each spliced wire/anchor assembly must be field tested to the loads given for existing assemblies above.

REFERENCES:

California Code of Regulations (CCR) Title 24
Part 2, 2013 California Building Code (CBC), Section 1616A.1.20, 1616.10.16*
Part 3, 2013 California Electrical Code (CEC), Article 410.36
ASCE 7-10 Minimum Design Loads for Building and Other Structures
ASTM C635.07, C636-08, and E580-10a

This Interpretation of Regulations (IR) is intended for use by the Division of the State Architect (DSA) staff and by design professionals to promote more uniform statewide criteria for plan review and construction inspection of projects within the jurisdiction of DSA which includes State of California public elementary and secondary schools (grades K–12), community colleges and state-owned or state-leased essential services buildings. This IR indicates an acceptable method for achieving compliance with applicable codes and regulations, although other methods proposed by design professionals may be considered by DSA.

This IR is reviewed on a regular basis and is subject to revision at any time. Please check DSA’s website for currently effective IRs. Only IRs listed on the webpage at www.dgs.ca.gov/dsa/Resources/IRManual.aspx at the time of plan submittal to DSA are considered applicable.

*Indicates alternative 2013 CBC sections that may be used by community colleges, per 2013 CBC Section 1.9.2.2.
APPENDIX A:
CONSTRUCTION DOCUMENTS
CEILING NOTES AND DETAILS
# Appendix A

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EESB – Essential Services Buildings
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1. **CEILING SYSTEM GENERAL NOTES:**

1.01 Ceiling system components shall comply with ASTM C635-07 and Section 5.1 of ASTM E580-10a.

1.02 The ceiling grid system must be rated heavy duty as defined by ASTM C635-08.

1.03 Ceiling systems. The following ceiling system(s) is/are part of the scope of this project:

   [For each system used, the RDP shall indicate in the construction documents, the information that follows]

   - Manufacturer's Name ____________________.
   - Product Evaluation Report Type and Number ____________________.
   - Manufacturer's Model Number - main runner ____________________.
   - Manufacturer's catalog number - cross runner ____________________.

1.04 Seismic Wall Clip: [RDP to specify if used]

   - Manufacturer’s Model ____________________.

1.05 Ceiling panels shall not support any light fixtures, air terminals or devices.

1.06 For ceiling installations utilizing acoustical tile panels of mineral or glass fiber, it is not mandatory to provide ¾” clearance between the acoustical tile panels and the wall on the sides of the ceiling which are free to slip. For all other ceiling panel types, provide ¾” clearance between the ceiling panel and the wall on the sides of the ceiling free to slip.

2. **MATERIALS:**

2.01 Ceiling wire shall be Class 1 zinc coated (galvanized) carbon steel conforming to ASTM A641-09a. Wire shall be #12 gage (0.106” diameter) with soft temper and minimum tensile strength = 70 ksi.

2.02 Galvanized sheet steel (including that used for metal stud and track compression struts/post) shall conform to ASTM A653-11, or other equivalent sheet steel listed in Section A2.1 of the North American Specification for the Design of Cold-Formed Steel Structural Members 2007, including supplement 2 dated 2010 (AISI S100-07/S2-10). Material 43 mil (18 gage) and lighter shall have minimum yield strength of 33 ksi. Material 54 mil (16 gage) and heavier shall have a minimum yield strength of 50 ksi.

2.03 Electrical metallic tube (EMT) shall be ANSI C80.3/UL 797 carbon steel with G90 galvanizing. EMT shall have minimum yield strength (Fy) of 30 ksi and minimum ultimate strength (Fu) of 48 ksi.
3. ATTACHMENT OF HANGER AND BRACING WIRES:

3.01 Separate all ceiling hanger and bracing wires at least six (6) inches from all unbraced ducts, pipes, conduit, etc.

3.02 Hanger and bracing wires shall not attach to or bend around obstructions including but not limited to: piping, ductwork, conduit and equipment.

3.03 Hanger wires that are more than one (horizontal) in six (vertical) out of plumb shall have counter-sloping wires.

3.04 Slack safety wires shall be considered hanger wires for installation and testing requirements.

3.05 Hanger and bracing wire anchorage to the structure shall be installed in such a manner that the direction of the anchorage aligns closely with the direction of the wire. (e.g. bracing wire ceiling clips must be bent as shown in the details and rotated as required to align closely with the direction of the wire, screw eyes in wood must be installed so they align closely with the direction of the wire, etc.)

4. FASTENERS AND WELDING:

4.01 Sheet metal screws shall comply with ASTM C1513-10, ASME B18.6.4-89 (R2005). Penetration of screws through joined material shall not be less than three exposed threads.

4.02 Expansion anchors shall be: [RDP to indicate manufacturer, product, evaluation report number and load for each size specified per CBC 1913A.7.2.]

4.03 Power-Actuated Fasteners shall be: [RDP to indicate manufacturer, product, evaluation report number]

4.04 If not otherwise specified in the evaluation report, power-actuated fasteners installed in steel shall be installed so the entire pointed end of the fastener is driven through the steel member.

4.05 Power-actuated fasteners in concrete are not permitted for bracing wires.

4.06 Concrete reinforcement and prestressing tendons shall be located by non-destructive means prior to installing post - installed anchor.

4.07 Welding shall be in accordance with AWS D1.3 using E60XX series electrodes.

5. TESTING: All field testing must be performed in the presence of the project inspector.

5.01 Post-installed anchors in concrete used to support hanger wires shall be tested at a frequency of 10 percent. Power actuated fasteners in concrete shall be field tested for 200 lbs. in tension. All other post-installed anchors in concrete shall be tested in accordance with CBC Section 1913A.7.

5.02 Post-installed anchors in concrete used to attach bracing wires shall be tested at a frequency of 50 percent in accordance with CBC Section 1913A.7.
6. **LIGHT FIXTURES:**

6.01 All light fixtures shall be positively attached to the ceiling suspension systems by mechanical means to resist a horizontal force equal to the weight of the fixture. A minimum of two screws or approved fasteners are required at each light fixture, per ASTM E580, Section 5.3.1.

6.02 Surface-mounted light fixtures shall be attached to the main runner with at least two positive clamping devices. The clamping device shall completely surround the supporting ceiling runner and be made of steel with a minimum thickness of #14 gage. Rotational spring catches do not comply. A #12 gage slack safety wire shall be connected from each clamping device to the structure above. Provide additional supports when light fixtures are eight (8) feet or longer or exceed 56 lb. Maximum spacing between supports shall not exceed eight (8) feet.

6.03 Light fixtures weighing less than or equal to 10 lb. shall have a minimum of one (1) #12 gage slack safety wire connected from the fixture housing to the structure above.

6.04 Light fixtures weighing less than or equal to 10 lb. shall have a minimum of one (1) #12 gage slack safety wire connected from the fixture housing to the structure above.

6.05 Light fixtures weighing greater than 10 lb. but less than or equal to 56 lbs. may be supported directly on the ceiling runners, but they shall have a minimum of two (2) #12 gage slack safety wires connected from the fixture housing at diagonal corners to the structure above.

   Exception: All light fixtures greater than two by four feet weighing less than 56 lbs. shall have a #12 gage slack safety wire at each corner.

6.06 All Light fixtures weighing greater than 56 lb. shall be independently supported by not less than four (4) taut #12 gage hanger wires, (one at each corner) attached from the fixture housing to the structure above or other approved hangers. The four (4) taut #12 gage wires or other approved hangers, including their attachment to the structure above, shall be capable of supporting four (4) times the weight of the fixture.

7. **SERVICES WITHIN THE CEILING:**

7.01 All flexible sprinkler hose fitting mounting brackets, ceiling-mounted air terminals or other services shall be positively attached to the ceiling suspension systems by mechanical means. Screws or approved fasteners are required. A minimum of two attachments are required at each component.

7.02 Ceiling-mounted air terminals or other services weighing less than or equal to 20 lb. shall have one (1) #12 gage slack safety wire attached from the terminal or service to the structure above.

7.03 Flexible sprinkler hose fittings, ceiling-mounted air terminals or other services weighing more than 20 lb. but less than or equal to 56 lb. shall have two (2) #12 gage slack safety wires (at diagonal corners) connected from the terminal or service to the structure above.

7.04 Flexible sprinkler hose fittings, ceiling-mounted air terminals or other services weighing more than 56 lb. shall be supported directly from the structure above by not less than four (4) taut #12 gage hanger wires attached from the terminal or service to the structure above or other approved hangers.
8. OTHER DEVICES WITHIN THE CEILING:

8.01 All lightweight miscellaneous devices, such as strobe lights, occupancy sensors, speakers, exit signs, etc., shall be attached to the ceiling grid. In addition, devices weighing more than 10 lbs. shall have a #12 gage slack safety wire anchored to the structure above. Devices weighing more than 20 lb. shall be supported independently from the structure above.
NOTE:
BRACING WIRES AND COMP. STRUT SHALL OCCUR AT EVERY 64 SQ. FT. MAX. IN ROOMS OVER 144 SQ. FT.

[WHERE A PROPRIETARY SEISMIC CLIP IS SPECIFIED, RDP TO REMOVE THE STABILIZER BARS SHOWN ON THE PLAN AND THE ABOVE STABILIZER BAR NOTE]
NOTE:
BRACING WIRES AND COMP. STRUT SHALL OCCUR AT EVERY 96 SQ. FT. MAX. IN ROOMS OVER 144 SQ. FT.
NOTE:
BRACING WIRES AND COMP. STRUT SHALL OCCUR AT EVERY 144 SQ. FT. MAX. IN ROOMS OVER 144 SQ. FT.

[WHERE A PROPRIETARY SEISMIC CLIP IS SPECIFIED, RDP TO REMOVE THE STABILIZER BARS SHOWN ON THE PLAN AND THE ABOVE STABILIZER BAR NOTE]
LOCATION OF EXPANSION/SLIP JOINTS IN CORRIDORS

NOTES:

1. "L" IS MAX. BRACE ASSEMBLY SPACING PER CEILING PLAN DETAIL, FOR EXAMPLE, WHERE 8' x 12' SPACING IS SPECIFIED, USE "L" = 8'.

[WHERE A PROPRIETARY SEISMIC CLIP IS SPECIFIED, RDP TO REMOVE THE STABILIZER BARS SHOWN ON THE PLAN AND THE ABOVE STABILIZER BAR NOTE]

[IF THE "ATTACHED JOINT" WALLS ARE DESIGNED TO RESIST PERPENDICULAR LATERAL LOAD FROM THE CEILING, THE RDP SHALL REMOVE THE STRUT BRACING ONLY IN THE DIRECTION PERPENDICULAR TO THE CORRIDOR MARKED WITH AN ASTERISK (*) AND ALSO THE ASTERISK (*) FROM THE PLAN, OTHERWISE REMOVE ONLY THE ASTERISK (*).]
STABILIZER BARS, CROSS TEES OR STRUTS 8" MAX. FROM WALL TYP. ALONG FREE JOINTS AT NON-EXITWAYS.

[AT NON-EXITWAYS WHERE A PROPRIETARY SEISMIC CLIP IS SPECIFIED, RDP TO REMOVE THE STABILIZER BARS SHOWN ON THE PLAN AND THE ABOVE STABILIZER BAR NOTE]

LOCATION OF EXPANSION/SLIP JOINTS IN CORRIDORS

IF THE "ATTACHED JOINT" WALLS ARE DESIGNED TO RESIST PERPENDICULAR LATERAL LOAD FROM THE CEILING, THE RDP SHALL REMOVE THE STRUT BRACING ONLY IN THE DIRECTION PERPENDICULAR TO THE CORRIDOR MARKED WITH AN ASTERISK (*) AND ALSO THE ASTERISK (*) FROM THE PLAN, OTHERWISE REMOVE ONLY THE ASTERISK (*).]
3.10 STRUTS SHALL NOT REPLACE HANGER WIRES.

THE MINIMUM ACCEPTABLE ANGLE IS DETERMINED SUCH THAT THE WIRES DO NOT INTERFERE WITH THE RUNNERS, LIGHT FIXTURES, ETC. AND REMAIN STRAIGHT AND UNOBSTRUCTED.

**NOTES:**

1. STRUTS SHALL NOT REPLACE HANGER WIRES.

2. THE MINIMUM ACCEPTABLE ANGLE IS DETERMINED SUCH THAT THE WIRES DO NOT INTERFERE WITH THE RUNNERS, LIGHT FIXTURES, ETC. AND REMAIN STRAIGHT AND UNOBSTRUCTED.

Basis Document: DSA IR 25-2.13

Sheet Title: SUSPENDED CEILING - SUSPENSION AND BRACING ASSEMBLY

Sheet No: 2.35
EXPANSION JOINT

EXPANSION JOINT ALTERNATE

EXPANSION JOINTS AT THE INTERSECTION OF CORRIDORS AND AT JUNCTIONS OF CORRIDORS AND LOBBIES OR OTHER SIMILAR AREAS

NOTES:
1. PROVIDE #12 GAGE HANGER WIRES AT THE ENDS OF ALL MAIN AND CROSS RUNNERS WITHIN EIGHT (8) INCHES OF THE SUPPORT OR WITHIN ONE-FOURTH (1/4) OF THE LENGTH OF THE END TEE, WHICHEVER IS LESS, FOR THE PERIMETER OF THE CEILING AREA. PERIMETER WIRES ARE NOT REQUIRED WHEN THE LENGTH OF THE END TEE IS EIGHT (8) INCHES OR LESS.
EXPANSION JOINTS AT THE INTERSECTION OF CORRIDORS AND AT JUNCTIONS OF CORRIDORS AND LOBBIES OR OTHER SIMILAR AREAS

NOTES:
1. PROVIDE #12 GAGE HANGER WIRES AT THE ENDS OF ALL MAIN AND CROSS RUNNERS WITHIN EIGHT (8) INCHES OF THE SUPPORT OR WITHIN ONE-FOURTH (1/4) OF THE LENGTH OF THE END TEE, WHICHEVER IS LESS, FOR THE PERIMETER OF THE CEILING AREA. PERIMETER WIRES ARE NOT REQUIRED WHEN THE LENGTH OF THE END TEE IS EIGHT (8) INCHES OR LESS.
NOTES:

1. PROVIDE #12 GAGE HANGER WIRES AT THE ENDS OF ALL MAIN AND CROSS RUNNERS WITHIN EIGHT (8) INCHES OF THE SUPPORT OR WITHIN ONE-FOURTH (1/4) OF THE LENGTH OF THE END TEE, WHICHERVER IS LESS, FOR THE PERIMETER OF THE CEILING AREA. PERIMETER WIRES ARE NOT REQUIRED WHEN THE LENGTH OF THE END TEE IS EIGHT (8) INCHES OR LESS.
ATTACHED JOINT

FREE JOINT

EXITWAY CORRIDOR DETAILS

NOTES:
1. PROVIDE #12 GAGE HANGER WIRES AT THE ENDS OF ALL MAIN AND CROSS RUNNERS WITHIN EIGHT (8) INCHES OF THE SUPPORT OR WITHIN ONE-FOURTH (1/4) OF THE LENGTH OF THE END TEE, WHICHERVER IS LESS, FOR THE PERIMETER OF THE CEILING AREA. PERIMETER WIRES ARE NOT REQUIRED WHEN THE LENGTH OF THE END TEE IS EIGHT (8) INCHES OR LESS.

Basis Document: DSA IR 25-2.13
Sheet Title: TYPICAL CEILING SECTION AT EXITWAY CORRIDORS
(Essential Services Buildings)
NOTES:

1. PROVIDE #12 GAGE HANGER WIRES AT THE ENDS OF ALL MAIN AND CROSS RUNNERS WITHIN EIGHT (8) INCHES OF THE SUPPORT OR WITHIN ONE-FOURTH (1/4) OF THE LENGTH OF THE END TEE, WHICHER IS LESS, FOR THE PERIMETER OF THE CEILING AREA. PERIMETER WIRES ARE NOT REQUIRED WHEN THE LENGTH OF THE END TEE IS EIGHT (8) INCHES OR LESS.

2. NAILS AT ENDS OF HORIZONTAL STABILIZERS ARE TO BE PLACED WITH NAIL HEAD TOWARD CENTER LINE OF SPAN OF STRUT.

3. STABILIZER BAR MAY BE SLOTTED APPROVED ANGLES OR CHANNELS WITH "DIAMOND POINTS" OF SPRING STEEL WHICH SNAP TIGHT TO PREVENT MOVEMENT OF STRUT.

4. (1) #10 SMS TO 20 GA. MIN. WALL STUD @ 24" O.C.

Basis Document: DSA IR 25-2.13
Sheet Title: CEILING PERIMETER
Sheet No: 2.60
(2) 12 GA. SLACK SAFETY WIRE HANGERS FOR DEVICES THAT WEIGH LESS THAN 56 LBS PLACE ON DIAGONAL CORNERS.

EXCEPTION: FIXTURES GREATER THAN 2 FEET X 4 FEET WEIGHING LESS THAN 56 LBS. REQUIRE A 12 GA. SLACK SAFETY WIRE HANGER AT EA. CORNER.

1-#8 S.M.S. IN OPPOSITE SIDES (2 TOTAL) LOCATE SCREWS NEAR THE CENTER OF TERMINAL OR FIXTURE

AIR TERMINAL OR LIGHT FIXTURE (56# MAX.)

HEAVY DUTY SYSTEM
NOT TO EXCEED THE ALLOWABLE LENGTH GIVEN IN THE TABLE ON 3.21 FOR THE COMPRESSION STRUT SELECTED.

FOR CONNECTION TO STRUCTURE SEE 5.10

CHANNEL TYPE COMPRESSION STRUT PER TABLE ON 3.21 CENTERED OVER CROSS RUNNER

4'-0" OC MAX

HANGER WIRE

3 TIGHT TURNS IN 3" FOR HANGER TYP.

3/4" MIN. EDGE DISTANCE, TYP.

(2) 1/4" DIA. MACHINE BOLT

CROSS RUNNER

3/4" MIN MAX

1 1/2" MAX

1" MAX

4 TIGHT TURNS IN 1 1/2" TYP. FOR BRACE WIRE

BRACE WIRES SEE 4.10

0° TO 45° TYP.

STRUCTURE

COPE FLANGE OR FLATTEN TO ALLOW INSTALLATION OF ACOUSTICAL TILE

HANGER WIRE BEYOND

BRACE WIRE BEYOND

CROSS RUNNER

A SECTION

3" = 1'-0"

Basis Document: DSA IR 25-2.13
Sheet Title: SUSPENDED ACOUSTICAL CEILING - CHANNEL TYPE STRUT

Sheet No: 3.10

rev. 09-21-15
NOT TO EXCEED THE ALLOWABLE LENGTH GIVEN IN THE TABLE ON 3.21 FOR THE COMPRESSION STRUT SELECTED

EMT NO MORE THAN ONE SIZE LARGER THAN EMT STRUT SELECTED

SLOT END OF EMT AND BEAR ON TEE BULB

OPTION 1 & 3

NOTES:
1. MACHINE BOLT IS NOT REQUIRED ON OPTION 3
2. APPLICABLE TO SAWN TIMBER WITHOUT GYPSUM BOARD ONLY.

OPTION 2

SEE OPTION 1 FOR INFORMATION NOT SHOWN

EMT TYPE COMPRESSION STRUT PER TABLE ON 3.21

HANGER WIRE

(2) #10 S.M.S.

BRACE WIRES SEE 3.10 & 4.10

(2) #10 S.M.S.

CENTER LINE OF EMT

BOLT & NUT

1/4" DIA. MACHINE BOLT

FOR CONNECTION TO STRUCTURE SEE 5.10

OPTION 3 (NOTE 2) (HANGER WIRE THROUGH STRUT)

1/4" DIA. MACHINE BOLT FOR CONNECTION TO EMT TYPE COMPRESSION STRUT PER TABLE ON 3.21

HANGER WIRE

(2) #10 S.M.S.

BRACE WIRES SEE 3.10 & 4.10

(2) #10 S.M.S.

CENTER LINE OF EMT

BOLT & NUT

1/4" DIA. MACHINE BOLT

FOR CONNECTION TO STRUCTURE SEE 5.10

OPTION 3 (NOTE 2) (HANGER WIRE THROUGH STRUT)
## COMPRESSION STRUT TABLE

<table>
<thead>
<tr>
<th>EMT COMPRESSION STRUT</th>
<th>MAXIMUM LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot; DIAMETER EMT (0.042&quot; WALL THICKNESS)</td>
<td>3'-11&quot;</td>
</tr>
<tr>
<td>3/4&quot; DIAMETER EMT (0.049&quot; WALL THICKNESS)</td>
<td>6'-4&quot;</td>
</tr>
<tr>
<td>1&quot; DIAMETER EMT (0.057&quot; WALL THICKNESS)</td>
<td>9'-9&quot;</td>
</tr>
<tr>
<td>1 1/4&quot; DIAMETER EMT (0.065&quot; WALL THICKNESS)</td>
<td>12'-9&quot;</td>
</tr>
<tr>
<td>1 1/2&quot; DIAMETER EMT (0.065&quot; WALL THICKNESS)</td>
<td>14'-9&quot;</td>
</tr>
<tr>
<td>2&quot; DIAMETER EMT (0.065&quot; WALL THICKNESS)</td>
<td>18'-10&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHANNEL COMPRESSION STRUT</th>
<th>MAXIMUM LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>250S125-33</td>
<td>5'-0&quot;</td>
</tr>
<tr>
<td>250S137-33</td>
<td>6'-10&quot;</td>
</tr>
<tr>
<td>362S137-33</td>
<td>8'-0&quot;</td>
</tr>
<tr>
<td>250137-43</td>
<td>8'-10&quot;</td>
</tr>
<tr>
<td>400S137-43</td>
<td>10'-10&quot;</td>
</tr>
</tbody>
</table>
HANGER WIRE

1/2" MAX. U.N.O.

FOR CONNECTION TO STRUCTURE SEE CONNECTION MATRIX ON

3 TURNS @ HANGER WIRE TYPICAL @ EACH END

#12 GAGE WIRE

BRACING WIRE

1/2" MAX. U.O.N.

FOR CONNECTION TO STRUCTURE SEE CONNECTION MATRIX ON

4 TURNS @ BRACE WIRES TYP. @ EACH END

10° TO 45°

#12 GAGE WIRE
<table>
<thead>
<tr>
<th>STRUCTURAL CONDITION OF FLOOR/ROOF ABOVE SUSPENDED CEILING</th>
<th>APPLICABLE HANGER WIRE DETAIL</th>
<th>APPLICABLE BRACING WIRE DETAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>METAL DECK</td>
<td>4.20</td>
<td>4.30</td>
</tr>
<tr>
<td>CONCRETE OVER METAL DECK</td>
<td>4.21</td>
<td>4.31</td>
</tr>
<tr>
<td>CONCRETE SLAB, BEAM, OR JOIST</td>
<td>4.22</td>
<td>4.32</td>
</tr>
<tr>
<td>STRUCTURAL STEEL</td>
<td>4.23</td>
<td>4.33</td>
</tr>
<tr>
<td>METAL STUD WALL</td>
<td>4.24</td>
<td>4.34</td>
</tr>
<tr>
<td>SAWN TIMBER</td>
<td>4.25, 4.29</td>
<td>4.35</td>
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<tr>
<td>WOOD I JOIST</td>
<td>4.26</td>
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<tr>
<td>WOOD CHORD TRUSS</td>
<td>4.27, 4.29</td>
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<tr>
<td>OPEN WEB STEEL JOIST</td>
<td>4.28, 4.29</td>
<td>4.39, 4.29</td>
</tr>
</tbody>
</table>
NOTES:

1. REFER TO 4.10 FOR ADDITIONAL DETAILS.
NOTES:

1. REFER TO 4.10 FOR ADDITIONAL DETAILS.

2. POST INSTALLED ANCHORS TO BE PLACED NO MORE THAN 1" OFFSET FROM CENTERLINE OF DECK LOW FLUTE

3. TEST POST INSTALLED ANCHORS IN ACCORDANCE WITH CEILING NOTE 5.01.
LIGHTWEIGHT OR NORMAL WEIGHT CONC.

OPTION 1

OPTION 2

NOTES:

1. REFER TO 4.10 FOR ADDITIONAL DETAILS

2. TEST POST INSTALLED ANCHORS IN ACCORDANCE WITH CEILING NOTE 5.01.
NOTES:

1. BEAM FLANGE THICKNESS SHALL NOT BE LESS THAN 3/16".

2. RDP IN RESPONSIBLE CHARGE, IOR AND CONTRACTOR SHALL VERIFY THAT NO PAF IS INSTALLED IN THE PROTECTED ZONE OF ANY STEEL MEMBER. SEE ANSI/AISC 341-10

3. REFER TO 4.10 FOR ADDITIONAL DETAILS

Basis Document: DSA IR 25-2.13
Sheet Title: HANGER WIRE CONNECTION TO STRUCTURAL STEEL
Sheet No: 4.23
**NOTES:**

1. THIS IS APPLIED FOR PERIMETER WIRE ATTACHMENT OR WHERE OBSTRUCTION PREVENTS ATTACHMENT TO STRUCTURE ABOVE

**OPTION 1**

WALL STUD PER RDP 20 GA MIN

1 LAYER OF GYP. BD.

2-#10 S.M.S. @ 2" O.C.

1"x1"x12GAx3" CLIP ANGLE

A. "DIRECT" (FOR NOTES SEE "B" "THRU GYP")

**OPTION 2**

WALL STUD PER RDP 20 GA MIN

GYP. BD.

(2) #10 SMS TO FRAMING

1"x1"x12GAx3/4" CLIP ANGLE

1 LAYER OF GYP. BD.

B. "THRU GYP"

**OPTION 3**

362S137-33 MIN. BACKING STUD.

SPAN 2 WALL STUDS MINIMUM.

FASTEN BACKING TO WALL STUDS USING (2) #10X1-1/4" SMS AT EACH STUD.

1"x1"x12GAx3/4" CLIP ANGLE

FASTEN TO BACKING STUD USING #10 X 1-1/4" SHEET METAL SCREW.

1 LAYER OF GYP. BD.

6 MIN.
NOTE:

(1) WHEN FIRE RATED GYP. BOARD IS INSTALLED ON THE BOTTOM FLANGES, USE SCREW EYES W/ SUFFICIENT LENGTH TO AVOID DAMAGING THE FIRE RATED GYP. BOARD AND MEET MIN. PENETRATION.
NOTE:

(1) WHEN FIRE RATED GYP. BOARD IS INSTALLED ON THE BOTTOM FLANGES, USE SCREW EYES W/ SUFFICIENT LENGTH TO AVOID DAMAGING THE FIRE RATED GYP. BOARD AND MEET MIN. PENETRATION.
#12 GAGE HANGER WIRES
(3) TIGHT TURNS WITHIN 3", AT BRACE WIRE PROVIDE (4) TIGHT TURNS WITHIN 1 1/2".

SADDLE TIE REQUIRED FOR ALL WIDTHS GREATER THAN 1/4"

MAIN CHANNEL SHOWN (WOOD FRAMING SIMILAR)

SADDLE TIE HAS DOUBLE LOOP AT SUPPORT

WHEN MULTIPLE SADDLE TIES ARE REQUIRED THEY SHALL ALTERNATE BACK AND FORTH TO PREVENT TWISTING

TYPICAL SADDLE TIE DETAIL
HANGER WIRE CONDITION SHOWN. BRACE WIRE CONDITION SIMILAR
1. IF SELF-TAPPING SCREWS ARE USED WITH CONCRETE FILL, SET SCREWS BEFORE PLACING CONCRETE.
MIN 5/8" DIA EXPANSION ANCHOR @ BRACING, TYP

[LDP TO SPECIFY MIN. EMBEDMENT]

1 1/2"x 1 1/2"x12GA x2" CEILING CLIP, TYP

1/2" MAX.

4.10

OPTION 1

LIGTHWEIGHT OR NORMAL WEIGHT CONCRETE

(2) 3/8" DIA EXPANSION ANCHORS

[LDP TO SPECIFY MIN. EMBEDMENT]

3/4" MIN TYP

1-1/2"x1-1/2"x12GA

4.10

OPTION 2

NOTES:
1. TEST POST INSTALLED ANCHORS IN ACCORDANCE WITH CEILING NOTE 5.02
2. REFER TO 4.10 FOR ADDITIONAL DETAILS
3. POST INSTALLED ANCHORS TO BE PLACED NO MORE THAN 1" OFFSET FROM CENTERLINE OF DECK LOW FLUTE.
Lightweight or normal weight concrete slab. Do not connect bracing wire to joist or beam.

Notes:
1. Test post installed anchors in accordance with ceiling note 5.02
2. Refer to 4.10 for additional details

Basis Document: DSA IR 25-2.13
Sheet Title: BRACING WIRE CONNECTION TO CONCRETE SLAB, BEAM OR JOIST
Sheet No: 4.32
NOTES:

1. BEAM FLANGE THICKNESS SHALL NOT BE LESS THAN 3/16".

2. RDP IN RESPONSIBLE CHARGE, IOR, AND CONTRACTOR SHALL VERIFY THAT NO PAF IS INSTALLED IN THE PROTECTED ZONE OF ANY STEEL MEMBER. SEE ANSI/AISC 341-10

3. REFER TO 4.10 FOR ADDITIONAL DETAILS
METAL STUD PER RDP
20 GA MIN.

1 LAYER OF GYP. BD., MAX.

1-1/2"x1-1/2"x12GAx1" CLIP ANGLE
W/ (2) #10x1-1/4" SMS (SEE NOTE 1)

600S137-54 SPAN (2) WALL STUDS MINIMUM. CONNECT
600S TO EACH WALL STUD PER SCHEDULE BELOW

<table>
<thead>
<tr>
<th>WALL STUD GAUGE</th>
<th>CONNECTION TO WALL STUD (WITH GYP. BD.)</th>
<th>CONNECTION TO WALL STUD (WITHOUT GYP. BD.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 GAUGE</td>
<td>(5) #10x1-1/4&quot; SMS</td>
<td>(3) #10x1-1/4&quot; SMS</td>
</tr>
<tr>
<td>18 GAUGE</td>
<td>(4) #10x1-1/4&quot; SMS</td>
<td>(2) #10x1-1/4&quot; SMS</td>
</tr>
</tbody>
</table>

NOTES:

1. THE CLIP ANGLE CAN BE ATTACHED DIRECTLY TO THE WALL STUD FLANGE PROVIDED BOTH OF THE FOLLOWING CONDITIONS ARE MET:
   - THE WALL STUD IS 18 GA MIN. AND CAPABLE OF SUPPORTING THE BRACE FORCE.
   - THE BRACE WIRE ALIGNS WITH THE WALL STUD WEB.

Basis Document: DSA IR 25-2.13
Sheet Title: BRACING WIRE CONNECTION TO METAL STUD WALL

4.34
1/4" DIA. SCREW EYE w/ FULL THREAD EMBEDMENT (1-1/2" MIN.) INSTALL IN DIRECTION OF WIRE

1/4" DIA. CLOSED SCREW EYE: INSTALL IN THE DIRECTION OF THE BRACE WIRE

1-1/2" MIN. PENETRATION

THREE 1-1/2" X 9 GA. STAPLES OR 3-STRONGHOLD "J" NAILS AT EACH WIRE LOOP

2X BLKG. w/ 2-16d COMMON NAILS AT EACH END

JOIST OR RAFTER

BENDING WIRE

1-1/2" MIN.
NOTE:
(1) DO NOT INSERT SCREW EYES PARALLEL TO LAMINATIONS.
(2) WHEN FIRE RATED GYP. BOARD IS INSTALLED ON THE BOTTOM FLANGES, USE SCREW EYES W/ SUFFICIENT LENGTH TO AVOID DAMAGING THE FIRE RATED GYP. BOARD AND MEET MINIMUM PENETRATION.

1/4" DIA. SCREW EYE WITH 1-1/2" MIN. PENETRATION. ALIGN WITH BRACE WIRE

BRACE WIRE WITH 4 TIGHT TURNS
NOTE:
(1) DO NOT INSERT SCREW EYES PARALLEL TO LAMINATIONS.
(2) WHEN FIRE RATED GYP. BOARD IS INSTALLED ON THE BOTTOM FLANGES, USE SCREW EYES w/ SUFFICIENT LENGTH TO AVOID DAMAGING THE FIRE RATED GYP. BOARD AND MEET MIN. PENETRATION.

1/4" DIA. CLOSED SCREW EYE WITH 1-1/2" MIN. PENETRATION. ALIGN WITH BRACE WIRE.

BRACE WIRE WITH 4 TIGHT TURNS.

ADD 2-1/2" X 20 GA. STUD* w/ (1) #10 X 1" WOOD SCREW TO EACH OF 3 JOISTS. PLACE STUD FLAT AND WITHIN 6" OF BRACING WIRE.

*ALTERNATE: 2 X 4 FLAT w/ 1-10d OR 1-#10 X 3" SCREW TO EACH OF 3 TRUSS BOTTOM FLANGES

Basis Document: DSA IR 25-2.13
Sheet Title: BRACE WIRE CONNECTION TO WOOD I - JOIST
Sheet No: 4.37
NOTES:
1. BRACE WIRE SHALL ALIGN PARALLEL WITH THE TRUSS BOTTOM CHORD
NOTES:
1. BRACE WIRE SHALL ALIGN PARALLEL WITH THE TRUSS BOTTOM CHORD
<table>
<thead>
<tr>
<th>STRUCTURAL CONDITION OF FLOOR / ROOF ABOVE COMPRESSION STRUT</th>
<th>APPLICABLE DETAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>METAL DECK</td>
<td>5.20</td>
</tr>
<tr>
<td>CONCRETE OVER METAL DECK</td>
<td>5.21</td>
</tr>
<tr>
<td>CONCRETE SLAB, BEAM, OR JOIST</td>
<td>5.30</td>
</tr>
<tr>
<td>STRUCTURAL STEEL</td>
<td>5.40</td>
</tr>
<tr>
<td>SAWN TIMBER WITH GYPSUM BOARD</td>
<td>5.50</td>
</tr>
<tr>
<td>SAWN TIMBER WITHOUT GYPSUM BOARD</td>
<td>5.60</td>
</tr>
</tbody>
</table>
**OPTION 1**

CHANNEL STRUT

- INSULATION OVER METAL DECK
- METAL DECK (20 GA. MIN.)
- (2) #12 S.M.S.
- L 2" x 2" x 12 GA.
- x 0'-8"
- FLATTEN END
- PLACE TIGHT TO CLIP OR STRUCTURE

**OPTION 2**

- PLACE TIGHT TO CLIP OR STRUCTURE
- L 2" x 2" x 12 GA.
- x 0'-8"
- SLOT END OF TUBE

**TUBE STRUT**

- INSULATION OVER METAL DECK
- METAL DECK (20 GA. MIN.)
- (2) #12 S.M.S.
- L 2" x 2" x 12 GA.
- x 0'-8"
- (2) #10 S.M.S.

**OPTION 1**

- PLACE TIGHT TO CLIP OR STRUCTURE
- L 2" x 2" x 12 GA.
- x 0'-8"
- (2) #12 S.M.S.
- (2) #10 S.M.S.
3/8" DIA. EXPANSION ANCHOR. [RDP TO SPECIFY MIN. EMBEDMENT]

CUT FLANGES AND BEND

3 7/8" MIN.

PLACE TIGHT TO CLIP OR STRUCTURE

L 1-1/2 x 1-1/2 x 12 GA. x 0'-2"

(2) #10 S.M.S

SLOT END OF TUBE

NOTES:
1. POST INSTALLED ANCHORS TO BE PLACED NO MORE THAN 1" OFFSET FROM CENTERLINE OF DECK LOW FLUTE.
2. TEST POST INSTALLED ANCHORS IN ACCORDANCE WITH CEILING NOTE 5.01.
LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE, TYP.

6" MIN. EDGE DISTANCE
FACE OF BEAM, SLAB EDGE OR JOIST WHERE OCCUR, TYPICAL

3/8" EXPANSION ANCHOR
[ RDP TO SPECIFY MIN. EMBEDMENT ]

CUT FLANGES AND BEND

CHANNEL STRUT

LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE, TYP.

L 1-1/2 x 1-1/2 x 12GA. x 2" CLIP

3/8" EXPANSION ANCHOR
[ RDP TO SPECIFY MIN. EMBEDMENT ]

PLACE TIGHT TO CLIP OR STRUCTURE

OPTION 1

3/8" EXPANSION ANCHOR
[ RDP TO SPECIFY MIN. EMBEDMENT ]

(2) #10 x 2" S.M.S.

FLATTEN END

SLOT END OF TUBE TO RECEIVE CLIP

OPTION 2

L 1-1/2"x 1-1/2" x 10GA. x 2" CLIP

(2) #10 S.M.S.

PLACE TIGHT TO CLIP OR STRUCTURE

NOTES:
1. TEST POST INSTALLED ANCHORS IN ACCORDANCE WITH CEILING NOTE 5.01

TUBE STRUT

Basis Document: DSA IR 25-2.13
Sheet Title: STRUT CONNECTION TO CONCRETE SLAB, BEAM, JOIST SOFFIT
Sheet No: 5.30
**CHANNEL STRUT**

**TUBE STRUT**

**NOTES:**

1. STRUCTURAL STEEL MEMBER SHALL NOT BE LESS THAN 3/16".

2. RDP IN RESPONSIBLE CHARGE, I.O.R. AND CONTRACTOR SHALL VERIFY THAT NO PAF IS INSTALLED IN THE PROTECTED ZONE OF ANY STEEL MEMBER, SEE ANSI/AISC 341-10.

3. REFER TO 5.20 AND 5.30 FOR ADDITIONAL INFORMATION.
NOTES:

1. WEB OF CHANNEL TO BEAR WITHIN WIDTH OF THE WOOD MEMBER.

2. FOR ANGLE ORIENTED IN THE STANDARD POSITION, VERTICAL LEG TO FALL WITHIN THE WIDTH OF THE WOOD MEMBER.
NOTES:

1. WEB OF CHANNEL TO BEAR WITHIN WIDTH OF WOOD MEMBER.
2. VERTICAL LEG OF MEMBER TO FALL WITHIN THE WIDTH OF THE WOOD MEMBER.
3. SEE PAGE 5.50 FOR ADDITIONAL INFORMATION.
HANGER WIRE ONLY

3 TURNS IN 3" TYPICAL @ EACH END

HANGER OR BRACE WIRE

4 TURNS IN 1-1/2" TYPICAL @ EACH END

NOTES:

WIRE SPLICES ARE SHOWN LOOSELY TIED FOR ILLUSTRATIVE PURPOSES ONLY AND SHALL BE DRAWN TIGHT TO COMPLETE INSTALLATION WHEN CONSTRUCTED.