



**CHABOT – LAS POSITAS
COMMUNITY COLLEGE DISTRICT**

Facilities Planning & Management Department

February 10, 2010

**Addendum No. 2
INVITATION FOR BID NO.: 10-02
Chabot College Physical Education Complex Addition – Bldg 4100**

All Prospective Bidders:

This Addendum modifies the original Bid Documents and previously issued addenda for the above Bid. Acknowledge receipt of this addendum in the space provided on the BID PROPOSAL FORM. Failure to do so may subject Bidder to disqualification.

The original Bid Documents are modified by the revision as follows:

A. Work described in this addendum is to be of the same quality as specified in the original documents.

B. ADDENDUM DRAWINGS (11 x 17 unless noted otherwise)

ELECTRICAL

AD.158	POWER & SIGNAL 1 ST FLOOR
AD.159	POWER & SIGNAL 2 ND FLOOR
AD.160	LIGHTING INTEGRATOR DETAIL
AD.161	ELECTRICAL DETAILS
AD.162	ELECTRICAL DETAILS

C. PROJECT MANUAL – VOLUME 1

1. Insert new Table of Contents (included with this addendum) at the front of volume, as indicated in Addendum No. 1, item C., 1.
2. Section 01 35 45 ENVIRONMENTAL PROCEDURES AND DOCUMENTATION
 - a. 1.05 C, 2: Delete “and shall be present on site at all times when work is in progress.”

D. PROJECT MANUAL - VOLUME 2

1. Insert new Table of Contents (included with this addendum) at the front of volume, as indicated in Addendum No. 1, item D., 1.
2. Section 04 22 00 CONCRETE UNIT MASONRY
 - a. 2.02 F, 6, a.: Delete "Three manufacturer colors will be provided" and replace with
 - a.CMU-1: Basalite D373
 - b.CMU-2: Basalite 265
 - c.CMU-3: Basalite D200
 - d.CMU-4: Basalite 128
3. Section 09 65 00 RUBBER FLOORING
 - a. 2.01 B.: Delete "Interlocking".
4. Section 11 66 13 EXERCISE EQUIPMENT
 - a. Delete and replace with new Section 11 66 13 EXERCISE EQUIPEMENT included with this addendum.
5. Section 12 93 00 SITE FURNISHINGS
 - a. Part 2: Insert:
 - B. Site Furniture Campus Standard, no known equal. Arcata bench backless by Landscape Forms, Kalamazoo, MI.
 1. Supports and Frame: Tubular steel 2-1/4" O.D., .188" wall thickness.
 - a. Finish: Stainless Steel.
 2. Seat panels to be gray polysite, nominal board size is 1-1/4" x 3", all boards have eased edges as well as ends.
 3. Mounting: as shown on drawings.
6. Section 23 09 00 HVAC INSTRUMENTATION AND CONTROLS
 - a. Delete section and replace with new section 23 09 00, provided with this addendum.
7. Section 26 09 23 LAMPS, BALLASTS, ACCESSORIES
 - 2.3 A: Insert at end of paragraph "Lamps shall have a Color Rendering Index (CRI) of 85 or above."
8. Section 32 17 26 TACTILE WARNING SURFACES
 - a. 2.01 A: Insert "Stepstone, Inc., Gardena, CA;" after "by"
9. Section 32 80 00 LANDSCAPE IRRIGATION
 - a. 2.08 C: Delete paragraph and replace with "PVC solvent-weld fittings shall be Schedule 80 for schedule 40 and class 315 mains. Type II-I NSF approved conforming to ASTM D2467. PVC solvent-weld fittings for laterals 2" and larger shall be Schedule 80, ASTM D2467. PVC solvent-weld fittings for laterals 1.5" and smaller shall be Schedule 40. Type II-I NSF approved conforming to ASTM D2466.

E. PROJECT MANUAL - VOLUME 3

Insert new Table of Contents (included with this addendum) at the front of volume, as indicated in Addendum No. 1, item E., 1.

F. DRAWINGS

1. AD.2 DEMOLITION PLAN
 - a. DEMOLITION GENERAL NOTES, Note 7: Delete and replace with "(E) BASKETBALL POST FOUNDATION BELOW (E) PAVING. REMOVE ONLY IN LOCATIONS COINCIDING WITH PAVEMENT DEMOLITION. "
2. AD.18 SITE PLAN AND DETAILS
 - a. See note "FUTURE CONCRETE MONUMENT. TYP OF (2): Delete "FUTURE".
3. A1.1 SITE PLAN AND DETAILS
 - a. GENERAL NOTES: Add note "2.CONTRACTOR SHALL PROVIDE ACCESS THROUGH THE SITE FOR DISTRICT FUNCTIONS AND MOVEMENT OF DISTRICT EQUIPMENT AS REQUESTED.
4. A2.1 FIRST AND SECOND FLOOR PLANS AND ENLARGED PLANS
 - a. Details 1 and 2: Remove all casework indicated.
 - b. Detail 2: Remove reference to Wall Type 8 "W8" from elevator shaft wall.
5. A5.1 ROOM FINISH AND DOOR SCHEDULES, DOOR AND DOOR FRAME TYPES
 - a. DOOR SCHEDULE: Delete "S-4" from Door number 104.
6. A6.1 FINISH FLOOR PLANS
 - a. Details 1 and 2: Remove all casework indicated.
7. A6.3 INTERIOR ELEVATIONS
 - a. Details 11 and 12: Delete.
8. A7.1 VERTICAL CIRCULATION – ELEVATOR PLANS, SECTIONS & DETAILS
 - a. Detail 1: Delete all references to "W8" and replace with "W9".
9. A7.4 INTERIOR DETAILS
 - a. Detail 11: Delete "EXISTING METAL LOCKER PROVIDED BY OWNER" and replace with "METAL LOCKER".
10. A7.6 SIGNAGE DETAILS
 - a. Detail 17: Delete.
11. A9.1 INTERIOR WALL AND CEILING TYPES
 - a. Detail 14: Delete "TOP OF" from image title.
12. E1.1.1 ELECTRICAL SITE LIGHTING PLAN

- a. NUMBERED NOTES, Note 1: Add sentence "POWER CIRCUITE TO BE MAINTAINED INTACT FOR THE DURATION OF CONSTRUCTION. COORDINATE WITH OWNER."
13. E2.1 POWER AND SIGNAL PLANS FIRST AND SECOND FLOOR
- a. Detail 2: Add 9 QUAD RECEPTACLE POKE THROUGH DEVICE WITH DATA CONNECTIONS to this plan. Include wiring and conduit to connect devices to power panels in like manner indicated in original bid documents. Device locations to be determined.
 - b. Revise per AD.158, included with this addendum.
 - c. Revise per AD.159, included with this addendum.
14. E3.1 LIGHTING INTEGRATOR DETAIL
- a. Revise per AD.160, included with this addendum.
15. E5.2 ELECTRICAL DETAILS
- a. Revise per AD.161, included with this addendum.
16. E5.2 ELECTRICAL DETAILS
- a. Revise per AD.162, included with this addendum.
17. T2.1 FIRST AND SECOND FLOOR DEVICE PLANS
- a. Detail 1: Add 9 MULTIMEDIA DEVICE MOUNTED IN POKE-THRU FLOOR BOX to this plan. Include wiring and cable tray to connect devices to telecom panels in like manner indicated in original bid documents. Device locations to be determined.
18. T2.2 FIRST AND SECOND FLOOR REFLECTED CEILING PLANS
- a. Detail 2: Add cable tray to serve additional poke throughs indicated in item 15 above.

G. BID DOCUMENT INQUIRIES

1. Upon review of the project plans and specification section 23 09 00 1.A Native BACnet manufacturers, we formally request that a Native BACnet Delta Controls System be considered as an equal to the Johnson Control BACnet Control and Energy Management System. *Controls and energy management system are to be Alerton BACtalk per District Standards. No Substitutions.*
2. Upon review of the project plans and specification section there is a discrepancy associated with the Controls and Energy Management System. Per specification section 23 09 00 the manufacturer specified is Johnson Control contrary to what is specified on the system architecture on drawing M6.1, Alerton BACtalk. Please provide more information as to what system is acceptable and if a new (N) frontend operator workstation will be provided. *Controls and energy management system shall be Alerton BACtalk per District Standards. See item in Part C, item 5 above.*
3. Per plan page A0.5, there will not be any ST-4 but one each is called out on the first floor. There are also no details of this sign. Please clarify. *Sign S-4 is not used, and is not currently indicated anywhere on either the first or second floor plan.*
4. Per plan page A3.1, two small sign types and a larger exterior sign type is called out but I see no

detail or information on these signs. Please clarify (Please clarify that ST-17 is the larger exterior sign and ST-2 are the smaller signs).

3/A3.1 indicates a large sign above the first floor entrance door. This should be building signage. The building signage design is to be determined and shall be included in the Owner's Unspecified Allowance.

5. Per plan A5.1, a sign for the riser room is called out. Can you direct me to Chabot-Las Positas Community College District's sign standards for this?
Sign shall be of similar materials and construction as other signage indicated in the bid documents. However the design is to be determined.
6. Per the specification section(s) 5120 and 5120-13 it is required that all fabricators participate in the AISC Certification Program. Is it possible to be granted a waiver of this Certification provided that the Fabricator can demonstrate that it has successfully supplied and/or erected similar structures in the past?
No
7. I just want to confirm that the General Contractor has to have a LEED accredited professional on site at all times.
A LEED accredited professional does not need to be on site at all times. Contractor shall assign a LEED AP to the project for the duration of the project to oversee proper documentation of construction materials and practices.
8. It references Vol. 1, 2, and 3 Table of Contents. We do not see the Table of Contents. Please advise.
Please find the revised table of contents included with this addendum.
9. How are we to quantify the expansive and clarify material, if any? Is this referenced in the soils report? Please provide the soils report.
*The Soils Report has been uploaded at the CLPCCD website:
<http://www.clpccd.org/bond/BiddingProjectBusinessOpportunitiesRFB.php> Bid 10-02.*
10. The specification for the anti-graffiti states "all surfaces". Will this apply to both interior and exterior surfaces?
Exterior surfaces only.
11. Can a material substitution for 10500 – Lockers be accepted prior to 02/17/10? Lyon manufactures a locker that meets or exceeds all specifications.
Lyon is an accepted metal locker manufacturer, provided the product submitted meets or exceeds the product requirements specified.
12. Detail 1/A7.2 shows elevator CMU walls to be type "W8" which is a furred wall (2-1/2 studs with drywall). Addendum 1 call for (AD.48) CMU2, CMU3 evenly distributed. Doesn't this conflict with furring requirement? I don't think inside of shaft gets furred.
Wall type at Elevator Shaft shall be W9. See drawing changes in Part F of this addendum.
13. Detail 8/A5.3 shows work at building 2900. Do we have work at this building?
Yes, see Site Plan on A1.1 for callouts.
14. Detail 1/A2.2 has a note: "Acoustical batt insulation at underside of deck, typ." No sections or details (Sheet A3.2) show this insulation. Ceiling finish schedule (Sheet A5.1) designates paint. Please clarify if insulation is required.
Not required. Acoustical batt insulation at underside of 2nd floor deck was deleted per Addendum No. 1.
15. Door schedule / specifications denotes door #210 as a rated HM door. New aluminum storefronts/glazing adjacent to this location (Type Q & R per AD.26) are not indicated as fire-rated. Please clarify.
Door 210 is not rated. See Addendum No. 1 for revisions to Door 210.

16. AD.137 shows installations to monuments at walk. E1.1.1 shows installations on monuments at walk. AD.18 states "future concrete monument". Doesn't this conflict?!
These monuments are to be included in this project.
17. There are a limited number of precast fabricators with proper certification. Those contacted do not want to bid due to details requiring welding – potential spilling. Can details be revised?
No.
18. Is the finish on the entry gate and iron fence panels a hot dip galvanized with powder coat?
Decorative fencing was removed from this project per Addendum No. 1.
19. Is the 18GA sheet steel fabric on the gate solid or perforated?
Sheet steel fabric was removed from this project per Addendum No. 1.
20. Detail 11/A7.4 is the only large-scale locker detail and says "existing...provided by owner". Are there any new lockers?
All lockers indicated are new.
21. Sheet A1.1 – please provide specification for benches (3) at circle area.
Spec is included in this addendum.
22. Sheet A1.1 – precast and CMU pilasters are labeled "DSA Increment 2" at ref. to 14/A1.2. Please confirm there are NIC for this bid.
Precast & CMU pilasters: The entry monument detailed by 14A/A1.2 is included in this project. The entry column detailed in 15/A1.2 is not included in this project.
23. Sheet A1.1 – please confirm A1.1 to new site plan (reduced) in Addendum 1.
Modifications to Sheet A1.1 provided in Addendum 1 are accurate, except as modified per this addendum.
24. AD.8, C7.1 - Interlocking pavers: Spec 32 14 14 says "sand set". 5/C7.1 and similar show 8"A.B. Please clarify section.
Install per specifications.
25. There is no color listed on any sheet for CMU 2, CMU 3, and CMU 4.
CMU colors are listed in Part D, Item 2 above.
26. Detail 1 on Sheet E5.2 shows the wiring diagram for the Mechoshade system. Low voltage switches are shown on the detail but not shown on E2.1. Will we be providing the low voltage switches and the low voltage wiring? Is there a low voltage lighting control diagram available for the low voltage light switches and the LCP?
27. *The Contractor is to provide the shade low voltage switches and wiring for a complete and operational system. 3 zones on 1st floor, 2 zones on 2nd floor, with a master switch on both floors. See Addendum No. 2 drawings with wiring diagrams for the shade system and lighting integrator panel.*

H. SUBSTITUTION REQUESTS

1. Section 03 30 00, pg 5, paragraph 2.06: Viper Vaporcheck II is an accepted equal to the products already named in this paragraph.
2. Section 09 65 00, pp 2-3, paragraph 2.01: Aacer MP Elite Flooring is not an accepted equal to the products already named in this paragraph.
3. Section 08 80 00 – pg 2, paragraph 2.1, SunGuard SuperNeutral Series SN 68 is not an accepted for substitution.
4. Section 09 65 00, pg 2, paragraph 2.01: Ovation Sports Tile is not an accepted equal to the products already named in this paragraph.
5. Section 09 65 00, pg 3, paragraph 2.01: Dynafit Rubber Flooring is not an accepted equal to the products already named in this paragraph.
6. Section 09 96 23, pg 2, paragraph 2.02: Protectosil ANTIGRAFFITI is an accepted equal to the products already named in this paragraph.
7. Section 09 96 23, pg. 2, paragraph 2.02: Protectosil AQUA-TRETE Concentrate is an accepted equal to the products already named in this paragraph.

If you have any questions regarding this Addendum No. 2, please contact the Office of the Facilities Planning & Management in writing, via facsimile or email. All other terms and conditions of BID No. 10-02 to remain the same.

Sincerely,
Ms. Victoria L. Lamica
Contract Manager
Facilities Planning & Management

Stafford King Wiese, Architects
Warren Consulting Engineers, Civil Engineers
Cole Yee Schubert, Structural Engineers
Turley & Associates, Mechanical Engineers
Ken Rubitsky & Associates, Electrical Engineers
Smith Fause McDonald, Inc., Low Voltage Engineers
Land Architecture, Inc., Landscape Architect



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27 14 00	Communications Outside Plant Backbone Cabling
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DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 05 00	Common Work Results for Electronic Safety and Security
28 05 13	Conductors and Cables for Electronic Safety and Security
28 13 00	Access Control
28 31 11	Fire Alarm System

DIVISIONS 29 AND 30 NOT USED

DIVISION 31 - EARTHWORK

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31 23 17	Trenching, Backfilling & Compaction

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 12 16	Asphalt Concrete Paving
32 13 13	Portland Cement Concrete Paving
32 14 14	Interlocking Precast Concrete Pavers
32 17 23	Pavement Markings
32 17 26	Tactile Warning Surfaces
32 18 25	Resilient Track Surfacing
32 31 13	Chain Link Fences and Gates
32 80 00	Landscape Irrigation
32 90 00	Landscape Planting & Materials
32 91 00	Landscape Soil Importation and Placement
32 92 00	Landscape Maintenance

DIVISION 33 – UTILITIES

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33 43 00	Site Drainage

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- Notice to Contractors Calling for Bids
- Instructions for Bidders
- Subcontractors List
- Non Collusion Affidavit
- Statement of Bidder's Qualifications
- Bid Bond
- Certification of Pre-Bid Site Visit
- Bid Proposal
- Agreement
- Performance Bond
- Labor and Material Payment Bond
- Certificate of Workers' Compensation Insurance
- Drug Free Workplace Certification

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- Article 1 Definitions; General
- Article 2 District
- Article 3 Architect; Construction Manager
- Article 4 The Contractor
- Article 5 Subcontractors
- Article 6 Insurance; Indemnity; Bonds
- Article 7 Contract Time
- Article 8 Contract Price
- Article 9 Changes
- Article 10 Separate Contractors
- Article 11 Tests and Inspections
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- Article 13 Warranties
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- Attachment B – Change Order Form
- Attachment C – Asbestos and Hazardous Materials Certification
- Attachment D – Debris Recycling Statement
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- 00 80 00 Electronic Data Transfer Agreement

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01 41 00 Regulatory Requirements

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- 09 84 39 Acoustical Clouds and Blanket Sound Control
- 09 91 10 Painting
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- 10 28 13 Toilet Accessories
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- 10 51 13 Metal Lockers

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- 11 66 13 Exercise Equipment

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- 12 21 26 Roller Shades
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27 05 36 Cable Trays for Communications Systems
27 05 43 Underground Ducts and Raceways for Communications Systems
27 05 48 Noise and Vibration Controls for Communications Systems
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27 11 23 Communications Cable Management

27 11 26	Communications Rack Mounted Power Protection and Power Strips
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27 14 00	Communications Outside Plant Backbone Cabling
27 15 00	Communications Horizontal Cabling

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28 05 00	Common Work Results for Electronic Safety and Security
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DIVISION 33 – UTILITIES

33 35 00	Piped Utilities
33 43 00	Site Drainage

PART 1 - GENERAL**1.01 SUMMARY**

- A. Section specifies physical education and athletic exercise equipment.
- B. Related requirements specified elsewhere:
 - 1. Documents affecting work of this Section include, but are not limited to, Conditions of the Contract and Sections in Division 01 of these Specifications.
 - 2. Power for specified equipment - Division 26, Electrical.
 - 3. Cabling for specified equipment – Division 27, Communications.

1.02 SUBMITTALS

- A. Refer to Section 01 33 00 – Submittals.
- B. Shop Drawings: Complete layout and installation drawings for all equipment.
 - 1. Show all electrical and communications connection points.
- C. Manufacturer's standard product literature.
- D. Manufacturers' warranties

PART 2 - PRODUCTS**2.01 EQUIPMENT**

- A. Refer to 3.03 – Exercise Equipment list and manufacturer's product literature.
- B. Equipment and accessories listed are Owner's preferred choices. Substitutions will not be reviewed by Architect during project bid period.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Before beginning the work specified in this section, carefully inspect the substrate to which the work specified in this section will be applied. Execution of the work specified in this section shall constitute a certification by the Contractor that the substrate is in proper condition to receive subsequent work.

3.02 INSTALLATION

- A. Assemble and install athletic equipment in accordance with manufacturer's installation instructions.
- B. Locations of all equipment listed but not keyed on equipment layout shall be coordinated with the Owner.

3.03 EXERCISE EQUIPMENT MANUFACTURER'S LIST

- A. The following list includes names of and contact information for each of the products Named in Part 3.04 of this section.

Bigger Faster Strong

843 West 2400 South
Salt Lake City, UT 84119
Toll Free: 1-800-628-9737

Cybex International

Inside Sales Department
10 Trotter Drive
Medway, MA 02053
Email: sales@cybexintl.com

Iron Grip Barbell Company

4012 West Garry Avenue
Santa Ana, CA 92704-6300
TEL: (714) 850-6900
FAX: (714) 850-6910
TOLL FREE: (800) 665-4766
info@irongrip.com

Life Fitness

US/Canada
T: 800-634-8637
commercialsales@lifefitness.com

MATRIX Fitness Systems Corp.

1610 Landmark Drive
Cottage Grove, WI 53527
Toll-free: 866-693-4863
Local: 608-839-8686
Fax: 608-839-8687

Perform Better

PO Box 8090
Cranston, RI 02920-0090
Phone: 888-556-7464
Fax: 800-682-6950
E-mail: performbetter@mfathletic.com

Power Systems

P.O. Box 51030
Knoxville, TN 37950
Phone: 1-800-321-6975 or 865-769-8223
Fax: 1-800-298-2057
E-mail: customerservice@power-systems.com

Red Crowther Co.

PO Box 12157
Rock Hill, CA 29731
Phone: 800-841-5050

Fax: 803-366-3633

Rogers Athletic Company
3760 West Ludington Dr.
Farwell, MI 48622
Phone: 800-457-5337
Fax: 888-549-9659

Schwinn Fitness
Email: customerservice@schwinnfitness.com
Phone: 800-868-5764

Star Trac
14410 Myford Rd.
Irvine, CA 92606
Phone: 800-228-6635 or 714-669-1660
Fax: 714-838-6286

Technogym USA Corp.
830 Fourth Ave South
Seattle, WA 98134
Phone: 800-804-0952
Fax: 206-623-1898
Email: info@technogymusa.com
Website: www.technogym.com/us

Dartfish USA
6505 Shiloh Rd., Suite 110B
30005 Alpharetta, George
Phone: 404-685-9505
Fax: 404-685-9130

Supreme Audio, Inc.
155 Troy Rd., PO Box 550
Marlborough, NH 03455-0550
info@supremeaudio.com
Phone: 1-800-445-7398 or 1-603-876-3636
Fax: 1-800-346-4867 or 1-603-876-4001

Polar Electro Inc.
1111 Marcus Avenue, Suite M15
Lake Success, NY 11042-1034
Phone: 800-227-1314
Fax: 516-364-5454
Website: www.polarusa.com

3.04 EXERCISE EQUIPMENT LIST

- A. The following schedule itemizes exercise equipment, manufacturer, equipment, and quantity of each piece of exercise equipment.

Dartfish

Quan	Unit	Catalog number, description, size, dimensions	Vendor	Fitness Center		Strength Center	
				Quan	Location	Quan	Location
1	each	Dartfish Software License: Dartfish Team Pro	Dartfish	1	Storage		

Computer, Television & Sound System

Quan	Unit	Catalog number, description, size, dimensions	Vendor	Fitness Center		Strength Center	
				Quan	Location	Quan	Location
4	each	Wall-mounted Samsung 42" LCD monitor	Samsung			4	39
2	set	Tower 1 - Supreme Sound Tower #1 – 300 watt sound system	Supreme Audio	1	Storage	1	Storage
8	each	EVSX80B – electro-voice speakers	Supreme Audio	4	15	4	40

Polar Heart Rate Monitors

Quan	Unit	Catalog number, description, size, dimensions	Vendor	Fitness Center		Strength Center	
				Quan	Location	Quan	Location
1	set	Polar F-series PowerPlus Packs (24 - FS2 watches & transmitters)	Polar	1	Storage		

Miscellaneous

Quan	Unit	Catalog number, description, size, dimensions	Vendor	Fitness Center		Strength Center	
				Quan	Location	Quan	Location
2	each	White Board - 4' x 8'	misc.	1	16	1	41

Cybex

Quan	Unit	Catalog number, description, size, dimensions	Vendor	Fitness Center		Strength Center	
				Quan	Location	Quan	Location
3	each	12230 - VR3 dip/chin assist – 62"L x 55"W - custom frame color: platinum & upholstery: black	Cybex	1	3B	2	7
1	each	12060 - VR3 seated leg curl (heavy stack) - 56"L x 55"W - custom frame color: platinum & upholstery: black	Cybex			1	8
2	each	12170 - VR3 glute (heavy stack) - 63"L x 42"W - custom frame color: platinum & upholstery: black	Cybex			2	9
1	each	12120 - VR3 calf raise (heavy stack) - 48"L x 37"W - custom frame color: platinum & upholstery: black	Cybex			1	10
1	each	12090 - VR3 abdominal (heavy stack) - 59"L x 40"W - custom frame color: platinum & upholstery: black	Cybex			1	11
1	each	12100 - VR3 back extension (heavy stack) - 47"L x 40"W - custom frame color: platinum & upholstery: black	Cybex			1	12
1	each	12020 - VR3 pull down (heavy stack) - 67"L x 49"W - custom frame color: platinum & upholstery: black	Cybex			1	13
1	each	12030 - VR3 row (heavy stack) - 71"L x 38"W - custom frame color: platinum & upholstery: black	Cybex			1	14
1	each	12180 - VR3 triceps press (heavy stack) - 54"L x 49"W - custom frame color: platinum & upholstery: black	Cybex			1	15
1	each	12080 - VR3 arm extension (heavy stack) - 49"L x 42"W - custom frame color: platinum & upholstery: black	Cybex			1	16
1	each	12070 - VR3 arm curl (heavy stack) – 58"L x 40"W - custom frame color: platinum & upholstery: black	Cybex			1	17

Iron Grip

Quan	Unit	Catalog number, description, size, dimensions	Vendor	Fitness Center		Strength Center	
				Quan	Location	Quan	Location
10	each	IP045 – Iron Olympic 45 lb. plate	Iron Grip			10	27A
24	each	IP035 – Iron Olympic 35 lb. plate	Iron Grip			24	27A
10	each	IP025 – Iron Olympic 25 lb. plate	Iron Grip			10	27A
10	each	IP010 – Iron Olympic 10 lb. plate	Iron Grip			10	27A
10	each	IP005 – Iron Olympic 5 lb. plate	Iron Grip			10	27A
24	each	IP02.5 – Iron Olympic 2.5 lb. plate	Iron Grip			24	27A

Life Fitness

Quan	Unit	Catalog number, description, size, dimensions	Vendor	Fitness Center		Strength Center	
				Quan	Location	Quan	Location
11	each	SMAB – Signature Multi Adjustable Bench – custom frame color: platinum & upholstery: black	Life Fitness			7	18
2	each	ILIPV – Hammer Iso-lateral Incline Press Vertical – 39”L x 52”W – custom frame color: platinum & upholstery: black	Life Fitness			2	19
2	each	ILCB – Hammer Iso-lateral Chest/Back – 72”L x 52”W - custom frame color: platinum & upholstery: black	Life Fitness			2	20
2	each	PL4W – Hammer 4-way Neck - custom frame color: platinum & upholstery: black	Life Fitness			2	21
2	each	IKLC - Hammer Iso-lateral kneeling leg curl - 43”L x 50”W - custom frame color: platinum & upholstery: black	Life Fitness			2	22

Matrix

Quan	Unit	Catalog number, description, size, dimensions	Vendor	Fitness Center		Strength Center	
				Quan	Location	Quan	Location
7	each	GS-MSFT 400 - Functional Trainer 400 – 39"L x 67"W – custom frame color: platinum & upholstery: black	Matrix	5	1B, 4B, 7B, 10B, 13B	2	23

Perform Better

Quan	Unit	Catalog number, description, size, dimensions	Vendor	Fitness Center		Strength Center	
				Quan	Location	Quan	Location
5	each	2610P – First place elite medicine ball – 2lbs	Perform Better	5	11A, 1, 5, 8, 11		
9	each	2611P – First place elite medicine ball – 4lbs	Perform Better	5	11A, 1, 5, 8, 11		
9	each	2612P – First place elite medicine ball – 6lbs	Perform Better	5	11A, 1, 5, 8, 11		
9	each	2613P – First place elite medicine ball – 8lbs	Perform Better	5	11A, 1, 5, 8, 11		
9	each	2614P – First place elite medicine ball – 10lbs	Perform Better	5	11A, 1, 5, 8, 11		
4	each	2615P – First place elite medicine ball – 12lbs	Perform Better			4	27A
4	pair	2905-10P – 10lb York bumper grip plates – green	Perform Better			4	27A
4	pair	2905-25P – 25lb York bumper grip plates – yellow	Perform Better			4	27A
4	pair	2905-35P – 35lb York bumper grip plates – blue	Perform Better			4	27A
4	pair	2905-45P – 45lb York bumper grip plates – red	Perform Better			4	27A
4	pair	2905-5P – 5lb York bumper grip plates – black	Perform Better			4	27A
2	each	3820P – First place kettle bell – 4kg	Perform Better	2	A3, A4		
2	each	3821P – First place kettle bell – 8kg	Perform Better	2	A3, A4		
6	each	3822P – First place kettle bell – 12kg	Perform Better	2	A3, A4	4	27A
6	each	3823P – First place kettle bell – 16kg	Perform Better	2	A3, A4	4	27A
4	each	3824P – First place kettle bell – 24kg	Perform Better			4	27A
6	each	3826P – First place kettle bell – 20kg	Perform Better	2	A3, A4	4	27A

4	each	3828P – First place kettle bell – 28kg	Perform Better			4	27A
12	each	3876P – Stability ball base	Perform Better	12	A12, 2B, 5B, 8B, 11B, 10		
2	each	5040P – Stinger 1 – Dynamax medicine ball – 4lbs	Perform Better	2	A1		
6	each	5041P – Stinger 11 – Dynamax medicine ball – 6lbs	Perform Better	2	1A, 10A	4	27A
6	each	5042P – Accelerator 1 – Dynamax medicine ball – 8lbs	Perform Better	2	1A, 10A	4	27A
6	each	5043P – Accelerator 11 – Dynamax medicine ball – 10lbs	Perform Better	2	1A, 10A	4	27A
4	each	5044P – Stout 1 – Dynamax medicine ball – 12lbs	Perform Better			4	27A
7	each	5046P – Hefty 1 – Dynamax medicine ball – 16lbs	Perform Better	7	1A, 6A, 9A, 5, 7, 9, 13		
4	each	5369P - Stability ball 'the loop' rack	Perform Better			4	34
1	set	5622P - Plyo-safe G2 box set – 30"L x 36"W - 5 boxes (3, 6, 12, 18 & 24 inch) – custom color: black	Perform Better	1	A7		
1	set	5623P - Plyo-safe G2 box set - 30"L x 36"W- 3 boxes (12, 18 & 24 inches)	Perform Better			1	35
5	each	5801P – 4lb Original body bar (4' foot long)	Perform Better	5	9A, 3, 6, 9, 12		
5	each	5802P – 9lb Original body bar (4' foot long)	Perform Better	5	9A, 3, 6, 9, 12		
5	each	5803P – 12lb Original body bar (4' foot long)	Perform Better	5	9A, 3, 6, 9, 12		
5	each	5804P – 15lb Original body bar (4' foot long)	Perform Better	5	9A, 3, 6, 9, 12		
5	each	5805P – 18lb Original body bar (4' foot long)	Perform Better	5	9A, 3, 6, 9, 12		
5	each	5806P – 24lb Original body bar (4' foot long)	Perform Better	5	9A, 3, 6, 9, 12		
5	each	5807P – 30lb Original body bar (5' foot long)	Perform Better	5	9A, 3, 6, 9, 12		
5	each	5808P – 36lb Original body bar (6' foot long)	Perform Better	5	9A, 3, 6, 9, 12		

5	each	5809P – Original body bar rack	Perform Better	5	9A, 3, 6, 9, 12		
5	pair	6678P – AB-originals wings	Perform Better	1	13A	4	27A
9	each	6778P - Big tree 5-ball rack – 12"W x 18"D x 54"H	Perform Better	5	11A, 2, 5, 8, 11	4	27A
2	each	7666P - Extreme core trainer w/wide grip handle (8 foot swing radius)	Perform Better			2	24
6	each	5059S Dynamax rack	Perform Better	2	2A, 10A	4	27A

Power Systems

Quan	Unit	Catalog number, description, size, dimensions	Vendor	Fitness Center		Strength Center	
				Quan	Location	Quan	Location
10	each	20611-AN – 12" Premium power-plyo box – 22"L x 22"W	Power Systems	3	8B, 12B, 13	7	27A
4	set	20611-K1 - set of 4 Premium Power-plyo boxes (12, 18, 24 & 30 inch)	Power Systems	4	8A, 13A, 6B, 4		
4	each	40470 - Horizontal plate rack (mobile) – 50"L x 16.5"W	Power Systems			4	27A
2	each	60060 - Dip cradle	Power Systems			2	4
1	set	60286 – Storage Rack w/44 pairs of premium neoprene petite dumbbells (w/casters)	Power Systems			1	25
1	set	69980 – entire set of 10 exercise charts	Power Systems			1	
1	set	70080 – set of 4 posters dumbbell training poster pack	Power Systems			1	
16	each	70540 – VersaBall stability ball	Power Systems	12	12A, 2B, 5B, 8B, 11B, 10	4	34
1	each	78010 – major anterior muscles chart	Power Systems			1	
1	each	78020 – major posterior muscles chart	Power Systems			1	
7	each	90807-9M-JB – Deluxe club mat – 96"L x 48"W x 2" thick – color: Jet black	Power Systems	7	2B, 5B, 9B, 11B, 12B, 1, 11		
6	each	92221-52 – Bowflex SelectTech Dumbbells 552	Power Systems	6	6A, 1, 4, 7, 10, 13		
6	each	92221-K1 – Bowflex SelectTech dumbbell stand	Power systems	6	6A, 1, 4, 7, 10, 13		

Rae Crowther

Quan	Unit	Catalog number, description, size, dimensions	Vendor	Fitness Center		Strength Center	
				Quan	Location	Quan	Location
4	each	3118 - 10-pair 2-tier hex dumbbell rack – 99”L x 18”W – custom frame color: platinum	Rae Crowther			4	1
2	set	JSP1 – Jump Smart plyo set	Rae Crowther			2	36
2	each	JSP2 – custom color: black: (THIS IS THE CODE FOR CUSTOM COLOR OF ITEM JSP1 ABOVE)	Rae Crowther			2	36
2	each	JSP3 - Glute Ham attachment	Rae Crowther			2	36
1	each	SWV7 - 7-foot shockwave – 7 feet X 56”W – custom frame color: platinum & upholstery: black	Rae Crowther			1	26

Rogers

Quan	Unit	Catalog number, description, size, dimensions	Vendor	Fitness Center		Strength Center	
				Quan	Location	Quan	Location
4	each	? - Wall mounted storage	Rogers			4	37
4	each	410511 & 410523 - Full brute rack 76"L x 70.5"W w/platform included 8' x 8' - custom frame color: platinum	Rogers			4	27
4	pair	410513 - Monster Incline arms - custom frame color: platinum	Rogers			4	37
4	pair	410514 - Monster Horizontal arms - custom frame color: platinum	Rogers			4	37
4	each	410531 - Jam pad	Rogers			4	37
2	each	410594 - Monster glute/ham machine - 76"L x 34"W - custom frame color: platinum & upholstery: black	Rogers			2	28
2	each	410605 - Pendulum power squat pro - 62"L x 71"W - custom frame color: platinum & upholstery: black	Rogers			2	30

Schwinn

Quan	Unit	Catalog number, description, size, dimensions	Vendor	Fitness Center		Strength Center	
				Quan	Location	Quan	Location
12	each	Schwinn IC Elite Indoor Cycling Bike w/smart release	Schwinn			12	29

Star Trac

Quan	Unit	Catalog number, description, size, dimensions	Vendor	Fitness Center		Strength Center	
				Quan	Location	Quan	Location
4	each	Star Trac E-TRe commercial treadmill – 85"L x 34"W x 60.5"H	Star Trac	4	C1, C2, C3, C4		
4	each	Star Trac E-TBTe Total Body Trainer – 70"L x 27"W x 68"H	Star Trac	4	C5, C6, C7, C8		
34	each	Star Trac eSpinner Indoor Cycling Bike	Star Trac	34	B		

Apple

Quan	Unit	Catalog number, description, size, dimensions	Vendor	Fitness Center		Strength Center	
				Quan	Location	Quan	Location
100	each	iPod classic 160GB - Black - Personalized with "CHABOT COLLEGE FITNESS CENTER" engraving	Apple	100	Storage		

Precor

Quan	Unit	Catalog number, description, size, dimensions	Vendor	Fitness Center		Strength Center	
				Quan	Location	Quan	Location
4	each	Precor Elliptical Trainer EFX 546i – 80"L x 32"W x 68"H	Precor	4	C9, C10, C11, C12		

3.05 EXERCISE EQUIPMENT LAYOUT PLAN

- A. The following layout plan for the first floor and legend are provided for information and reference purposes only.

4100 Fitness Center 2nd Floor

Legend

- #A = Circuit A Station
- #B = Circuit B Station
- C# = Cardio Equipment
- B = Stationary Bike
- M = Monitor
- # = Stand Alone Circuit Station
- φ = Electrical Receptacle
- + = Data Port

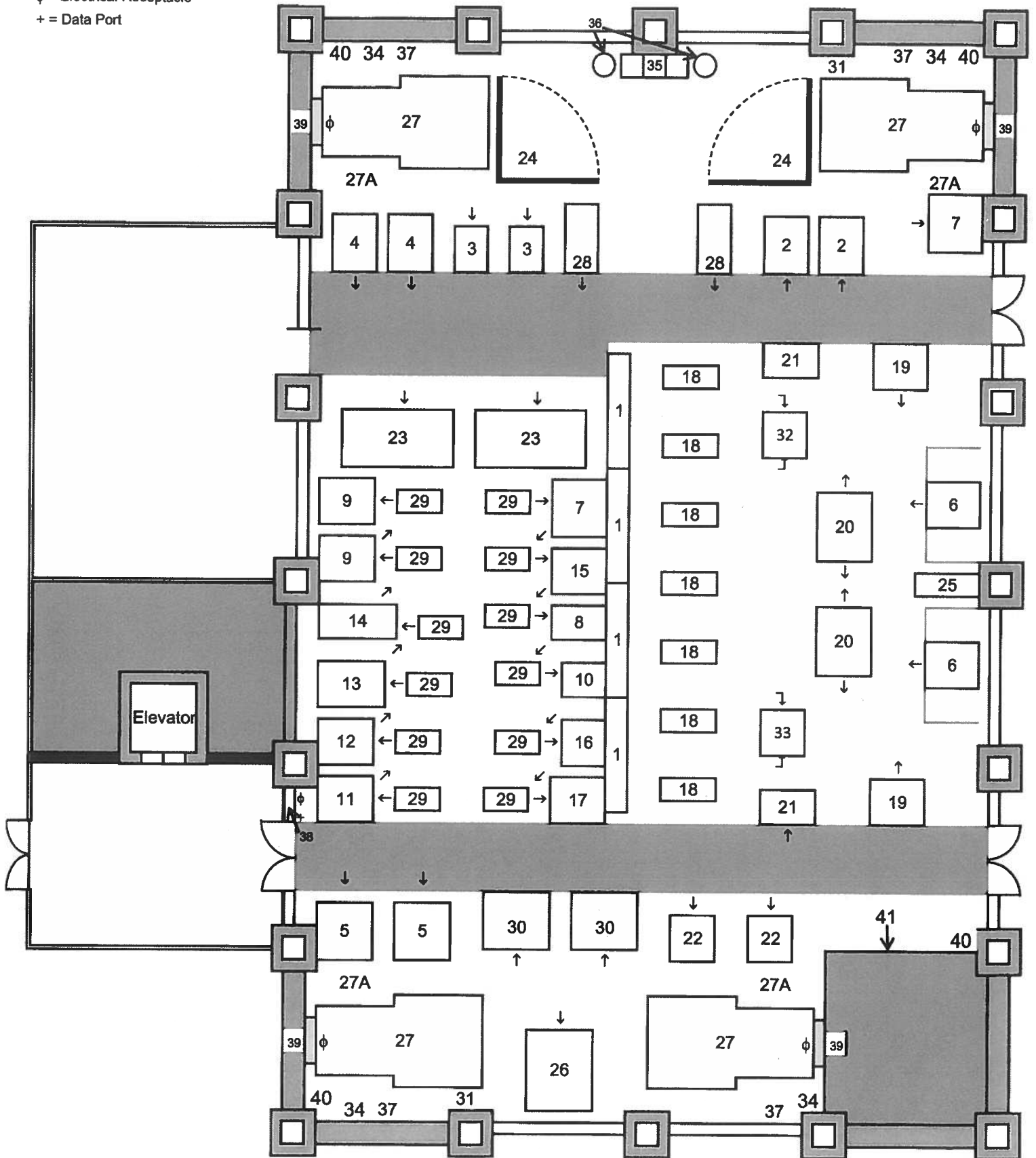


4100 Strength Center 1st Floor

Legend

φ = Electrical Receptacle

+ = Data Port



END OF SECTION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish an Alerton native BACnet-based system to tie into and match the current district's EMS standard. The EMS system shall be based on a distributed control system in accordance with this specification. The operator's workstation, all building controllers, application controllers, and all input/output devices shall communicate using the protocols and network standards as defined by ANSI/ASHRAE Standard 135-2001, BACnet.
- B. Provide all necessary BACnet-compliant hardware and software to meet the system's functional specifications. All controller devices must be BTL tested and listed by an official BACnet Testing Laboratory and have the BTL mark issued.
- C. Prepare individual hardware layouts, interconnection drawings, and sequence of control from the project design data.
- E. Design, provide, and install all equipment cabinets, panels, data communication network cables needed, and all associated hardware.
- H. Provide complete manufacturer's specifications for all items that are supplied. Include vendor name of every item supplied.
- I. Provide a comprehensive operator and technician training program as described herein.
- J. Provide as-built documentation, operator's terminal software, diagrams, and all other associated project operational documentation (such as technical manuals) on approved media, the sum total of which accurately represents the final system.

1.02 SYSTEM DESCRIPTION

- A. A distributed logic control system complete with all software and hardware functions shall be provided and installed. System shall be completely based on ANSI/ASHRAE Standard 135-2001, BACnet. This system is to control all mechanical equipment, including all unitary equipment such as VAV boxes, heat pumps, fan-coils, AC units, etc. and all air handlers, boilers, chillers, and any other listed equipment using native BACnet-compliant components shown on specified drawings.
- B. Operator's workstation software if applicable shall be Microsoft Windows XP Professional as the computer operating system. The Energy Management System (EMS) application program shall be written to communicate specifically utilizing BACnet protocols. Software functions delivered on this project shall include password protection, scheduling (including optimum start), alarming, logging of historical data, full graphics including animation, after-hours billing program (if applicable), demand limiting (if applicable), full suite of field engineering tools including graphical programming and applications.

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- C. Building controllers shall include complete energy management software, including scheduling building control strategies with optimum start and logging routines. All energy management software and firmware shall be resident in field hardware and shall not be dependent on the operator's terminal. Operator's terminal software is to be used for access to field-based energy management functions only. Provide zone-by-zone direct digital logic control of space temperature, scheduling, runtime accumulation, equipment alarm reporting, and override timers for after-hours usage.
- D. All application controllers for every terminal unit (VAV, HP, UV, etc.) air handler, all central plant equipment, and any other piece of controlled equipment shall be fully programmable. Application controllers shall communicate with building controller via BACnet LAN.
- E. Room sensors shall be provided with digital readout that allow the user to view room temperature, view outside air temperature, adjust the room setpoint within preset limits and set desired override time. User shall also be able to start and stop unit from the digital sensor. Include all necessary wiring and firmware such that room sensor includes field service mode. Field service mode shall allow technician to balance VAV zones and access any parameter in zone controller. Space sensors shall operate in two modes. One for the tenant and the other is a field service mode for the technician.

1.03 APPROVED MANUFACTURERS

- 1 Alerton (no equal)

1.04 REFERENCE STANDARDS

- A. The latest edition of the following standards and codes in effect and amended as of supplier's proposal date, and any applicable subsections thereof, shall govern design and selection of equipment and material supplied:
 - 1. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).
 - 2. ANSI/ASHRAE Standard 135-2001 and addendums, BACnet.
 - 3. Uniform Building Code (UBC), including local amendments.
 - 4. UL 916 Underwriters Laboratories Standard for Energy Management Equipment. Canada and the US.
 - 5. National Electrical Code (NEC).
 - 6. FCC Part 15, Subpart J, Class A

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7. BACnet Testing Laboratories (BTL)

B. City, county, state, and federal regulations and codes in effect as of contract date.

1.05 SUBMITTALS

A. Drawings

1. The system supplier shall submit engineered drawings, control sequence, and bill of materials for approval.
2. Drawings shall be submitted in the following standard sizes: 11" x 17" (ANSI B).
3. Eight complete sets (copies) of submittal drawings shall be provided.

B. System Documentation

Include the following in submittal package:

1. Electrical drawings that show all system internal and external connection points, terminal block layouts, and terminal identification.
2. Complete bill of materials, valve schedule and damper schedule.
3. Manufacturer's cutsheets.

1.06 WARRANTY

A. Warranty shall cover all costs for parts, labor, associated travel, and expenses for a period of one year from completion of system acceptance.

1.07 RELATED WORK IN OTHER SECTIONS

A. Refer to Division 0 and Division 1 for related contractual requirements.

B. Refer to Section 15000 for General Mechanical Provisions

C. Refer to Section 16000 for General Electrical Provisions

PART 2 - PRODUCTS

2.01 OPERATOR'S WORKSTATION (IF APPLICABLE)

A. BACnet Conformance

1. Operator's workstation shall as a minimum support Ethernet BACnet LAN types. It shall communicate directly via these BACnet LANs as a BACnet operator workstation.
2. Standard BACnet object types accessed by the workstation shall include as a minimum: Analog Value, Analog Input, Analog Output, Binary Value, Binary Input, Binary Output, Calendar, Device, Event Enrollment, File,

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Notification Class, Program and Schedule object types.

3. The Operator Workstation shall comply with Annex J of the BACnet specification for IP connections.

B. Displays

1. Operator's workstation shall display all data associated with project as called out on drawings and/or object type list supplied.

C. Password Protection

1. Provide security system that prevents unauthorized use unless operator is logged on. Access shall be limited to operator's assigned functions when user is logged on.
2. All passwords, user names, and access assignments shall be adjustable at the operator's terminal. Each user shall also have a set security level, which defines access to displays and individual objects the user may control. System shall include 10 separate and distinct security levels for assignment to users.
3. System shall include an Auto Logout Feature that shall automatically logout user when there has been no keyboard or mouse activity for a set period of time. Time period shall be adjustable by system administrator. Auto Logout may be enabled and disabled by system administrator. Operator terminal shall display message on screen that user is logged out after Auto Logout occurs.

D. Operator Activity Log

1. Operator Activity Log shall be included with system that tracks all operator changes and activities. System shall track what is changed in the system, who performed this change, date and time of system activity and value of the change before and after operator activity. Operator shall be able to display all activity, sort the changes by user and by operation.
2. Log shall be gathered and archived to hard drive on operator workstation as needed.

E. Scheduling

1. Operator's workstation shall show all information in easy-to-read daily format. Priority for scheduling shall be events, holidays and daily with events being the highest.
2. Holiday and special event schedules shall display data in calendar format. Operator shall be able to schedule holidays and special events directly from these calendars.
3. Operator shall be able to change all information for a given weekly or

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exception schedule if logged on with the appropriate security access.

F. Alarm Indication and Handling.

1. Operator's workstation shall provide visual means of alarm indication. The alarm dialog box shall always become the top dialog box regardless of the application(s), currently running.
2. System shall provide log of alarm messages. Alarm log shall be archived to the hard disk of the system operator's terminal. Each entry shall include a description of the event-initiating object generating the alarm. Entry shall include time and date of alarm occurrence.
3. Alarm messages shall be in user-definable text and shall be entered either at the operator's terminal or via remote communication.

G. Trendlog Information

1. System server shall periodically gather historically recorded data stored in the building controllers and archive the information. Archived files shall be appended with new sample data, allowing samples to be accumulated.
2. Software shall be included that is capable of graphing the trend logged object data. Software shall be capable of creating two-axis (x,y) graphs that display object values relative to time.
3. Operator shall be able to change trend log setup information. This includes the information to be logged as well as the interval at which it is to be logged. All input, output, and value object types in the system may be logged. All operations shall be password protected. Setup and viewing may be accessed directly from any and all graphics on which object is displayed.

H. Energy Log Information (If Applicable)

1. System server shall be capable of periodically gathering energy log data stored in the field equipment and archive the information. Archive files shall be appended with new data, allowing data to be accumulated.
3. Operator shall be able to change the energy log setup information as well. This includes the meters to be logged, meter pulse value, and the type of energy units to be logged. All meters monitored by the system may be logged.
4. System shall display archived data in tabular format form for both consumption and peak values. Data shall be shown in hourly, daily, weekly, monthly and yearly formats. In each format the user shall be able to select a specific period of data to view.

I. Demand Limiting (If Applicable)

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1. System shall include demand limiting program that includes two types of load shedding. One type of load shedding shall shed/restore equipment in binary fashion based on energy usage when compared to shed and restore settings. The other type of shedding shall adjust operator selected control setpoints in an analog fashion based on energy usage when compared to shed and restore settings. Shedding may be implemented independently on each and every zone or piece of equipment connected to system.
 2. Status of each and every load shed program shall be capable of being displayed on every operator terminal connected to system. Status of each load assigned to an individual shed program shall be displayed along with the description of each load.
- J. Workstation Hardware (If Applicable)
1. Provide operator's workstation(s) at location(s) noted on the plans.
 2. Workstation/Server Computer Minimum Requirements
 - a. Pentium 4, 2.8 Ghz or better
 - b. 1 GB RAM or better
 - c. 80GB hard disk or better
 - d. High-performance graphics adapter
 - e. Ethernet 10/100 network interface card
 - f. Keyboard, mouse, and CD/RW-ROM
 - g. 19" flat panel LCD monitor
 - h. Windows XP Pro SP2 or Windows Vista
 - j. Color Inkjet Printer
 - k. Standard 3 year on-site warranty
- K. Portable Laptop Computer (If Applicable)
1. Provide portable laptop as noted on plans.
 2. Laptop Computer Minimum Requirements
 - a. Intel Pentium M, 1.73 Ghz or better
 - b. 1 GB RAM or better
 - c. 40GB hard disk or better
 - d. High-performance graphics adapter

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- e. Ethernet 10/100 network interface card
- f. Integrated wireless 802.11 b/g
- g. Serial port and CD/RW-ROM
- h. Windows XP Pro SP2 or Windows Vista
- i. Internal Modem, 56Kb Minimum
- j. Standard 3 year on-site warranty

L. Software

- 1. At the conclusion of project, contractor shall leave with owner a CD ROM that includes the complete software operation system and project graphics, setpoints, system parameters, etc. This backup shall allow the owner to completely restore the system in the case of a computer malfunction.

2.02 BUILDING GLOBAL CONTROLLER

A. General Requirements

- 1. Building Controller shall consist of a power supply and a BACnet Ethernet-MS/TP port as a minimum for the specific application.
- 2. Programming shall be object-oriented using control function blocks, supporting DDC functions, 1000 Analog Values and 1000 Binary Values.
- 3. Controller shall have a battery to provide power for orderly shutdown of controller and storage of data in nonvolatile flash memory. Battery back up shall maintain real-time clock functions for a minimum of 10 days.
- 4. Schedules
 - a. Each building controller module shall support a minimum of 80 BACnet Schedule Objects and 80 BACnet Calendar Objects.
 - b. Building controller modules shall provide normal 7 day scheduling, holiday scheduling and event scheduling.
- 5. Logging Capabilities
 - a. Each building controller shall log as minimum 320 values. Any object in the system (real or calculated) may be logged. Sample time interval shall be adjustable at the operator's workstation.
- 6. Alarm Generation
 - a. Alarms may be generated within the system for any object change of value or state either real or calculated. This includes things such as analog object value changes, binary object state changes, and various controller communication failures.

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- b. Each alarm may be dialed out as noted elsewhere.
- c. Alarm log shall be provided for alarm viewing. Log may be viewed on-site at the operator's terminal or off-site via remote communications.
- d. Controller must be able to handle up to 320 alarm setups stored as BACnet event enrollment objects – system destination and actions individually configurable

B. Ethernet – MS/TP Port

- 1. Ethernet – MS/TP Port shall support every function as listed below:
- 2. All communication with operator workstation and all application controllers shall be via BACnet. Building controller Ethernet – MS/TP port shall incorporate as a minimum, the functions of a 2-way BACnet router. Controller shall route BACnet messages between the high-speed LAN (Ethernet 100MHz) and master slave token passing (MS/TP) LAN. Ethernet – MS/TP port shall also route messages from all other Building Controller ports onto the BACnet Ethernet network.
 - a. MS/TP LAN must be software configurable from 9.6 to 76.8Kbps.
 - b. The RJ-45 Ethernet connection must accept 100Base-TX BACnet over twisted pair cable (UTP).
- 3. BACnet Conformance
 - a. Ethernet – MS/TP port shall as a minimum support MS/TP and Ethernet BACnet LAN types.
 - b. Standard BACnet object types supported shall include as a minimum: Analog Value, Binary Value, Calendar, Device, File, Group, Notification Class, Program and Schedule object types.
 - c. The Building Controller shall comply with Annex J of the BACnet specification for IP connections. This device shall use Ethernet to connect to the IP internetwork, while using the same Ethernet LAN for non-IP communications to other BACnet devices on the LAN. Must support interoperability on wide area networks (WANs) and campus area networks (CANs) and function as a BACnet Broadcast Management Device (BBMD).

C. MS/TP Port

- 1. MS/TP port shall support every function as listed below:
- 2. Building Controller MS/TP port communications shall be via BACnet

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master slave token passing (MS/TP) LAN to all advanced application and application specific controllers. MS/TP port shall also route messages to Ethernet-MS/TP port for communication over WAN.

- a. MS/TP LAN must be software configurable from 9.6 to 76.8Kbps
- b. Configuration shall be via RS-232 connection.

3. BACnet Conformance

- a. MS/TP port shall as a minimum support MS/TP BACnet LAN type. It shall communicate directly via this BACnet LAN as a native BACnet device and shall support simultaneous routing functions between all supported LAN types. Controller shall be a native BACnet Building Controller (B-BC) device and support all BACnet services necessary.
- b. Standard BACnet object types supported shall include as a minimum: Analog Value, Binary Value, Calendar, Device, File, Group, Notification Class, Program and Schedule object types.

2.03 VISUAL LOGIC CONTROLLERS

- A. Provide one or more native BACnet application controllers for each equipment specified to provide native BACnet application controllers as needed for control that adequately cover all equipment specified. All controllers shall interface to building controller via LAN using BACnet protocol. Controllers shall include input, output and self-contained logic program as needed for complete control of units. Controllers shall be fully programmable using graphical programming blocks.
- B. BACnet Conformance
 1. Application controllers shall as a minimum support BACnet LAN types. They shall communicate directly via this BACnet LAN at 9.6, 19.2, 38.4 and 76.8 Kbps or higher speed, as native BACnet devices. Application specific controllers shall be a native BACnet Application Specific Controller (B-ASC) device.
 2. Standard BACnet object types supported shall include as a minimum— Analog Input, Analog Output, Analog Value, Binary Input, Binary Output, Binary Value, Device, File, and Program object types.
- C. Application controllers shall include universal inputs with minimum 10-bit resolution that accept thermistors, 0–10VDC, 0–5 VDC, 4–20 mA and dry contact signals. Any input on a controller may be either analog or digital with at least 1 input that accepts pulses. Controller shall also include support and modifiable programming for interface to intelligent room sensor with digital display. Controller shall include binary and analog outputs on board. Analog outputs shall be switch selectable as either 0–10VDC or 0–20mA. Software shall include

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scaling features for analog outputs. Application controller shall include 24VDC voltage supply for use as power supply to external sensors.

- D. All program sequences shall be stored on board application controller in EEPROM. No batteries shall be needed to retain logic program. All program sequences shall be executed by controller 10 times per second and capable of multiple PI loops for control of multiple devices. All calculations shall be completed using floating-point math and system shall support display of all information in floating-point nomenclature at operator's terminal. Programming of application controller shall be completely modifiable in the field over installed BACnet LANs or remotely via modem interface. Operator shall program logic sequences by graphically moving function blocks on screen and tying blocks together on screen.
- E. Application controller shall include support for intelligent room sensor Display on intelligent room sensor shall be programmable at application controller and include an operating mode and a field service mode. All button functions and display data shall be programmable to show specific controller data in each mode based on which button is pressed on the sensor. See sequence of operation for specific display requirements at intelligent room sensor.

2.04 EXPANDABLE VLX CONTROLLERS

A. General

1. Expandable application controller shall be capable of providing control strategies for the system based on information from any or all connected inputs. The program implementing these strategies shall be completely flexible and user definable. Program execution of controller shall be a minimum of once per second.
2. Programming shall be object-oriented using control program blocks. Controller shall support a minimum of 500 Analog Values and 500 Binary Values. Each and every analog and binary value shall support standard BACnet priority arrays.
3. Provide means to graphically view inputs and outputs to each program block in real-time as program is executing. This function may be performed via the operator's terminal or field computer.
4. Controller shall have adequate data storage to ensure high performance and data reliability. Battery shall retain static RAM memory and real-time clock functions for a minimum of 1.5 years (cumulative). Battery shall be a field-replaceable (non-rechargeable) lithium type. Unused battery life shall be 10 years.
5. The onboard, battery-backed real time clock must support schedule operations and trend logs.
6. Global control algorithms and automated control functions should execute

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via 32-bit processor.

7. Controller shall include both on-board 10BASE-T/100BASE-TX Ethernet BACnet communication over twisted pair cable (UTP) and shall include BACnet IP communication. In addition, controller shall include BACnet PTP connection port.
8. The base unit of the controller shall host up to 8 expansion modules with various I/O combinations. These inputs and outputs shall include universal 12-bit inputs, binary triac outputs, and 8-bit switch selectable analog outputs (0-10V or 0-20 mA). Inputs shall support thermistors, 0-5VDC, 0-10VDC, 4-20mA, dry contacts and pulse inputs directly.
9. All outputs must have onboard Hand-Off-Auto switches and a status indicator light. HOA switch position shall be monitored. Each analog output shall include a potentiometer for manually adjusting the output when the HOA switch is in the Hand position.
10. The position of each and every HOA switch shall be available system wide as a BACnet object. Expandable VLX Controller shall provide up to 176 discreet inputs/outputs per base unit.

B. BACnet Conformance

1. Central Plant/AHU Controller shall as a minimum support Point-to-Point (PTP), MS/TP or Ethernet BACnet LAN types. It shall communicate directly via these BACnet LANs as a native BACnet device and shall support simultaneous routing functions between all supported LAN types. Advanced application controllers shall be a native BACnet Advanced Application Controller (B-AAC) device.
2. Standard BACnet object types supported shall include as a minimum: Analog Input, Binary Input, Analog Output, Binary Output, Analog Value, Binary Value, Device, File, Group, Event Enrollment, Notification Class, Program and Schedule object types.
3. The Controller shall comply with Annex J of the BACnet specification for IP connections. This device shall use Ethernet to connect to the IP internetwork, while using the same Ethernet LAN for non-IP communications to other BACnet devices on the LAN. Must support interoperability on wide area networks (WANs) and campus area networks (CANs) and function as a BACnet Broadcast Management Device (BBMD).

C. Schedules

1. Each VLX controller shall support a minimum of 50 BACnet Schedule Objects.

D. Logging Capabilities

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1. Each controller shall support a minimum of 200 trend logs. Any object in the system (real or calculated) may be logged. Sample time interval shall be adjustable at the operator's workstation.

E. Alarm Generation

1. Alarms may be generated within the system for any object change of value or state either real or calculated. This includes things such as analog object value changes, binary object state changes, and various controller communication failures.
2. Alarm log shall be provided for alarm viewing. Log may be viewed on-site at the operator's terminal or off-site via remote communications.
3. Controller must be able to handle up to 200 alarm setups stored as BACnet event enrollment objects – system destination and actions individually configurable.

2.05 TERMINAL UNIT CONTROLLERS (VAV, DUAL DUCT, EXHAUST BOXES)

- A. Provide one native BACnet application controller for each VAV box that adequately covers all objects listed in object list for unit. All controllers shall interface to building controller via LAN using BACnet protocol. Controllers shall include on board CFM flow sensor, inputs, outputs and programmable, self-contained logic program as needed for control of units.

B. BACnet Conformance

1. Application controllers shall as a minimum support BACnet LAN types. They shall communicate directly via this BACnet LAN at 9.6, 19.2, 38.4 and 76.8 Kbps, as a native BACnet device. Application specific controllers shall be a native BACnet Application Specific Controller (B-ASC) device.
2. Standard BACnet object types supported shall include as a minimum— Analog Input, Analog Output, Analog Value, Binary Input, Binary Output, Binary Value, Device, File and Program Object Types.

- C. Application controllers shall include universal inputs with 10-bit resolution that can accept thermistors, 0–5 VDC, and dry contact signals. Inputs on controller may be either analog or digital. Controller shall also include support and modifiable programming for interface to intelligent room sensor with digital display. Controller shall also include binary outputs on board. For applications using variable speed parallel fans, provide a single analog output selectable for 0-10 V or 0-20 mA control signals. Application controller shall include microprocessor driven flow sensor for use in pressure independent control logic. All boxes shall be controlled using pressure independent control algorithms and all flow readings shall be in CFM.

- D. All program sequences shall be stored on board application controller in

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EEPROM. No batteries shall be needed to retain logic program. All program sequences shall be executed by controller 10 times per second and shall be capable of multiple PI loops for control of multiple devices. Programming of application controller shall be completely modifiable in the field over installed BACnet LANs or remotely via modem interface. Operator shall program logic sequences by graphically moving function blocks on screen and tying blocks together on screen. Application controller shall be programmed using the same programming tool as Building Controller and as described in operator workstation section.

- E. Application controller shall include support for intelligent room sensor. Display on room sensor shall be programmable at application controller and include an operating mode and a field service mode. All button functions and display data shall be programmable to show specific controller data in each mode based on which button is pressed on the sensor. See sequence for specific display requirements for intelligent room sensor.
- F. Provide duct temperature sensor at discharge of each reheat VAV box that is connected to controller for reporting back to operator workstation.

2.06 SENSORS AND MISCELLANEOUS DEVICES

A. Temperature Sensors

- 1. All temperature sensors to be solid state electronic, factory-calibrated to within 0.5°F, totally interchangeable with housing appropriate for application. Wall sensors to be installed as indicated on drawings. Mount 48 inches about finished floor. Duct sensors to be installed such that the sensing element is in the main air stream. Immersion sensors to be installed in wells provided by control contractor, but installed by mechanical contractor. Immersion wells shall be filled with thermal compound before installation of immersion sensors. Outside air sensors shall be installed away from exhaust or relief vents, not in an outside air intake and in a location that is in the shade most of the day.

B. Intelligent Room Sensor with LCD Readout

- 1. Sensor shall contain a backlit LCD digital display and user function keys along with temperature sensor. Controller shall function as room control unit, and shall allow occupant to raise and lower setpoint, and activate terminal unit for override use—all within limits as programmed by building operator. Sensor shall also allow service technician access to hidden functions as described in sequence of operation.
- 2. The Intelligent Room Sensor shall simultaneously display room setpoint, room temperature, outside temperature, and fan status (if applicable) at

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each controller. This unit shall be programmable, allowing site developers the flexibility to configure the display to match their application. The site developer should be able to program the unit to display time-of-day, room humidity and outdoor humidity. Unit must have the capability to show temperatures in Fahrenheit or Centigrade.

3. Override time may be set and viewed in half-hour increments. Override time count down shall be automatic, but may be reset to zero by occupant from the sensor. Time remaining shall be displayed. Display shall show the word "OFF" in unoccupied mode unless a function button is pressed.

4. See sequence of operation for specific operation of LCD displays and function keys in field service mode and in normal occupant mode. Provide intelligent room sensors as specified in point list.

5. Field service mode shall be customizable to fit different applications. If intelligent room sensor is connected to VAV controller, VAV box shall be balanced and all air flow parameters shall be viewed and set from the intelligent room sensor with no computer or other field service tool needed.

C. Wall Sensor

1. Standard wall sensor shall use solid-state sensor identical to intelligent room sensor and shall be packaged in aesthetically pleasing enclosure. Sensor shall provide override function, warmer/cooler lever for set point adjustment and port for plug-in of Field Service Tool for field adjustments. Override time shall be stored in controller and be adjustable on a zone-by-zone basis. Adjustment range for warmer/cooler lever shall also be stored in EEPROM on controller. All programmable variables shall be available to Field Service Tool through wall sensor port.

2.07 ELECTRONIC ACTUATORS AND VALVES

A. Quality Assurance for Actuators and Valves

1. UL Listed Standard 873 and C.S.A. Class 4813 02 certified.
2. NEMA 2 rated enclosures for inside mounting, provide with weather shield for outside mounting.
3. Five-year manufacturers warranty. Two-year unconditional and three-year product defect from date of installation.

B. Execution Details for Actuators and Valves

1. For chiller and boiler plant isolation, each DDC analog output point shall

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have an actuator endswitch, wired and terminated to the DDC as a binary input for actuator open status.

2. VAV box damper actuation shall be Floating type or Analog (2-10vdc, 4-20ma).
 3. Booster-heat valves actuation shall be Floating type or Analog (2-10vdc, 4-20ma).
 4. Primary valve control shall be Analog (2-10vdc, 4-20ma).
- C. Actuators for Damper and Control Valves ½" to 6" shall be Electric unless otherwise specified, provide actuators as follows:
1. UL Listed Standard 873 and Canadian Standards association Class 481302 shall certify Actuators.
 2. NEMA 2 rated actuator enclosures are. Use additional weather shield to protect actuator when mounted outside.
 3. 5 year Manufacturers Warranty. Two-year unconditional + Three year product defect from date of installation.
 4. Mechanical spring shall be provided when specified. Capacitors or other non-mechanical forms of fail-safe are not acceptable.
 5. Position indicator device shall be installed and made visible to the exposed side of the Actuator. For damper short shaft mounting, a separate indicator shall be provided to the exposed side of the Actuator.
 6. Overload Protection: Actuators shall provide protection against actuator burnout by using an internal current limiting circuit or digital motor rotation sensing circuit. Circuit shall insure that actuators cannot burn out due to stalled damper or mechanical and electrical paralleling. End switches to deactivate the actuator at the end of rotation are acceptable only for Butterfly Valve actuators.
 7. A push button gearbox release shall be provided for all non-spring actuators.
 8. Modulating actuators shall be 24Vac and consume 10VA power or less.
 9. Conduit connectors are required when specified and when code requires it.
- D. Damper Actuators:
1. If Outside Air and Exhaust Air Damper Actuators in specification drawings are Spring Return, then capacitors or other non-mechanical forms of fail-safe are not acceptable. The actuator mounting arrangement and spring return feature shall permit normally open or normally closed positions of the damper as required.

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2. Economizer Actuators shall utilize Analog control 2-10 VDC, Floating control is not acceptable.
 3. Electric damper actuators (including VAV box actuators) shall be direct shaft mounted and use a V-bolt and toothed V-clamp causing a cold weld effect for positive gripping. Single bolt or setscrew type fasteners are not acceptable.
 4. One electronic actuator shall be direct shaft mounted per damper section. No connecting rods or jackshafts shall be needed. Small outside air and return air economizer dampers may be mechanically linked together if one actuator has sufficient torque to drive both and damper drive shafts are both horizontal installed.
 5. Multi-section dampers with electric actuators shall be arranged so that each damper section operates individually. One electronic actuator shall be direct shaft mounted per damper section. (See below execution section for more installation details.)
- E. Valve Actuators ½" to 6"
1. Non-spring return actuators shall be provided on all actuators for pre-heat coil and actuators for AHU heating or cooling coil.
 2. All zone service actuators shall be non-spring return unless otherwise specified.
 3. The valve actuator shall be capable of providing the minimum torque required for proper valve close off for the required application.
 4. All control valves actuators shall have an attached 3-foot cable for easy installation to a junction box.
 5. Override handle and gearbox release shall be provided for all non-spring return valve actuators.
- F. Control Valves ½" to 6": The BAS contractor shall furnish all specified motorized control valves and actuators. BAS contractor shall furnish all control wiring to actuators. The Mechanical contractor shall install all valves. Equal Percentage control characteristic shall be provided for all water coil control valves. Linear valve characteristic is acceptable for 3-way valves 2½ inch and above.
1. Characterized Control Valves shall be used for hydronic heating or cooling applications and small to medium AHU water coil applications to 100GPM. Actuators are non-spring return for terminal unit coil control unless otherwise noted.
 - a. Leakage is Zero percent, Close-off is 200psi, Maximum differential is 30psi. Rangeability is 500:1.
 - b. Valves 1/2 inch through 2 inches shall be nickel-plated forged

**HVAC INSTRUMENTATION AND CONTROLS
SECTION 230900**

brass or stainless steel body, NPT screw type connections.

- c. Valves 1/2 inch through 1-1/4 inches shall be rated for ANSI Class 600 working pressure. Valves 1-1/2 inch and 2 inches shall be rated for ANSI Class 400 working pressure.
 - d. The operating temperature range shall be 0° to 250° F.
 - e. Stainless steel ball & stem shall be furnished on all modulating valves.
 - f. Seats shall be fiberglass reinforced Teflon.
 - g. Two-way and three-way valves shall have an equal percentage control port. Full stem rotation is required for maximum flow to insure stable BTU control of the coil.
 - h. Three-way valve shall be applicable for both mixing and diverting.
 - i. The characterizing disc is made of TEFZEL and shall be keyed and held secure by a retaining ring.
 - j. The valves shall have a blow out proof stem design.
 - k. The stem packing shall consist of 2 lubricated O-rings designed for on-off or modulating service and require no maintenance.
 - l. The valves shall have an ISO type, 4-bolt flange, for mounting actuator in any orientation parallel or perpendicular to the pipe.
 - m. A non-metallic thermal isolation adapter shall separate valve flange from actuator.
 - n. One fastening screw shall secure the direct coupling of the thermal isolation adapter between the actuator and the valve. This will prevent all lateral or rotational forces from affecting the stem and it's packing O-rings.
2. Globe valves 1/2" to 2" shall be used for steam control or water flow applications.
- a. Valves shall be bronze body, NPT screw type, and shall be rated for ANSI Class 250 working pressure.
 - b. Valves 1/2 inch (DN15) through 2 inches (DN50) with spring return actuators shall close off against 50 psi pressure differential with Class III leakage (.1%).
 - c. The operating temperature range shall be 20° to 280° F.
 - d. Spring loaded TFE packing shall protect against leakage at the stem.

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- e. Two-way valves shall have an equal percentage control port.
 - f. Three-way valves shall a linear control and bypass port.
 - g. Mixing and diverting valves must be installed specific to the valve design.
3. Globe Valve 2 ½ to 6”
- a. Valves 2-1/2 inch (DN65) through 6 inches (DN50) shall be iron body, 125 lb. flanged with Class III (.1%) close-off leakage at 50 psi differential.
 - b. Valves with spring return actuators shall close off against 50 psi pressure differential with Class III leakage (.1%).
 - c. Flow type for two-way valves shall be equal percentage. Flow type for three-way valves shall be linear.
 - d. Mixing and diverting valves must be installed specific to the valve design.

G. Butterfly valves

- 1. Butterfly Valves shall be sized for modulating service at 60-70 degree stem rotation. Isolation valves shall be line-size. Design velocity shall be less than 12 feet per second when used with standard EPDM seats.
 - a. Body is Cast Iron.
 - b. Disc is Aluminum Bronze standard.
 - c. Seat is EPDM Standard.
 - d. Body Pressure is 200 psi, -30F to 275F.
 - e. Flange is ANSI 125/250.
 - f. Media Temperature Range is -22F to 240F.
 - g. Maximum Differential Pressure is 200 psi for 2” to 6” size.

H. Butterfly Valve Industrial Actuators

- 1. Actuators shall be approved under Canadian Standards Association or other Nationally Recognized Testing Laboratory to UL standards. CSA Class 4813 02 or equal. Enclosure shall be NEMA 4 (weatherproof) enclosure and will have an industrial quality coating.
 - a. Actuator shall have a motor rated for continuous duty. The motor shall be fractional horsepower; permanent split capacitor type designed to operate on a 120 VAC, 1 pH, 60 Hz supply. Two adjustable cam actuated end travel limit switches shall be provided

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to control direction of travel. A self-resetting thermal switch shall be imbedded in the motor for overload protection.

- b. Reduction gearing shall be designed to withstand the actual motor stall torque. Gears shall be hardened alloy steel, permanently lubricated. A self-locking gear assembly or a brake shall be supplied.
 - c. Actuator shall have a 3 ft wiring harness provided for ease in field wiring (above 1500 in-lbs). Two adjustable SPDT cam-actuated auxiliary switches, rated at 250 VAC shall be provided for indication of open and closed position. Actuator shall have heater and thermostat to minimize condensation within the actuator housing.
 - d. Actuator shall be equipped with a hand wheel for manual override to permit operation of the valve in the event of electrical power failure or system malfunction. Hand wheel must be permanently attached to the actuator and when in manual operation electrical power to the actuator will be permanently interrupted. The hand wheel will not rotate while the actuator is electrically driven.
 - e. The actuator shall be Analog, floating, or two position as called out in the control sequence of operation. All Analog valves shall be positive positioning, and respond to a 2-10 VDC, 4-20 mA, or adjustable signal as required. Analog actuators shall have a digital control card allowing any voltage input for control and any DC voltage feedback signal for position indication.
2. Performance Verification Test
- a. Control loops shall cause productive actuation with each movement of the actuator and actuators shall modulate at a rate which is stable and responsive. Actuator movement shall not occur before the effects of previous movement have affected the sensor.
 - b. Actuator shall have capability of signaling a trouble alarm when the actuator Stop-Go Ratio exceeds 30%.
3. Actuator Mounting for Damper and Valve arrangements shall comply to the following:
- a. Damper Actuators: Shall not be installed in the air stream
 - b. A weather shield shall be used if actuators are located outside. For Damper Actuators use clear plastic enclosure.
 - c. Damper or valve actuator ambient temperature shall not exceed 122 degrees F through any combination of medium temperature or

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surrounding air. Appropriate air gaps, thermal isolation washers or spacers, standoff legs, or insulation shall be provided as necessary

- d. Actuator cords or conduit shall incorporate a drip leg if condensation is possible. Water shall not be allowed to contact actuator or internal parts. Location of conduits in temperatures dropping below dew point shall be avoided to prevent water from condensing in conduit and running into actuator.
- e. Damper mounting arrangements shall comply to the following:
 - 1. The ventilation subcontractor shall furnish and install damper channel supports and sheet metal collars.
 - 2. No jack shafting of damper sections shall be allowed.
 - 3. Multi-section dampers shall be arranged so that each damper section operates individually. One electronic actuator shall be direct shaft mounted per section.
- f. Size damper sections based on actuator manufacturers specific recommendations for face velocity, differential pressure and damper type. In general:
 - 1. Damper section shall not exceed 24 ft-sq. with face velocity £ 1500 FPM.
 - 2. Damper section shall not exceed 18 ft-sq. with face velocity £ 2500 FPM.
 - 3. Damper section shall not exceed 13 ft-sq. with face velocity £ 3000 FPM.
- g. Multiple section dampers of two or more shall be arranged to allow actuators to be direct shaft mounted on the outside of the duct.
- h. Multiple section dampers of three or more sections wide shall be arranged with a 3-sided vertical channel (8'' wide by 6'' deep) within the duct or fan housing and between adjacent damper sections. Vertical channel shall be anchored at the top and bottom to the fan housing or building structure for support. The sides of each damper frame shall be connected to the channels. Holes in the channel shall allow damper drive blade shafts to pass through channel for direct shaft mounting of actuators. Open side of channel shall be faced down stream of the airflow, except for exhaust air dampers.
- i. Multiple section dampers to be mounted flush within a wall or housing opening shall receive either vertical channel supports as described above or sheet metal standout collars. Sheet metal collars (12'' minimum) shall bring each damper section out of the wall to

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allow direct shaft mounting of the actuator on the side of the collar.

4. Valve Sizing for Water Coil
 - a. On/Off Control Valves shall be line size.
 - b. Modulating Control Valve Body Size may be reduced at most two pipe sizes from the line size or not less than ½ the pipe size. The BAS contractor shall size all water coil control valves for the application as follows:
 1. Booster-heat valves shall be sized not to exceed 4-9psi differential pressure. Size valve for 50% Valve Authority. Valve design pressure drop is equal to the sum of coil drop plus the balance valve drop.
 2. Primary valves shall be sized not to exceed 5-15psi differential pressure. Size valve for 50% Valve Authority. Valve design pressure drop is equal to the sum of coil drop plus the balance valve drop.
 3. Butterfly valves shall be sized for modulating service at 60-70 degree rotation. Design velocity shall be 12 feet per second or less when used with standard EPDM seats.
 - c. Valve Mounting arrangements shall comply to the following:
 1. Unions shall be provided on all ports of two-way and three-way valves.
 2. Install three-way equal percentage Characterized Control valves in a mixing configuration with the “A” port piped to the coil.
 3. Install 2½ inch and above, Three-Way globe valves, as manufactured for mixing or diverting service to the coil.
- I. Approved Manufacturers:
 1. Belimo
 2. or Equal

2.08 ENCLOSURES

- A. All controllers, fused power supplies and labeled terminal strips shall be mounted in enclosures.
- B. Enclosures may be NEMA 1 when located in a clean, dry, indoor environment. Indoor enclosures shall be NEMA 12 when installed in other than a clean environment. Outdoor enclosures must be either NEMA 3R or NEMA 4.
- C. Provide laminated plastic nameplates for all enclosures in any mechanical room or electrical room labeled with TCP number. Laminated plastic shall be 1/8” thick

sized appropriately to make label easy to read.

2.09 DIFFERENTIAL PRESSURE TRANSMITTER

A. WET MEDIA

1. Sensor shall have multiple range models available.
2. Sensor shall have provision for zeroing.
3. Sensor shall be available in outputs of 0-5v, 0-10v, and 4-20ma.
4. Sensor shall operate from 24vdc or 24vac. (AC power applies to operation in voltage mode only)
5. Sensor accuracy shall be +/-1% FS combined linearity, hysteresis, and Repeatability or better.

Approved Manufacturers:

1. Veris
2. Setra
3. or Equal

B. DRY MEDIA

1. Sensor shall have multiple range models available.
2. Sensor shall have provision for zeroing.
3. Sensor shall be available in outputs of 0-5v, 0-10v, and 4-20ma.
4. Sensor shall be available in unidirectional or bi-directional models.
5. Sensor shall have barb fittings.
6. Sensor shall operate from 24vdc or 24vac. (AC power applies to operation in voltage mode only)
7. Sensor accuracy shall be +/-1% FS selected range or better.

Approved Manufacturers:

- a. Veris
- b. Setra
- c. or Equal

2.10 CURRENT SWITCH STATUS

- A. The current switch (CS) shall be utilized for monitoring motor operation. Switch set point shall be fixed so that a contact closure is made any time the motor is operating within a range of .75-200 amps. Induced current from the motor power feed shall power CS; shall be a self gripping split-core type with optional mounting feet bracket; shall be isolated to 600 VAC rms; shall have an adjustable mounting bracket for installation flexibility. Output shall be N.O., Solid State, 1.0 A @ 30 VAC/DC with a minimum aperture of 0.52"X0.68" for motor power feed.

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B. Motor Status: The contractor shall provide and install a Current Sensing switch on any motor required to have motor status with a current switch. One phase of the motor power feed shall be routed through the aperture of the current sensing switch. The current switch must be listed by the manufacturer for use for with VFDs if the motor has a VFD.

C. Approved Manufacturers:

1. Veris
2. or Equal

2.11 CURRENT SENSOR

A. The current sensor (CS) shall be utilized for monitoring load operation. Sensor shall provide an analog signal corresponding to voltage). Low motor amps resulting from low loading or belt failure shall initiate an alarm in the control programming. The Current Sensor shall be loop (2 wire) powered from a power supply or control system. The Current Sensor shall have an slide switch for amp range selection with the choices of 0-30,0-60,0-120 Amps; shall be isolated to 600 VAC rms; Output shall be 4-20mA minimum aperture of 1.10" X .90" for load power feed; shall be split core with self gripping iris and optional drill mount bracket.

B. Motor Status: The contractor shall provide and install a Current Sensor on any motor required to have motor status with a current sensor. The split core current sensor shall clamp around one phase of the motor power feed. The contractor shall use the control system to interpret the signal from the sensor and show proof of flow only when the fan or pump is operating normally. The current sensor must be listed by the manufacturer for use for with VFDs if the motor has a VFD.

C. Approved Manufacturers:

1. Veris
2. or Equal

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence.

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- B. Notify the owners' representative in writing of conditions detrimental to the proper and timely completion of the work.
- C. Do not begin work until all unsatisfactory conditions are resolved.

3.02 **INSTALLATION (GENERAL)**

- A. Install in accordance with manufacturer's instructions.
- B. Provide all miscellaneous devices, hardware, software, interconnections installation and programming required to ensure a complete operating system in accordance with the control drawings.

3.03 **LOCATION AND INSTALLATION OF COMPONENTS**

- A. Locate and install components for easy accessibility as shown on specification drawings; in general, mount 48 inches above floor with minimum 3'-0" clear access space in front of units.
- B. All instruments, switches, transmitters, etc., shall be suitably wired and mounted to protect them from vibration, moisture and high or low temperatures.
- C. Identify all equipment and panels. Provide permanently mounted tags for all panels with the exception of terminal unit box controls.
- D. Provide stainless steel thermowells suitable for respective application and for installation under other sections—sized to suit pipe diameter without restricting flow.

3.04 **INTERLOCKING AND CONTROL WIRING**

- A. Provide all interlock and control wiring. All wiring shall be installed neatly and professionally, in accordance with Specification Division 16 and all national, state and local electrical codes.
- B. Provide wiring as required by functions as specified and as recommended by equipment manufacturers, to serve specified control functions. Provide shielded low capacitance wire for all communications trunks.
- C. Control wiring shall not be installed in power circuit raceways. Magnetic starters and disconnect switches shall not be used as junction boxes. Provide auxiliary junction boxes as required. Coordinate location and arrangement of all control equipment with the owner's representative prior to rough-in.
- D. Provide auxiliary pilot duty relays on motor starters as required for control function.

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- E. Provide power for all control components from nearest electrical control panel or as indicated on the specification drawings—coordinate with electrical contractor.
- F. All control wiring in the mechanical, electrical, telephone and boiler rooms to be installed in raceways. All other wiring to be installed neatly and inconspicuously per local code requirements. If local code allows, control wiring above accessible ceiling spaces may be run with plenum rated cable (without conduit).

3.05 DDC OBJECT TYPE SUMMARY

- A. Provide all database generation.
- B. Displays
 - 1. System displays shall show all analog and binary object types within the system. Provide outside air temperature indication on all system displays associated with economizer cycles.
- C. Run Time Totalization
 - 1. At a minimum, run time totalization shall be incorporated for each monitored supply fan, return fan, exhaust fan, hot water and chilled water pumps. Warning limits for each point shall be entered for alarm and or maintenance purposes.
- D. Trendlog
 - 1. All binary and analog object types (including zones) shall have the capability to be automatically trended, but trend log setup is not necessary unless specified in the control drawings.
- E. Alarm
 - 1. All analog inputs (High/Low Limits) and selected binary input alarm points shall have the capability to be prioritized and routed (locally or remotely) with alarm messages. Alarm setup is not necessary unless specified in the control drawings.
- F. Database Save
 - 1. Provide back-up database for all stand-alone application controllers on disk.

3.06 FIELD SERVICES

- A. Prepare and start logic control system under provisions of this section.
- B. Start-up and commission systems. Test general operation of equipment and document by printing equipment summary screens that show the heating and cooling attained temperatures.

**HVAC INSTRUMENTATION AND CONTROLS
SECTION 230900**

3.07 AS BUILT DOCUMENTATION REQUIRED

- A. As-built documentation is required at the completion of the project and must include operations and maintenance manuals with technical documentation and as-built drawings in a tabbed binder divided into categories.

3.08 TRAINING

- A. Provide application engineer to instruct owner in operation of systems and equipment.
- B. Provide system operator's training to include (but not limited to) such items as the following: modification of basic data displays, alarm and status descriptors, requesting data, execution of commands and request of logs. Provide this training to a minimum of 2 persons.
- C. Provide on-site training above as required, up to 16 hours as part of this contract.

3.09 DEMONSTRATION

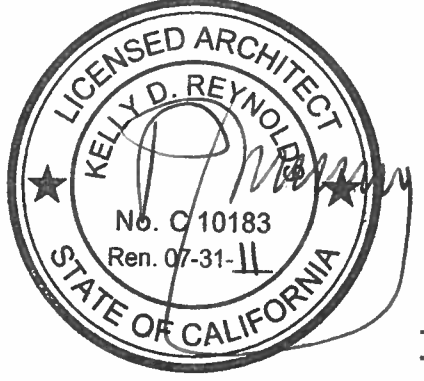
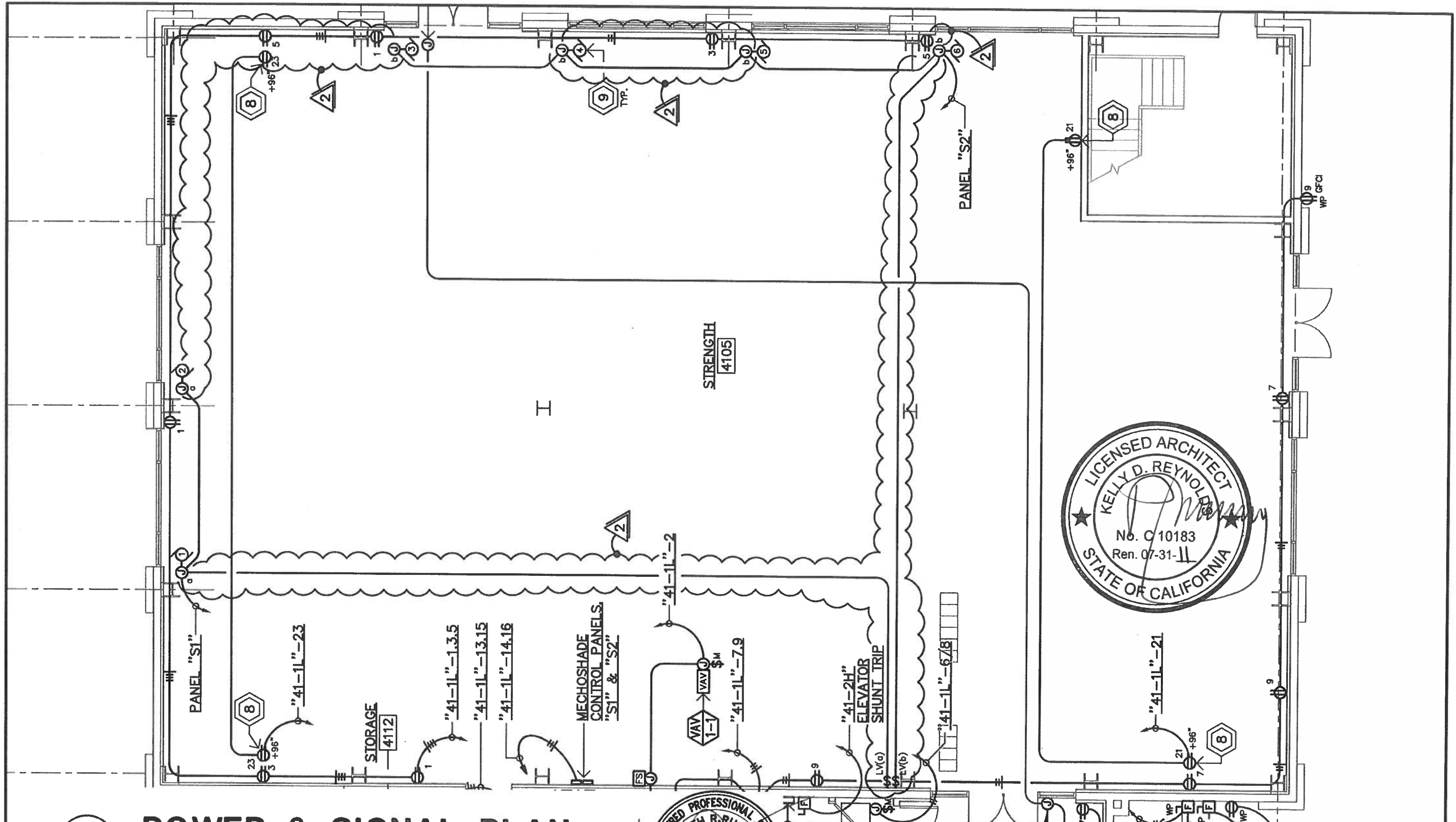
- A. Provide equipment summary screens / start-up report that show the heating and cooling attained temperatures and the equipment is operating correctly.

PART 4 - SEQUENCE OF OPERATIONS

4.01 GENERAL

- A. Provide a complete and operational temperature control and building automation system based on the following points and sequence of operation in the specification drawings. The system shall be complete as to sequences and standard control practices.
- B. BACnet Object List
 - 1. The following points as defined for each piece of equipment are designated as follows:
 - a. Binary Out (BO) - Defined as any two-state output (start/stop) (enable/disable), etc.
 - b. Binary In (BI) - Defined as any two-state input (alarm, status), etc.
 - c. Analog In (AI) - Defined as any variable input (temperature) (position), etc.
 - d. Analog Out (AO) - Defined as any electrical variable output. 0–20mA, 4–20mA and 0–10VDC are the only acceptable analog outputs. The driver for analog outputs must come from both hardware and software resident in the controllers. Transducers will not be acceptable under any circumstance.

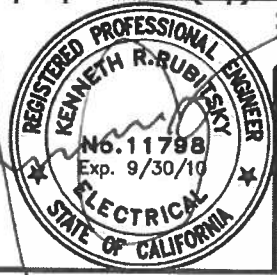
END OF SECTION



1
E2.1

POWER & SIGNAL PLAN - FIRST FLOOR

SCALE: 1/8" = 1'-0"

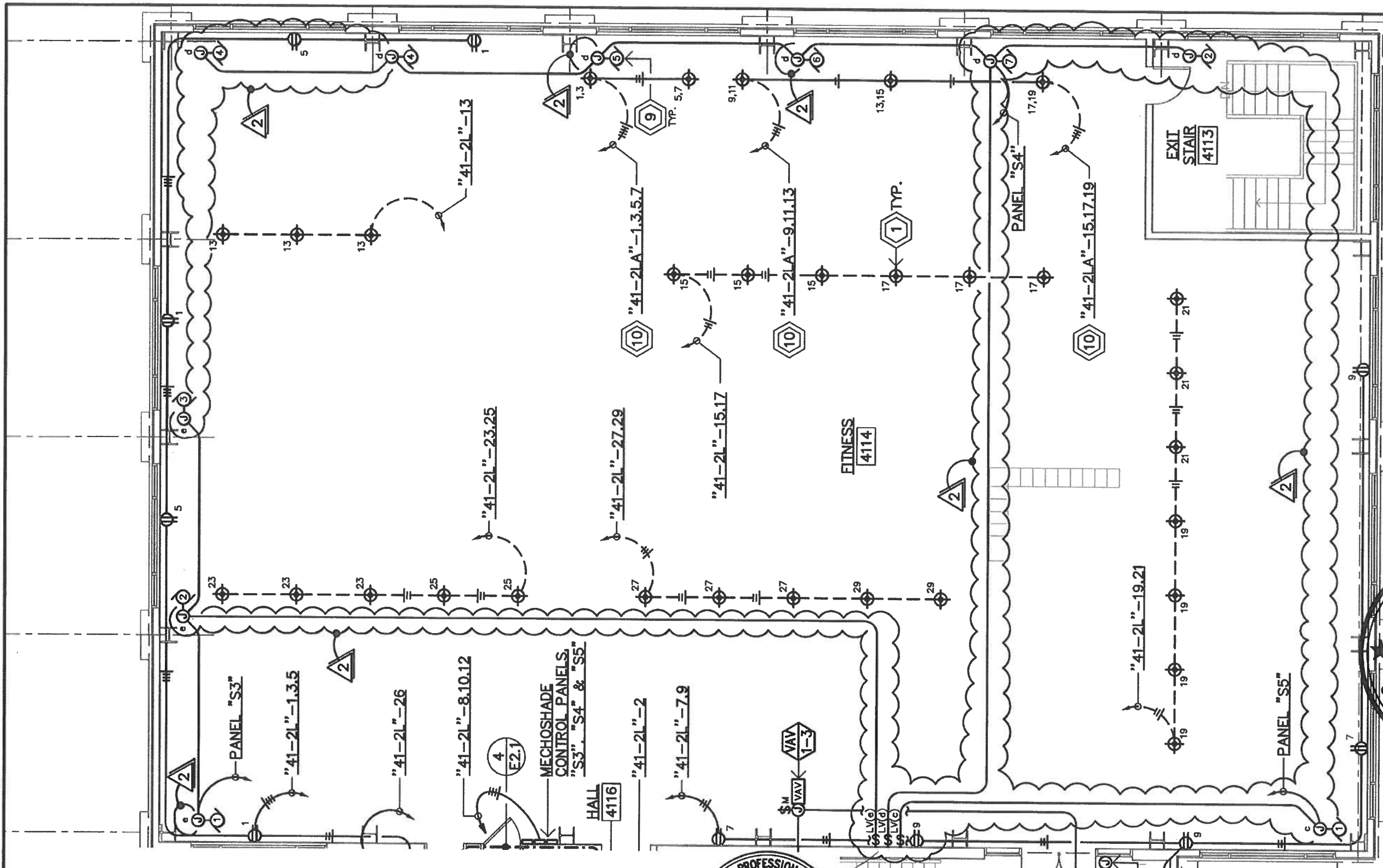


**STAFFORD
KING
WIESE
ARCHITECTS**

POWER & SIGNAL 1ST FLOOR
CHABOT COLLEGE PE COMPLEX
ADDITION - BUILDING 4100

CHABOT LAS POSITAS COMMUNITY COLLEGE DISTRICT
25555 HESPERIAN BLVD.
HAYWARD, CA 94545

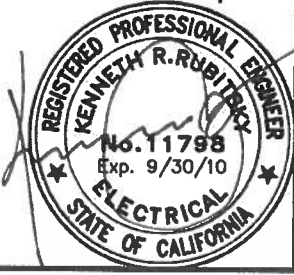
AGENCY APPLICATION # DSA App. # 01-110446	
JOB NO. 8179	DRAWING NO.
DATE 02/08/2010	AD.158
DRAWN BY BS	(REF. E2.1)
CHECKED WJ	ADDENDUM NO. 2



2
E2.1

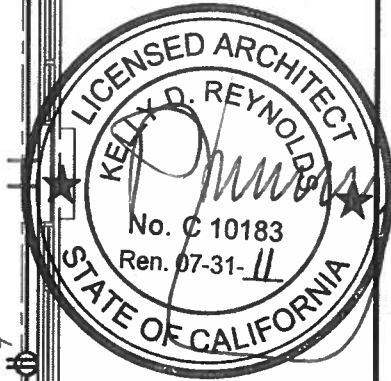
POWER & SIGNAL PLAN - SECOND FLOOR

SCALE: 1/8" = 1'-0"



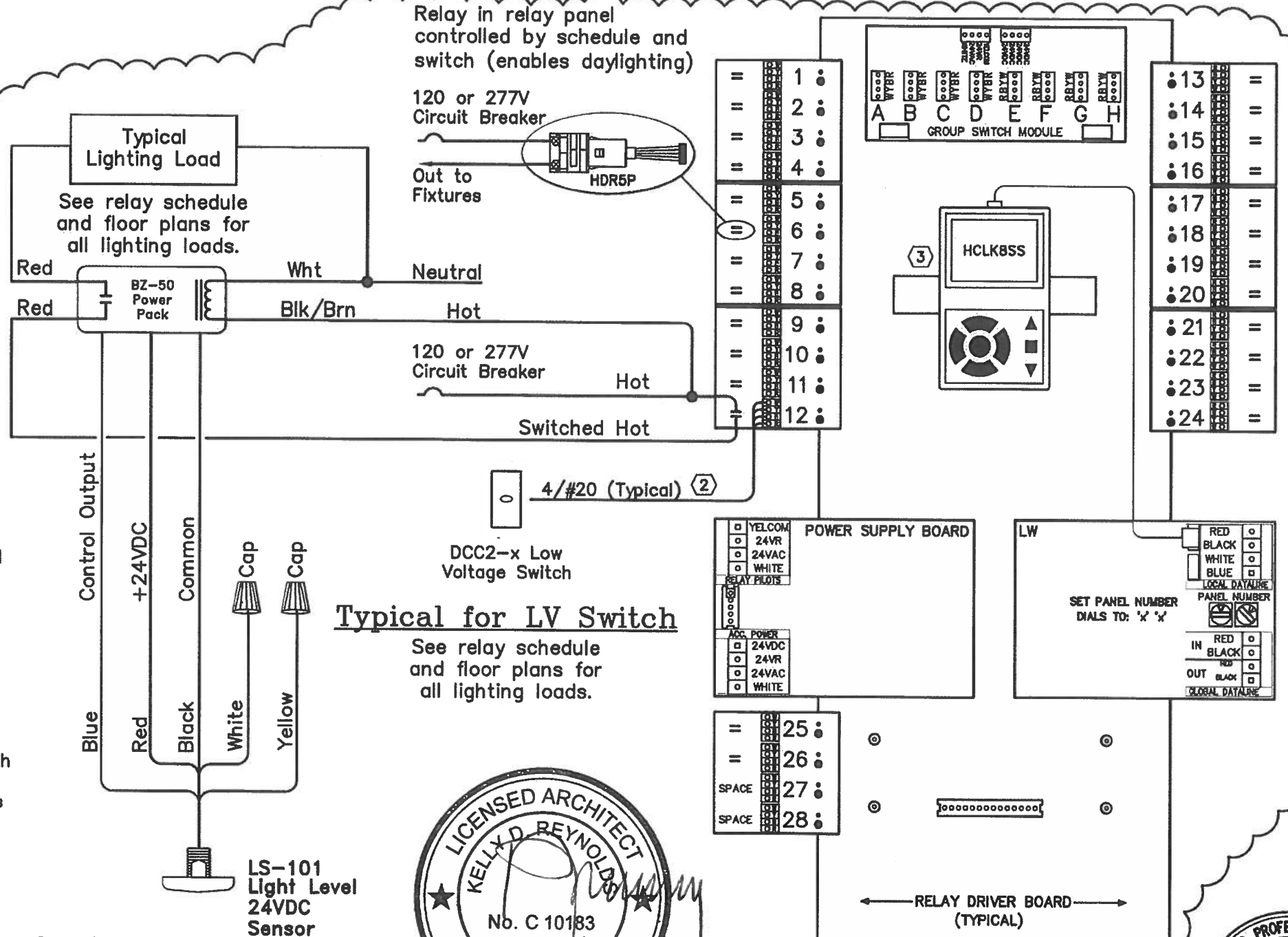
**STAFFORD
KING
WIESE
ARCHITECTS**

POWER & SIGNAL 2ND FLOOR
CHABOT COLLEGE PE COMPLEX
ADDITION - BUILDING 4100
CHABOT LAS POSITAS COMMUNITY COLLEGE DISTRICT
25555 HESPERIAN BLVD.
HAYWARD, CA 94545



AGENCY APPLICATION # DSA App. # 01-110446	
JOB NO. 8179	DRAWING NO.
DATE 02/08/2010	AD.159
DRAWN BY BS	(REF. E2.1)
CHECKED BY WJ	ADDENDUM NO. 2

2



Notes:

- ① The maximum length of a local Dataline from each LI Panel with an Automation card is (1500ft) using free topology without a repeater and (8000ft) using linear topology.
- ② Maximum 1000 feet with #20 AWG wire. Additional switches controlling the same zone can be connected in the field or at the relay panel terminals.
- ③ The Network Clock (HCLK8SS) and the Photocell Controller (HPCU8SS) can be located in any panel with enough space on the low voltage din-rail (8-relay panels can hold one device, 24- and 48-relay panels can hold two).

Watt Stopper/Legrand 800-879-8585			
Title Typical 48-relay Capacity Lighting Integrator Panel Automation Level			
Scale	Drawing#	Date	Rev.
None	60-952-1	02/08/10	1

Operation:
LS-101 turns power pack ON/OFF based on light level.

Typical for DS



3
E3.1

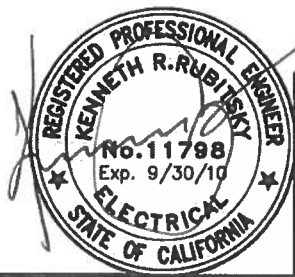
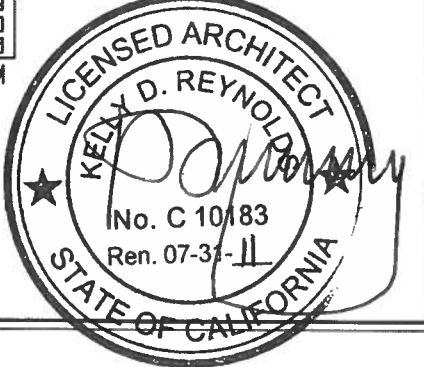
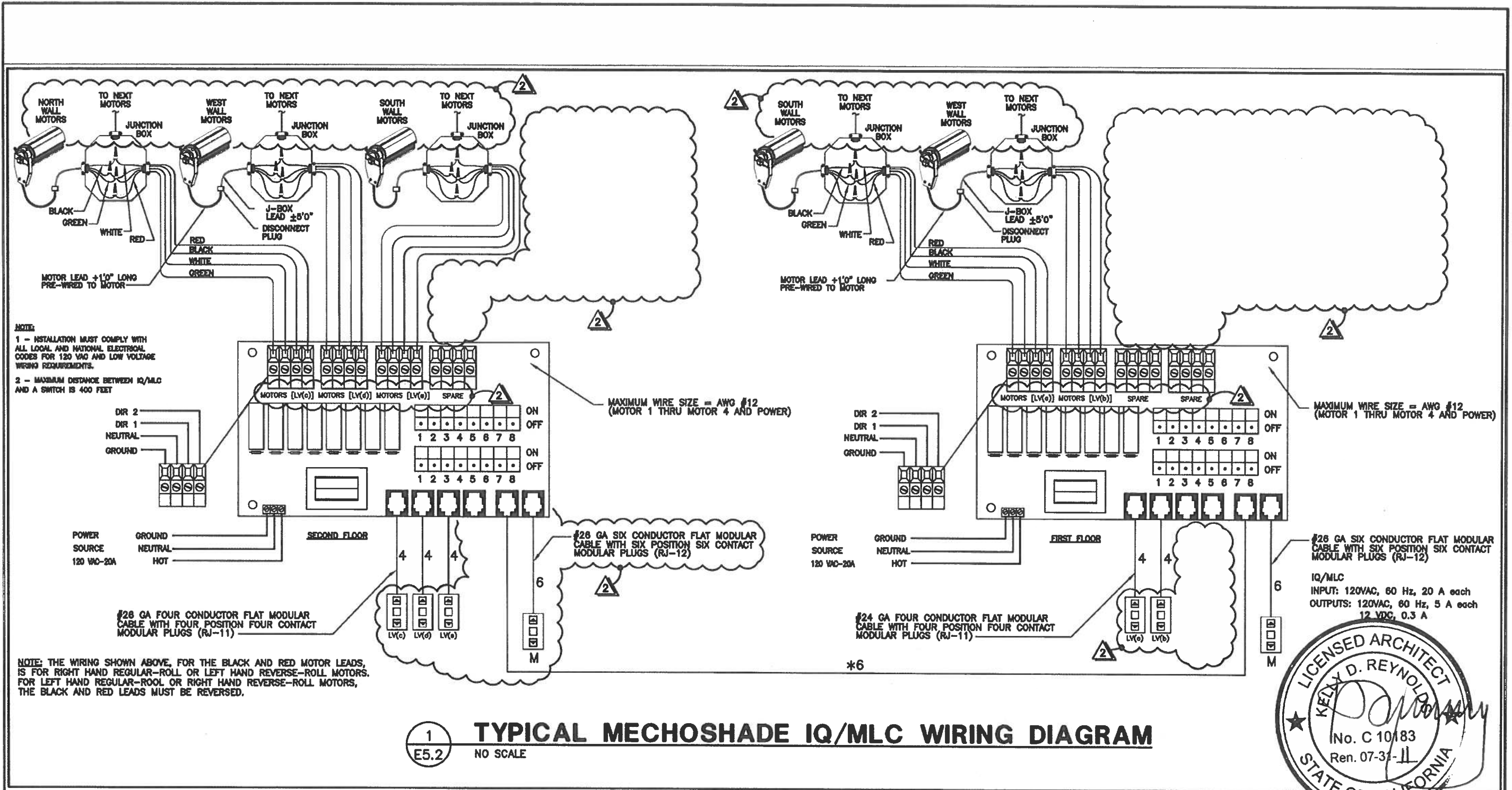
LIGHTING INTEGRATOR 48-RELAY CAPACITY PANEL

NO SCALE

**STAFFORD
KING
WIESE
ARCHITECTS**

LIGHTING INTEGRATOR DETAIL
CHABOT COLLEGE PE COMPLEX
ADDITION - BUILDING 4100
CHABOT LAS POSITAS COMMUNITY COLLEGE DISTRICT
25555 HESPERIAN BLVD.
HAYWARD, CA 94545

AGENCY APPLICATION # DSA App. # 01-110446	DRAWING NO.
JOB NO. 8179	AD.160
DATE 02/08/2010	(REF. E3.1)
DRAWN BY BS	ADDENDUM NO. 2
CHECKED WJ	



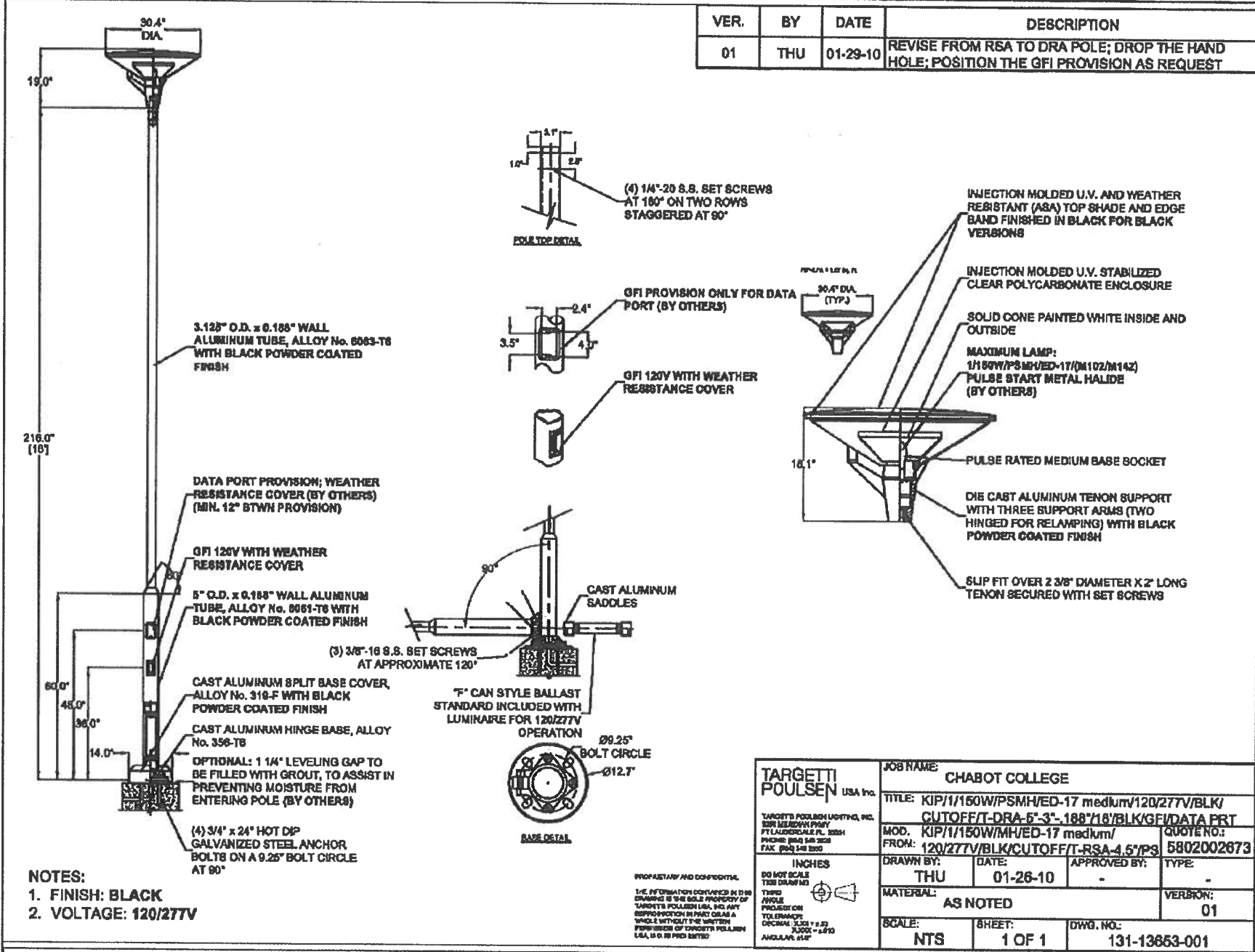
STAFFORD KING WIESE ARCHITECTS

ELECTRICAL DETAILS
CHABOT COLLEGE PE COMPLEX ADDITION - BUILDING 4100
 CHABOT LAS POSITAS COMMUNITY COLLEGE DISTRICT
 25555 HESPERIAN BLVD.
 HAYWARD, CA 94545

AGENCY APPLICATION # DSA App. # 01-110446	DRAWING NO.
JOB NO. 8179	AD.161
DATE 02/08/2010	(REF. E5.2)
DRAWN BY BS	ADDENDUM NO. 2
CHECKED WJ	

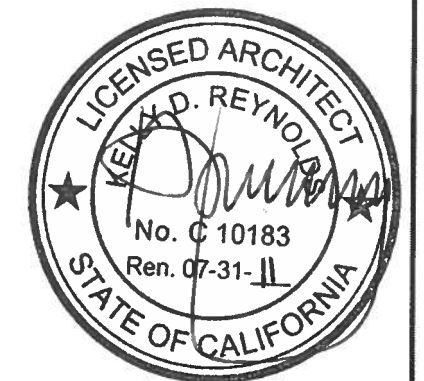
2

VER.	BY	DATE	DESCRIPTION
01	THU	01-29-10	REVISE FROM RSA TO DRA POLE; DROP THE HAND HOLE; POSITION THE GFI PROVISION AS REQUEST



NOTES:
 1. FINISH: BLACK
 2. VOLTAGE: 120/277V

TARGETTI POULSEN USA Inc. <small>TARGETTI'S POULSEN LIGHTING, INC. 5000 MERRIDEN PARK FT LAUDERDALE, FL 33309 PHONE: (954) 548-2028 FAX: (954) 548-2025</small>	JOB NAME: CHABOT COLLEGE	
	TITLE: KIP/1/150W/PSMH/ED-17 medium/120/277V/BLK/CUTOFF/T-DRA-6-3"-188"18/BLK/GFI/DATE PRT	
MOD: KIP/1/150W/PSMH/ED-17 medium/	QUOTE NO.: 5802002673	FROM: 120/277V/BLK/CUTOFF/T-RSA-4.5"/PS
DRAWN BY: THU	DATE: 01-26-10	APPROVED BY: -
MATERIAL: AS NOTED	VERSION: 01	
SCALE: NTS	SHEET: 1 OF 1	DWG. NO.: 131-13653-001



10 **FIXTURE "S4R" LIGHT POLE DETAIL**
 E5.2 NO SCALE

STAFFORD KING WIESE ARCHITECTS

ELECTRICAL DETAILS
 CHABOT COLLEGE PE COMPLEX ADDITION - BUILDING 4100
 CHABOT LAS POSITAS COMMUNITY COLLEGE DISTRICT
 25555 HESPERIAN BLVD.
 HAYWARD, CA 94545

AGENCY APPLICATION # DSA App. # 01-110446	
JOB NO. 8179	DRAWING NO. AD.162 (REF. E5.2)
DATE 02/08/2010	ADDENDUM NO. 2
DRAWN BY BS	
CHECKED WJ	