

## **PART 3**

### **HANGAR PERFORMANCE TECHNICAL PROVISIONS**

The following sets forth the general technical requirements for furnishing, delivery and off-loading of the new hangar buildings.

#### **SCOPE**

The bidder shall furnish, deliver and construct one pre-manufactured steel 12-Unit Executive Hangar Building "A1" (approximately 100' x 424') and one pre-manufactured steel 18-Unit Nested T-Hangar Buildings "B1" (approximately 56'x406') with hangar foundation design plans and complete with all components necessary for on-site erection by the bidder. The bid lump sum for construction of each Hangar building includes the foundation involving excavation, pouring of concrete for the foundation and underground electric conduits up to the building as shown on the reference drawings to bidder. Internal wiring including the electrical panel for the bi-fold door operation and lights for each hangar shall be the responsibility of this contract and shall be completed at the time of erection of the building.

#### **DESIGN**

The bidder shall furnish buildings that have a design approved and stamped by a California registered civil or structural engineer. The manufacturer may propose one or more design options for different hangars that meet the Airport's requirement, i.e. structural framing methods, bi-fold metal versus fabric doors. Rolling doors are not acceptable for the site conditions.

The designs shall be based on applicable sections of the following:

- AISC Specification for the Design, Fabrication and Erection of Structural Steel for buildings
- AISI Specification for the Design of Cold-Formed Steel Structural Members.
- MBMA Metal Building Systems Manual and American Welding Society standards.
- C.B.C. and other building codes applicable to the project site location, including seismic and wind loading.
- For Bidding purposes Design Wind Speed is to be 100 mph

The bidder shall supply all design calculations along with building plans for elevations, foundation design and improvement plans for the City's review and permit within thirty (30) days from the notice to proceed. The bidder shall obtain a building permit from the City of San Bernardino Building Department.

#### **FRAMING**

The bidder shall describe the primary and secondary framing features such as build-up or wide flange sections, methods of connections, preparation before painting, painting coats and methods of application, forming of members and grade and gauges of materials. Minimum deflection allowed is L/240.

#### Fire Walls:

1. For Building B1, fire wall design shall be in accordance with section 705 of 2010 CBC. Typical fire wall design shall be submitted for review and approval simultaneously with the approval for building permit from the City.
2. For Building A1, fire wall design shall be in accordance with section 705 of 2010 CBC. Typical fire wall design shall be submitted for review and approval simultaneously with the approval for building permit from the City.

### **EXTERNAL ROOFING AND WALL PANELS**

The bidder shall describe the external materials used with associated treatments and methods of painting including processes and thicknesses. The forming of trim pieces, comers, flashings and methods and materials for sealing the structure shall be identified. Pedestrian and hangar door colors shall match the building colors at no additional cost.

### **ACCESSORIES**

The delivered hangar shall be a complete and functional unit, including all structural members, non-structural materials, bolts, foundation anchors and anchor bolts, panels, roofing, doors, operating systems, motors, ventilation, and other systems. The bidder shall describe the accessories included that allow for a complete and functional building to be erected at the airport.

Each Hangar shall include:

1. Continuous air flow roof vents
2. Blanket insulation with WMP-50
3. White PVC lite panels in each hangar door (3'x8').
4. Safety interlock switched on bi-fold door manual latches.
5. Center and side jamb weather seals on bi-fold doors.
6. Pedestrian door in each hangar unit painted to match the building exterior.

### **FOUNDATION PLAN**

Final foundation design and plans will be furnished by the selected building manufacturer as part of the cost of each building. There will be no separate payment for the foundation design and plans including anchor bolts and related items. The foundation design shall be stamped by a California registered civil or structural engineer. For soils borings of the existing site, see the geotechnical report (included in this addendum). The foundation design shall be to the satisfaction of the City Building Department for purposes of issuing permits.

The hangar buildings shall be manufactured to fit concrete slabs that are uniformly sloped on the longitudinal perimeter and sloped internally to the door openings (1-1/2" slope from back of wing bay to front of unit where bi-fold door is located) as appropriate for floor drainage as approved by the Engineer in consultation with the selected manufacturer. The foundation design shall incorporate a 1/2" vertical lip around perimeter of building and under the bi-fold doors to prevent water gaining access into the building (see Detail D4 on Sht FG-01 of the Precise Grading Plans). One Hangar unit in each building "A1" & "B1" shall be ADA compliant.

## **DETAILED SPECIFICATIONS**

1.0 T-hangers shall be supplied by a manufacturer who is regularly engaged in the manufacturing of aircraft hangar buildings and by a manufacturer who is regularly engaged in the manufacturing of bi-fold hangar door system and hangar buildings. The T-hanger package shall be supplied as a complete system and furnished by a manufacturer who designs and manufactures hangar doors and hangar buildings as an integral hangar building package. The hangar manufacturer shall have been engaged in the manufacture for a minimum of ten years and upon request from owner, provide a list of completed hangar projects.

1.1 Or Equal Manufacturers – Bidders shall base their bids on furnishing steel buildings manufactured by Erect-A-Tube, Inc. or “equal buildings”. It is recognized that few manufactured products are identical in all respects; therefore, the Agency is the sole judge as to whether a proposed equal building is considered by the Agency as being equal because it either meets or exceeds the requirements set forth in these specifications.

1.2 Bidder shall submit to the Engineer/Owner, a complete technical proposal based on the building system, including the following materials: equipment brochures, detailed technical data sheets, detailed drawings, detailed dimensional layout diagrams, detailed operational description, and evidence of manufacturing capability and experience of outside major fabricator if utilized.

1.3 In addition to the above material, all building manufacturers must include a list of five (5) existing applications supplied by the building manufacturer of comparable complexity and functional capability, along with a list of the names of the applications names of the operating and owner personnel, telephone numbers and addresses so that the list can be used for the purpose of reference checking by the Engineer/Owner.

2.0 Hangar sizes shall be as defined below:

	<u>A1</u>	<u>B1</u>
Number of Units	12-units	18-units
Building Length	Per Plan	Per Plan
Building Width	Per Plan	Per Plan
Building Eave Height	22'6" Min.	15'6" Min.

Minimum Clear Unit Dimensions:

Clear Door Opening	(4) 44'6" x 16'0" min.	(16) 41'6" x 12'0" min.
	(6) 61'4" x 18'0" min.	(1) 49'6" x 12'0" min.
	(3) 74'4" x 18'0" min.	(1) 54'4" x 12'0" min.
	(1) 59'4" x 18'0" min.	

Wing Depth

Tail Bay Depth	n/a	12'0" min.
Tail Bay Width	n/a	21'3" min.
Overall Unit Depth	50'0"-100'0"	34'0" min.

2.1 Width shall be as measured from centerline to centerline of endwall columns.

2.2 Length shall be as measured from centerline to centerline of endwall columns.

- 2.3 Eave height shall be as measured from the top of the eave purlin or door truss to the bottom of column base plate.
- 3.0 Primary structural framing shall be main load carrying structural members. They shall include door trusses, rafters, interior columns and exterior columns. Maximum deflection shall be  $L/240$ .
  - 3.1 Rafters shall be steel wide flange beams "W" shaped ASTM A38 and shall be pre-punched for purlin connections, door truss, and interior column connections. Rafters shall be complete with factory welded ridge splice plates, and designed to support specified loads.
  - 3.2 Door truss shall span width of bi-fold hangar door opening and shall be shipped full length for ease of construction. Door truss design shall be integral with door design. Door truss shall be factory welded of ASTM A500 GR.B. Door truss shall be pre-punched for column connection and bi-fold door hinges pre-located on upper door truss chord. Field welding of bi-fold door frames, door hinges or pick up plates is not acceptable.
  - 3.3 Door columns shall be manufactured of steel wide flange beams "W" shapes ASTM A36 and shall be W6 x 15 pounds per foot minimum with pre-welded base plate and door truss saddles. Field welding of components is not acceptable.
  - 3.4 Interior column shall be structural welded steel ASTM A500 minimum with pre-welded base plates and girt clips.
- 4.0 Secondary framing shall be the structural members which carry the loads to the primary framing systems; and shall include the purlins, girts, wind bracing and miscellaneous structural members.
  - 4.1 Purlins shall be nominal 8" deep "Z" shaped members; and shall be manufactured of 16, 14 or 12 gauge steel designed for specified loads, and shall be fabricated of material based on the requirements of ASTM A570 or ASTM A571 as applicable.
  - 4.2 Exterior flush mount design wall girts shall be fabricated from 4" square structural weld steel tube or rolling formed CEE sections of ASTM A570 or ASTM A572 as applicable.
  - 4.3 Interior partition girt shall be fabricated from 4"x 16 ga. red oxide steel "CEE" sections, when specified.
  - 4.4 Provide wind bracing, rafter bracing, sheeting angels where required.
- 5.0 Structural field connections shall be bolted (unless otherwise noted). All primary bolted connections, as shown on manufacturer's drawing, shall be furnished with high strength bolts conforming to the physical specifications of ASTM A-325 or shall be Grade 5. All Grade 5 bolts shall be zinc plated.
- 6.0 All structural members shall be shop primed red oxide.
- 7.0 Roof sheets shall be 26 ga. galvalume coating conforming to ASTM specification A-792 with panel configuration with 1-1/8" min. high major ribs 12" on center. Panel coverage shall be 36" and shall be furnished full length from building cave to ridge purlin. A pre-formed ridge

cap shall be provided. A minimum 20 year limited warranty shall be provided. Roof sheets shall meet sky lighting requirements per 2010 UBC.

- 7.1 Wall sheet shall be 26 ga. galvalume coating conforming to ASTM specification A446 with a siliconized polyester coating. Panel configuration shall be 1-1/8" min. major ribs 12" on center. Wall sheet shall be furnished full height. A minimum 30 year limited warranty shall be provided.
- 8.0 Partition sheet shall be 26 ga. galvalume. A 3" by 8" x 16 ga. Galvanized containment angle shall be added at the base of all interior partitions walls including fuel resistant sealant at connection to the slab. Panel configuration shall be furnished in full height and include bird-proofing trim between partition sheet and roof decking. A minimum 20 year limited warranty shall be provided.
- 9.0 Building trim shall include eave trim, gable trim, corner trim, service door trim, bi-fold hangar door trim. All trim shall be 26 ga. and manufactured of flat stock material equal in quality to wall sheets and color as selected from manufacturer's standard color char. Trim pieces shall be packaged for shipment at factory. All trims shall be hemmed.
  - 9.1 Roof caulking shall be at all roof sheet side laps and at pre-formed ridge caps. Roof caulk shall be a tape sealant type and shall be pre-formed butyl rubber base and shall be supplied as a 3/16" x 3/8" extruded shape.
  - 9.2 Inside and outside semi-rigid cross-linked polyethylene foam closure shall be provided as required to provide a bird proof building. Inside closure shall be self-adhesive.
  - 9.3 Fasteners provided as follows:
    - 9.3.1 Roof fasteners shall be minimum #12-14x1" zinc-alloy head on carbon steel shank, hex head, with dual seal washer.
    - 9.3.2 Roof stitch screws shall be minimum #12x3/4" zinc-alloy head screws with washers.
    - 9.3.3 Wall fasteners shall be minimum #12-14x1" hex head color match self-drilling sheet metal screws with washer.
    - 9.3.4 Wall sheet stitch screws shall be a minimum 1/4"-#14x3/4" hex head color match self-drilling lap screw with washer.
    - 9.3.5 Partition sheet fasteners shall be minimum #12-3/4" hex head zinc plated self-drilling screws.
    - 9.3.6 All sheet metal screws shall be installed as shown on building manufacturer's erection plans.
- 10.0 Building Design
  - 10.1 Design loads shall be as clearly set forth in order document and shall be in accordance with UBC 2010 standard design practices.
  - 10.2 Design calculations, drawings and documents shall contain information requested for permits and approval and sufficient information for building erection and shall be as applied to products finished. The selected bidder shall prepare, submit and respond to questions and make changes in support of issuance of the city building permit for the buildings.

- 10.3 Building reactions shall be furnished by building supplier. Design of floors and foundation shall be the responsibility of the bidder's foundation designer. See Foundation Plan requirements under Technical Proposal Requirements.
- 11.0 Bi-fold doors shall be integral with hangar building design. Door framing members shall be square tube jig welded in full size panels to eliminate any field welding. Door frames shall have pre-located top hinges factory located to align with pre-located door truss hinges on door header to eliminate field welding. Structural steel shall be minimum ASTM A500 Grade B square structural steel.
- 11.1 Electric bi-fold door operator shall be a top mounted operator on center of door truss and shall be provided with adjustable turnbuckles and fastened securely. Motors shall be sized to meet design load, 230 V.A.C. single-phase thermally protected and supplied with a reset button. Motor shall be totally enclosed capacitor start. Cable drum shall be a direct drive drum by shaft mounted gearbox. Gearbox shall be oil bath two-stage gearbox, bronze worm gear, hardened steel spur gears, tapered roller and ball bearings. Door operator shall be pre-wired at factory complete with 24 V.A.C. momentary up and down pressure-down push button control, magnetic controllers, geared rotary limit switch attached to cable drum designed to coordinate reversing operation, spring set electric brake, and up-stop safety switch; over-ride safety mercury tilt switch to disconnect power in case of over travel. Power connection shall be by heavy-duty 230-volt plug for easy connection.
- 11.2 Bi-fold door hardware shall include 3" dia. Bottom guide roller with sealed bearing and column followers, manual cam locks of bi-fold door, center cane bolt pin 1" dia. Minimum and embedded floor sockets, 16" minimum center plated door poppers and skid plates all require hinge pins, 3/16" dia. 7 x 19 galvanized aircraft cables with wire rope clips and thimbles, bottom and top 2-ply rubber astragals. 5" dia. steel sheave wheels with ball bearings.
- 11.3 Lock out safety switches on manual door latches of bi-fold door so as to prevent bi-fold door system from opening unless both latches are unlocked.
- 11.4 Each bi-fold door shall be provided with 3'-0" x 6'-0" colored (to match building exterior) steel flush entry door, 1-3/4" 24 ga. polyurethane foam core thermal broke leaf with R-12 insulation value, 16 ga. colored thermal broke frame, dual seal bulb weather-stripping and ANSI A156.2 Series 4000. Grade 2 lever lockset keyed and master keyed.
- 11.5 Bi-fold door shall be installed according to manufacturer's installation instructions.
- 12.0 Building manufacturer to provide contractor with anchor layout plan and building column reactions.
- 13.0 Passage Doors for End Units of Tee Hangars.
- 13.1 3'-0" x 7'-0" colored (to match building exterior) steel flush entry door, 1-3/4" 24 ga. polyurethane foam core thermal broke leaf with R-12 insulation value, 16 ga. colored thermal broke frame, dual seal bulb weather-stripping, ADA compliant low profile sill and ANSI A156.2 Series 4000, Grade 2 lever lockset keyed and master keyed. Door leaf has blocking for future door closer. Doors shall be ADA compliant.

#### 14.0 Restrooms for End Units of Tee Hangars

Restrooms shall include one Stainless Steel floor mounted toilet, and one wall mounted Stainless Steel lavatory with auto sensing tapset. Bathroom shall have an epoxy coated concrete floor and 5/8" "greenboard" drywall walls. Walls shall be painted with one coat of primer and two coats of glass enamel paint (color to be approved by the owner). Electrical lighting and ventilation shall be as required by 2010 UBC.

#### 15.0 Continue low profile air-flow ridge vent.

15.1 Vent consists of 28 ga. galvalume or color finish ridge vent cap. (The total minimum operable area shall be minimum 4% of floor area being vented). Profile Vent ventilation core, roof sealant and mounting components.

#### 16.0 Polycarbonate soft white light panels for upper section of bi-fold door. Two light panels per bi-fold. Panels to be a minimum of .039 in. thickness and to match panel coverage of 36 in. width. Sealant required on vertical laps with trim strips to cover lap material for aesthetics.

#### 17.0 Electrical Scope of Work.

In addition to the building erection, the successful bidder shall furnish and install all material required for the building electrical systems as follows:

1. Load calculations, single line diagram, panel schedules, Title 24 and electrical drawings for permit processing and construction and Edison Company service assistance. The Owner will sign Edison applications and pay service fees.
2. One 400 amp meter to provide for each building and materials for installation and distribution to each building from the source.
3. Four each 100 amp service panels per building including 20 amp breakers for convenience outlets at each aircraft bay.
4. Two each 120 volt convenience outlets per aircraft bay and materials to locate outlets at opposite corners of wing/tail bay wall intersections.
5. Two each light fixtures per aircraft bay (two 4' fluorescent bulbs per fixture) and one light switch.
6. 240 volt service to each aircraft bay electric bi-fold door.
7. 42 watt fluorescent external lights with photo eye mounted above aircraft bay bi-fold door.
8. Wire, cable, conduit, boxes, fittings, hangers, connectors, wiring devices and wall plates to provide a complete functional operating installation.

All equipment, devices and installations shall be in full compliance with all applicable current standards, codes and regulations including the NEC, State of California building codes, and the standards, requirements, rules, regulations, codes statutes, ordinances of the City of San Bernardino.

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### END OF PART 3

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