RANCHO SANTIAGO COMMUNITY COLLEGE DISTRICT

ADDENDUM NO. 01

Bid #1504 Computer Lab Upgrade in H229 Project
at
Santiago Canyon College

Address: 8045 East Chapman Avenue, Orange, CA 92869

Project ID #FMR25-86

August 20, 2026

Owner:
Rancho Santiago Community College District
2323 North Broadway, Room 112
Santa Ana, California 92706

RECEIPT OF THIS ADDENDUM MUST BE ACKNOWLEDGED ON BID FORM WHEN SUBMITTED

The following changes, additions, deletions or corrections shall become a part of the Contract Documents for the project named on the previous page and all other conditions shall remain the same. The Bidders shall be responsible for transmitting this information to all affected Subcontractors and Suppliers, prior to the closing of Bids. Prospective Bidders shall acknowledge receipt of all Addenda in the space provided on the Bid Proposal Form by the number (list every addenda). Failure to do so shall deem the Bid Proposal as non-responsive and subject the Bidder to disqualification.

Item No. AD 1-1 Submittal of Bid Proposals Due Date Extension (revision in red)

Submittal of Bid Proposals. All Bid Proposals must be submitted on forms furnished by the District prior to **2:00 P.M., ~~Tuesday, September 1, 2026~~ Tuesday, September 8, 2026**, the last time for submission of Bid Proposals and the District's public opening and reading of Bid Proposals. Submit Bids to RSCCD Facility Planning, Construction and District Support Services at 2323 North Broadway, Suite 112, Santa Ana, CA 92706. Bidders are solely responsible for timely submission of Bid Proposals to the District at the designated location. The District shall not be responsible for any delays or issues with mail delivery. Any bid received after the scheduled closing time for receipt of bids shall be returned to the bidder unopened. Bid Summary will be posted on the District's website (https://www.rsccd.edu/bids).

Item No. AD 1-2 Updated Drawings and Specifications – OFCI Clarification

The drawings and specifications identified in **Attachment No. 1** have been revised to clarify Owner-Furnished Contractor-Installed (OFCI) requirements. Refer to **Attachment No. 1 – Updated Drawings and Specifications** for the complete list of revisions.

Item No. AD 1-3 Responses to Questions

The following provides a response to the Bidder's Request for Pre-Bid Information submitted on the Pre-Bid Clarification Form. See attached for a total of (2) RFI Response(s).

Enclosure: One (1) Attachment No. 1 – Updated Drawings and Specifications

Two (2) Pre-Bid Clarification Form Responses

This is the end of Addendum No.1

PRE-BID CLARIFICATION FORM

(Email this completed form to FacilitiesBid@rsccd.edu. See Instructions to Bidders.)

PROJECT NAME:	Computer Lab Upgrade in H229 Project at Santiago Canyon College		
PROJECT NUMBER:	FMR25-86	BID NUMBER:	1504
EMAIL TO: facilitiesbid@rsccd.edu			
DATE:	08/07/2026		
FROM:	NM Building Group	EMAIL:	chris@nmbuildinggroup.com
SPEC SECTION:	01 11 00	DRAWING NUMBER:	G-001, A-201, A-202

REQUESTED CLARIFICATION:

RFI-01 - Project Room Number (H229 vs. Room 207)

The bid documents identify the project as the "Computer Lab Upgrade in H229 Project at Santiago Canyon College." Specification Section 01 11 00 identifies the work location as Humanities Building Room 207 and describes Room 207 as an approximately 1,140 SF computer lab. Drawing G-001 and the floor plans also identify Classroom 207 as the project area.

Please confirm:
1. Is the entire project scope limited to Humanities Building Room 207 as shown on the drawings?
2. Does "H229" refer only to the project designation/title, or is Room H229 also intended to be included in the construction scope?
3. If Room H229 is part of the work, please issue revised drawings and specifications defining the additional scope.

RESPONSE TO CLARIFICATION:

IDS Responses:

1) No, IDS attachment 1 - updated Drawings and Specifications revised the room to Humanities Building Room 229, Rm 207, was a typo.

2) Room H229 is also intended to be included in the construction scope.

3) Scope of work is entirely within Humanities Bldg Room 229, IDS attachment 1 - updated Drawings and Specifications clarifies this.

Attach additional numbered sheets as necessary; however, only one (1) request shall be contained on each submitted form.

END OF DOCUMENT

PRE-BID CLARIFICATION FORM

(Email this completed form to FacilitiesBid@rsccd.edu. See Instructions to Bidders.)

PROJECT NAME:	Computer Lab Upgrade in H229 Project at Santiago Canyon College		
PROJECT NUMBER:	FMR25-86	BID NUMBER:	1504
EMAIL TO: facilitiesbid@rsccd.edu			
DATE:	08/07/2026		
FROM:	NM Building Group	EMAIL:	chris@nmbuildinggroup.com
SPEC SECTION:	01 21 00	DRAWING NUMBER:	N/A

REQUESTED CLARIFICATION:

RFI-03 - District Allowance Amount and Bid Treatment

Specification Section 01 21 00 states that allowances listed in the Specifications are to be included in the Base Bid and separately identified in the Schedule of Values and Application for Payment. The Schedule of Allowances identifies the amount as "TBD" for unforeseen electrical, low-voltage, and structural existing conditions.

Please confirm:
1. What dollar amount, if any, shall bidders include for this allowance?
2. Is the allowance to be included in the submitted Base Bid?
3. If the District intends to establish the allowance after bid opening, please confirm bidders should exclude the allowance from the submitted Base Bid.
4. Please confirm whether contractor overhead and markup are included within the allowance amount or applied only when an authorized allowance expenditure is made.

RESPONSE TO CLARIFICATION:

1. The allowance amount will be identified following the receipt and evaluation of bids.

2. Allowance is not to be included in the submitted Base Bid.

3. Refer to Responses No. 1 and No. 2 above.

4. Contractor will apply the markup when an authorized allowance expenditure is provided.

RSCCD Response on 8/17/26

Attach additional numbered sheets as necessary; however, only one (1) request shall be contained on each submitted form.

END OF DOCUMENT

Attachment No. 1 - Updated Drawings and Specifications

Revisions to Specification 274116 "Integrated Audio Video Systems and Equipment":

General Revisions:

1. Revised reference "NEC" National Electric Code to "CEC" California Electric Code throughout specification

Specific Revisions

1. Revised Paragraph 1.1.D: Eliminated Division 10 from list of related sections.
2. Revised Paragraph 1.4.B.2: Revised three button manual controls for screen to Extron Touch Panel.
3. Revised Paragraph 1.4.B.8: Added "keyboard, mouse" to OFCI equipment.
4. Revised Paragraph 1.5.D.1.g.4): Deleted "TV Mount" and added "Ceiling Speaker Mount".
5. Revised Paragraph 1.5.E.1: Added "ceiling speaker baffle and/or grill".
6. Revised Table 2.2 completely to coordinate with AV Drawing requirements.

Revisions to Drawings:

1. Revised E-001:
   a. Revised "Signal" Symbols for AV Equipment to coordinate with floor plans and schematics.
   b. Added symbol "AVD and associated requirements.
   c. Added part number requirements for "SPD"
2. Revised E-101:
   a. Revised symbols for ceiling projectors; typical for Detail 3.
3. Revised AV-101:
   a. Revised symbols for ceiling projectors; typical for Details 1,2.
   b. Revised symbols for equipment at Lectern; typical for Detail 1.
4. Revised AV-102:
   c. Added symbols for equipment to coordinate with specifications; typical for Detail 1.
   d. Added (CFCI) AVD box to schematic; typical for Detail 1.
   e. Revised Video Projector to CFCI; typical for Detail 1.
   f. Revised requirements for SPD to rack mounted.
   g. Revised Detail 2 to eliminate duplicate ceiling speaker requirements.

H229 PROJECTOR AT SANTIAGO CANYON COLLEGE

8045 EAST CHAPMAN AVENUE, ORANGE, CA 92868

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
A.G.	ACCESSORY GROUP
A.D.	ACCESS DOOR
ACOUS	ACOUSTICAL
ACT.	ACOUSTICAL TILE
ADD	ADDENDUM
ADJ	ADJACENT
A.C.	AIR CONDITION
ALT	ALTERNATE
ALUM	ALUMINUM
A.B.	ANCHOR BOLT
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
AD	AREA DRAIN
AUTO	AUTOMATIC
ASL	ABOVE SEA LEVEL
B.E.J.	BRICK EXPANSION JOINT
BSMT	BASEMENT
B.T.	BATH TUB
BM	BEAM
BRG	BEARING
B.M.	BENCH MARK
BET	BETWEEN
BIT	BITUMINOUS
BLK	BLOCK
BLKG	BLOCKING
BD	BOARD
BS	BOTH SIDES
BOT	BOTTOM
BRK	BRICK
B.C.	BRICK COURSE
BLDG	BUILDING
BUR	BUILT-UP ROOFING
B.O.	BY OWNER
CAB	CABINET
C.H.	CABINET HEATER
CHNL	CHANNEL
C.O.	CLEAN OUT
C.O.	CLEAN OUT
CO2	CARBON DIOXIDE
CARP.	CARPET
C.W.	CASEWORK
C.I.	CAST IRON
C.B.	CATCH BASIN
CEM	CEMENT
CM	CENTIMETER
CT	CERAMIC TILE
CHBD	CHALK BOARD
CLG.	CEILING
CLR	CLEAR
COL	COLUMN
CONC.	CONCRETE
CMU	CONCRETE MASONRY UNIT
COND	CONDUCTIVE
C.S.V	CONDUCTIVE SHEET VINYL
CONT.	CONTINUOUS
CLL	CONTRACT LIMIT LINE
CONTR	CONTRACTOR
C.J	CONTROL JOINT
CONV	CONVECTOR
C.G.	CORNER GUARD
CORR	CORRIDOR
C.S.	COUNTER SINK
CRS	COURSE
C.R.	CURTAIN ROD
C.R.-1	CRASH RAIL
DEM	DEMOLISH/DEMOLITION
DET.	DETAIL
DIAG	DIAGONAL
DIA.	DIAMETER
DIFF.	DIFFUSER
DIM.	DIMENSION
DISP.	DISPENSER
DO	DITTO
DR	DOOR
DBL	DOUBLE
DN	DOWN
DS	DOWNSPOUT
DWG.	DRAWING
D.F.	DRINKING FOUNTAIN
EA	EACH
ELEC.	ELECTRICAL
ELEC. CAB	ELECTRIC CABINET
EPNL	ELECTRIC PANEL
EWC	ELECTRIC WATER COOLER
EL	ELEVATION
ELEV.	ELEVATOR
EQ	EQUAL
E.O.	EQUIPMENT BY OWNER
EX	EQUIPMENT, X-RAY
EX.F	EXHAUST FAN
(E)	EXISTING
EXP. JT.	EXPANSION JOINT
EXP'D	EXPOSED
EXT	EXTERIOR
E.I.F.S.	EXTERIOR INSULATION & FINISH SYSTEM
FB	FACE BRICK
F.C.U.	FAN COIL UNIT
F.D.C.	FIRE DEPARTMENT CONNECTIONS
F.N.V.	FEM. NAPKIN VENDOR
FIN.RAD.	FIN TUBE RADIATION
FIN	FINISH
F.A.	FIRE ALARM
FEC	FIRE EXTINGUISHER CAB
FHC	FIRE HOSE CABINET
F.H.	FIRE HYDRANT
F.P.	FIRE PROOFING
FHMS	FLAT HEAD MACH.SCREW
FHWS	FLAT HEAD WOOD SCREW
FL.	FLOOR
F.D.	FLOOR DRAIN
FR	FRAME
F.S.	FINISH SLAB
FT	FOOT
FTG	FOOTING
FDTN	FOUNDATION
FUR	FURRING
FUR. CH.	FURRING CHANNEL/S
F.W.	FULL WIDTH
F.W.C.	FABRIC WALL COVERING
GAL	GALLON
GALV.	GALVANIZED
GI	GALVANIZED IRON
GA	GAGE
G.C.	GENERAL CONTRACT
GL	GLASS
G.B.	GRAB BAR
GSF	GROSS SQUARE FEET
G.W.B.	GYPSUM WALL BOARD
HR-1	HANDRAIL
HDNR	HARDENER
HDW	HARDWARE
HD.WD.	HARDWOOD
HTR	HEATER
HTG	HEATING
HVAC	HEATING, VENTILATION & AIR CONDITIONING
HT	HEIGHT
HC	HOLLOW CORE
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HB	HOSE BIBB
H.C.	HOSE CABINET
H.C.U.	HOSPITAL CASEWORK UNIT
H.C.T.	HOSPITAL CUBICAL TRACK
H.PL.	HOT PLATE
H.P.L.	HIGH PRESSURE PLASTIC LAMINATE
H.W.	HOT WATER
HR	HOUR
INCIN.	INCINERATOR
I.D.	INSIDE DIAMETER
INSUL.	INSULATE(D)(ION)
INS. GL	INSULATED GLASS
INT	INTERIOR
IV	INTRAVENOUS
INV	INVERT
JAN	JANITOR
JT	JOINT
KIT	KITCHEN
KO	KNOCK OUT
L.C.	LABORATORY CASEWORK
LEV	LOW EMISSION VEHICLE
LAM	LAMINATED
LAV.	LAVATORY
L.GL.	LEADED GLASS
LH	LEFT HAND
LGT	LENGTH
LT	LIGHT
LT.P	LIGHT PANEL
LTWT	LIGHT WEIGHT
L.F.	LINEAR FEET
LTL	LINTEL
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LVR	LOUVER
L.P.	LOW POINT
MACH	MACHINE
M.H.	MANHOLE
MFR	MANUFACTURER
MARB	MARBLE
MAS	MASONRY
M.O.	MASONRY OPENING
MATL	MATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MC	MEDICINE CABINET
MEMB	MEMBRANE
MET	METAL
MTD	MOUNTED
M.T.P.	METAL TOILET PARTITION
MET. TM	METAL TRIM
M.W.U.	MILLWORK UNIT
MIN.	MINIMUM
MISC.	MISCELLANEOUS
MOD	MODULAR
M.H.	MOP HOPPER
MOV	MOVABLE
MULL	MULLION
(N)	NEW
NAT	NATURAL
N.L.	NIGHT LIGHT
N2O	NITROUS OXIDE
NRC	NOISE REDUCTION COEIF.
N.I.C.	NOT ON CONTRACT
N.T.S.	NOT TO SCALE
NOM	NOMINAL
NO.	NUMBER
OBS	OBSCURE
O.C.	ON CENTER
OPNG	OPENING
OPP	OPPOSITE
OPH	OPPOSITE HAND
O.D.	OUTSIDE DIAMETER
OHMS	OVAL HEAD MACH. SCREW
OHWS	OVAL HEAD WOOD SCREW
OA	OVERALL
OH	OVERHEAD
O2	OXYGEN
PNT	PAINT(ED)
PNL	PANEL
P.T.D	PAPER TOWEL DISPENSER
P.T.R.	PAPER TOWEL RECEPTACLE
P.BD.	PARTICLE BOARD
PTN	PARTITION
PVMT	PAVEMENT
PG.BD.	PEG BOARD
PLAS.	PLASTER
P.LAM	PLASTIC LAMINATE
PL	PLATE
PL.GL.	PLATE GLASS
PLMB	PLUMBING
PMLD	PREMOLDED
PWD	PLYWOOD
PT	POINT
PPGL	POLISHED PLATE GLASS
PPTGL	POLISHED PLATE TEMPERED GLASS
PPWGL	POLISHED PLATE WIRE GLASS
PVC	POLYVINYL CHLORIDE
PCF	POUNDS PER CU.FT.
PSI	POUNDS PER SQ. INCH
PSF	POUNDS PER SQ.FT.
P.P.	POWER PANEL
PCP	PRECAST CONCRETE PANEL
PRE. FAB.	PREFABRICATED
PREF.	PREFINISHED
PSC	PRE-STRESS CONC.
PROJ	PROJECTION
PL	PROPERTY LINE
PTDF	PRESSURE TREATED DOUGLAS FIR
QTY	QUANTITY
QT	QUARRY TILE
RAD	RADIUS
R.W.L.	RAIN WATER LEADER
RECPT.	RECEPTACLE, ELECTRIC
REC.	RECESS(ED)
RE:	REFER TO
R.C.P.	REFLECTED CEILING PLAN
REFR.	REFRIGERATOR
REG.	REGISTER
REINF.	REINFORCE(D)(ING)
REQ'D	REQUIRED
RES	RESILIENT
R.C.P.	REINF. CONC. PIPE
RET	RETURN
RA	RETURN AIR
RVS	REVERSE
REV	REVISION
RH	RIGHT HAND
ROW	RIGHT OF WAY
R	RISER
RVT	RIVET
R.D.	ROOF DRAIN
RFH	ROOF HATCH
R.V.	ROOF VENT
RFG	ROOFING
RM	ROOM
R.F.S.	ROOM FINISH SCHEDULE
RO	ROOF OPENING
RND	ROUND
RBL	RUBBLE STONE
S.A.M.F.	SELF-ADHERED MEMBRANE FLASHING
SDL	SADDLE
S.N.C.	SAN. NAP. CABINET
S.N.D.	SAN.NAP.DISPOSER
STC	SEALANT
STG	SEATING
SECT.	SECTION
S.S.	SERVICE SINK
S.B.	SHAMPOO BOWL
SHTH	SHEATHING
SHT	SHEET
SH	SHELF, SHELVING
SHR	SHOWER
SIM.	SIMILAR
S	SINK
S.DI.	SOAP DISPENSER
SPKR	SPEAKER
S.F.C.	SPECIAL FLR. COATING
S.W.C.	SPECIAL WALL COATING
S.O.G	SLAB ON GRADE
SPEC.	SPECIFICATIONS
SQ	SQUARE
SST	STAINLESS STEEL
SP	STAND PIPE
STD	STANDARD
STL	STEEL
STER	STERILIZER
SD	STORM DRAIN
S.G.T.	STRUCTURAL GLAZED TILE
STRUCT	STRUCTURAL
SUSP.	SUSPENDED
S.V.	SHEET VINYL
SW	SWITCH
SWBD	SWITCH BOARD
SYM	SYMMETRICAL
T.B.	TACKBOARD
T.P.	TANGENT POINT
TEL	TELEPHONE
TEMP	TEMPERATURE
TEMP. GL.	TEMPERED GLASS
TER.	TERRAZZO
TEX.	TEXTURE
THK	THICK(NESS)
THR	THRESHOLD
T.D.	TISSUE DISPENSER
T	TOILET (FIXTURE)
TPH	TOILET PAPER HOLDER
T&G	TONGUE & GROOVE
T.O.S.	TOP OF STEEL
T.O.B	TOP OF BEAM
T.O.C.	TOP OF COLUMN
T.O.F.	TOP OF FASCIA
T.O.FTG	TOP OF FOOTING
T.O.P.	TOP OF PARAPET
T.O.W.	TOP OF WALL
TB	TOWEL BAR
TYP	TYPICAL
U.C.	UNDERCUT
U/C	UNDER COUNTER
U.C.L.	UNDER COUNTER LIGHT
U.L.	UNDERWRITERS LABORATORIES INC.
UNGND	UNDERGROUND
U.H.	UNIT HEATER
U.V.	UNIT VENTILATOR
U.N.O.	UNLESS NOTED OTHERWISE
UR	URINAL
UPH.	UPHOLSTERY
V.T.R.	VENT THROUGH ROOF
VENT	VENTILATOR
V.I.F.	VERIFY IN FIELD PRIOR TO FABRICATION
VERT	VERTICAL
VEST	VESTIBULE
V.C.T.	VINYL COMPOSITION TILE
V.W.C.	VINYL WALL COVERING
V	VINYL
VT	VINYL TILE
WSCT	WAINSCOT
W	WASTE
WC	WATER CLOSET
W.L.	WATER LINE
WS	WEATHER STRIP
WT	WEIGHT
WWF	WELDED WIRE FABRIC
W.C.D.F.	WHEELCHAIR DRINKING FOUNTAIN
WG	WIRE GLASS
W.M.P.	WIRE MESH PARTITION
W/	WITH
W/O	WITHOUT
WD	WOOD
W.R.B.	WATER-RESISTANT BARRIER (WEATHER-RESISTANT BARRIER)

LEGEND AND SYMBOLS

SYMBOL	DESCRIPTION
N	NORTH ARROW
	WORK POINT, CONTROL POINT, DATUM POINT OR START POINT FOR LAYING OUT CEILING GRID
1 / A	DRID IDENTIFICATION; GRID LINE

BUILDING SECTION & WALL SECTION

1 / A101 — SECTION NUMBER; SHEET WHERE DRAWN

DETAIL REFERENCE

1 / A101 — DETAIL NUMBER; SHEET WHERE DRAWN

EXTERIOR ELEVATION REFERENCE

1 / A1.01 — ELEVATION NUMBER; SHEET WHERE DRAWN

INTERIOR ELEVATION REFERENCE

2 / 1 / A1.01 / 3 / 4 — ELEVATION NUMBER; SHEET WHERE DRAWN

COMPONENT SYMBOLS LEGEND

SYMBOL	FIRE PROTECTION
*	FIRE SPRINKLER HEAD
FE	SURFACE-MOUNTED FIRE EXTINGUISHER W/ 2A-10B:C (U.N.O.)
FEC	SEMI-RECESSED FIRE EXTINGUISHER CABINET W/ 2A-10B:C (U.N.O.)
	FIBROUS INSULATION
F.H. (N/E)	FIRE HYDRANT (N) NEW OR (E) EXISTING

SYMBOL	SITE
	RED CURBING FOR FIRE LANE
	SIGN POST
	ACCESSIBLE SYMBOL

PROJECT INFORMATION

ADDRESS:	8045 EAST CHAPMAN AVENUE, ORANGE, CA 92868
OCCUPANCY GROUP:	MIXED OCCUPANCY (A-3 & B)
TYPE OF CONSTRUCTION:	II-B, FULL SPRINKLERED
BUILDING HEIGHT:	45'-4" (3 STORIES)
EXISTING AREA:	
1ST FLOOR AREA:	37, 016 SF
2ND FLOOR AREA:	36, 773 SF
3RD FLOOR AREA:	23,732 SF
TOTAL AREA:	97, 521 SF
SCOPE OF WORK AREA (CLASSROOM #207):	+/-1,140 SF

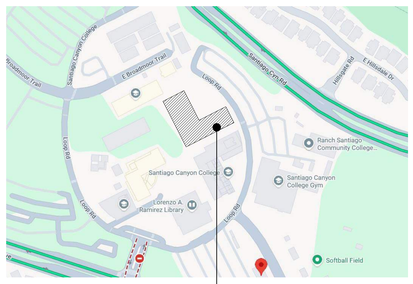
SCOPE OF WORK

INSTALLATION OF COMPUTER STATIONS (OWNER FURNISHED OWNER INSTALLED) AND AV EQUIPMENT IN THE SANTIAGO CANYON COLLEGE HUMANITIES BUILDING ROOM H229. ROOM H229 IS APPROXIMATELY 1,140 SF AND IS A COMPUTER LAB WITH 24 COMPUTER STATIONS. 1

SCOPE OF WORK INCLUDES, BUT NOT LIMITED TO THE FOLLOWING:

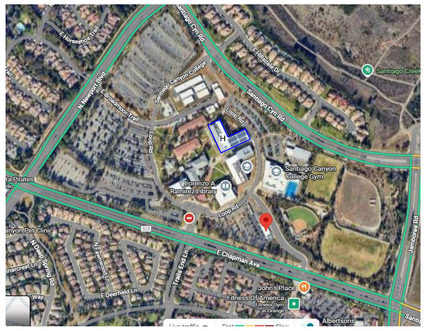
- ADDITION OF 18 COMPUTER STATIONS (OWNER FURNISHED OWNER INSTALLED)
- ADDITION OF PROJECTORS (CONTRACTOR FURNISHED CONTRACTOR INSTALLED) AND PROJECTOR SCREENS (CONTRACTOR FURNISHED CONTRACTOR INSTALLED) & ASSOCIATED INFRASTRUCTURE
- AV SYSTEM UPGRADE

VICINITY MAP



PROJECT SITE
HUMANITIES
BUILDING H

CAMPUS MAP



PROJECT TEAM

CLIENT: RSCCD SANTIAGO CANYON COLLEGE
CONTACT: CARRI M. MATSUMOTO, ASSISTANT VICE CHANCELLOR
FACILITY PLANNING, CONSTRUCTION & DISTRICT SUPPORT SERVICES
RANCHO SANTIAGO COMMUNITY COLLEGE DISTRICT
2323 N. BROADWAY, STE 112
SANTA ANA, CA 92706
TEL: (714) 480-7516 DIRECT

ARCHITECTURAL: IDS GROUP
CONTACT: JOHN SILBER
E-MAIL: JOHN.SILBER@IDSGI.COM
(949) 387-8500 EXT.154

ELECTRICAL: IDS GROUP
CONTACT: STEVEN COLLNS
E-MAIL: STEVEN.COLLINS@IDSGI.COM
(949) 387-8500 EXT. 425

SHEET INDEX

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A-203	DETAILS
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TOTAL: 11	

APPLICABLE CODE

2025 CALIFORNIA ADMINISTRATIVE CODE (CAC), PART 1, TITLE 24 CCR
2025 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 CCR
2025 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 CCR
2025 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 CCR
2025 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 CCR
2025 CALIFORNIA ENERGY CODE, PART 6, TITLE 24 CCR
2025 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24 CCR
2025 CALIFORNIA EXISTING BUILDING CODE (CEBC), PART 10, TITLE 24 CCR
2025 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGREEN), PART 11, TITLE 24 CCR
2025 CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24 CCR
TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS

APPLICABLE STANDARDS
FOR A LIST OF APPLICABLE STANDARDS, INCLUDING CALIFORNIA AMENDMENTS TO THE NFPA STANDARDS, REFER TO CBC CHAPTER 35 AND CFC CHAPTER 80.

APPROVAL

CLIENT

RANCHO SANTIAGO COMMUNITY COLLEGE DISTRICT
2323 N Broadway, Santa Ana, CA 92706

PROJECT NAME

H229 PROJECTOR AT SANTIAGO CANYON COLLEGE

8045 EAST CHAPMAN AVENUE, ORANGE, CA 92868

PROJECT ADDRESS

ENGINEER/ARCHITECT

IDS GROUP
1 PETERS CANYON ROAD, SUITE 130
IRVINE, CA. 92606
TEL: 949-387-8500, FAX: 949-387-0800

STAMP

REGISTERED ARCHITECT JOSEPH SIMPSON No. C-15573 REN. 7-31-27 STATE OF CALIFORNIA

STAMP

ISSUE

REV.	DESCRIPTION	DATE
	SCHEMATIC DESIGN SET	02/27/2026
	90% CD SET	03/27/2026
	100% CD SET	05/15/2026
	UPDATED 100% CD SET	07/27/2026
1	ADDENDUM #1	08/18/2026

PROJECT IDENTIFICATION

THIS DRAWING WAS CREATED IN REVIT V. 2023
UNLESS OTHER WISE NOTED.

THE ORIGINAL SIZE OF THIS SHEET IS 30" X 42"

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IDS PROJECT NO.	25X100.00
DRAWN BY	PF
CHECKED BY	BM
APPROVED BY	JS

SHEET TITLE

PROJECT INFORMATION

SHEET NUMBER

G-001

IDS GROUP - FILE LOCATION: C:\Users\jane.kigula\Documents\25X100.00 RSCCD Building H Computer and AV Installation_Revit
PLOT DATE: 8/18/2026 11:08:53 AM
USER: PF

GENERAL NOTES

INSTRUMENT OF SERVICE

1. THE SCOPE OF THIS PROJECT IS AS GENERALLY DEPICTED IN THESE INSTRUMENTS OF SERVICE AS PART OF THE CONTRACT DOCUMENTS. WORK INCLUDING: POINTS OF CONNECTION, NOT SPECIFICALLY DEPICTED, THAT NEED TO BE MADE ARE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR. ALL WORK PERFORMED EVEN IN REMOTE AREAS OF THE BUILDING OR SITE, PERTAINING TO THIS PROJECT SHALL COMPLY WITH THE INTENT OF CONTRACT DOCUMENTS.

2. THESE CONTRACT DOCUMENTS COVER THE FURNISHING AND INSTALLATION OF MATERIALS AND WORK AS CALLED FOR ON THE DRAWINGS OR IN THE SPECIFICATIONS (OR IN BOTH) WHICH ARE BOUND SEPARATELY AND ARE A PART OF THE CONTRACT. IT SHALL BE THE RESPONSIBILITY OF EACH CONTRACTOR TO CHECK WITH THE ARCHITECTURAL DRAWINGS BEFORE FINALIZING THEIR BID AND BEFORE THE INSTALLATION OF THEIR WORK. ANY DISCREPANCY BETWEEN THE ARCHITECTURAL AND THE CONSULTING ENGINEER(S) DRAWINGS SHALL BE BROUGHT TO THE ARCHITECT'S ATTENTION BY WRITTEN REQUEST FOR CLARIFICATION. ANY WORK INSTALLED IN CONFLICT WITH THE ARCHITECTURAL DRAWINGS SHALL BE CORRECTED BY THE CONTRACTOR AT HIS OWN EXPENSE AND AT NO EXPENSE TO THE OWNER OR ARCHITECT.

3. GENERAL REQUIREMENTS, DESCRIBING THE PROJECT'S ADMINISTRATIVE REQUIREMENTS AND THE PHYSICAL ASPECTS OF CONSTRUCTION, ARE PROVIDED WITHIN EACH PROFESSIONAL DISCIPLINE'S PROJECT SPECIFICATION AND GENERAL NOTATION. GENERAL REQUIREMENTS ARE NOT LIMITED TO THE INSTRUMENT OF SERVICES AND MAY EXTEND TO THE CONTRACT DOCUMENTS AND OWNER REQUIREMENTS.

4. THE PROJECT SPECIFICATIONS CONSISTING OF THE WRITTEN REQUIREMENTS FOR MATERIAL, EQUIPMENT, SYSTEMS, STANDARDS AND WORKMANSHIP FOR THE WORK, AND PERFORMANCE OF RELATED SERVICES ARE CONTAINED WITHIN EACH OF THE ARCHITECT AND THE ARCHITECHT'S INSTRUMENT OF SERVICES. REFER TO GENERAL NOTES FOR ADDITIONAL PROJECT STANDARDS INFORMATION. DOCUMENTS INDICATED AS 'REFERENCE DOCUMENT' ARE NOT CONSIDERED INSTRUMENTS OF SERVICES AND ARE BEING ISSUED TO PROVIDE ASSISTANCE DURING THE REGULATORY AGENCY CONTRACT DOCUMENT REVIEW.

5. OVERALL AND BUILDING SCOPE DIAGRAMS PROVIDE GUIDLINE TO IDENTIFY THE LIMIT OF SCOPE.

6. REFER TO LIFESAFETY AND ACCESSIBILITY DIAGRAMS THAT INDICATE PROVISIONS WITHIN EXISTING CONDITIONS.

7. THESE DRAWINGS ARE BASED ON FIELD OBSERVATION AND DOCUMENTS FURNISHED BY THE OWNER. THE ARCHITECT SHALL BE NOTIFIED IMMEDIATELY BY THE CONTRACTOR OF ANY DISCREPANCIES OR OTHER QUESTIONS PERTAINING TO THE CONTRACT DOCUMENTS.. IF OBVIOUSLY OMISSIONS OR CONTRADICTORY SITUATIONS IN THE CONTRACT DOCUMENTS ARE DISCOVERED TO EXIST, THEY SHOULD BE IMMEDIATELY CALLED TO THE ATTENTION OF ARCHITECT FOR CLARIFICATION.

8. ALL DIMENSIONS TAKE PRECEDENCE OVER SCALE UNLESS OTHERWISE NOTED BY A PLUS/MINUS DIMENSION. DETAILED DRAWINGS HAVE PRECEDENCE OVER SMALL SCALE DRAWINGS. CONTRACTOR SHALL CHECK ACCURACY OF DIMENSIONS ON PLANS WITH ACTUAL FIELD DIMENSIONS. THE CONTRACTOR SHALL REPORT TO THE ARCHITECT ALL CONDITIONS WHICH PREVENT THE PROPER EXECUTION OF ITS WORK. CONTRACTOR SHALL NOT START ANY CONSTRUCTION OR ANY OFF-SITE FABRICATION OF MATERIALS UNTIL THE DRAWINGS DIMENSIONS ARE VERIFIED WITH ACTUAL FIELD CONDITIONS. DO NOT SCALE DRAWINGS.

9. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR THE RESULTS OF ANY ERRORS, DISCREPANCIES OR OMISSIONS THAT THE CONTRACTOR FAILED TO NOTIFY THE ARCHITECT OF BEFORE CONSTRUCTION AND/OR FABRICATION OF THE WORK.

10. WORK INCLUDES DEMOLITION, REMOVAL AND REINSTALLATION WHERE REQUIRED. REMOVE, REVISE, RELOCATE AND REINSTALL AS REQUIRED.

11. IT IS NOT THE RESPONSIBILITY OF THE ARCHITECT OR GENERAL CONTRACTOR TO INSURE THAT AREAS OF THE BUILDING, NOT DESCRIBED WITHIN THE SCOPE OF THIS PROJECT COMPLY WITH CURRENT BUILDING CODES. IT IS THE RESPONSIBILITY OF THE OWNER TO MAINTAIN THE BUILDING, SO AS TO PROVIDE FOR THE SAFETY AND COMFORT OF THE OCCUPANTS. THIS INCLUDES ALL LIFE SAFETY FEATURES SUCH AS FIRE ALARM, FIRE-SPRINKLERS, NURSE CALL, EXIT ENCLOSURE, HANDICAP ACCESSIBILITY, ETC.. THIS ALSO INCLUDES MAINTAINING THE BUILDING FREE OF HAZARDOUS MATERIALS I.E., CHEMICALS AS DESCRIBED BY STATE OR FEDERAL AGENCIES AS "HAZARDOUS", INCLUDING ASBESTOS.

GENERAL CONDITIONS

1. PRIOR TO BEGINNING ANY WORK, THE GENERAL CONTRACTOR SHALL FURNISH A CONSTRUCTION SCHEDULE SHOWING THE CHRONOLOGICAL PHASES OF HIS WORK, AND ALL RELATED WORK FOR THAT OF THE PROJECT. THIS SCHEDULE SHALL INDICATE ALL ORDERING LEAD TIMES, LENGTH OF TIME FOR EACH PHASE (AS APPLICABLE), ITS START AND COMPLETION, WITH A PROJECTED COMPLETION DATE.
2. ALL WORK PERFORMED BY THE GENERAL CONTRACTOR/SUBCONTRACTORS SHALL CONFORM TO THE REQUIREMENTS OF MUNICIPAL, LOCAL, FEDERAL AND STATE LAWS, INCLUDING BUT NOT LIMITED TO OSHA, AMD.
3. THE GENERAL CONTRACTOR SHALL TAKE ALL NECESSARY AND PROPER PRECAUTIONS TO PROTECT ADJACENT PROPERTY FROM ALL DAMAGES THAT MAY OCCUR FROM STORM WATER RUNOFF AND/OR DEPOSITION OF DEBRIS RESULTING FROM ANY AND ALL WORK IN CONJUNCTION WITH CONSTRUCTION OF THESE PLANS
4. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL ABOVE GROUND AND UNDERGROUND UTILITIES
5. ANY MODIFICATION OF OR CHANGES IN APPROVED GRADING PLANS MUST BE APPROVED AND OR ON-LINE ENGINEERING (HEREIN AFTER ENGINEER).
6. THE GENERAL CONTRACTOR SHALL BE FULLY AND SOLELY RESPONSIBLE FOR THE REMOVAL, REPLACEMENT AND RECTIFICATION OF ALL DAMAGED AND DEFECTIVE MATERIAL AND WORKMANSHIP IN CONNECTION WITH THE CONTRACT WORK. HE SHALL REPLACE OR REPAIR AS DIRECTED ALL SUCH DAMAGED OR DEFECTIVE MATERIALS WITHIN A PERIOD OF FIVE (5) BUSINESS DAYS FROM THE DATE OF SUBSTANTIAL COMPLETION, UNLESS OTHERWISE AGREED UPON IN WRITING BY OWNER.
7. THE GENERAL CONTRACTOR/SUBCONTRACTORS SHALL OBTAIN AND PAY FOR ALL LEGALLY REQUIRED APPROVALS AND PERMITS NECESSARY FOR THE EXECUTION AND COMPLETION OF HIS WORK.
8. ALL DRAWINGS AND ALL CONSTRUCTION NOTES ARE COMPLEMENTARY, AND WHAT IS CALLED FOR BY EITHER, WILL BE BINDING AS IF CALLED FOR BY ALL. ANY WORK SHOWN OR REFERRED TO ON ANY ONE SET OF DRAWINGS SHALL BE PROVIDED AS THOUGH SHOWN ON ALL RELATED DRAWINGS.
9. THE GENERAL CONTRACTOR IS SOLELY RESPONSIBLE FOR THE COORDINATION AND SCHEDULING OF THE WORK EFFORT FOR ALL SUBCONTRACTORS, CRAFTSMEN AND TRADESMEN REQUIRED TO COMPLETE THE JOB.
10. THE GENERAL CONTRACTOR SHALL NOTIFY THE INSPECTOR AT LEAST 48-HOURS PRIOR TO COMMENCING ANY WORK.
11. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE SHALL BE RESPONSIBLE FOR ALL WORK AND SHALL MAINTAIN ALL FACILITIES, COMPLETED AND UNCOMPLETED, UNTIL ACCEPTED BY THE OWNER.
12. THE GENERAL CONTRACTOR SHALL NOTIFY ARCHITECT IMMEDIATELY OF DISCREPANCIES OR OMISSIONS BETWEEN THE DRAWINGS, THESE NOTES, AND FIELD CONDITIONS BEFORE COMMENCING ANY WORK AND REQUEST FOR CLARIFICATION.
13. THE USE OF THE WORDS "PROVIDE" OR "PROVIDED" IN CONNECTION WITH ANY ITEM SPECIFIED, IS INTENDED TO MEAN, UNLESS OTHERWISE NOTED, THAT WHICH SHALL BE FURNISHED AND INSTALLED AND CONNECTED WHERE SO REQUIRED.
14. WHERE THE TERMS "APPROVED EQUAL", "EQUAL TO", "ACCEPTABLE" OR THE OTHER GENERAL QUALIFYING TERMS ARE USED IN THESE NOTES, IT SHALL BE UNDERSTOOD THAT REFERENCE IS MADE TO THE RULING AND JUDGMENT OF ARCHITECT.
15. THE GENERAL CONTRACTOR SHALL HAVE FIVE (5) WORKING DAYS FROM AWARD OF THE CONTRACT TO SUBMIT ANY "OR EQUAL" SUBSTITUTIONS FOR SPECIFIED PRODUCTS OR WORK FOR REVIEW BY ARCHITECT. HE SHALL INCLUDE CUT SHEETS WITH SPECIFICATIONS AND REASONS FOR SUBSTITUTION. ARCHITECT SHALL RESPOND IN FIVE (5) WORKING DAYS TO SUBMITTAL. NO SUBSTITUTIONS SHALL BE ACCEPTED AFTER THE INITIAL TEN (10) DAY TIME LIMIT HAS PASSED.
16. ALL WOODWORK, BLOCKING, ETC., TO BE FIRE RETARDANT TREATED, AS REQUIRED BY CODE.
17. THE GENERAL CONTRACTOR SHALL EXERCISE STRICT DUST CONTAINMENT CONTROL OVER JOB TO PREVENT DIRT OR DUST FROM LEAVING THE JOBSITE.
18. THE CONSTRUCTION NOTES AND/OR DRAWINGS ARE SUPPLIED TO ILLUSTRATE THE DESIGN INTENT AND THE GENERAL TYPE OF CONSTRUCTION DESIRED, AND ARE INTENDED TO APPLY TO THE FINEST QUALITY OF CONSTRUCTION, MATERIAL AND WORKMANSHIP THROUGHOUT.
19. THE GENERAL CONTRACTOR SHALL MAINTAIN A COMPLETE AND CURRENT SET OF CONSTRUCTION DRAWINGS ON SITE DURING ALL PHASES OF CONSTRUCTION FOR USE OF ALL TRADES.
20. THE GENERAL CONTRACTOR UPON AWARD OF THE CONTRACT FOR CONSTRUCTION, ASSUMES FULL RESPONSIBILITY FOR THE CONSTRUCTION, MATERIALS, AND WORKMANSHIP OF THE WORK DESCRIBED IN THESE NOTES AND DRAWINGS.
21. ALL REQUIRED EXITS, WAYS OF APPROACH THERETO, AND WAYS OF TRAVEL FROM THE EXIT INTO THE STREET SHALL CONTINUOUSLY BE MAINTAINED FREE FROM ALL OBSTRUCTIONS AND IMPEDIMENTS FOR UNOBSTRUCTED EGRESS IN THE CASE OF FIRE OR OTHER EMERGENCY.
22. THE CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONTRACTOR WILL BE REQUIRED TO ASSUME FULL AND COMPLETE RESPONSIBILITY FOR THE JOBSITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING THE SAFETY OF ALL PERSONS AND PROPERTY THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
23. THE GENERAL CONTRACTOR SHALL SUBMIT ALL APPLICATIONS FOR PAYMENT TO THE OWNER FOR REVIEW AND APPROVAL.
24. THE GENERAL CONTRACTOR SHALL SEE THAT ALL SUBCONTRACTORS RECEIVE COMPLETE SETS OF WORKING DRAWINGS AND ASSUME FULL RESPONSIBILITY FOR COORDINATION OF WORK.
25. THE ARCHITECT AND ENGINEER SHALL BE NOTIFIED WHEN CONSTRUCTION HAS COMMENCED. CONTRACT CLOSE OUT SHALL OCCUR ONLY AFTER THE ARCHITECT ISSUED THE PUNCHLIST AND PUNCHLIST ITEMS HAVE BEEN CORRECTED BY THE CONTRACTOR.

DEMOLITION-REMOVAL-RELOCATION

1. THE GENERAL CONTRACTOR SHALL FURNISH ALL LABOR AND MATERIALS AS REQUIRED TO COMPLETE DEMOLITION, REMOVAL AND RELOCATION OF ALL ITEMS INDICATED IN DRAWINGS OR AS OTHERWISE DIRECTED BY ARCHITECT.
2. THE GENERAL CONTRACTOR SHALL FURNISH OWNER WITH A COMPLETE INVENTORY LIST OF ALL ITEMS THAT WILL BE RELOCATED REUSED AND/OR STORED IN BUILDING STOCK, AND OBTAIN DIRECTIVE REGARDING THEIR DISPOSITION.
3. THE GENERAL CONTRACTOR SHALL EXECUTE ALL WORK WITHIN THE REGULATIONS OF PROPERTY MANAGEMENT FOR DEMOLITION AND REMOVAL OF DEBRIS, INCLUDING AFTER HOURS WORK, AS MAY BE REQUIRED.
4. ALL WORK DEMOLISHED SHALL BE REMOVED FROM THE PREMISES, EXCEPT ITEMS TO BE RELOCATED OR RETURNED TO OWNER OR AS OTHERWISE NOTED.
5. THE GENERAL CONTRACTOR SHALL REMOVE ALL RUBBISH AND WASTE MATERIALS, BOTH FROM HIS OWN AND OTHER SUBCONTRACTORS EMPLOYEES, AND PROVIDE FOR ITS REMOVAL FROM THE SITE.
6. UPON COMPLETION OF THE REMOVAL AND RELOCATION WORK, THE GENERAL CONTRACTOR SHALL ENSURE THAT ALL AREAS ARE LEFT BROOM CLEAN.

CLEANING

1. "NEW" ITEMS INSTALLED BY THE GENERAL
2. CONTRACTOR, IN ADDITION TO BEING AMPLY PROTECTED THROUGHOUT THE PERIOD OF CONSTRUCTION SHALL BE THOROUGHLY CLEANED TO THE SATISFACTION OF OWNER PRIOR TO BEING TURNED OVER TO THE OWNER.

SUBMITTAL PROCEDURES

1. GENERAL CONTRACTOR SHALL SUBMIT ALL REQUESTED FABRICATION SHOP DRAWINGS, SAMPLES AND FIXTURE CUTS TO ARCHITECT FOR REVIEW. THREE (3) SETS OF REPRODUCIBLY PAPER COPIES SHALL BE PROVIDED. ALL SHOP DRAWINGS AND CUT SHEETS SIGNED "REVIEWED" SHALL SUPERSEDE ORIGINAL DRAWINGS IN DESIGN APPEARANCE ONLY. SUBCONTRACTORS SHALL ASSUME RESPONSIBILITY FOR ERRORS IN THEIR DRAWINGS.
2. GENERAL CONTRACTOR SHALL REVIEW SUBCONTRACTOR'S SUBMITTED DRAWINGS AND DATA, VERIFY FIELD MEASUREMENTS, APPLY REVIEW STAMP AND SUBMIT TO ARCHITECT PROMPTLY.
3. GENERAL CONTRACTOR SHALL INDICATE ON REVIEW STAMP THAT THE CONTRACTOR HAS REVIEWED SUBCONTRACTOR'S SUBMITTAL FOR CONFORMANCE TO THE SPECIFIED PRODUCT.
4. GENERAL CONTRACTOR SHALL DISAPPROVE AND RETURN TO SUBCONTRACTOR ANY SUBMITTALS NOT MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. GENERAL CONTRACTOR SHALL MAINTAIN AN UP-TO-DATE SUBMITTAL LOG, AND DISTRIBUTE THE LOG WEEKLY.
5. THE ARCHITECT WILL REVIEW, AND EITHER ACCEPT OR REJECT, WITH REASONABLE PROMPTNESS AND AS OUTLINED IN THE ACCEPTED SUBMITTAL SCHEDULE, DATA AND DRAWINGS SUBMITTED BY THE CONTRACTOR.
6. THE ARCHITECT WILL REVIEW SUBMITTALS FOR CONFORMANCE WITH THE INTENT OF THE DESIGN, AND FOR COMPLIANCE WITH SPECIFIC AND RELEVANT REQUIREMENTS OF THE CONTRACT DOCUMENTS.
7. THE ARCHITECT WILL REJECT AND RETURN TO THE CONTRACTOR, SHOP DRAWINGS AND PRODUCT LITERATURE SUBMITTED WITHOUT THE CONTRACTOR'S REVIEW STAMP AND/OR NOT THOROUGHLY REVIEWED BY CONTRACTOR PRIOR TO THEIR SUBMITTAL. THE ARCHITECT IS NOT RESPONSIBLE FOR DELAYS CAUSED BY REJECTION OF SHOP DRAWINGS SUBMITTED BY THE CONTRACTOR.
8. REVIEW WILL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS.
9. REVIEW OF SUBMITTALS BY THE ARCHITECT SHALL NOT BE CONSTRUED AS AUTHORIZING CHANGES IN THE CONTRACT SUM OR CONTRACT TIME, NOR SHALL IT BE CONSTRUED AS RELIEVING THE CONTRACTOR OF HIS RESPONSIBILITY FOR COORDINATION OF WORK WITH OTHER TRADES, OR INTERPRETED AS APPROVING QUANTITIES AND DIMENSIONS.
10. THE ARCHITECT'S REVIEW OF SUBMITTALS OR DATA SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR DEVIATIONS FROM CONTRACT DRAWINGS OR SPECIFICATIONS UNLESS THE CONTRACTOR HAS CALLED THE ARCHITECT'S AND OWNER'S ATTENTION TO SUCH DEVIATIONS AND SECURED WRITTEN ACCEPTANCE, NOR SHALL IT RELIEVE HIM OF RESPONSIBILITY FOR ERRORS IN SHOP DRAWINGS OR OTHER DATA

PATCHING AND CUTTING

1. THE GENERAL CONTRACTOR SHALL DO ALL CUTTING, FITTING AND PATCHING WORK THAT MAY BE REQUIRED TO MAKE ALL PARTS COME TOGETHER PROPERLY, AND FIT TO RECEIVE OR BE RECEIVED BY WORK OF OTHER CONTRACTORS WHERE SHOWN, OR REASONABLY IMPLIED BY, THE DRAWINGS AND NOTES.
2. THE GENERAL CONTRACTOR SHALL PROVIDE ALL EXTERIOR SOFFIT CUT-OUTS AND PATCHING REQUIRED FOR THE INSTALLATION OF ALL WORK.
3. THE GENERAL CONTRACTOR SHALL SURVEY ALL EXISTING FINISHED SURFACES TO REMAIN FOR CHIPS, CRACKS, HOLES, AND OTHER DAMAGE. THESE DEFECTIVE SURFACES SHALL BE REPAIRED, OR IF BEYOND REPAIRING, THEN THE GENERAL CONTRACTOR SHALL REMOVE ALL EXISTING AND REPLACE WITH NEW TO MATCH EXISTING TO THE SATISFACTION OF OWNER AND TENANT.
4. ALL EXISTING OR NEW CONSTRUCTION WORK SHOWN ON DRAWINGS THAT IS DAMAGED AS A RESULT OF WORK FOR THIS PROJECT, SHALL BE PATCHED AS REQUIRED TO MATCH IMMEDIATE EXISTING ADJACENT AREAS IN MATERIALS, FIRE RATING, FINISH AND COLOR, UNLESS OTHERWISE NOTED.

GLAZING

1. ALL GLAZING SHALL COMPLY WITH C.P.S.C. 16 C.F.R. AND CBC.

2. GLASS DOORS, ADJACENT PANELS AND ALL GLAZED OPENINGS SHALL BE APPROVED FOR IMPACT HAZARD PER C.B.C. SECTION 2406. PROVIDE IDENTIFICATION OF GLAZING PER SECTION 2406.2

3. PROVIDE TEMPERED GLASS AS REQUIRED BY CBC SECTION 2406 AND BY OTHER APPLICABLE CODES.

SIGNAGES

1. FURNISH AND INSTALL SUPPORTS AND OTHER NECESSARY FINISH MATERIALS FOR A COMPLETE SIGNAGE INSTALLATION.

2. HANDICAPPED SIGNAGE / IDENTIFICATION
   a. THE INTERNATIONAL SYMBOL OF ACCESSIBILITY SHALL BE THE STANDARD USED TO IDENTIFY FACILITIES THAT ARE ACCESSIBLE TO AND USEABLE BY PHYSICALLY HANDICAPPED PERSONS.
   b. LETTERS AND NUMBERS ON SIGNS HAVE A WIDTH TO HEIGHT RATIO OF BETWEEN 3:5 AND 1:1 AND STROKE WIDTH TO HEIGHT RATIO OF BETWEEN 1:5 AND 1:10.
   c. CHARACTERS AND SYMBOLS SHALL CONTRAST WITH THEIR BACKGROUND, EITHER LIGHT CHARACTERS ON A DARK BACKGROUND OR DARK CHARACTERS ON A LIGHT BACKGROUND.
   d. ALL BUILDING ENTRANCES THAT ARE ACCESSIBLE TO AND USABLE BY PHYSICALLY HANDICAPPED PERSONS SHALL BE IDENTIFIED WITH AT LEAST ONE STANDARD SIGN AND WITH ADDITIONAL DIRECTIONAL SIGNS AS REQUIRED TO BE VISIBLE TO PERSONS ALONG APPROACHING PEDESTRIAN WAYS.
   e. ALL SANITARY FACILITIES WILL BE PROVIDED WITH APPROPRIATE IDENTIFICATION SYMBOLS.

3. AREA AND OCCUPANCY SIGNAGE REQUIREMENTS OCCUPANT LOAD SIGN SHALL BE POSTED IN EACH MEETING ROOM, ASSEMBLY ROOM OR SIMILAR PURPOSE ROOM HAVING AN OCCUPANT LOAD OF 50 OR MORE.

4. EXIT SIGNS SHALL BE POSTED OVER EXITS DOORS SERVING 50 OR MORE AND ALL HAZARDOUS AREAS. MINIMUM LETTER HEIGHT IS 6" AND SHALL CONFORM WITH CBC AND LOCAL CODES. CBC SECTION 1003.2.8 AND UFC SECTION 12113A. SEE ELECTRICAL PLANS FOR LOCATIONS AND FURTHER INFO.

5. AN APPROVED SIGN SHALL BE LOCATED AT EACH FLOOR LEVEL LANDING IN ALL ENCLOSED STAIRWAYS. THE SIGN SHALL INDICATE FLOOR LEVEL, TERMINUS OF THE TOP AND BOTTOM OF THE STAIRWAY, AND THE IDENTIFICATION OF THE STAIRWAY.

EXITS

1. EXIT DOORS SHALL BE OF THE PIVOTED OR IDE-HINGEDSWINGING TYPE. EXIT DOORS SHALL SWING IN THE DIRECTION OF EXIT TRAVEL WHEN THE AREA SERVED HAS AN OCCUPANT LOAD OF 50 OR MORE.

2. EVERY EXIT DOOR SHALL BE OPENABLE FROM THE INSIDE WITHOUT THE USE OF A KEY OR ANY SPECIAL KNOWLEDGE OR EFFORT. NOTE ALSO THAT FLUSH BOLTS OR SURFACE BOLTS ARE PROHIBITED.

3. PANIC HARDWARE SHALL BE PROVIDED ON EXIT DOORS OF ROOMS, CORRIDORS, STAIRWAYS, HANDLING AN OCCUPANT CAPACITY OF 50 OR MORE PERSONS.

4. EXIT SIGNS SHALL BE INSTALLED AT REQUIRED EXIT DOORWAYS AND WHERE OTHERWISE NECESSARY TO CLEARLY INDICATE THE DIRECTION OF EGRESS IN COMPLIANCE WITH THE CODE OF JURISDICTION.

5. THE FORCE FOR PUSHING OR PULLING OPEN INTERIOR SWINGING EGRESS DOORS, OTHER THAN FIRE DOORS, SHALL NOT EXCEED 5 POUNDS. THESE FORCES DO NOT APPLY TO THE FORCE REQUIRED TO RETRACT LATCH BOLTS OR DISENGAGE OTHER DEVICES THAT HOLD THE DOOR IN A CLOSED POSITION. FOR OTHER SWINGING DOORS, AS WELL AS SLIDING AND FOLDING DOORS, THE DOOR LATCH SHALL RELEASE WHEN SUBJECTED TO A 15-POUND FORCE. THE DOOR SHALL BE SET IN MOTION WHEN SUBJECTED TO A 30-POUND FORCE. THE DOOR SHALL SWING TO A FULL-OPEN POSITION WHEN SUBJECTED TO A 15-POUND FORCE. FORCES SHALL BE APPLIED TO THE LATCH SIDE OF THE DOOR.

6. EACH DOOR IN A MEANS OF EGRESS FROM A GROUP 'A' OCCUPANCY SHALL NOT BE PROVIDED WITH A LATCH OR LOCK UNLESS IT IS PANIC HARDWARE OR FIRE EXIT HARDWARE (CBC 1008.1.9).

7. DOOR HANDLES, LOCK AND OTHER OPERATING DEVICES SHALL BE INSTALLED AT A MIN. 34" AND A MAX. 44" A.F.F.

8. EXIT SIGNS SHALL BE CONNECTED TO AN EMERGENCY POWER SYSTEM THAT WILL PROVIDE AN ILLUMINATION OF NOT LESS THAT 90min. IN CASE OF PRIMARY POWER LOSS (CBC 1011.2 - 1011.5.3)

9. THE MEANS OF EGRESS, INCLUDING THE EXIT DISCHARGE, SHALL BE ILLUMINATED AT ALL TIMES THE BUILDING SPACE SERVED BY THE MEANS OF EGRESS IS OCCUPIED.

GENERAL

THESE PLANS ARE THE PROPERTY OF IDS GROUP INC., AND ARE NOT TO BE USED FOR ANY OTHER THAN THE LOCATION SHOWN HEREON.

1. NO CHANGES ARE TO BE MADE ON THESE PLANS WITHOUT THE KNOWLEDGE OR CONSENT OF THE ARCHITECT OR ENGINEER WHOSE SIGNATURE APPEARS HEREON.

2. DO NOT SCALE DRAWINGS. ALL DIMENSIONS ARE TO FACE OF CONCRETE, FACE OF CONCRETE MASONRY UNITS, CENTERLINE OF COLUMNS AND BEAMS, OR FACE OF STUDS, UNLESS OTHERWISE NOTED. FINISH FLOOR ELEVATIONS ARE TO TOP OF CONCRETE SLAB OR TOP OF INTERIOR PAVING UNLESS OTHERWISE NOTED.

3. ALL LEVELS REFERENCE POINTS ABOVE PODIUM LEVEL ARE TAKEN FROM TOP OF SHEATHING. DIMENSIONS ON ELEVATIONS, SECTIONS AND WALL SECTIONS ARE REFERENCED TO THESE POINTS, UNLESS NOTED.

4. NO SUBSTITUTIONS WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL. REQUEST FOR SUBSTITUTIONS SHALL BE IN ACCORDANCE WITH SECTION 012500 OF SPECIFICATIONS.
- THESE DRAWINGS DO NOT CONTAIN THE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY.
- ALL CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH THE STATE CONSTRUCTION SAFETY ORDERS ENFORCED BY THE STATE DIVISION OF INDUSTRIAL SAFETY.

CODES

CONSTRUCTION SHALL COMPLY WITH APPLICABLE EDITION OF CALIFORNIA BUILDING CODE, ALL APPLICABLE LOCAL, STATE AND FEDERAL CODES, ORDINANCES, LAWS, REGULATIONS AND PROTECTIVE COVENANTS GOVERNING THE WORK. IN CASE OF CONFLICTS, THE MORE STRINGENT REQUIREMENT SHALL GOVERN.

METAL WORK

1. ALL METAL FRAMING MEMBERS SHALL BE SO ARRANGED AND SPACED AS TO PERMIT INSTALLATION OF PIPE CONDUITS AND DUCTWORK WITH A MINIMUM OF CUTTING. SHAFT WALLS SHALL BE PROVIDED WITH NECESSARY FRAMES, BRACING, AND SEALANT AROUND THE OPENING.

2. CONTACT BETWEEN DISSIMILAR METAL SHALL BE PROTECTED.

3. ALL LIGHT GAUGE COLD FORMED METAL FRAMING SHALL MEET OR EXCEED PROPERTIES SPECIFIED FOR THE CORRESPONDING MEMBER SIZE IN STEEL MANUFACTURERS ASSOCIATION [SSMA] PRODUCT TECHNICAL INFORMATION [ICC-ESR-3016] AND SHALL COMPLY WITH APPLICABLE AMERICAN SOCIETY FOR TESTING AND MATERIALS, AMERICAN IRON AND STEEL INSTITUTE S100 AND SPECIFIED TRUE GAUGE FLAT STEEL MIL THICKNESS THAT ONLY TRUE GAUGE FLAT STEEL CAN SATISFY. USE OF "EFFECTIVE THICKNESS" COLD REDUCED AFTERMARKET EQUIVALENT PRODUCT (EQ) STUDS FURNISHED BY EQ STUD MANUFACTURERS, VENDORS OR SUPPLIERS ARE NOT PERMITTED WITHOUT EXCEPTION.

DOORS

1. DOORS IN RATED WALLS SHALL CONSIST OF SELF-CLOSING, SELF-LATCHING ASSEMBLIES WITH SMOKE AND DRAFT SEALS AT HEAD AND JAMBS. DOOR ASSEMBLY RATINGS SHALL BE AS INDICATED ON DOOR SCHEDULE. HOLD OPEN DEVICES ON RATED ASSEMBLIES SHALL BE MAGNETICALLY OPERATED AND ACTIVATED BY SMOKE DETECTORS.

2. DOOR SIZES SHOWN ON DOOR SCHEDULE ARE OPENING SIZES. ALLOWANCE FOR THRESHOLDS, ECT., SHALL BE TAKEN OFF THE DOOR. DOORS AND FRAMES SHALL BE REINFORCED WHERE REQUIRED FOR CLOSERS, STOPS, AND HARDWARE.

APPROVAL

CLIENT

RANCHO SANTIAGO
Community College District
Santa Ana College • Santiago Canyon College

RANCHO SANTIAGO COMMUNITY COLLEGE DISTRICT

2323 N Broadway, Santa Ana, CA 92706

PROJECT NAME

H229 PROJECTOR AT SANTIAGO CANYON COLLEGE

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PROJECT ADDRESS

ENGINEER/ARCHITECT

IDS

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STAMP

REGISTERED ARCHITECT
JOSEPH SCHMITZ
No. C-15573
REN. 7-31-27
STATE OF CALIFORNIA

STAMP

ISSUE

REV.	DESCRIPTION	DATE
	SCHEMATIC DESIGN SET	02/27/2026
	90% CD SET	03/27/2026
	100% CD SET	05/15/2026
	UPDATED 100% CD SET	07/27/2026
1	ADDENDUM #1	08/18/2026

PROJECT IDENTIFICATION

THIS DRAWING WAS CREATED IN REVIT V. 2023 UNLESS OTHER WISE NOTED.

THE ORIGINAL SIZE OF THIS SHEET IS 30" X 42"

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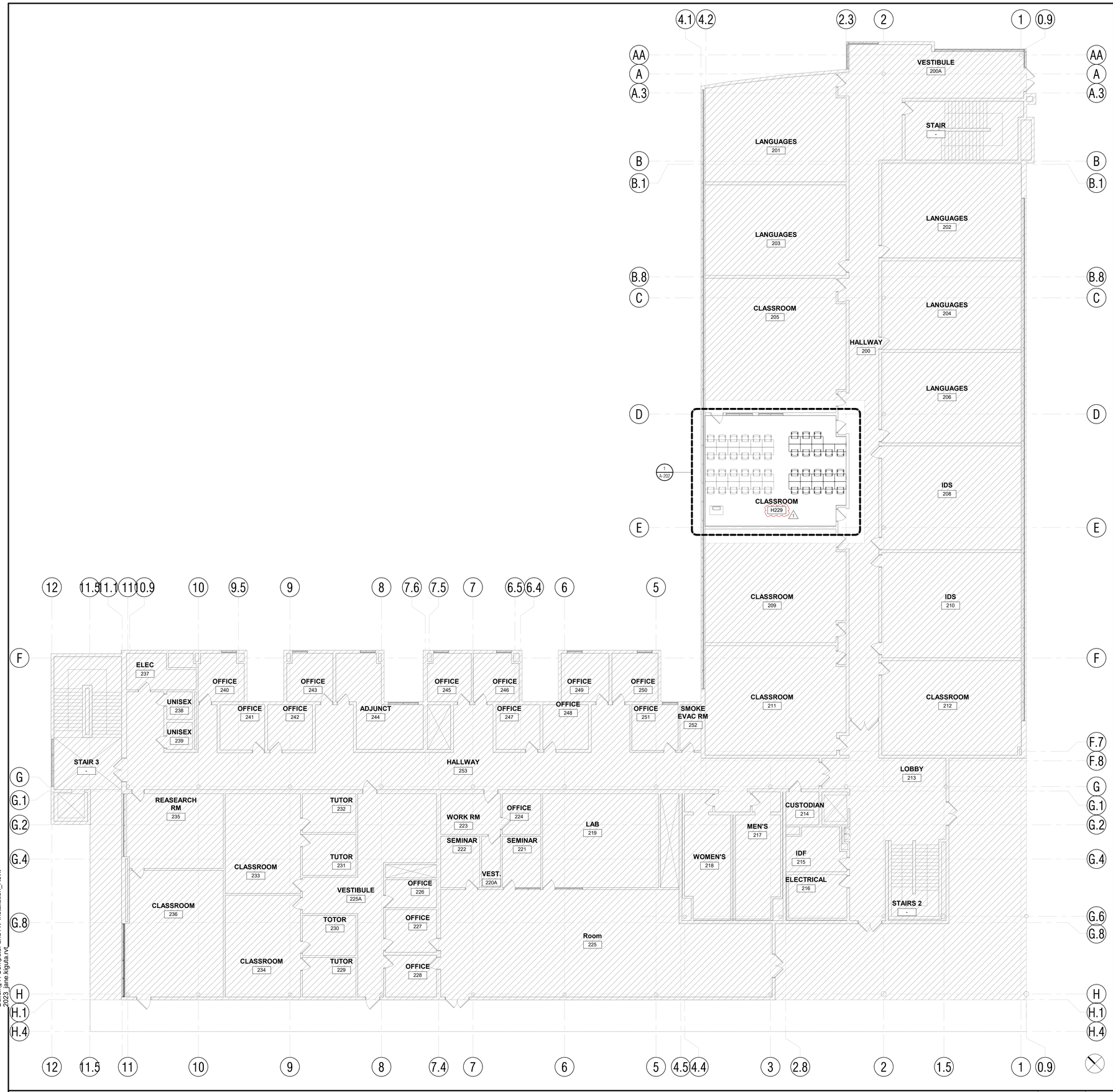
IDS PROJECT NO.	25X100.00
DRAWN BY	PF
CHECKED BY	BM
APPROVED BY	JS

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

G-101



LEVEL 2 | 1" = 10'-0" | 1

GENERAL NOTES - FLOOR PLAN

1. SEE G-SHEET SERIES FOR ADDITIONAL NOTES AND ABBREVIATIONS.
2. PARTITIONS DIMENSIONED TO FINISH FACE U.O.N. DO NOT ADJUST DIMENSIONS INDICATED AS "CLEAR" WITHOUT WRITTEN DIRECTION FROM ARCHITECT. DRAWINGS SHALL NOT BE SCALED. VERIFY ALL DIMENSIONS AND EXISTING AS BUILT FIELD CONDITIONS, INCLUDING FIELD MEASUREMENTS PRIOR TO START OF WORK, NOTIFY ARCHITECT WHERE DISCREPANCIES OCCUR.
3. FIRE SAFE PENETRATIONS AT FIRE RESISTANT RATED PARTITIONS PER UL U419 ASSEMBLY.
4. LARGE SCALE DRAWINGS TAKE PRECEDENCE OVER SMALL SCALE DRAWINGS. DETAILS TAKE PRECEDENCE OVERALL. NOTIFY ARCHITECT IN WRITING WHERE DISCREPANCIES OCCUR.
5. PATCH FLOOR AND WALL AREAS DAMAGED DUE TO NEW CONSTRUCTION OR WHERE PENETRATIONS HAVE BEEN MADE FOR MECHANICAL, ELECTRICAL AND PLUMBING WORK. FIRESAFE AT UL RATED ASSEMBLIES CONSISTENT WITH EXISTING UL RATING.
6. PATCH AND REPAIR ALL EXISTING PARTITIONS AFTER DEMOLITION WHERE DAMAGE HAS OCCURRED AT UNPROTECTED LOCATIONS. PLEASE NOTE THAT DEMOLITION ACTIVITY MAY OCCUR BEYOND WORK LIMITS SHOWN ON DEMOLITION PLAN DUE TO CONCEALED CONDITIONS.
7. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL INSPECTIONS AND APPROVAL REQUIRED BY DSA.

LEGEND - FLOOR PLAN

EXISTING WALLS & DOORS TO REMAIN

NOT IN CONTRACT

DSA NOTES

1. ALL WORK SHALL CONFORM TO 2025 TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR).
2. CHANGES TO THE APPROVED DRAWINGS AND SPECIFICATIONS SHALL BE MADE BY AN ADDENDUM OR A CONSTRUCTION CHANGE DOCUMENT (CCD) APPROVED BY THE DIVISION OF THE STATE ARCHITECT, AS REQUIRED BY SECTION 4-338, PART 1, TITLE 24, CCR.
3. A "DSA CERTIFIED" PROJECT INSPECTOR EMPLOYED BY THE DISTRICT (OWNER) AND APPROVED BY THE DSA SHALL PROVIDE CONTINUOUS INSPECTION OF THE WORK. THE DUTIES OF THE INSPECTOR ARE DEFINED IN SECTION 4-342, PART 1, TITLE 24, CCR. A MINIMUM CLASS 3 INSPECTOR IS REQUIRED.
4. A DSA ACCEPTED TESTING LABORATORY DIRECTLY EMPLOYED BY THE DISTRICT (OWNER) SHALL CONDUCT ALL THE REQUIRED TESTS AND INSPECTIONS FOR THE PROJECT.
5. THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS IS THAT THE WORK OF THE ALTERATION, REHABILITATION OR RECONSTRUCTION IS TO BE IN ACCORDANCE WITH TITLE 24, CCR. SHOULD ANY EXISTING CONDITIONS SUCH AS DETERIORATION OR NON-COMPLYING CONSTRUCTION BE DISCOVERED WHICH IS NOT COVERED BY THE CONTRACT DOCUMENTS WHEREIN THE FINISHED WORK WILL NOT COMPLY WITH TITLE 24, CCR, A CONSTRUCTION CHANGE DOCUMENT (CCD), OR A SEPARATE SET OF PLANS AND SPECIFICATIONS, DETAILING AND SPECIFYING THE REQUIRED WORK SHALL BE SUBMITTED TO AND APPROVED BY DSA BEFORE PROCEEDING WITH THE WORK. (SECTION 4-317(C), PART 1, TITLE 24, CCR).
6.SUBSTITUTIONS AFFECTING ITEMS REGULATED BY THE DIVISION OF THE STATE ARCHITECT (DSA) REQUIRE DSA APPROVAL AS AN ADDENDUM OR A CONSTRUCTION CHANGE DOCUMENT (CCD). DSA APPROVAL SHALL BE OBTAINED PRIOR TO FABRICATION AND/OR INSTALLATION PER SECTION 4-338, PART 1, TITLE 24, CCR.

APPROVAL

CLIENT

RANCHO SANTIAGO COMMUNITY COLLEGE DISTRICT

2323 N Broadway, Santa Ana, CA 92706

PROJECT NAME

H229 PROJECTOR AT SANTIAGO CANYON COLLEGE

8045 EAST CHAPMAN AVENUE, ORANGE, CA 92868

PROJECT ADDRESS

ENGINEER/ARCHITECT

IDS GROUP

1 PETERS CANYON ROAD, SUITE 130
IRVINE, CA. 92606
TEL: 949-387-8500, FAX: 949-387-0800

STAMP

REGISTERED ARCHITECT JOSEPH SHIRE No. C-15573 REN. 7-31-27 STATE OF CALIFORNIA

STAMP

ISSUE

REV.	DESCRIPTION	DATE
	SCHEMATIC DESIGN SET	02/27/2026
	90% CD SET	03/27/2026
	100% CD SET	05/15/2026
	UPDATED 100% CD SET	07/27/2026
1	ADDENDUM #1	08/18/2026

PROJECT IDENTIFICATION

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THE ORIGINAL SIZE OF THIS SHEET IS 30" X 42"

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IDS PROJECT NO.	25X100.00
DRAWN BY	JK
CHECKED BY	QM
APPROVED BY	JS

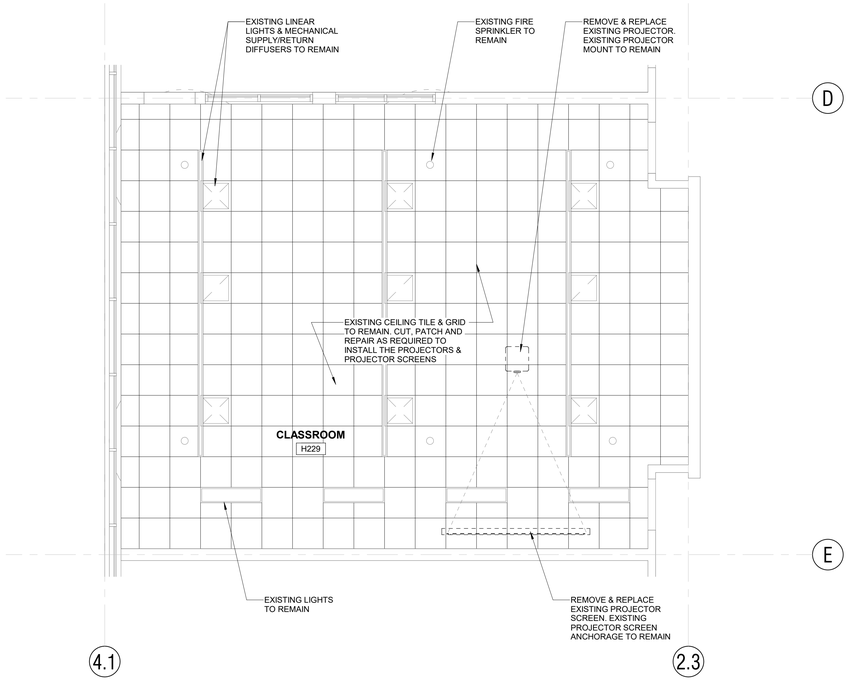
SHEET TITLE

OVERALL SECOND FLOOR PLAN

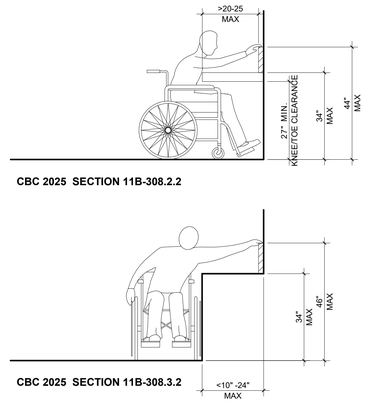
SHEET NUMBER

A-201

IDS GROUP - FILE LOCATION: C:\Users\jane.kiguta\Documents\25X100.00 RSCCD Building H Computer and AV Installation_Revit 2023_jane.kiguta.rvt
PLOT DATE: 8/18/2026 11:08:56 AM
USER: JK

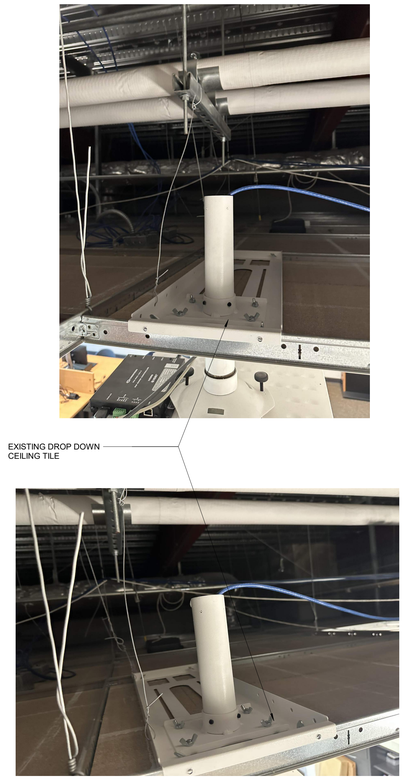


ENLARGED RCP - CLASSROOM #207 - DEMOLITION | 1/4" = 1'-0" | 10

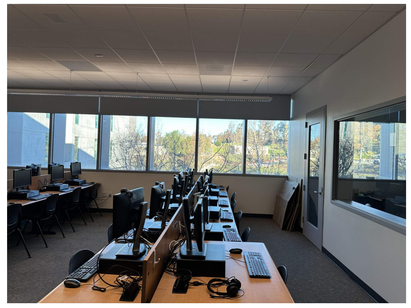


OBSTRUCTED REACH | 1/2" = 1'-0" | 12

(E) PROJECTOR SCREEN ATTACHMENT | 12" = 1'-0" | 11



(E) PROJECTOR ATTACHMENT IMAGES | 12" = 1'-0" | 3

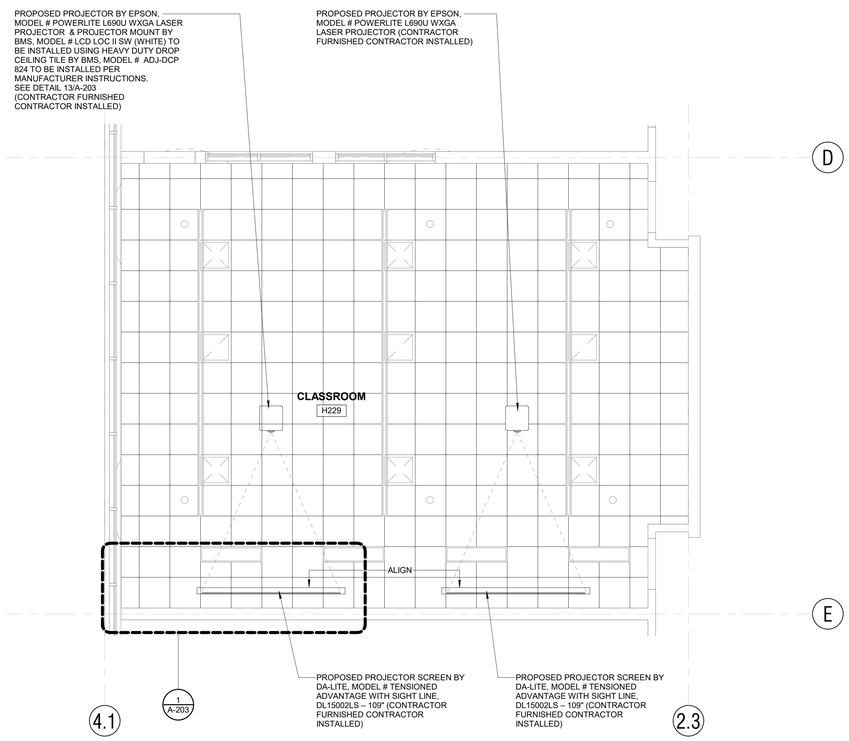


(E) COMPUTER STATIONS IMAGE#1 | 12" = 1'-0" | D

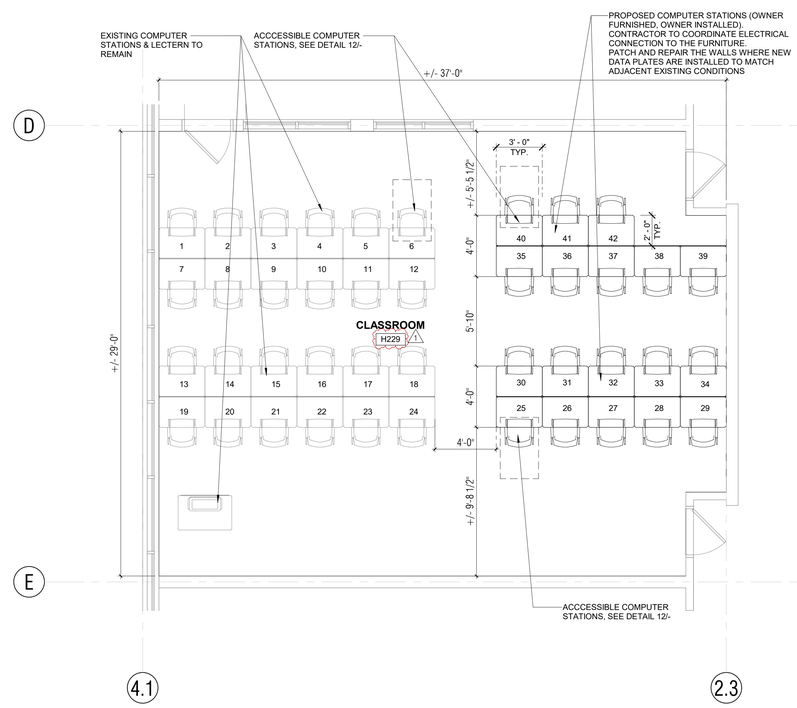
(E) COMPUTER STATIONS IMAGE#2 | 12" = 1'-0" | C

(E) CEILING TILES | 12" = 1'-0" | B

(E) PROJECTOR | 12" = 1'-0" | A



ENLARGED RCP - CLASSROOM #207 - PROPOSED | 1/4" = 1'-0" | 9



ENLARGED FLOOR PLAN - CLASSROOM #207 - PROPOSED | 1/4" = 1'-0" | 1

APPROVAL

CLIENT

RANCHO SANTIAGO COMMUNITY COLLEGE DISTRICT

2323 N Broadway, Santa Ana, CA 92706

PROJECT NAME

H229 PROJECTOR AT SANTIAGO CANYON COLLEGE

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PROJECT ADDRESS

ENGINEER/ARCHITECT

IDS GROUP

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TEL: 949-387-8500, FAX: 949-387-0800

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REGISTERED ARCHITECT JOSEPH SIMMONS No. C-15573 REN. 7-31-27 STATE OF CALIFORNIA

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IDS PROJECT NO.	25X100.00
DRAWN BY	JK
CHECKED BY	QM
APPROVED BY	JS

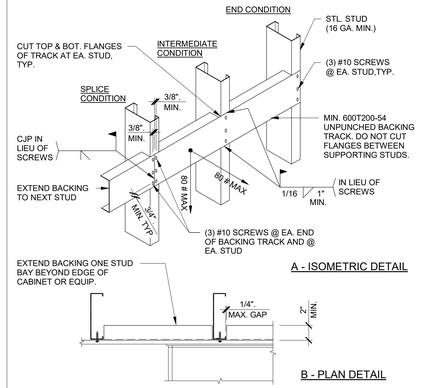
SHEET TITLE

ENLARGED 2ND FLOOR PLAN, RCP & DETAILS

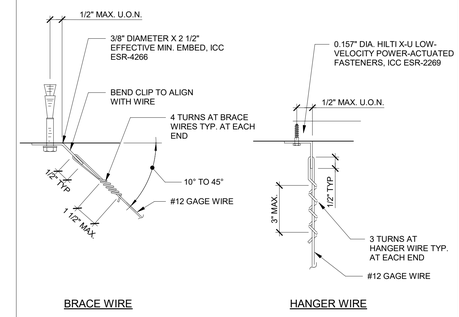
SHEET NUMBER

A-202

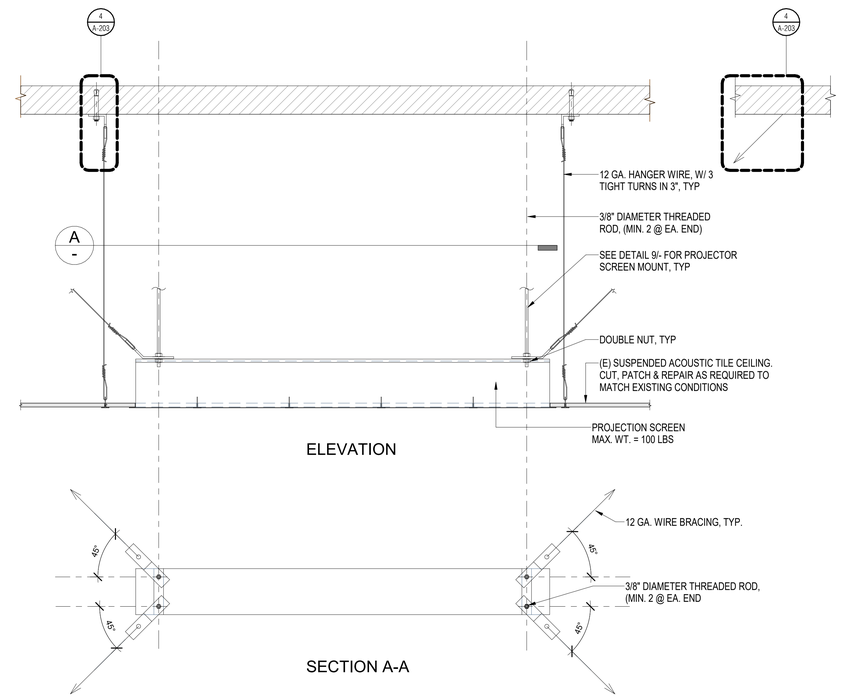
IDS GROUP - FILE LOCATION: C:\Users\jane.kigutai\Documents\25X100.00 RSCCD Building H Computer and AV Installation_2023_jane.kigutai.rvt
PLOT DATE: 8/18/2026 11:09:01 AM
USER: JK



TYPICAL BACKING STUD | 1 1/2" = 1'-0" | 8



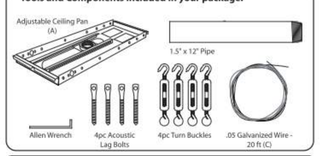
HANGER & BRACING WIRE CONN. | 3" = 1'-0" | 4



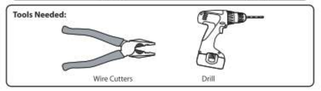
PROJECTOR SCREEN W/ BRACKET | 1 1/2" = 1'-0" | 2

Parts Included

Tools and Components included in your package:



Tools Needed:



Important Warnings and Cautions

Warning - Failure to read, understand and follow instructions can result in serious injury, damage to equipment or voiding equipment warranty.

Warning - Improper installation can result in serious personal injury or death. Ensure that the mounting surface can support a weight factor of four times the combined total weight of the equipment and the mount. If not, reinforcement of the mounting surface will be necessary before installing the mount.

Warning - It is the installer's responsibility to make sure that the mounting surface and the subsurface is free and clear of all electrical wires, plumbing and gas pipes. Failure to provide adequate clearance of all electrical wires and pipes can result in serious personal injury or death.

Warning - Mount and equipment exceeding a combined weight of 50 lbs can result in damage to the support structure, the mount, the equipment and may cause personal injury.

Warning - Business Machine Security, Inc. does not warrant its mounts against damage caused by the end use of its mounts for any purpose other than for the purpose for which it has been designed.

Warning - Business Machine Security, Inc. is not responsible for damage, or injury that may result in the use of any unauthorized modifications or attachment.

Warning - Proper safety gear (Goggles, Glasses & Gloves) and practices should be adhered to at all times throughout the installation process.

Warning - Do not install the mount near any heat source or air conditioning vent which may be prone to vibration.

Warning - Maximum load capacity 50 lbs.

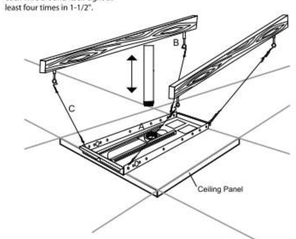
Warning - Do not expose to extreme temperatures.

1 Attaching to Ceiling

The Adj 824 Drop Ceiling Panel is designed to fit above a ceiling tile. Decide where the pipe will go through the tile and cut a hole into that section of the tile. Place the Adj 824 in position above the ceiling tile attaching to the ceiling runners. Adjust the Slide Carrage (A) tighten the wing nuts when in the correct position. Run the Pipe down through the Slide Carrage Sleeve. Once the desired height is achieved tightedn the two set screws with the provided Allen Wrench.

WOOD JOIST OR BEAMS
Drill four 11/64" (4.5mm) diameter holes at least 2" deep into wood joist or beams, and fully screw in the Acoustical Lag Bolt (B). Pull Galvanized Wires (C) through hole in lag bolt and twist each wire around itself tight at least four times in 1-1/2".

CONCRETE
Drill four 1/4" diameter holes at least 1-3/8" deep into concrete, clean hole with blow out bulb. Tap HILTI HLC-T 1/4 x 1-3/8" TIE WIRE SLEEVE ANCHOR into hole. Set the sleeve anchor. Pull Galvanized Wire (C) through hole in anchor and twist each wire around itself tight at least four times in 1-1/2".



2 Hanger Wires

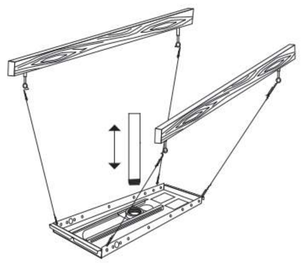
Attach the 4 Turn Buckles to the corners of the ceiling pan (A). Insert Galvanized Wire (C) through the eyelet of the Turn Buckles. Twist each wire around itself tight at least four times in 1-1/2". Adjust the Turn Buckles so the weight of the Adjustable Ceiling Pan (A) is supported fully by the hanger wires.

BMS Business Machine Security **AnchorPad**

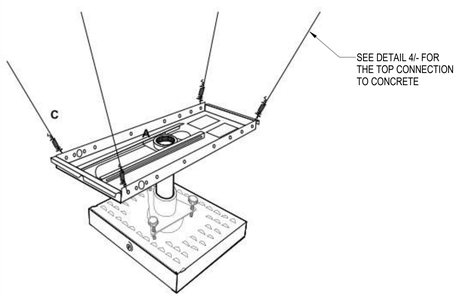
DCP 824 Drop Ceiling Panel

Model# DCP 824

Installation Guide



Made in USA | www.LocDown.com | www.Anchorpad.com | 800.872.9562



3 Attaching Mount

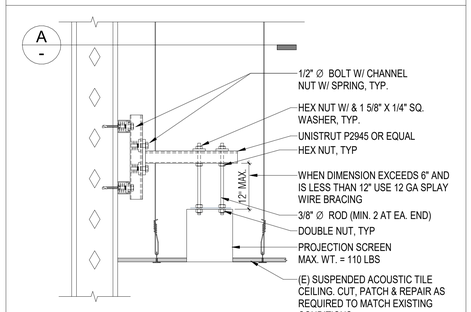
The Adjustable Ceiling Pan (A) can be attached to a mount with the provided adjustable pipe. NOTE: It is important to use the Thread Locker included with the LCD LOC II to secure the pipe in place at the appropriate height for the particular installation.

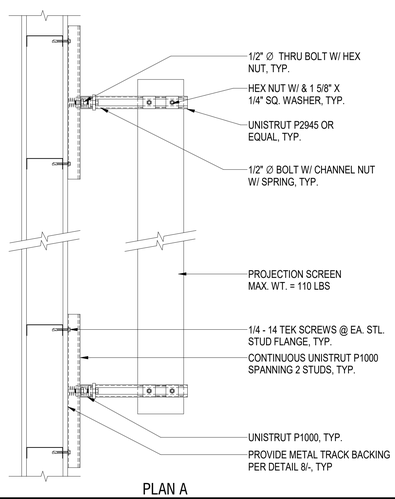
4 Verify Installation

Drop Ceiling Panel installation is now complete. After all components and equipment have been attached, verify that the load is carried by the Galvanized Wires (C) not the suspended ceiling runners.

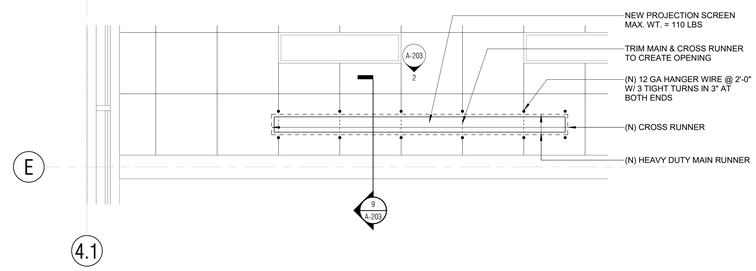
Warning: It is the responsibility of the installer to verify that the ceiling, to which the Drop Ceiling Panel is anchored, will safely support the combined load of all attached components and equipment. Do not exceed 250 pounds load capacity.

DROP CEILING TILE - CUTSHEET | 12" = 1'-0" | 13





PROJECTOR SCREEN W/ BRACKET | 1 1/2" = 1'-0" | 9



ENLARGED PROJECTOR SCREEN @ CEILING PLAN | 1/2" = 1'-0" | 1

APPROVAL

CLIENT

RANCHO SANTIAGO COMMUNITY COLLEGE DISTRICT

2323 N Broadway, Santa Ana, CA 92706

PROJECT NAME

H229 PROJECTOR AT SANTIAGO CANYON COLLEGE

8045 EAST CHAPMAN AVENUE, ORANGE, CA 92868

PROJECT ADDRESS

ENGINEER/ARCHITECT

IDS GROUP

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REGISTERED ARCHITECT JOSEPH MICHAEL SIMPSON No. C-15573 REN. 7-31-27 STATE OF CALIFORNIA

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IDS PROJECT NO.	25X100.00
DRAWN BY	JK
CHECKED BY	QM
APPROVED BY	JS

SHEET TITLE

DETAILS

SHEET NUMBER

A-203

IDS GROUP - FILE LOCATION: C:\Users\jane.kigutra\Documents\25X100.00 RSCCD Building H Computer and AV Installation_Revit 2023_jane.kigutra.rvt PLOT DATE: 8/18/2026 11:09:02 AM USER: JK

GENERAL ELECTRICAL NOTES

1. ALL SYMBOLS ARE NOT NECESSARILY USED IN THIS PROJECT.
2. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS TO ESTABLISH A STANDARD OF QUALITY. THE ENGINEER RESERVES THE RIGHT TO ALLOW OTHER METHODS AND MATERIALS NOT REFLECTED HEREIN. THE CONTRACTOR SHALL BE RESPONSIBLE TO REQUEST THE ENGINEER WAIVE THE STANDARDS TO ALLOW ALTERNATE MEANS AND METHODS PRIOR TO BEGINNING THE PROJECT. CONTRACT DOCUMENT REVISIONS TO ACCOMMODATE INSTALLED CONDITIONS, WITHOUT PRIOR APPROVAL, WILL RESULT IN ADDITIONAL DESIGN CHARGES TO THE CONTRACTOR.
3. ELECTRICAL WORK SHALL BE PERFORMED IN A WORKMANLIKE MANNER IN ACCORDANCE WITH THE NECA INSTALLATION STANDARDS TO THE SATISFACTION OF THE ARCHITECT AND ENGINEER.
4. WORK, MATERIALS AND EQUIPMENT SHALL CONFORM TO THE CURRENTLY ACCEPTED EDITION OF APPLICABLE NATIONAL, STATE AND CITY CODES AND ORDINANCES.
5. ELECTRICAL SYSTEM COMPONENTS SHALL BE LISTED OR LABELED BY UL OR OTHER RECOGNIZED TESTING FACILITY AS ALLOWED BY AUTHORITY HAVING JURISDICTION.
6. WHERE AN APPARENT DISCREPANCY EXISTS BETWEEN THE REQUIREMENTS OF THE GENERAL NOTES AND INFORMATION PORTRAYED IN THE ELECTRICAL DRAWINGS, THE CONTRACTOR SHALL INCLUDE IN HIS BID THE COST OF THE GREATER QUALITY OR QUANTITY.
7. CONTRACTOR SHALL VISIT JOB SITE PRIOR TO BID AND VERIFY EXISTING CONDITIONS. CONTRACTOR SHALL INCLUDE IN BASE BID COSTS REQUIRED FOR PERMITS AND INSPECTIONS.
8. CONTRACTOR SHALL VERIFY, WITH OWNER'S REPRESENTATIVE PRIOR TO SUBMITTING BID, ALLOWABLE WORKING HOURS, EMPLOYEE PARKING AREAS, MATERIAL DELIVERY, STORAGE REQUIREMENTS, DEMOLITION AND REMOVAL OF CONSTRUCTION DEBRIS, AS WELL AS DAILY CLEAN UP REQUIREMENTS. INCLUDE COSTS IN BID FOR DUST BARRIERS, DUMPSTERS ETC. AS REQUIRED FOR THE DURATION OF THE PROJECT. PERFORM WORK AS DIRECTED BY OWNER'S REPRESENTATIVE AND ARCHITECT.
9. ELECTRICAL SYSTEMS SHALL BE TESTED FOR PROPER OPERATION. IF TESTS SHOW THAT WORK IS DEFECTIVE, CONTRACTOR SHALL MAKE NECESSARY CORRECTIONS.
10. CONTRACTOR SHALL GUARANTEE WORK AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP WHICH MAY OCCUR UNDER NORMAL USE FOR A PERIOD OF ONE YEAR AFTER OWNER'S ACCEPTANCE. DEFECTS SHALL BE PROMPTLY CORRECTED BY CONTRACTOR WITHOUT ADDITIONAL CHARGE TO OWNER.
11. PROVIDE AS-BUILT DRAWINGS TO ARCHITECT. DRAWINGS SHALL INCLUDE ACCURATE CONDUIT AND DEVICE LOCATIONS DIMENSIONED FROM PERMANENT LANDMARKS SUCH AS BUILDING WALLS.
12. DO NOT SCALE ELECTRICAL DRAWINGS. VERIFY EXACT LOCATION OF ALL DEVICES, JUNCTION BOXES, LIGHTING FIXTURES, WITH ARCHITECTURAL AND INTERIOR DESIGN DRAWINGS PRIOR TO INSTALLATION. CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF MECHANICAL EQUIPMENT AND OTHER EQUIPMENT REQUIRING ELECTRICAL CONNECTION PRIOR TO ROUGH-IN. EVERY OUTLET HEIGHT SHALL BE VERIFIED ON EACH WALL WITH THE INTERIOR PLANNING AND DESIGN DRAWINGS. COORDINATE WITH CABINET SHOP DRAWINGS TO ENSURE PROPER HEIGHT AND LOCATION WITH RESPECT TO MILLWORK, EQUIPMENT.
13. THESE DRAWINGS INDICATE THE FINISHED REQUIREMENTS FOR THE ELECTRICAL SYSTEMS, EQUIPMENT, LIGHTING FIXTURES, OUTLETS AND DEVICES. DUE TO STRUCTURAL CONDITIONS, MECHANICAL DUCT, PIPING CONFLICTS, OR OTHER LEGITIMATE REASONS, THE CONTRACTOR MAY DESIRE TO INSTALL THE WORK INDICATED IN A MANNER DIFFERENT FROM THAT SHOWN. SUCH CHANGES SHALL BE PRESENTED TO THE OWNER'S REPRESENTATIVE FOR REVIEW AND APPROVAL PRIOR TO PROCEEDING. UPON APPROVAL, THE WORK SHALL BE PERFORMED AND THE AS-BUILT DRAWINGS SHALL BE REVISED TO ACCURATELY REFLECT THE WORK AS ACTUALLY INSTALLED.
14. RACEWAY SYSTEMS ARE SHOWN DIAGRAMMATICALLY. ACTUAL LOCATION AND ROUTING SHALL BE DETERMINED BY CONTRACTOR TO SUIT FIELD CONDITIONS.
15. PROVIDE DEDICATED NEUTRAL FOR EACH NEW CIRCUIT. HOME RUN CONDUCTORS MAY BE COMBINED INTO ONE CONDUIT. NO RACEWAY OR CABLE SHALL CONTAIN MORE THAN NINE (9) CURRENT CARRYING CONDUCTORS. WHERE MULTIPLE CONDUCTORS IN EXCESS OF THREE (3) ARE INDICATED ON THESE DRAWINGS, THEY HAVE BEEN DERATED AS REQUIRED BY NEC ARTICLE 310 REQUIREMENTS.
16. WHERE ALLOWED, MC CABLE MAY BE INSTALLED PER NEC ARTICLE 330. WHERE MULTIPLE CABLES ARE ROUTED ADJACENT TO EACH OTHER (BUNDLED), A MINIMUM SEPARATION OF ONE (1) CABLE DIAMETER (LARGEST) SHALL BE REQUIRED.
17. PLASTIC CABLE TIES SHALL NOT BE USED AS A MEANS OF SUPPORT FOR MC CABLE. USE ONLY APPROVED CABLE SUPPORTS PER CABLE MANUFACTURER'S INSTALLATION REQUIREMENTS.
18. RACEWAYS SHALL BE INSTALLED CONCEALED (IN CMU OR OTHER WALL) WHENEVER POSSIBLE. RACEWAYS INSTALLED EXPOSED SHALL BE ROUTED OUT OF PUBLIC VIEW AS MUCH AS POSSIBLE. RACEWAYS SHALL BE RUN PARALLEL WITH, OR AT RIGHT ANGLE TO WALLS.
19. PROVIDE APPROVED EXPANSION FITTINGS WHERE RACEWAYS CROSS BUILDING EXPANSION JOINTS. PROVIDE BONDING JUMPER(S) SIZED PER CODE WHERE REQUIRED. PROVIDE FITTINGS REQUIRED FOR A COMPLETE INSTALLATION. REFER TO ARCHITECTURAL DRAWINGS FOR EXPANSION JOINT LOCATION(S).
20. MINIMUM RACEWAY SIZE SHALL BE 1/2". MINIMUM HOMERUN SIZE SHALL BE 3/4". MINIMUM CONDUCTOR SIZE SHALL BE #12 AWG U.N.O. TYPICAL. POWER RELATED CONDUITS SHALL HAVE A CODE SIZE GROUND WIRE INSTALLED IN EACH RUN.
21. CONTRACTOR SHALL PROVIDE PULL CORDS IN ALL EMPTY CONDUITS. WHERE MORE THAN ONE CONDUIT TERMINATES IN A JUNCTION BOX, THE CONTRACTOR SHALL IDENTIFY EACH CONDUIT AND JUNCTION BOX IN A MANNER ALLOWING IDENTIFICATION AFTER WALL FINISHES HAVE BEEN APPLIED.
22. CONTRACTOR SHALL PROVIDE RACEWAY SYSTEMS INDICATED ON THE DRAWING PER NEC REQUIREMENTS AND GENERAL NOTES. ANY DEVIATION FROM THE WIRING METHODS INDICATED SHALL BE ALLOWED ONLY BY SPECIFIC WRITTEN APPROVAL FROM EITHER THE ARCHITECT, ENGINEER OR OWNER. CONTRACTOR'S BID SHALL INCLUDE COSTS FOR RACEWAY SYSTEMS AS SPECIFIED UNLESS SPECIFIC WRITTEN APPROVAL FOR AN ALTERNATIVE WIRING METHOD IS OBTAINED FROM EITHER THE ARCHITECT, ENGINEER OR OWNER AND IS SUBMITTED AS PART OF CONTRACTOR'S FORMAL BID PROPOSAL.
23. CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECT SIZE AND INSTALLATION OF OUTLET, PULL AND JUNCTION BOXES IN ACCORDANCE WITH NEC 314-16. BOXES SHALL BE MINIMUM 4" SQUARE BY 1-1/2" DEEP OR AS INDICATED ON THE DRAWINGS. BOXES SHALL BE RECESSED WITH COVER PLATE TO SUIT THE INTENDED APPLICATION.
24. REFER TO THE ARCHITECTURAL REFLECTED CEILING PLAN(S) FOR EXACT LOCATION OF CEILING MOUNTED LIGHTING FIXTURES. ARCHITECTURAL DRAWINGS SHALL GOVERN IN CASE OF CONFLICT WITH THESE DRAWINGS.
25. PRIOR TO INSTALLATION, CONTRACTOR SHALL REVIEW THE COMPLETE SET OF CONSTRUCTION DOCUMENTS FOR CONFLICTS WITH OTHER TRADES. CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE WORK WITH OTHER TRADES TO AVOID CONFLICT DURING INSTALLATION. CONTRACTOR SHALL MAKE MINOR ADJUSTMENTS IN EQUIPMENT LOCATION AND ROUTING AS NECESSARY.
26. CONTRACTOR SHALL BE RESPONSIBLE TO PROPERLY CUT AND PATCH EXISTING CONSTRUCTION AS REQUIRED TO INSTALL NEW ELECTRICAL WORK PATCHING SHALL BE OF THE SAME MATERIALS, WORKMANSHIP AND FINISH AS THE EXISTING WORK AND SHALL ACCURATELY MATCH SURROUNDING WORK TO THE SATISFACTION OF THE ARCHITECT.
27. ELECTRICAL EQUIPMENT SHALL HAVE SUFFICIENT GUTTER SPACE AND LUGS TO ACCOMMODATE QUANTITY AND SIZE OF CONDUCTORS REQUIRED. CONTRACTORS SHALL PROVIDE EQUIPMENT WITH OVERSIZED ENCLOSURES WHERE REQUIRED.
28. PROVIDE TYPE WRITTEN UPDATED PANEL DIRECTORY TO BE MOUNTED ON INSIDE OF PANEL DOOR COVERS. DIRECTORY SHALL REFLECT ADDITIONS OR MODIFICATIONS TO EXISTING PANELS AND SHALL REFLECT ACTUAL "AS-BUILT" CONDITIONS.
29. VERIFY DEVICE COLOR AND MOUNTING ORIENTATION (VERTICAL OR HORIZONTAL) WITH ARCHITECTURAL AND INTERIOR DESIGN DRAWINGS PRIOR TO ORDERING ANY EQUIPMENT AND PROVIDE DEVICES AS REQUIRED. UNLESS NOTED OTHERWISE, DEVICES AND DEVICE PLATES SHALL BE WHITE IN COLOR.
30. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR REVIEW OF THE FOLLOWING EQUIPMENT:
    a. RACEWAY
    b. HANGARS AND SUPPORTS
    c. CONDUCTORS AND CABLES
    d. WIRING DEVICES
    e. INTERIOR LIGHT FIXTURES
    f. LIGHTING CONTROLS
34. EQUIPMENT ELECTRICAL TERMINATIONS TO UNDERGO A TORQUE TEST. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR MANUFACTURER'S RECOMMENDED TORQUE DOCUMENTATION AND TOOLS TO PERFORM TORQUE TEST.
35. UNDERGROUND SERVICE CONDUITS SHALL BE SEALED PER NEC ARTICLE 230-8.
36. FLOOR MOUNTED ELECTRICAL EQUIPMENT SHALL BE MOUNTED ON A 4" HIGH CONCRETE PAD.
37. INSTALL TRANSFORMER FOLLOWING MANUFACTURER'S RECOMMENDATIONS FOR VENTILATION CLEARANCES.
38. COORDINATE ELECTRICAL REQUIREMENTS FOR PLUMBING AND MECHANICAL EQUIPMENT WITH FINAL CONTRACTOR SELECTION. THE CONTRACTOR SHALL SIZE DISCONNECTS BASED UPON CIRCUIT BREAKER RATINGS AND PROVIDE FUSING AS REQUIRED PER EQUIPMENT MANUFACTURER RECOMMENDATIONS AND U.L. LISTING REQUIREMENTS.
39. PROVIDE 10 AWG CONDUCTORS FOR 20 AMPERE, 120V BRANCH CIRCUITS LONGER THAN 75' AND 8 AWG CONDUCTORS FOR 20 AMPERE, 120V BRANCH CIRCUITS LONGER THAN 120'. PROVIDE 10 AWG CONDUCTORS FOR 20 AMPERE, 277V BRANCH CIRCUITS LONGER THAN 200'.
40. ALL ELECTRICAL EQUIPMENT SHALL BE LABELED, LISTED, OR CERTIFIED BY A NATIONALLY RECOGNIZED TESTING LABORATORY ACCREDITED BY THE UNITED STATES OCCUPATIONAL SAFETY HEALTH ADMINISTRATION.
41. ALL NEW CIRCUIT BREAKERS INSTALLED IN PANELS SHALL MATCH THE HIGHEST EXISTING AIC RATED CIRCUIT BREAKER WITHIN THAT BOARD. INSPECTOR TO VERIFY HIGHEST AIC RATING AT THE SITE."

ELECTRICAL SYMBOL LIST

SINGLE LINE DIAGRAM

- CIRCUIT BREAKER
- UTILITY COMPANY SERVICE CABLE TERMINATION
- FUSE
- FUSED DISCONNECT SWITCH
- SWITCH
- TVSS — TRANSIENT VOLTAGE SURGE SUPPRESSOR
- CURRENT TRANSFORMER (CT)
- POTENTIAL TRANSFORMER
- GROUNDING ELECTRODE
- M — UTILITY COMPANY POWER METER
- # — MOTOR (# INDICATED HP)
- M — CUSTOMER OWNED POWER METER
- G — GENERATOR
- ST — SHUNT TRIP
- GFPD — GROUND FAULT PROTECTION DEVICE
- TRANSFER SWITCH ATS OR MTS AND NUMBER OF POLES AS NOTED
- CONTACTOR (NORMALLY OPEN)
- CONTACTOR (NORMALLY CLOSED)
- TIME SWITCH
- CONTROL SWITCH
- PUSH BUTTON
- T — AC-1 — THERMOSTAT OUTLET AT +54" (HVAC UNIT DESIGNATION)
- ENCLOSED CIRCUIT BREAKER
- R — RELAY
- C — CONTACTOR

POWER

- SINGLE RECEPTACLE, NEMA 5-20R, 20A, 125V, MOUNT CENTER OF OUTLET AT 18" A.F.F. U.N.O.
- DUPLEX RECEPTACLE, NEMA 5-20R, 20A, 125V RATED, MOUNT CENTER OF OUTLET AT 18" A.F.F. U.N.O.
- F — DUPLEX RECEPTACLE FURNISHED BY FURNITURE MANUFACTURER
- DUPLEX RECEPTACLE / HALF-SWITCHED "C" INDICATES CONTROLLED VIA MOTION SENSOR/TIME CLOCK, MOUNT CENTER OF OUTLET AT 18" A.F.F. U.N.O.
- DUPLEX RECEPTACLE NEMA 5-20R, 20A, 125V GFCI TYPE
- DUPLEX RECEPTACLE NEMA 5-20R, 20A, 125V GFCI TYPE, MOUNTED 6" ABOVE COUNTER SPLASH
- QUADPLEX RECEPTACLE, NEMA 5-20R, 20A, 125V, MOUNT CENTER OF OUTLET AT 18" A.F.F. U.N.O.
- SPECIAL RECEPTACLE 480V RATED w/GROUND AS NOTED
- SPECIAL RECEPTACLE. 250V RATED AS NOTED
- DUPLEX RECEPTACLE NEMA 5-20R, 20A, 125V - FLUSH MOUNT CEILING
- POWER FLOOR OUTLET w/ DEVICE AS INDICATED
- COMBINATION POWER / DATA FLOOR OUTLET AS INDICATED
- COMBINATION USB/DUPLEX NEMA 5-20R, 125V, MOUNTED 18" A.F.F. U.N.O.
- COMBINATION USB/DUPLEX NEMA 5-20R, 125V, MOUNTED 6" ABOVE COUNTER SPLASH
- P — FURNITURE POWER DROP
- D — FURNITURE DATA DROP
- J — JUNCTION BOX
- J — JUNCTION BOX - WALL MOUNT
- J — JUNCTION BOX - FLUSH FLOOR MOUNT
- MULTI-OUTLET SURFACE RACEWAY w/ NEMA 5-20R, 20A, 125V AT 12" ON CENTER., U.N.O.
- PB — PULLBOX - EXTERIOR OR INTERIOR AS INDICATED
- LIGHTING AND APPLIANCE PANELBOARD - SURFACE MOUNT
- LIGHTING AND APPLIANCE PANELBOARD - FLUSH MOUNT
- SWITCHBOARD OR DISTRIBUTION BOARD
- LV # — LOW VOLTAGE PROJECTOR SCREEN THREE BUTTON WALLSWITCH, 48"AFF MAX (TOP),MATCH EXISTING.4S BACKBOX , SINGLE GANG PASTER RING, 3/4" C UP TO CEILING, CONNECTOR AND INSULATING BUSHING BOTH ENDS. GANG MULTIPLE DEVICES IN MULTIGANG BACKBOX
- SCP # — LOW VOLTAGE PROJECTOR SCREEN CONTROLLER MOUNTED ABOVE ACCESSIBLE CEILING.
- WM# — (WIREMOLD) SURFACE METAL RACEWAY.SEE PLANS FOR REQUIREMENTS.
- F — POWER/DATA OUTLET(S) IN FURNITURE (FBO)

SIGNAL

- COMBINATION TELE/DATA OUTLET AT +18"
- TELEPHONE OUTLET AT +18"
- DATA OUTLET AT +18"
- F — DATA OUTLET FURNISHED BY FURNITURE MANUFACTURER
- TELE/DATA CEILING OUTLET
- DATA CEILING OUTLET
- CR — CARD READER
- 1 VPJ1 — EXTRON PROJECTOR L690U W/BMS LCD LOC II SW (WHT) VANDLE RESISTANT MOUNTING KIT, KEY#13
- DC — DOCUMENT CAMARA: ELMO TT-12G CAMARA - # 1380
- SPD — SURGE PROTECTION STRIP SURGEX SX-1120-RT 1
- 1 ERK1 — LECTURN EQUIPMENT RACK
- SYSW1 — EXTRON DTP CROSSPOINT 82 4K - 60-1583-93
- TTP1 — EXTRON CABLE CUBBY 700-60-1893-02
- HD — EXTRON USBC HDMI HD101 - 60-1883-01
- PI — EXTRON POE INJECTOR 115 -60-1233-02
- TPC — EXTRON TOUCH PANEL CONTROL 1025T - 6-1565-12
- 1 PRS — DA LITE TENSIONED CONTOUR ELECTROL PROJECTOR SCREEN - 109"
- 1 RX1 — EXTRON DTP HDMI 4K 230 RX RECIEVER
- SC1, S — CEILING MOUNTED SPEAKER: EXTRON FF220T AND BACKBOX
- AVD — AV DISTRIBUTION JUNCTION BOX: HOFFMAN A-SG12X12X6 1
- FLUSH FLOOR BOX WITH COMBINATION TELE/DATA OUTLET
- T — POWER TRANSFORMER. SIZE AND TYPE NOTED ON PLANS AND SPECIFICATIONS
- TELEPHONE BACKBOARD

WIRING

- CONDUIT ROUTED EXPOSED
- CONDUIT ROUTED UNDER FLOOR/UNDERGROUND
- RACEWAY CONCEALED IN WALL OR CEILING 1/2"C, 2#12 AND 1#12 GND - TYPICAL U.N.O.
- RACEWAY TURNED UP 1/2"C, 2#12 AND 1#12 GND - TYPICAL U.N.O.
- RACEWAY TURNED DOWN 1/2"C, 2#12 AND 1#12 GND - TYPICAL U.N.O.
- MIN. 3/4"C- HOMERUN TO PANELBOARD
- CONDUIT CAP-OFF

MISCELLANEOUS

- UNIT # — MECHANICAL EQUIPMENT TAG
- # SHEET — DIAGRAM TAG
- 1 — KEYNOTE PLAN SYMBOL
- 1 — DEMOLITION KEYNOTE PLAN SYMBOL
- 1 — REVISION SYMBOL
- XXX — FEEDER SCHEDULED EQUIPMENT
- XXXX — ELECTRICAL EQUIPMENT TAG

APPLICABLE CODES

- 2025 CALIFORNIA ELECTRICAL CODE (CEC) PART 3, TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR)
- 2025 CALIFORNIA ADMINISTRATIVE CODE (CAC) PART 1, TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR)
- 2025 CALIFORNIA BUILDING CODE (CBC) PART 2, TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR)
- 2025 CALIFORNIA MECHANICAL CODE (CMC) PART 4, TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR)
- 2025 CALIFORNIA PLUMBING CODE (CPC) PART 5, TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR)
- 2025 CALIFORNIA ENERGY CODE (CEC) PART 6, TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR)
- 2025 CALIFORNIA FIRE CODE (CFC) PART 9, TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR)
- 2025 CALIFORNIA EXISTING BUILDING CODE PART 10, TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR)
- 2025 CALIFORNIA GREEN BUILDING CODE (CGBC) PART 11, TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR)
- 2023 NATIONAL ELECTRICAL CODE (NEC)

WIRE SCHEDULE

NOTES:

1. CONTRACTOR TO USE PLENUM RATED CABLE WHERE REQUIRED BY CODE.
2. WIRING TO BE INSTALLED BY AV CONTRACTOR.

TYPE	APPLICATION	DESCRIPTION (FIXED INSTALL CABLE)	O.D	MANUF.	PART NO.
C2P	CONTROL/PWR SUPPLY	CONTROL CABLE AC/DC, 24 AWG, 2 PAIR, TWISTED, TINNED COPPER, PLENUM RATED	0.158	BELDEN	1325A
C8P	SERIAL CONTROL / AUDIO CABLE	CONTROL CABLE AC/DC, 20 AWG, 2 PAIR, SHIELDED, TWISTED, PLENUM RATED	0.150	EXTRON	STP20-2P
D11P	CAT 6A DATA NETWORK CABLE	CATEGORY 6A (500MHz) DATA CABLE, 23 AWG, 4-UNBONDED PAIR, SOLID BARE COPPER, F/UTP-FOIL SHIELDED, MAX. ATTENUATION 19.1dB/100m @100MHz, MAX DELAY SKEW 45ns/100m, NOM MUTUAL CAPACITANCE 17pF/FT, PLENUM RATED.	0.275	BELDEN	10GX53F
R1P	LOW LOSS 50Ω WIRELESS	RG58C/U, 20 AWG, 50Ω, 95% BRAIDED SHIELD, NOM ATTN-21.5dB/100ft @ 1GHz, PLENUM RATED	0.159	BELDEN	88240
S1P	SPEAKER	LOUDSPEAKER LEVEL OR CIRCUIT WIRING GREATER THAN +24dBu, FROM 20Hz TO 20kHz, 16AWG, STRANDED, TWISTED PAIR, PLENUM RATED.	0.210	BELDEN	1862A

STANDARD ABBREVIATIONS

- A -
A AMPERE
AB ABOVE BACK SPLASH
ADA AMERICANS W/DISABILITIES ACT
A.F.F. ABOVE FINISHED FLOOR
AF ARC FAULT
AHU AIR HANDLING UNIT
AMP FUSE
AFG ABOVE FINISHED GRADE
AIC AMPERE INTERRUPTING CAPACITY
AL ALUMINUM
ARCH'L ARCHITECTURAL AS AMP SWITCH
ATS AUTOMATIC TRANSFER SWITCH
AWG AMERICAN WIRE GAUGE

- B -
BC BARE COPPER
BLDG BUILDING BLDG

- C -
C CONDUIT
CAB CABINET
CAT CATALOG/CATEGORY
CB CIRCUIT BREAKER
CKT CIRCUIT
CLG CEILING
CO CONDUIT ONLY
CC COMM COMMUNICATION
CU COPPER
CTEP CALIFORNIA TYPE EVALUATION PROGRAM

- D -
DEMO,(D) DEMOLITION/DEMOLISH
DISC. DISCONNECT
DN DOWN
DWG DRAWING

- E -
EA EACH
EF EXHAUST FAN
EG EQUIPMENT GROUND
ELEC. ELECTRICAL
ELEV ELEVATOR
EM EMERGENCY
EMT ELECTRICAL METALLIC TUBING
EQUIP EQUIPMENT
(E) EXISTING TO REMAIN
EVCS ELECTRICAL VEHICLE CHARGING STATION

- F -
FBO FURNISHED BY OTHERS
FF FINISHED FLOOR
FIXT FIXTURE
FLA FULL LOAD AMPS
FLEX FLEXIBLE METALLIC CONDUIT(STEEL)
FLUOR FLUORESCENT
FT FEET OR FOOT

- G -
GFA GROUND FAULT ALARM
GFCI GROUND FAULT CIRCUIT INTERRUPTER
GND GROUND

- H -
HP HORSEPOWER
HVAC HEATING, VENTILATING & AIR CONDITIONING

- I -
IBC INTERNATIONAL BUILDING CODE
IMC INTERMEDIATE METAL CONDUIT
IN INCH(ES)
IRC INTERNATIONAL RESIDENTIAL CODE
ISC SHORT CIRCUIT AMPERES

- J -
JB, J-BOX JUNCTION BOX

- K -
KCMIL & MCM THOUSAND CIRCULAR MILS
KVA KILOVOLT AMPERE
KW KILOWATT

- L -
LTG LIGHTING
LRA LOCK RUNNING AMPS
LOTO LOCK OUT TAG OUT

- M -
MAX. MAXIMUM
MCA MAXIMUM CIRCUIT AMP
MCB MAIN CIRCUIT BREAKER
MCC MOTOR CONTROL CENTER
MECH. MECHANICAL
MIN. MINIMUM
MLO MAIN LUGS ONLY
MTD MOUNTED

- N -
NC NORMALLY CLOSED
NEC NATIONAL ELECTRICAL CODE
NECA NATIONAL ELECTRICAL CONTRACTOR'S ASSOCIATION
NEMA NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NEUT NEUTRAL
NFC NATIONAL FIRE CODE
NF NON-FUSIBLE
NFPA NATIONAL FIRE PROTECTION ASSOCIATION
NIC NOT IN CONTRACT
NO NORMALLY OPEN
NTS NOT TO SCALE

- O -
OCPD OVER CURRENT PROTECTION DEVICE

- P -
P POLE
PH PHASE
PNL PANEL
PV PHOTOVOLTAIC
PVC POLYVINYL CHLORIDE
PWR POWER

- Q -
QTY QUANTITY

- R -
(R) RELOCATE
RECEP RECEPTACLE
REQ'D REQUIRED
RGS RIGID GALVANIZED STEEL
RSC RIGID STEEL CONDUIT

- S -
SCHED SCHEDULE
SECT SECTION
SP SINGLE POLE
SN SOLID NEUTRAL
SPEC SPECIFICATION
SW SWITCH
SWBD SWITCHBOARD
SWGR SWITCH GEAR
SYS SYSTEM

- T -
TEMP TEMPORARY
TELE TELEPHONE
T-STAT THERMOSTAT
TTB TELEPHONE TERMINAL BACKBOARD
TTC TELEPHONE TERMINAL CABINET
TYP. TYPICAL

- U -
UBC UNIFORM BUILDING CODE
UL UNDERWRITERS LABORATORY
U.N.O. UNLESS NOTED OTHERWISE

- V -
V VOLT OR VOLTAGE
VA VOLT AMPERE
VD VOLTAGE DROP
VFD VARIABLE FREQUENCY DRIVE
VP VAPOR PROOF

- W -
W WATT, WIRE
WP WEATHERPROOF, NEMA 3R

- X -
XFMR TRANSFORMER

ELECTRICAL SHEET INDEX

SHEET NUMBER	SHEET TITLE
E-001	GENERAL NOTES, SYMBOL LIST & SHEET INDEX
E-002	SINGLE LINE DIAGRAM & PANEL SCHEDULES
E-101	ENLARGED ELECTRICAL FLOOR PLANS & RCP
E-201	ELECTRICAL DETAILS
AV-101	AV ENLARGED INFATRUCTURE & EQUIPMENT PLANS
AV-102	AV RISER DIAGRAMS

APPROVAL

CLIENT

RANCHO SANTIAGO Community College District
Santa Ana College • Santiago Canyon College

RANCHO SANTIAGO COMMUNITY COLLEGE DISTRICT

2323 N Broadway, Santa Ana, CA 92706

PROJECT NAME

H229 PROJECTOR AT SANTIAGO CANYON COLLEGE

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PROJECT ADDRESS

ENGINEER/ARCHITECT

IDS

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STAMP

REGISTERED PROFESSIONAL ENGINEER — STEVEN M. COLVIN — No. E22808 — ELECTRICAL — STATE OF CALIFORNIA

STAMP

ISSUE

REV.	DESCRIPTION	DATE
	SCHEMATIC DESIGN SET	02/27/2026
	90% CD SET	03/27/2026
	100% CD SET	05/15/2026
	UPDATED 100% CD SET	07/27/2026
1	ADDENDUM #1	08/18/2026

PROJECT IDENTIFICATION

THIS DRAWING WAS CREATED IN REVIT V. 2023 UNLESS OTHER WISE NOTED.

THE ORIGINAL SIZE OF THIS SHEET IS 30" X 42"

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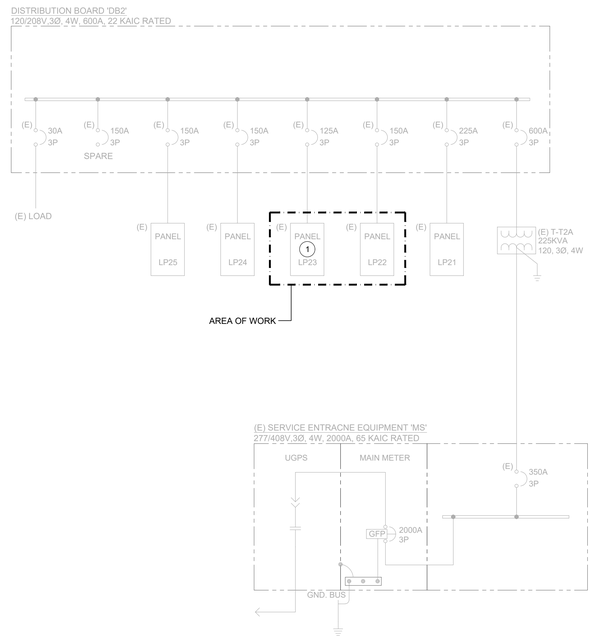
IDS PROJECT NO.	25X100.00
DRAWN BY	AL
CHECKED BY	SC
APPROVED BY	SC

SHEET TITLE

GENERAL NOTES, SYMBOL LIST & SHEET INDEX

SHEET NUMBER

E-001



PARTIAL SINGLE LINE DIAGRAM | NO SCALE | 1

(E) PANEL "LP22"

MOUNTING SURFACE | DOUBLE LUG NO | Volts: 208Y/120V | MAIN MLO
NEMA 3R NO | 200% NO | Phases: 3 | BUS 250 A
FEED THRU NO | I/G BUS NO | Wires: 4 | A.I.C. 10,000

NOTES	LOADS	CIRC	DESCRIPTION	TRIP AMPS	POLES	A	B	C	A	B	C	POLES	TRIP AMPS	DESCRIPTION	CIRC	LOADS	NOTES
9	P	1	(E) RM 200/224/225 IG RECEPT.	20A	1							1	20A	(E) LOBBY 200 IG	2	R	9
9	R	3	(E) RM 200/224/225 RECEPT.	20A	1							1	20A	(E) RM 200/201/223/224 IG RECEPT.	4	R	9
9	R	5	(E) RM 200/223/224 IG RECEPT.	20A	1							1	20A	(E) RM 200/203/204 RECEPT.	6	R	9
9	R	7	(E) RM 223/224 RECEPT.	20A	1							1	20A	(E) RM 218 COPIER	8	R	9
9	R	9	(E) RM 221/222 IG RECEPT.	20A	1							1	20A	(E) RM 210 RECEPT.	10	R	9
9	R	11	(E) RM 200/221/222 RECEPT.	20A	1							1	20A	(E) RM 208 COPIER	12	R	9
9	R	13	(E) RM 200/219/220 IG RECEPT.	20A	1							1	20A	(E) RM 210 RECEPT.	14	R	9
9	R	15	(E) RM 219/220 RECEPT.	20A	1							1	20A	(E) RM 209 COPIER	16	R	9
9	R	17	(E) RM 200/218 RECEPT.	20A	1							1	20A	(E) RM 210 RECEPT.	18	R	9
9	R	19	(E) RM 218 RECEPT.	20A	1							1	20A	(E) RM 208-1,2,3 IG RECEPT.	20	R	9
9	R	21	(E) RM 217/218 IG RECEPT.	20A	1							1	20A	(E) RM 208-1,2,3 RECEPT.	22	R	9
9	R	23	(E) RM 217/218 RECEPT.	20A	1							1	20A	(E) RM 209-4,1,5,2 IG RECEPT.	24	R	9
9	R	25	(E) RM 215/216 IG RECEPT.	20A	1							1	20A	(E) RM 209-4,1,5,2 RECEPT.	26	R	9
9	R	27	(E) RM 200/215/216 RECEPT.	20A	1							1	20A	(E) RM 209-4,2 IG RECEPT.	28	R	9
9	R	29	(E) RM 214 IG RECEPT.	20A	1							1	20A	(E) RM 209-4,2 RECEPT.	30	R	9
9	R	31	(E) RM 211-214 RECEPT.	20A	1							1	20A	(E) ELEC. DOOR LOCKS	32	M	9
9	R	33	(E) CORRIDOR 253 COPIER	20A	1							1	20A	(E) ELEC. DOOR LOCKS	34	M	9
9		35	(E) SPARE	20A	1							1	20A	(E) CLASS 209-5 PROJECTOR	36	R	9
9	R	37	(E) RM 240 PROJECTOR	20A	1							1	20A	(E) CLASS 241 PROJECTOR	38	R	9
9	R	39	(E) RM 239 PROJECTOR	20A	1							1	20A	(E) CLASS 209-4 PROJECTOR	40	R	9
9	R	41	(N) CLASS 207 PROJECTOR	20A	1							1	20A	(E) LAB 206 PROJECTOR	42	R	9

	ØA	ØB	ØC
TOTAL LOAD CONNECTED:	0	0	0
TOTAL CONNECTED AMPS:	0 A	0 A	0 A
TOTAL LOAD DEMAND:	0	0	0
TOTAL DEMAND AMPS:	0 A	0 A	0 A

100% PERCENT BALANCE

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL LOADS	
CONTINUOUS LOAD = C	0	125%	0		
KITCHEN EQUIPMENT LOAD = K	0	100%	0	TOTAL CONN. LOAD (VA):	0
LIGHTING LOAD = L	0	125%	0	TOTAL EST. DEMAND (VA):	0
MOTOR LOAD = M	0	0 @100% /0 @125%	0	TOTAL CONN. (AMPS):	0
NON-CONTINUOUS LOAD = N	0	100%	0	**TOTAL EST. DEMAND (AMPS):**	**0**
PANEL LOAD = P	0	100%	0	HIGH LEG DEMAND (AMPS):	0
RECEPTACLE LOAD = R	0	100%	0		

PANEL SCHEDULE NOTES:

1. PROVIDE LOCK-ON DEVICE.
2. PROVIDE LOCK-OFF DEVICE.
3. CIRCUIT BREAKER CONTROLLED BY ANSUL SYSTEM. REFER TO HOOD FIRE SYSTEM INTERLOCK DIAGRAM.
4. PROVIDE GFCI TYPE DEVICE.
5. PROVIDE A RED CIRCUIT BREAKER.
6. PROVIDE A NEW BREAKER TO EXISTING TYPE AND A.I.C. RATING IN PANEL.
7. PROVIDE "HACR" TYPE CIRCUIT BREAKER. FOR HVAC EQUIPMENT.
8. PROVIDE PHOTOCELL AND TIME CLOCK CLOCK WITH RELAYS FOR EXTERIO LIGHITNG CONTROL. REFER TO EXTERIOR LIGHTING CONTROL DIAGRAM.
9. EXISTING BREAKER
10. CIRCUIT MADE AVAILABLE THROUGH DEMOLITION
11. REMOVE EXISTING 3 POLE CIRCUIT BREAKER

(E) PANEL "LP23"

MOUNTING SURFACE | DOUBLE LUG NO | Volts: 208Y/120V | MAIN MLO
NEMA 3R NO | 200% NO | Phases: 3 | BUS 125 A
FEED THRU NO | I/G BUS NO | Wires: 4 | A.I.C. 10,000

NOTES	LOADS	CIRC	DESCRIPTION	TRIP AMPS	POLES	A	B	C	A	B	C	POLES	TRIP AMPS	DESCRIPTION	CIRC	LOADS	NOTES
9	P	1	(E) HVAC CONTROL PANEL	20A	1							2	15A	(E) CRAC-2	2	M	9
9	C	3	(E) CRAC-2TCP8	20A	1							--			4	M	9
9	C	5	(E) SMOKE FIRE DAMPERS	20A	1							1	30A	(E) IDF 102 L5-30R RECEPT	6	R	9
9	M	7	(E) VAV BOX	20A	1							1	30A	(E) IDF 102 L5-30R RECEPT	8	R	9
9	M	9	(E) VAV BOX	20A	1							1	30A	(E) IDF 102 L5-30R RECEPT	10	R	9
9	M	11	(E) VAV BOX	20A	1							1	30A	(E) IDF 102 L5-30R RECEPT	12	R	9
9	M	13	(E) VAV BOX	20A	1							1	20A	(E) IDF 102 L5-20R RECEPT	14	R	9
9	R	15	(E) RM 206/239/240 REC	20A	1							1	20A	(E) IDF 102 L5-20R RECEPT	16	R	9
9	R	17	(E) RM 206/207/239/240 REC	20A	1							1	20A	(E) IDF 102 L5-20R RECEPT	18	R	9
9	R	19	(E) RM 207 COPIER	20A	1							1	20A	(E) IDF 102 L5-20R RECEPT	20	R	9
9	L	21	(E) COORIDOR 253 LED LTS	20A	1							1	20A	(E) IDF 202 L5-30R RECEPT	22	R	9
9	R	23	(E) RM 209, -1-5 IG REC	20A	1							1	30A	(E) IDF 202 L5-30R RECEPT	24	R	9
9	R	25	(E) RM 209, -1,-5-1 REC	20A	1							1	30A	(E) IDF 202 L5-30R RECEPT	26	R	9
9	R	27	(E) RM 209-5/210 IG REC	20A	1							1	30A	(E) IDF 202 L5-30R RECEPT	28	R	9
9	R	29	(E) RM 209-5/210 REC	20A	1							1	20A	(E) IDF 202 L5-20R RECEPT	30	R	9
9	R	31	(E) RM 210/241 IG REC	20A	1							1	20A	(E) IDF 202 L5-20R RECEPT	32	M	9
9	R	33	(E) RM 210/241 IG REC	20A	1							1	20A	(E) IDF 202 L5-20R RECEPT	34	M	9
9	R	35	(E) RM 210/241 REC	20A	1							1	20A	(E) IDF 202 L5-20R RECEPT	36	R	9
9	P	37	(E) PANEL LCP2	20A	1				720			3	20A	(N) CLASSROOM 207 FURNITURE WHIP	38	R	6
9	P	39	(E) PANEL LCP4M	20A	1					720		--			40	R	6
9	C	41	(E) SMOKE FIRE DAMPERS	20A	1						720	--			42	R	6

	ØA	ØB	ØC
TOTAL LOAD CONNECTED:	720	720	720
TOTAL CONNECTED AMPS:	3 A	3 A	3 A
TOTAL LOAD DEMAND:	720	720	720
TOTAL DEMAND AMPS:	6 A	6 A	6 A

100% PERCENT BALANCE

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL LOADS	
CONTINUOUS LOAD = C	0	125%	0		
KITCHEN EQUIPMENT LOAD = K	0	100%	0	TOTAL CONN. LOAD (VA):	2160
LIGHTING LOAD = L	0	125%	0	TOTAL EST. DEMAND (VA):	2160
MOTOR LOAD = M	0	0 @100% /0 @125%	0	TOTAL CONN. (AMPS):	6
NON-CONTINUOUS LOAD = N	0	100%	0	**TOTAL EST. DEMAND (AMPS):**	**6**
PANEL LOAD = P	0	100%	0	HIGH LEG DEMAND (AMPS):	6
RECEPTACLE LOAD = R	2160	100%	2160		

PANEL SCHEDULE NOTES:

1. PROVIDE LOCK-ON DEVICE.
2. PROVIDE LOCK-OFF DEVICE.
3. CIRCUIT BREAKER CONTROLLED BY ANSUL SYSTEM. REFER TO HOOD FIRE SYSTEM INTERLOCK DIAGRAM.
4. PROVIDE GFCI TYPE DEVICE.
5. PROVIDE A RED CIRCUIT BREAKER.
6. PROVIDE A NEW BREAKER TO EXISTING TYPE AND A.I.C. RATING IN PANEL.
7. PROVIDE "HACR" TYPE CIRCUIT BREAKER. FOR HVAC EQUIPMENT.
8. PROVIDE PHOTOCELL AND TIME CLOCK CLOCK WITH RELAYS FOR EXTERIO LIGHITNG CONTROL. REFER TO EXTERIOR LIGHTING CONTROL DIAGRAM.
9. EXISTING BREAKER
10. CIRCUIT MADE AVAILABLE THROUGH DEMOLITION
11. REMOVE EXISTING 3 POLE CIRCUIT BREAKER

SINGLE LINE GENERAL NOTES

1. OVERCURRENT DEVICES IN AN INDIVIDUAL PIECE OF EQUIPMENT SHALL HAVE AN AIC RATING EQUAL TO THE OVERALL RATING OF THE EQUIPMENT - SERIES RATING OF DEVICES WITHIN A PIECE OF EQUIPMENT IS NOT ALLOWED.
2. SERIES CONNECTED DEVICES SHALL HAVE BEEN INVESTIGATED BY UL IN COMBINATION WITH THE END USE EQUIPMENT, AND THE EQUIPMENT IN WHICH THESE DEVICES ARE USED SHALL BE MARKED WITH THE SERIES CONNECTED RATING. EQUIPMENT SHALL BE MARKED IN ACCORDANCE WITH NEC REQUIREMENTS.
3. TERMINATIONS AND ENCLOSURES SHALL BE RATED FOR USE WITH 75 DEGREE CELSIUS CONDUCTORS.

KEYNOTES

1. CONTRACTOR TO MOVE CIRCUITS 38 & 40 TO CIRCUITS 3 & 21 RESPECTIVLY (30-DAY LOAD STUDY REQUIRED).

APPROVAL

CLIENT

RANCHO SANTIAGO Community College District
Santa Ana College • Santiago Canyon College

RANCHO SANTIAGO COMMUNITY COLLEGE DISTRICT

2323 N Broadway, Santa Ana, CA 92706

PROJECT NAME

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8045 EAST CHAPMAN AVENUE, ORANGE, CA 92868

PROJECT ADDRESS

ENGINEER/ARCHITECT

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REGISTERED PROFESSIONAL ENGINEER STEVEN M. COLLINS No. E22808 ELECTRICAL STATE OF CALIFORNIA

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ISSUE

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SHEET TITLE

SINGLE LINE DIAGRAM & PANEL SCHEDULES

SHEET NUMBER

E-002

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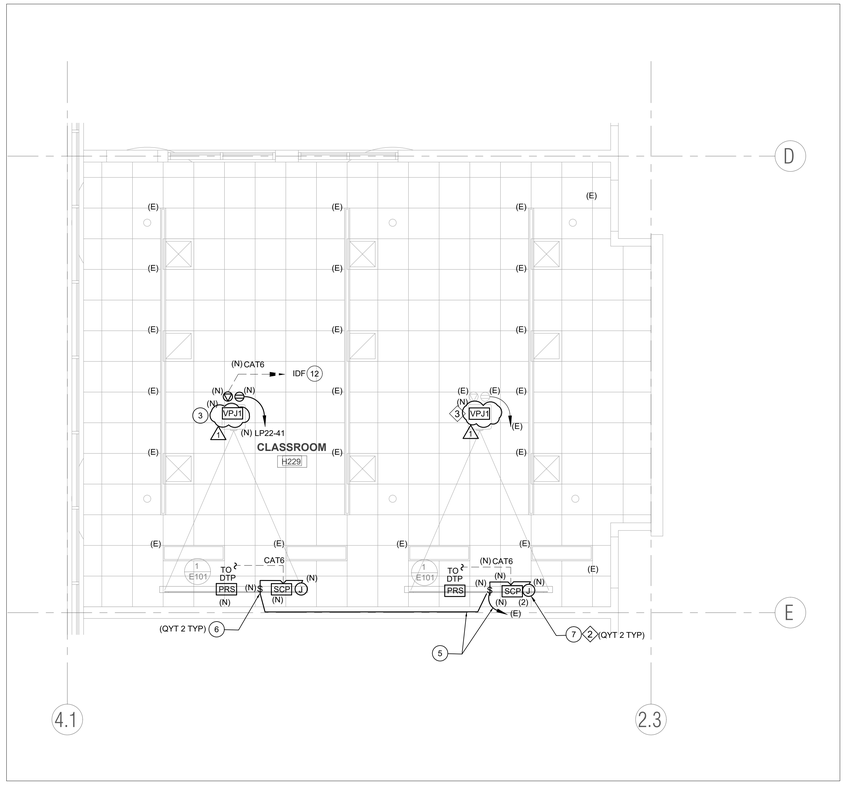
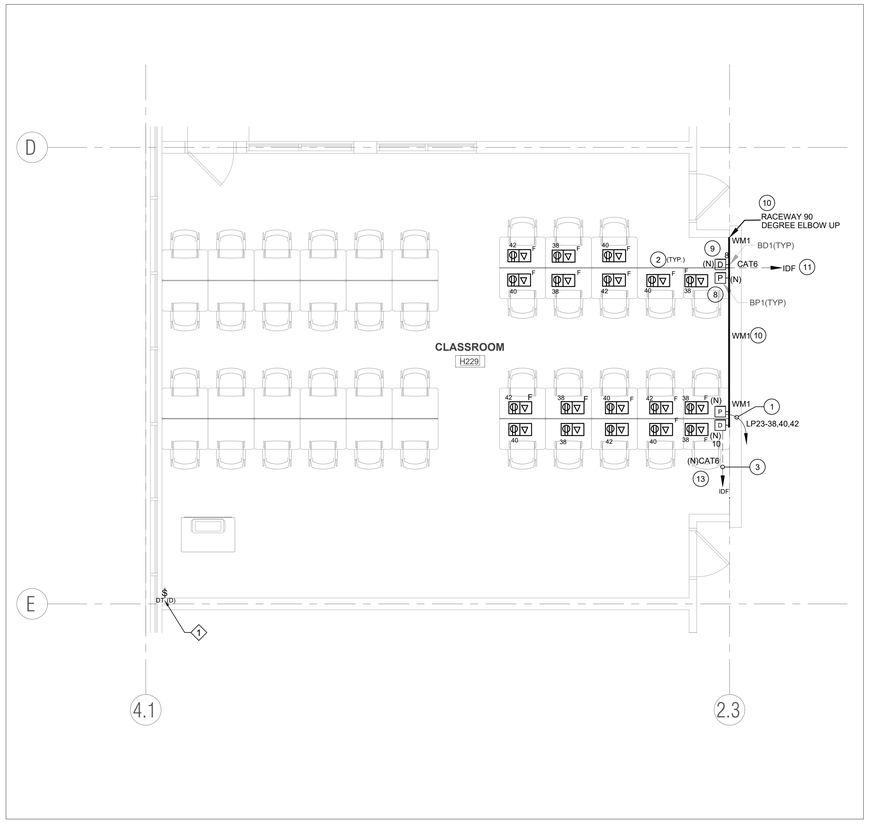
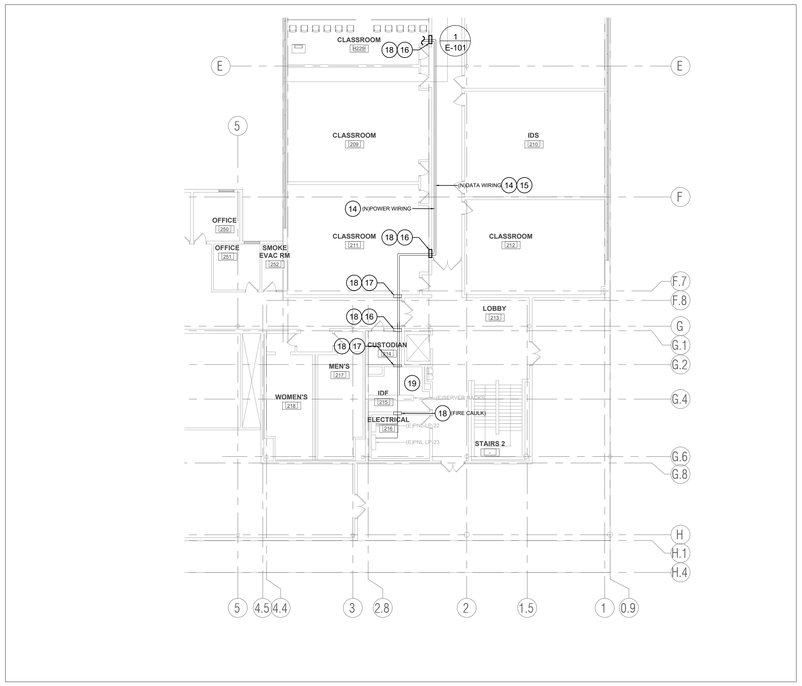


REFLECTED CEILING PLAN | 1/4" = 1'-0" | 3



POWER PLAN | 1/4" = 1'-0" | 1



PARTIAL EXISTING ELECTRICAL AND IDF ROOM PART PLAN | 1/16" = 1'-0" | 2

POWER PLAN GENERAL NOTES

1. PENETRATIONS THROUGH FIRE RATED WALLS SHALL BE PROTECTED FROM THE SPREAD OF FIRE W/ AN APPROVED FIRESTOP SYSTEM EQUAL OR GREATER THAN THE FIRE RATING OF THE WALL.
2. 1-1/4" C.O. HOME RUN FOR EACH TELE/DATA OUTLET 6" IN THE CEILING SPACE, U.N.O.
3. FURNITURE DATA DROPS SHALL BE PROVIDED WITH 4S BACKBOX, SINGLE GANG PLASTER RING, AND WALLPLATE WITH GROMMETTED HOLE OPENING FOR CABLE EXIT. PROVIDE 1-1/4"C FROM BACKBOX UP TO ACCESSIBLE CEILING SPACE.
4. ALL LOW VOLTAGE RACEWAYS SHALL BE TERMINATED AT EACH END WITH A CONNECTOR AND INSULATING BUSHING.
5. FURNITURE POWER DROP SHALL INCLUDE 4S BACKBOX, SINGLE GANG PLASTER RING,WALL PLATE WITH 90 DEGREE CONDUIT ELBOW CONNECTOR AND 3/4" FMC FROM WALL PLATE TO FURNITURE BASE-POWER-IN LOCATION.
6. CONTRACTOR SHALL COORDINATE ALL REQUIREMENTS FOR WALL OPENINGS WITH G.C. FOR INSTALLATION OF NEW OUTLETS. ALL NEW WALL OPENINGS SHALL BE PATCHED, REPAIRED AND PAINTED TO MATCH EXISTING.
7. FIELD COORDINATE EXACT FURNITURE BASE-POWER-IN LOCATIONS AND ADJUST INDICATED LOCATIONS FOR POWER AND DATA DROPS ACCORDINGLY. POWER AND DATA DROPS SHALL BE INSTALLED IN ACCESSIBLE LOCATION.
8. BRANCH CIRCUIT WIRING SHALL BE 3/4"C, (2) #12, (1)#12 GND TYP. U.O.N.
9. FIELD COORDINATE EXACT LOCATION FOR BPI/BDI WITH FURNITURE CONTRACTOR
10. INSTALL CAT6 CABLE ABOVE ACCESSIBLE CEILING ON J-HOOKS SPACED APPROXIMATELY 4 FEET ON CENTER (TYP). DATA CABLING SHALL BE SUPPORTED SO AS NOT TO TOUCH CEILING TILE.
11. CAT6 CABLE SHALL BE PLENUM RATED.
12. FIRE RATED WALL LOCATIONS BASED ON AS-BUILT FLOOR PLANS. CONTRACTOR SHALL FIELD COORDINATE EXACT REQUIREMENTS.

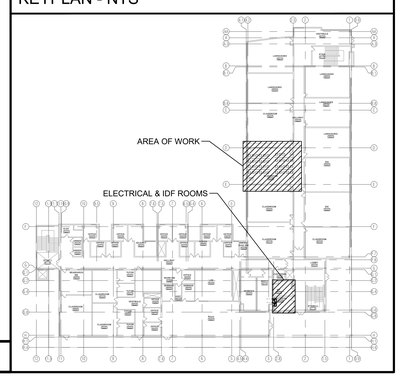
KEYNOTES

1. PROVIDE 3/4" C. WITH (3) #12 H + (3) #12 N + (1) #12 GND.
2. PROVIDE DATA PLATES AND TERMINATE. PROVIDE CAT 6 PATCH CABLES AS NECESSARY TO RUN TO EACH COMPUTER AT REQUIRED LENGTH.
3. PROVIDE (10) CAT 6 CABLES FROM FURNITURE BACK TO LOCAL IDF: TERMINATIONS, LABELING AND TESTING PER OWNER REQUIREMENTS.
4. PROVIDE DA-LITE THREE BUTTON LOW VOLTAGE WALL SWITCH CONTROL MODEL DL16622.
5. EXTEND EXISTING PROJECTOR SCREEN 20A, 120V BRANCH CIRCUIT WIRING TO THE TWO NEW PROJECTOR SCREEN CONTROLLERS.
6. PROVIDE LOCAL PROJECTOR SCREEN CONTROLLER DISCONNECT, 20A, 120V, SPST TOGGLE SWITCH MOUNTED ABOVE ACCESSIBLE CEILING LOCATION.
7. PROJECTOR SCREEN JBOX FROM MANUFACTURER; FIELD COORDINATE EXACT LOCATION.
8. FURNITURE POWER OUTLETS AND WIRING FROM BPI TO THE FURNITURE OUTLETS FURNISHED AND INSTALLED BY FURNITURE CONTRACTOR.DIVISION 26 SHALL EXTEND BUILDING WIRING TO FURNITURE BPI LOCATION AND TERMINATE.
9. FURNITURE DATA OUTLETS FURNISHED AND INSTALLED BY FURNITURE CONTRACTOR. BUILDING DATA WIRING FURNISHED AND INSTALLED BY OWNERS TECHNOLOGY CONTRACTOR UNDER THIS CONTRACT.
10. PROVIDE LEGRAND AL5200 SERIES SURFACE METAL RACEWAY,DUAL CHANNEL. ENTRANCE END FITTING, END FITTING, COVER, ALUMINIUM FINISH, FURNITURE FEED EXIT PLATES, COUPLINGS,COVER CLIPS, WIRE CLIPS.PROVIDE RACEWAY 90DEGREE ELBOW AND RACEWAY UP TO ACCESSIBLE CEILING LOCATION.MOUNT RACEWAY 18" AFF.
11. PROVIDE (8) CAT 6 CABLES FROM FURNITURE BACK TO LOCAL IDF;TERMINATIONS,LABELING AND TESTING PER OWNER REQUIREMENTS.
12. PROVIDE (1) CAT 6 CABLE FROM CEILING DEVICE BACK TO LOCAL IDF CLOSET; TERMINATIONS,LABELING AND TESTING PER OWNER REQUIREMENTS.
13. HOMERUN 23 CAT 6 CABLES TO IDF; SUPPORT ON JHOOKS AND/OR EXISTING CABLE TRAY. CABLE QUANTITY INCLUDES THE QUANTITY OF CABLES INDICATED ON BOTH THE ELECTRICAL AND AUDIO VISUAL PLANS.
14. APPROXIMATE PATH FOR NEW POWER AND DATA WIRING. CONTRACTOR SHALL ROUTE ALL WIRING ABOVE ACCESSIBLE CEILING SPACES TYPICAL; REMOVE AND REINSTALL CEILING PANELS TO FACILITATE WORK. FIELD COORDINATE EXACT PATH.
15. CONTRACTOR SHALL SUPPORT DATA WIRING ON NEW J-HOOKS SUPPORTED FROM STRUCTURE WHERE WIRING IS LOCATED ABOVE ACCESSIBLE CEILING TYPICAL. MAXIMUM SPACE 4 FEET ON CENTER. CONTRACTOR SHALL TRANSITION TO 4"C SUPPORTED FROM STRUCTURE WHERE WIRING IS INSTALLED IN EXPOSED UNFINISHED LOCATIONS WITHOUT ACCESSIBLE CEILING.
16. CONTRACTOR SHALL PROVIDE REQUIRED NON-FIRE RATED WALL PENETRATION AND CONDUIT SLEEVE FOR DATA WIRING: 4" RMC TYPICAL WITH INSULATING BUSHINGS AT BOTH ENDS.
17. CONTRACTOR SHALL PROVIDE REQUIRED FIRE RATED WALL PENETRATION AND CONDUIT SLEEVE FOR DATA WIRING SIMILAR TO STI EZ-PATH 44 SERIES FIRE RATED PATHWAY OR EQUIVALENT; PROVIDE REQUIRED 6" DIAMETER WALL PENETRATION FOR INSTALL.
18. PROVIDE REQUIRED WALL PENETRATION FOR POWER CONDUIT PENETRATION REQUIREMENTS. FIRE CAULK ALL REQUIRED FIRE RATED WALL PENETRATIONS - REFER TO KEYNOTE 17 FOR LOCATIONS.
19. ROUTE DATA CABLING ON (E) CABLE TRAY WITHIN IDF ROOM TYPICAL TO EXISTING SERVER RACK DATA PATCH PANEL LOCATION. FIELD COORDINATE EXACT REQUIREMENTS WITH OWNER'S IT DEPARTMENT.

DEMOLITION KEY

1. REMOVE EXISTING RAISE/LOWER SCREEN WALL SWITCH AND ASSOCIATED WIRING BACK TO SOURCE.
2. REMOVE EXISTING MOTORIZED SCREEN AND ASSOCIATED CONTROLD; SAFE-OFF EXISTING LPOWER WIRING FOR CONNECTION TO NEW SCREEN.
3. REMOVE EXISTING PROJECTOR AND ASSOCIATED CONTROL WIRING BACK TO SOURCE.

KEYPLAN - NTS



APPROVAL

CLIENT

RANCHO SANTIAGO Community College District
Santa Ana College • Santiago Canyon College

RANCHO SANTIAGO COMMUNITY COLLEGE DISTRICT

2323 N Broadway, Santa Ana, CA 92706

PROJECT NAME

H229 PROJECTOR AT SANTIAGO CANYON COLLEGE

8045 EAST CHAPMAN AVENUE, ORANGE, CA 92868

PROJECT ADDRESS

ENGINEER/ARCHITECT

IDS

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REGISTERED PROFESSIONAL ENGINEER
STEVEN W. COLTRIN
No. E22808
Exp. 06-30-27
ELECTRICAL
STATE OF CALIFORNIA

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ISSUE		
REV.	DESCRIPTION	DATE
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1	ADDENDUM #1	08/18/2026

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IDS PROJECT NO.	25X100.00
DRAWN BY	AL
CHECKED BY	SC
APPROVED BY	SC

SHEET TITLE

ENLARGED ELECTRICAL FLOOR PLANS & RCP

SHEET NUMBER

E-101

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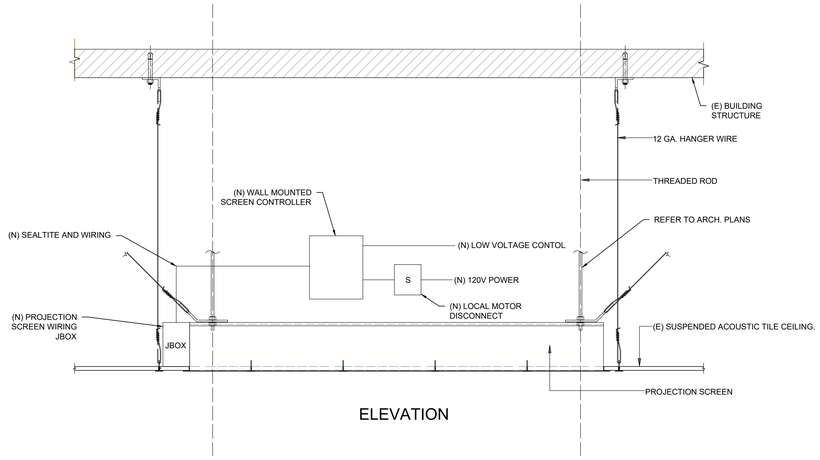
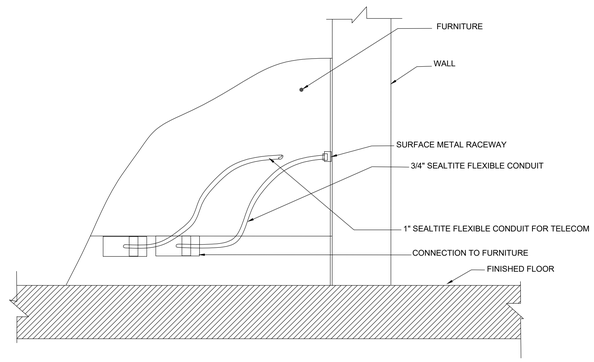
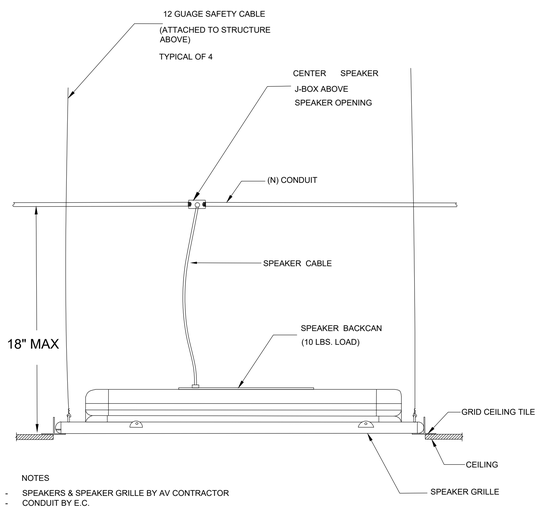


PROJECTOR SCREEN ELECTRICAL DETAIL | NO SCALE | 5

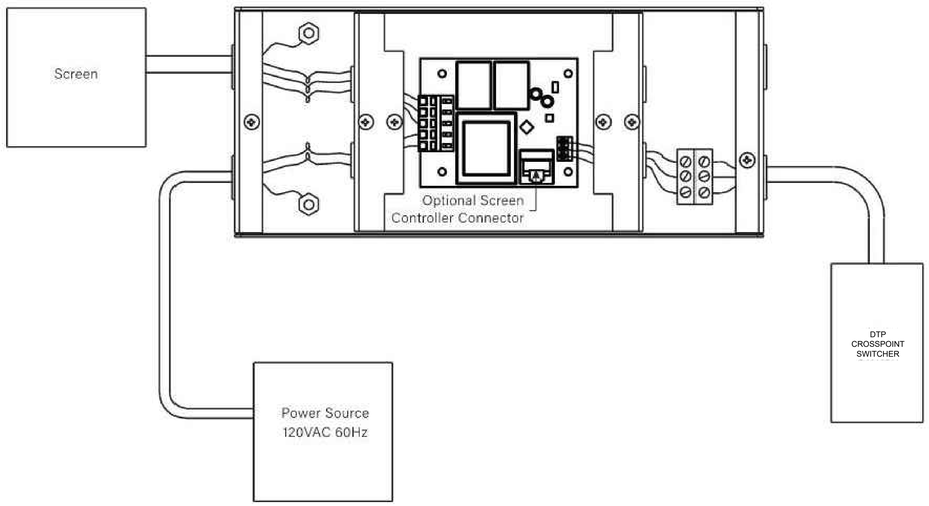


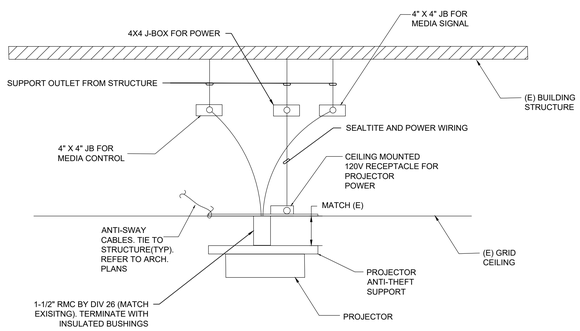
MODULAR FURNITURE CONNECTION - WALL OUTLET | NTS | 2



NOTES
- SPEAKERS & SPEAKER GRILLE BY AV CONTRACTOR
- CONDUIT BY E.C.

TYPICAL CEILING SPEAKER "SC1" DETAIL | NTS | 4





PROJECTION CEILING MOUNT DETAIL | NTS | 3

PROJECTION SCREEN CONTROL SCHEMATIC | NTS | 1

APPROVAL

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ELECTRICAL DETAILS

SHEET NUMBER

E-201

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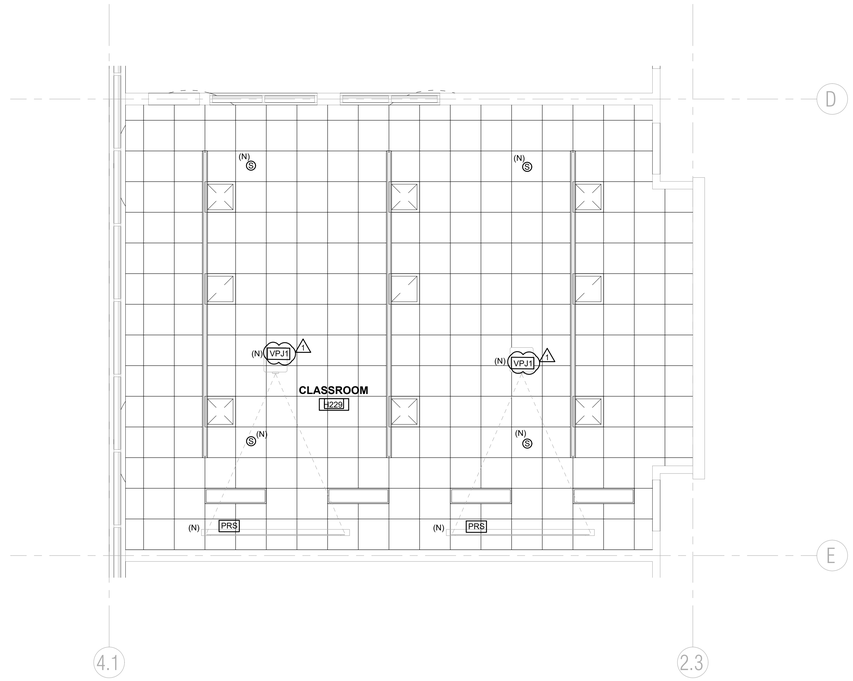
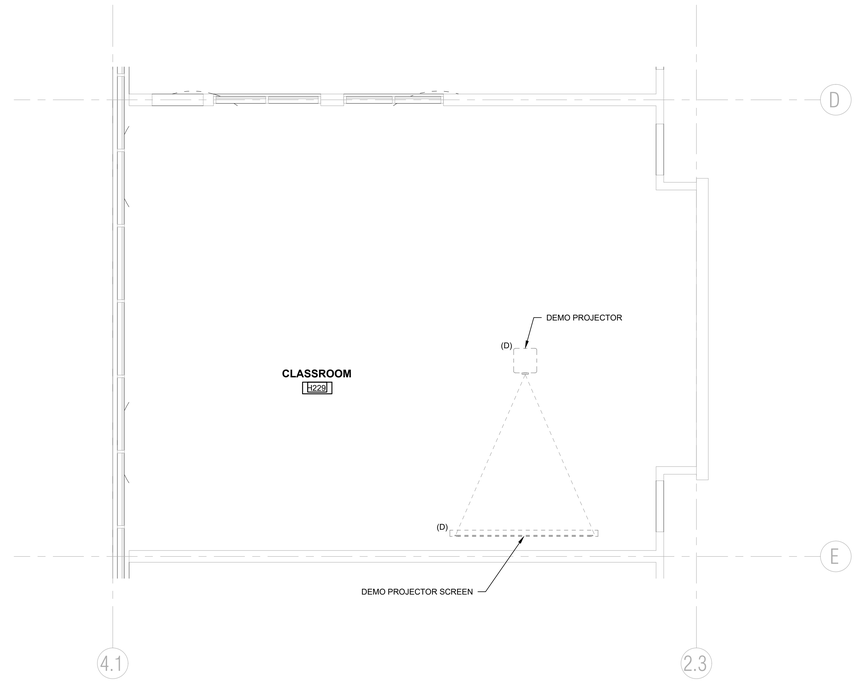
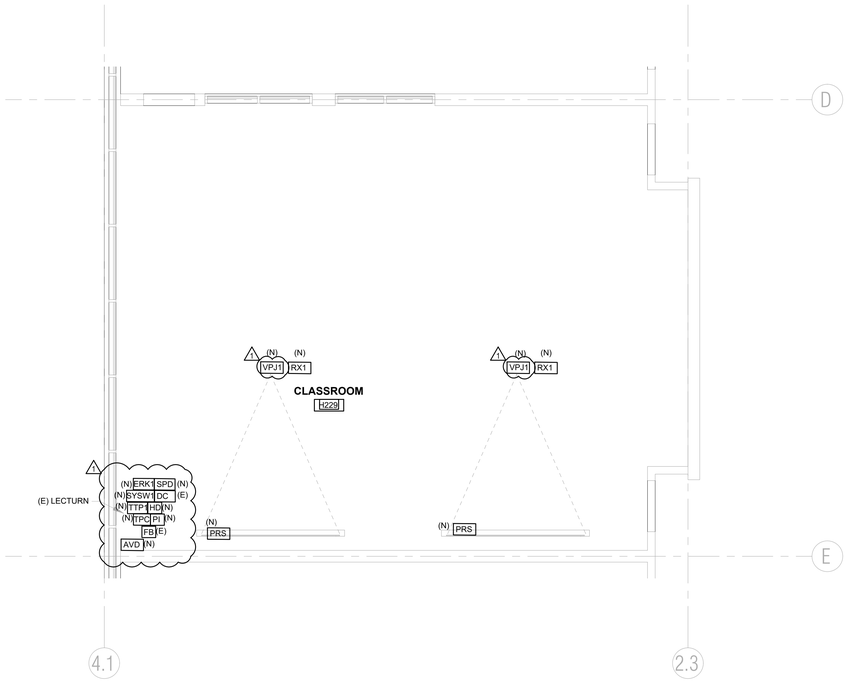


AUDIO/VISUAL RCP PLAN | 1/4" = 1'-0" | 1



AUDIO/VISUAL RCP DEMOLITION PLAN | 1/4" = 1'-0" | 3



PARTIAL EXISTING ELECTRICAL AND IDF ROOM PART PLAN | 1/4" = 1'-0" | 2

AUDIO/VISUAL DEMOLITON PLAN | 3/32" = 1'-0" | 4

AUDIO VISUAL PLAN GENERAL NOTES

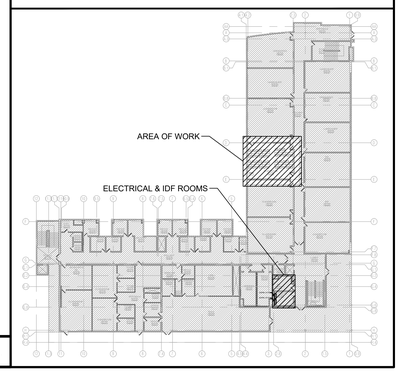
1. PROVIDE 2 GANG BACK BOX, SINGLE GANG PLASTER RING, 1"C.O. UP TOP ACCESSIBLE CEILING LOCATION WITH NYLON BUSHING AT BOTH ENDS TYPICAL FOR EACH WALLMOUNTED AV OUTLET LOCATION. WHERE RACEWAY CAN NOT BE INSTALLED WITHIN EXISTING WALL CONTRACTOR SHALL PROVIDE TWO-PIECE, SINGLE CHANNEL SURFACE METAL RACEWAY AND SURFACE MOUNTED BACK BOX.
2. PROVIDE 2 GANG BACK BOX, 1" C.O. UP TO NEAREST CABLE TRAY/J-HOOK LOCATION. NYLON BUSHING AT BOTH ENDS TYPICAL FOR EACH CEILING MOUNTED AV OUTLET LOCATION.
3. ABOVE CEILING POWER OUTLETS ARE NOT PERMITTED BY CEC CODE TO CONNECT TO EQUIPMENT VIA PLUG AND CORD; ALL CONNECTIONS TO EQUIPMENT VIA CORD SHALL BE MADE BELOW CEILING. PER UNIT PRICING SHALL INCLUDE RELOCATING EXISTING RECEPTACLE AND ASSOCIATED BRANCH CIRCUIT WIRING TO BELOW CEILING LOCATION.
4. OFFSET BACK-TO-BACK OUTLET BOXES BY 16 INCHES TYPICAL.
5. ABOVE CEILING POWER OUTLETS ARE NOT PERMITTED BY CEC CODE TO CONNECT TO EQUIPMENT VIA PLUG AND CORD; ALL CONNECTIONS TO EQUIPMENT VIA CORD SHALL BE MADE BELOW CEILING.
6. CEILING MOUNTED DEVICES SHALL BE INSTALLED CENTER OF TILE.

KEYNOTES

AV BILL OF MATERIAL

1. 1X EXTRON DTP CROSSPOINT 82 4K - EXTRON 60-1583-93.
2. 1X EXTRON 1025T - EXTRON 60-1565-12.
3. 1X EXTRON PI 115 POE INJECTOR - 60-1233-02.
4. 1XEXTRON USBC HD101 - EXTRON 26-759-45
5. 1XEXTRON CABLE CUBBY 700 - 60-1893-02
6. 4XEXTRON FF 220T + ALL REQUIRED EQUIPMENT FOR AUDIO TO INTEGRATE.
7. 2XEPSON L690U PROJECTORS.
8. 1XBMS LOC 11 - LCD LOC 11 SW (WHT) PREFERRED LOCK NUMBER 13
9. 1X ELMOTT - 12G PRODUCT CODE #1380
10. 2X DA-LITE TENSIONED CONTOUR ELECTROL - 109" SCREEN SIZE FOR STANDARD CLASSROOM.
11. 2X EXTRON DTP HDMI 4K 230 RX RECIEVER.

KEYPLAN - NTS



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TEL: 949-387-8500, FAX: 949-387-0800

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REGISTERED PROFESSIONAL ENGINEER STEVEN M COLLINS No. E22808 Exp. 06/30/26 ELECTRICAL STATE OF CALIFORNIA

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ISSUE		
REV.	DESCRIPTION	DATE
	SCHEMATIC DESIGN SET	02/27/2026
	90% CD SET	03/27/2026
	100% CD SET	05/15/2026
	UPDATED 100% CD SET	07/27/2026
1	ADDENDUM #1	08/18/2026

PROJECT IDENTIFICATION

THIS DRAWING WAS CREATED IN REVIT V. 2023 UNLESS OTHER WISE NOTED.

THE ORIGINAL SIZE OF THIS SHEET IS 30" X 42"

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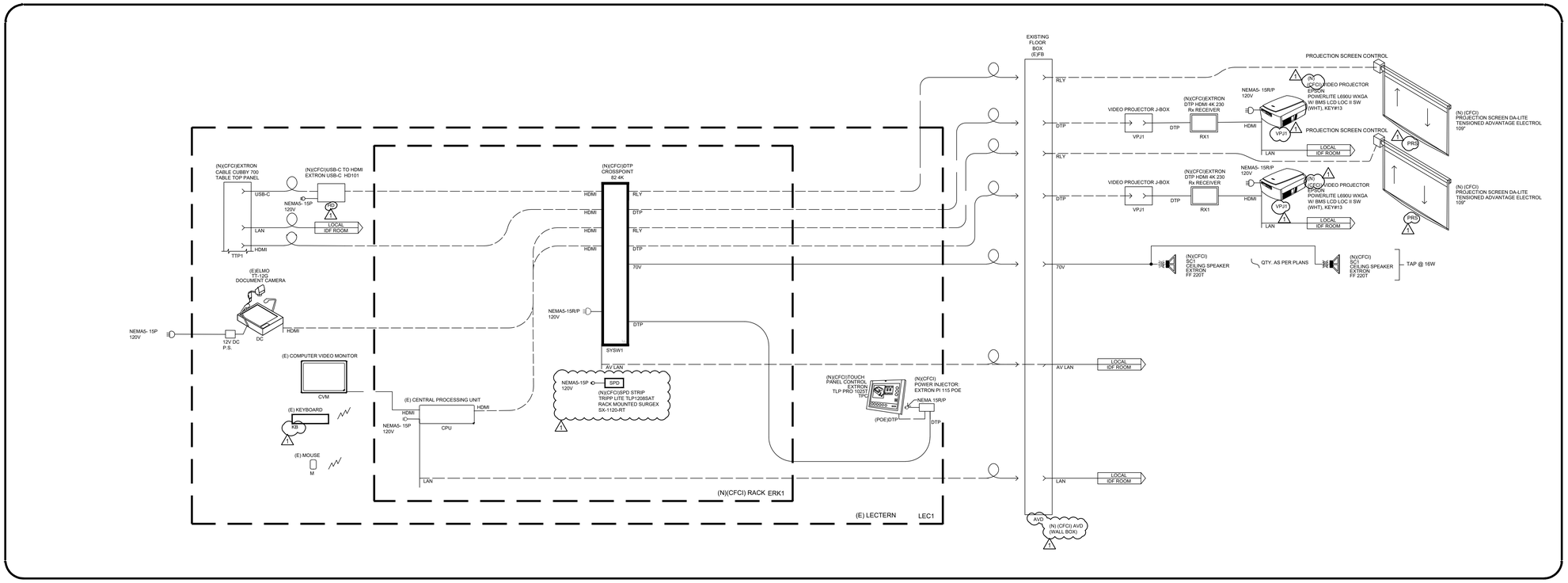
SHEET TITLE

AV ENLARGED INFATRUCTURE & EQUIPMENT PLANS

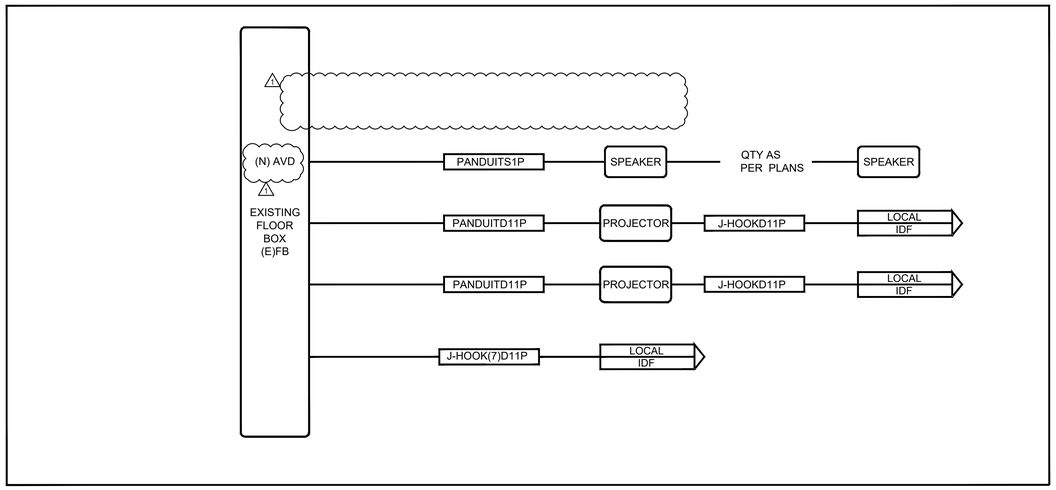
SHEET NUMBER

AV-101

USER: DWG TO PDF.PC3
PLOT DATE: 8/18/2026 2:20 PM
IDS GROUP - FILE LOCATION: --



AV ONLINE DIAGRAMS | NO SCALE | 1



AV RISER DIAGRAM | NO SCALE | 1

USER: DWG TO PDF.PC3

PLOT DATE: 8/18/2026 2:20 PM

IDS GROUP - FILE LOCATION: --

APPROVAL

CLIENT

RANCHO SANTIAGO Community College District
Santa Ana College • Santiago Canyon College

RANCHO SANTIAGO COMMUNITY COLLEGE DISTRICT

2323 N Broadway, Santa Ana, CA 92706

PROJECT NAME

H229 PROJECTOR AT SANTIAGO CANYON COLLEGE

8045 EAST CHAPMAN AVENUE, ORANGE, CA 92868

PROJECT ADDRESS

ENGINEER/ARCHITECT

IDS

IDS GROUP

1 PETERS CANYON ROAD, SUITE 130
IRVINE, CA. 92606
TEL: 949-387-8500, FAX: 949-387-0800

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SHEET TITLE

AV RISER DIAGRAMS

SHEET NUMBER

AV-102

1

SECTION 27 41 16

INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Provisions of Division 1 apply to this section.

B. Section Includes
1. Provide all labor, materials, transportation, and equipment to complete the furnishing, installation, assembly, set up, and testing of the Audio, Video and Control Systems work indicated on the drawings and specified herein. Notwithstanding any detailed information in this Section, provide complete working systems. General design intent for this project is shown on the drawings and described in the specification.
2. All equipment requiring coordination with other trades must be evaluated and verified for proper operation. The contractor is fully responsible for the coordination and must resolve all conflicts with AV equipment that connects or interacts with other systems.
3. If an operational function is specified that requires hardware or software to complete that specific function, then consider that software or hardware are part of this specification. The cost of any omissions of software or hardware necessary to complete all operational functions outlined in this specification shall be borne by the contractor providing this system.
4. Design, engineer and provide complete means of support, suspension, attachment, fastening, bracing, and seismic restraints (hereinafter "support") of the Work of this Section, including future installed equipment, in accordance with local building codes and regulations. Provide engineering of such support by parties licensed to perform work of this type in the Project jurisdiction. Contractor shall obtain the services of an engineer licensed to perform this work within the state or jurisdiction it is to be performed.
5. The Contractor shall include all costs associated with structural engineering required by code for work in this section.
6. Use skilled mechanics that are capable of returning surfaces to the appearance of new work when modifying millwork.
7. Conduit and common back boxes including four square, pull boxes, junction boxes, etc. are supplied and installed by Division 26 Electrical Contractor. Connection panels that install in these boxes are supplied by AV Contractor.
8. Provide Power Over Ethernet switches and injectors where required.
9. Provide all cable and wire associated with this specification section and related documents.
10. All systems shall be completely installed with all of the necessary interconnection, power supplies, patch cords, snakes, portable equipment cables and wiring to provide a fully functioning system.
11. The governing overall requirement for this project is a complete and functional system.
12. Include work not usually shown or specified, but necessary for proper installation and operation of the system or piece of equipment.

C. Products Supplied But Not Installed Under This Section
1. Loose equipment or products supplied but not installed shall be turned-over to the Owner immediately upon delivery. Contractor is to supply a signed statement of transfer of this equipment to the consultant for record. Client must sign this statement acknowledging receipt of this equipment.

D. Related Sections
   1. 019113 – General Commissioning Requirements
   2. Division 1.
   3. Division 9.
   4. Division 26.

E. Measurement Procedures
   1. Product quantity is as required. If a quantity is given, the Contractor will provide at least the given amount. Some products listed under this section may not be required to fulfill the obligations of the work.

1.2 REFERENCES

A. Comply with all applicable governing codes.

B. Comply with the following applicable organizations and standards:
   1. AES Audio Engineering Society
   2. ANSI American National Standards Institute
   3. ASTM American Society for Testing and Materials
   4. BICSI Building Industry Consulting Service International, Inc.
   5. BTSC Broadcast Television Stereo Committee
   6. CEDIA Custom Electronic Design and Installation Association
   7. EIA Electronic Industries Alliance
      a. RS-310-C: (ANSI C83.9) Racks, Panels, and Associated Equipment
      b. RS-453: Dimensional, Mechanical, and Electrical Characteristics Defining Phone Plugs and Jacks
   8. ETL Electrical Testing Laboratories, Inc.
   9. FCC Federal Communications Commission
   10. ICIA International Communications Industries Association
   11. IEC International Electrotechnical Commission
   12. IEEE Institute of Electrical and Electronic Engineers
   13. INCITS International Committee for Information Technology Standards
   14. ISO International Organization for Standardization
   15. ITU International Telecommunications Union
   16. NAB National Association of Broadcasters
   17. NCTA National Cable and Telecommunications Association
   18. CEC California Electrical Code
   19. NEMA National Electrical Manufacturers Association
   20. NFPA National Fire Protection Association
   21. NSCA National Systems Contractors Association
   22. OSHA Occupational Safety and Health Administration
   23. SMPTE Society of Motion Picture and Television Engineers
   24. TASO Television Allocation Study Organization
   25. TIA Telecommunications Industry Association
   26. UBC Uniform Building Code
   27. UL Underwriters Laboratories Inc.

1.3 DEFINITIONS

A. Definitions of Terms: The following definitions and conditions apply to each of the respective parameters and the measurements of those parameters, unless specifically stated otherwise:

1. Frequency Response: The minimum acceptable frequency band over which the amplitude response is within 3 dB (or any specified range), or the specified limits of the response relative to the reference frequency (1 kHz for audio, 1.0 MHz for video) under design load conditions, at any operating level up to and including the specified maximum output while fully in compliance with all other performance specifications.
2. Maximum Output Level: The minimum acceptable maximum signal output level (voltage, current or power) attained under design load conditions attained while fully in compliance with all other performance specifications.
3. Harmonic Distortion: The maximum acceptable harmonic distortion measured at any operating level, up to and including the specified maximum output, with an applied sine wave signal of any frequency in the range of the specified frequency response.
4. Audio Intermodulation Distortion: The maximum acceptable intermodulation distortion resulting from the introduction of 60 Hz and 7 kHz signals in a ratio of 4:1 under design load conditions at any operating level up to and including the specified maximum output level.
5. Signal to Noise Ratio: The minimum acceptable ratio of signal to noise levels derived from broadband measurements under design load at maximum output over the entire range of the specified frequency response.
6. Clipping Level: The minimum acceptable maximum level of signal applied to the device under design load conditions while fully in compliance with all other performance specifications.
7. Sensitivity: The maximum acceptable level of input signal applied to the device that is necessary to provide the maximum output under design load conditions.
8. Design Load: The load (in ohms) specified by usage of the particular device input or output.

B. Signal Levels: The following voltage levels shall be considered the standard operating levels for the particular circuitry, unless specifically noted otherwise (0.775 Volt = O dBu = O dBm for a 600 ohms terminated circuit):
   1. Microphone Circuits: -30 dBu or less.
   2. Audio Line Level Circuits: -30 dBu to +24 dBu; equivalent to -30 dBm to +24 dBm for a 600 ohms terminated circuit.
   3. Loudspeaker Level Circuits: More than +24 dBu.
   4. Video Line Level Circuits: 1.0 Volt, peak to peak composite signal.

C. Characteristic Impedances: The following operating impedances shall be considered to be the standard operating impedances for the particular circuitry, unless specifically noted otherwise:
   1. Microphone Circuits: 50-250 ohms source, 150-1500 ohms terminating, electrostatically and electromagnetically balanced to ground.
   2. Audio Line Level Circuits: 600 ohms maximum source, 600 ohms minimum. terminating, line to line, electrostatically and electromagnetically balanced to ground.
   3. Video Line Level Circuits: 75 ohms maximum source, 75 ohms minimum terminating to shield and signal ground, with Vertical Standing Wave Ratio (VSWR) not to exceed 1.2.

1.4 SYSTEM DESCRIPTION

A. Design Requirements
   1. General
      a. The Rancho Santiago Community College audio-visual system upgrades include Computer Classroom in Building H, Room 229.

b. All audio processing functions for the system shall be implemented with Digital Signal Processing equipment (DSP). The system shall connect to the Local Area Network for monitoring. Functions provided by this system include but are not limited mixing, level control, automatic mixing, equalization, adaptive equalization, delay, routing, dynamics, filters, processors, presets, etc.

a. Infrastructure shall be provided for the installation of AV equipment that will be installed at a future date. This infrastructure shall be labeled to allow easy identification of these devices. Back boxes shall be labeled with Device ID. Conduit shall be labeled as follows: AV-CTRL = Control, AV-SPK = Speaker, AV-AUD = Audio, AV-VID = Video, AV = Both Audio & Video.

b. An integrated web enabled central control system will be used to control all aspects of the audio and video system's functions, signal routing, and audio levels.

B. RSCCD - Building H – Classroom 229

1. Multiple video projectors shall be provided to display multimedia presentations onto a motorized front projection screen. All relevant aspects of the video projector and screen operation shall be controlled via the main control system.
2. Multiple motorized projection screens with controls integrated into the new Extron TLP Pro Touch Panel, recessed in the existing grid ceiling, and supported from structure.
3. A digital video presentation system switcher shall be used to route any source signal to the projector.
4. Recessed ceiling mounted speakers shall be provided for sound reinforcement of program material. The ceiling speakers shall be distributed to provide uniformed sound throughout the audience area.
5. An existing teacher's lectern shall be utilized to house an equipment rack with source and switching equipment. Additionally, the lectern shall be provided with a tabletop box with connectivity to allow connection of portable equipment.
6. An integrated web-enabled central control system shall be used to control all aspects of the audio and video system's functions, signal routing, and audio levels.
7. A touch panel interface located at the teacher's lectern shall be provided to control the system. Presets shall be programmed to allow automatic recall of predetermine routing of signal.
8. Sources installed in the teacher's lectern shall include the following OFCI equipment: document camera, computer, keyboard, mouse and monitor.

C. Software Programming

1. General

a. Except when otherwise agreed in writing the client shall retain legal and beneficial ownership of all Intellectual Property, including source code, created by the Contractor, their employees and sub-contractors.

b. The Contractor must allow sufficient time for the programming of all software configurable audio, video and control systems. Contractors must evaluate the systems functional requirements and user interface and then allow time in their bid accordingly. The system description as well as the end user interview will provide the Contractor with the necessary information needed to proceed with the programming. Any questions as to the systems functional requirements must be sent in written RFI form to the Consultant. All programming schemes must be submitted to the Consultant for approval before programming starts. This includes the appearance of all user interfaces, touch panel layouts, preset and sub-preset information (acquired through client interviews), and speaker control schemes. The Contractor will also submit a narrative for the control system concept to the Consultant for approval. The Contractor is to interview the Owner and their representatives to acquire the necessary information needed to allow for the proper programming of this system. The Contractor, after interviewing the Owner, will then submit a written report stating his interpretation of the client's requirements for approval by Consultant. Only after the Client and Consultant have approved the programming report may the Contractor proceed with the programming of this system.

c. All equipment that is connected to the Client's local area network and is configurable via the local area network must have its equipment software installed onto dedicated computers provided by the Client. The Contractor is to allot time to install and test equipment software onto a minimum of two of the Client's computers which are to be identified by the Client and/or Consultant. The computers will be programmed to emulate user interfaces throughout the facility. The Contractor shall coordinate all software deployment over IP with the Client's Information technology department.

2. Control system minimum programming outlined below:

a. The Contractor shall allot 4 hours for on-site control system programming with the Client's representative.

b. The Control System in this project shall connect to the Client's Local Area Network (LAN). This connection will provide desktop computers control of the audio-visual system as well as make available remote troubleshooting via the internet. The Contractor shall provide time to install control system interface software on at least three desktop computers. Coordinate work with Client's Information Services personnel.

c. Provide password protection to each control surface in this facility. Upon start up a password dialog box shall be presented to the user to enter his/her password. Only after entering a password will the user have access to the system. The system shall be programmed to shut down automatically after being idle for a time to be specified by the user.

d. User Interface layout design will conform to the InfoComm International "Dashboard for Controls" guidelines. Touch panel designs are to be custom to this project. Re-purposed touch panel designs are not acceptable.

e. Technical users shall have the ability to access individual speaker zone controls via the User Interface.

f. The contractor shall provide a default audio level preset button, in the control system user interface, to allow a user or technician to recall all gain levels that were set when the system was commissioned.

g. Control Help File: Each touch panel will include a help file that will explain each layer of the touch-panel control scheme.

h. Control system shall utilize help desk software to provide:

1) Real-time monitoring of:

(a) Control system.

(b) Device monitoring.

(c) Projector lamp life.

(d) System online status.
(e) Room activity.
2) Remote system diagnostics via Contractors help desk.
3) Remote system control.
4) Event scheduling.
5) Fault reporting via email alert.
6) Logging of help request.
7) User access control via password protection.
8) Event logging, report and chart generation.

i. The help desk software shall be placed on the desktop computers of each audio-visual maintenance person as well as key personnel of the Client. The Contractor shall train maintenance and operations persons to use this software feature.
j. Provide, install and test, room scheduling software programs to allow scheduling of each AV enabled room.
k. All serial controlled devices must have bi-directional communication with the control system. All control functions locally available on each device must be accessible via the remote control system. All locally gestured control functions must mirror on the control system user interface. In other words, if a volume control is adjusted on a DSP interface that adjustment must register on the control interface.
l. Control system shall be used to power up and down connected equipment at control system start up and shut down.
m. The control system shall monitor the connected power amplifiers and report overheating that may occur.
n. All projectors shall be monitored and report lamp hours remaining and lamp failure.

3. Complexity of Programming:
   a. It is required that the Contractor be experienced in programming systems of this complexity. Contractors shall allow enough time in their bid to permit extensive programming of all software configurable audio, video and control systems to the requirements of the client and consultant. Contractor shall break out cost associated with programming of these systems for review by the Consultant. By submitting this bid, the Contractor agrees that they understand systems of this type and that all programming services are included to the satisfaction of the Consultant. The Contractor further agrees that they will not make any claim for additional monies because of misinterpretation of programming requirements.

D. System Performance Standards and Requirements (meet or exceed)
1. Audio Systems:
   a. Electrical Performance; Source Input to Power Amplifier Output:
      1) Frequency Response (Equalizer flat): +/- 0.2 dB 20 Hz to 20 kHz.
      2) Total Harmonic Distortion (THD): Less than 0.05%, 20 Hz to 20 kHz, 4 ohms.
      3) Noise: At least -105 dB, 20 Hz to 20 kHz, referenced to input of +4 dBm.
      4) Crosstalk: At least -60 dB, 20 Hz to 20 kHz.
      5) Damping Factor: Greater than 500 (below 1 kHz)
   b. Electro/Acoustic Performance; Distributed Systems: 103 dB Consistent with devices specified herein.
      1) Equipment: Specified individually.
      2) Audio signal paths: Shall not degrade performance of connected equipment.
   c. CEC - Article 640: Audio Signal Processing, Amplification and Reproduction Equipment.
2. Video Systems:
   a. Video signal system: NTSC to EIA RS-170A, except as noted.

b. Video signal paths: To EIA RS-250C short haul where equalized or fiber optic transmission, otherwise to the performance limit of the specified video cable.
c. ANSI IT7.228 (ANSI Lumens): Measurement method for light output of fixed resolution video projection systems.
d. ANSI IT7.228 (ANSI Contrast Ratio): Measurement method for the contrast ratio of fixed resolution video projection systems.
e. SMPTE 170M: Color Specification for NTSC.
f. SMPTE 125M: Universal Sampling spec for SDTV and HDTV Broadcast Video.
g. SMPTE 253M: RGB Analog Video Interface spec for SDTV Studio applications.
h. SMPTE 274M: Component spec for 1920 x 1080 HDTV.
i. SMPTE 296M: Spec for 1280 x 720 RGB and YPbPr Baseband Video.

3. Data and Communications Systems:
   a. TIA/EIA 568-C series: Commercial Building Telecommunications Cabling Standard.
   b. ANSI J-STD-607-A: Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.
   c. Comply with ITU-T (International Telecommunications Union – Telecom) for video conferencing systems.
4. Control Systems:
   a. RS485 (TIA-485): Electrical characteristics of generators and receivers for use in balanced digital multipoint systems.
   b. RS232 (TIA-232): Interface between data terminal equipment and data circuit-terminating equipment employing serial binary data interchange.
   c. RS 422 (TIA-422): Electrical characteristics of balanced voltage digital interface circuits.

1.5 SUBMITTALS

A. General
   1. In addition to the requirements of Division 1, submit all materials for review arranged in the same order as the Specification, individually referenced to the Specification paragraph and Contract Drawing number.

B. Infrastructure
   1. Provide drawings indicating boxes conforming and non-conforming to Consultant's AV drawings.

C. Product Data
   1. Manufacturer's Product Data
      a. Contractor is to submit submittal in electronic format (i.e. PDF)
      b. List of materials (i.e. Table of Contents) categorized by room type: For each item specified in PART 2, include:
         1) Drawing device ID code.
         2) Manufacturer.
         3) Model number.
         4) Listing: UL or other lab.
         5) Quantity.
      c. In sequence of List of Materials, provide a data sheet for each item, including all accessories marked for the proposed product.

D. Shop Drawings
   1. Field (Installation) Drawings: Collate in sequence:
      a. Contractor is to submit shop drawings in .DWF format.

b. Drawing index/symbol sheet.
c. Floor plans. At scale of Contract Documents. Show:
   1) Device rough-in boxes with ID number.
   2) Mounting height.
   3) Conduit size.
   4) Wire type.
   5) Wire fill.
d. Sections/Elevations. At scale of Contract Documents:
   1) Mounting location reference to nearest gridline.
      (a) Provide sections for each room containing AV equipment.
      (b) Provide elevations for each wall in rooms containing AV equipment.
      (c) Show all equipment, including speakers, monitors, projectors, podium, floor boxes, facility boxes, etc.
      (d) Provide vertical dimensions referenced above finished floor to each piece of equipment.
      (e) Provide horizontal dimensions reference to gridlines.
e. Enlarged Plans. At scale of Contract Documents or larger as required for trade coordination. Show:
   1) Items indicated in "floor plans" above.
   2) Architectural features.
   3) Rack cabinets.
      (a) Ventilation details.
      (b) Power distribution detail.
   4) System furniture.
   5) Clearances required by applicable Code.
f. System Conduit Riser Drawing, Show:
   1) Terminal cabinets.
   2) Coordination with floor plans.
   3) Wire runs not shown on floor plans.
   4) Wire type.
   5) Wire fill.
g. Mounting details:
   1) Stamped and signed by an Engineer licensed in the Project jurisdiction for work of this type, where required by code.
   2) Show loads, type and strength of connections, sizes, dimensions, materials, etc.
   3) Show calculations on drawings or in bound volume for review by Authorities having jurisdiction.
   4) Provide details for:
      (a) Equipment rack anchorage.
      (b) Ceiling speaker mounts.
      (c) Video projector mounts.
      (d) Video displays.
      (e) Projection screens, both fixed and motorized.
      (f) Attachment to building structure.
h. Installation details as required:
   1) Terminal cabinets: Terminations.
   2) Audio-Visual panel details.
i. Wire run sheets. Show:
   1) Wire number.
   2) Source.
   3) Designation.

4) Signal type.
5) Wire type.
6) Operating level or voltage.
7) Timing reference, where applicable.
8) Physical length.

2. Shop (Fabrication) Drawings: Collate in sequence:
   a. Contractor is to submit shop drawings in .DWF format.
   b. Drawing index/symbol sheet (if separate set from Field Drawings).
   c. System functional drawings. Submit separate drawings for each system/subsystem. Show at least:
      1) Equipment:
         (a) Function, make, model.
         (b) Rack number, module frame and slot number.
      2) Field device information
         (a) Terminal cabinets.
         (b) Pull boxes.
         (c) Audio-visual panel connector designations.
      3) Wiring
         (a) Wire number.
         (b) Wire type.
      4) Shield condition at both ends (float, ground, location of ground).
      5) Connector wiring details, each type.
      6) Audio: Nominal operating level, Polarity. Note deliberate polarity inversions where required to maintain absolute polarity.
      7) Video: Physical length. Electrical length in nanoseconds or degrees of sub-carrier, as applies. Equalization required.
      8) Twisted pair, transmit and received devices: Transmission range at 60 Hz., cable length and signal quality.
   d. Provide drawings for the following systems, if applicable:
      1) Audio.
      2) Video.
      3) Control.
      4) Data transmission.
      5) Coordinated grounding scheme.
   e. Equipment rack elevations: Show:
      1) All racks scaled at 1 1/2" equals 1 foot, or larger.
      2) Rack: Make, model.
      3) Equipment: Function, make, model.
   f. Rack wiring drawings: For each rack, show:
      1) Power strip: Receptacles, circuiting.
      2) Sequencing power and surge suppression systems.
      3) Equipment.
      4) Grounding.
      5) Wiring, all systems.
      6) Wiring harness scheme.
      7) Ventilation detail.
   g. Fabrication details: Submit for:
      1) Receptacles.
      2) Panels.
      3) Special mounting provisions.
   h. Legends/engraving details. Half or full size:

1) Receptacles.
2) Audio-visual panels.
3) Equipment designations.

E. Samples
1. Of all finishes/materials that will be visible to the public, including but not limited to:
   a. Receptacles and controls with associated trim plate.
   b. Each type of ceiling speaker baffle and/or grille.
   c. All audio-visual panels.
   d. Audio-visual devices in public areas.

F. Programming
1. Control Programming Scheme Submittal
   a. Contractor is to submit submittal in electronic format (i.e. PDF)
   b. Provide a password-protected link to a folder on the Contractor's network to remotely access the touch panel from the Consultant's computer. Contractor is to have a dedicated control processor utilized on their network.
   c. Provide a graphic layout of each user control interface (touch panels, push buttons, etc.).
   d. Provide a list of devices that are controlled by each control user interface, including:
      1) Device.
      2) Brand.
      3) Model Number.
      4) Control Method.
   e. Provide a logic tree for each page for each control interface.
   f. Provide a system routing sheet for each control user interface, including:
      1) Source.
      2) Switcher / device input.
      3) Switcher / device output.
      4) Final destination.
   g. Provide help file content on each user interface.

G. Shop and Project Site Test Reports
1. Contractor is to submit submittal in electronic format (i.e. PDF)
2. Schedule: Submit test reports in a timely manner relative to the Project schedule such that the representative of the Owner may conduct Verification of Submitted Test Data without delay of progress.
   a. Shop test report: Submit prior to shipping completed equipment racks to Project Site.
   b. Project Site test report: Submit project site test report for this section after system completion and prior to Acceptance Review and Testing.
3. Content: Include at least:
   a. Time and date of start of burn-in.
   b. Time and date of test.
   c. Personnel conducting test.
   d. Test equipment, including serial and date of calibration.
   e. Procedures used.
   f. Results of test - numerical or graphical presentation.

H. Close Out Submittal
1. Contractor is to submit submittals in electronic format (i.e. PDF)
2. Operation and Maintenance Manuals
   a. Index.

b. Systems operating instructions.
c. Reduced set of system Record Drawings.
d. Key schedule.
e. Maintenance and spare parts schedules.
f. Shop and Field Test Reports.
g. Equipment manuals. Collate alphabetically by manufacturer. Provide manufacturer's original operation, instruction and service manuals in color for each equipment item. Provide tabbed dividers between each product. Manuals provided by the Manufacturer in an individual binder may be submitted in that form.

3. Framed Operating and Maintenance Instructions: Provide adjacent to each ensemble of equipment racks. Provide sturdy frame with clear glass or non-scratching plastic cover. Provide permanent, non-fading media. Blueprints shall not be acceptable. Include:
   a. Sequence for system start-up and shutdown.
   b. System Functional Diagrams.
   c. Signal levels and impedance at accessible system signal and test ports, where applicable.
4. Record Drawings
   a. As work progresses, maintain records of "as installed" conditions. Update the set at least weekly. After successful completion of Project Site testing specified herein, and after completion of Punch List corrections, copy all records of "as installed" conditions on to final Record Document drawings, as specified in Division 1.
   b. Content: All drawings required under "Field and Shop Drawings". Show "as installed" condition. Where room designations according to Project permanent signage differ from construction designations in the Contract Documents, show both designations.
5. Provide four copies on CD-ROM containing the “as built” drawings, all manuals, training manual and programming code.
   a. Submit un-compiled programming code.
6. Training Submittal
   a. Provide all training materials for review prior to scheduling training sessions.
      1) Training manual.
      2) Agenda for the training session.
      3) The final punch list, indicating that all equipment is fully functional.
   b. See the section under Owner’s Instructions for training manual requirements.
   c. No training session will be scheduled until final punch list is completed and submitted.
7. Warranty Certificates
   a. Comply with Division 1.

1.6 QUALITY ASSURANCE

A. Qualifications
   1. The bidder shall, prior to the bid, in accordance with the Instruction to Bidders, submit at least the following information to verify that the bidder has the necessary experience and qualifications to perform the specified work:
      a. A detailed brochure describing the bidder’s capabilities in terms of facilities, personnel (include a personnel organization chart followed by resumes), experience, background, examples of similar installations (at least two projects within the past two years), distribution arrangements with manufacturers and financial capability, including certificates of insurance and satisfaction of the project bonding requirements.

b. Contractor must, at the time of this bid submittal, have distribution or a dealership agreement with all manufacturers whose products are specified in the bid documents. Contractor must also have completed manufacturers training and certification before bids are submitted.
c. Information identifying any and all local agents and/or subcontractors that will assist in the work and their role in the project.
d. Identification of sources of labor for all fabrication and installation throughout the duration of the project.
e. Evidence that he has acquired all necessary licenses, certificates and approvals to perform the specified work within the state or jurisdiction the work is to be performed.

2. Projects that include networked audio or video systems will require the Contractor to submit the name of the person, in their employment, qualified to perform this work. This person shall have certification in computer network technology and hold one of the following certifications:
   a. CNP – Certified Network Professional Program.
   b. Computing Technology Industry Association - Network+ certification.
   c. MCSE – Microsoft Certified Systems Engineer.
   d. CNE – Certified Systems Engineer.
   e. CCNA – Cisco Certified Network Associate.
3. Projects that include software configurable, integrated central control systems must include, as a sub-contractor, an authorized independent programmer who is fully engaged in the work of programming. The Contractor is to enter into an agreement utilizing the authorized independent programmer as a sub-contractor. Under this agreement, the Contractor will retain all of the responsibility for a complete and working system. The Contractor must include in their bid time to work out any programming glitches that may occur in the initial programming stage. These items include working through the initial and final programming stage with the authorized independent programmer to provide a functional system, testing the programmer's graphical user interface for intended functionality and providing onsite support for the programmer in the uploading and testing of programming revisions. The control systems programmer shall be present either by web meeting or in person at the end user interviews to acquire information firsthand. The control systems programmer shall submit a report outlining the meeting results to Contractor for approval. Only when the Contractor approves this report shall it be submitted to the consultant for review. If the contractor does not employ a full-time programmer, the following companies have been approved subject to above.
4. The Contractor will provide information on how and by whom the requirements of the warranty period will be fulfilled.
5. The submittal must justify, in the judgment of the Consultant, the Architect, and the Owner, that the Contractor has the capability to manage and install a project of this size and scope and that he is capable of the necessary business and technical arrangements for this installation and the pursuant warranty service. Contractor may be disqualified as a bidder if all of the submittal does not meet the approval of the Owner and his/her representative.
6. Company: Work of this Section shall be performed by a Sound or Audio-Visual Systems Contractor who has at least five years direct experience with the devices, equipment and systems of the type and scope specified herein, and who has a fully staffed and equipped maintenance and repair facility, and who is licensed to perform work of this type in the Project jurisdiction. The company must be NSCA R-ESI or CTS certified.

7. Personnel: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section. Supervisors shall have at least five years of direct experience in similar work. Installation and maintenance personnel shall have at least three years of direct experience in similar work. Contractors shall have at least 60% of their installation staff CTS or C-EST certified.
8. Designated Supervisor: Provide a designated supervisor present and in responsible charge in the fabrication shop and on the Project Site during all phases of installation and testing of the Work of this Section. This supervisor shall be the same individual throughout the execution of the Work unless illness, loss of personnel, or other circumstances reasonably beyond the control of the Contractor intervene.
9. Staff Engineer: The Contractor shall have on his full-time payroll at least one staff engineer having five years minimum experience as an electronics engineer covering systems and projects comparable in substance and complexity to the project described herein. The staff engineer shall have NICET certification in Electrical/Electronics Engineering Technology and Audio Systems or equivalent. The signature of that engineer shall appear on all shop drawings and submittals.
10. Coordination: Coordinate the Work of this Section with the Work of all other Separate Contracts. Comply with Division 1.
11. Help Desk: The Contractor must employ a fully staffed help desk department that shall provide knowledgeable responses to inquiries regarding system operation. This department must also have the ability to provide remote diagnostics to identify equipment faults for troubleshooting.

B. Cutting and Patching
1. Cut, patch and extend existing work using skilled mechanics that are capable of matching existing quality of workmanship.
2. Assign work of moving, removal, cutting and patching, to trades qualified to perform the work in a manner to cause least damage to each type of work, and provide means of returning surfaces to appearance of new work.
3. Perform cutting and removal work to remove minimum necessary, and in a manner to avoid damage to adjacent work. Cut finish surfaces such as masonry, tile, plaster or metals, by methods to terminate surfaces in a straight line at a natural point of division.
4. When new work abuts or finishes flush with existing work, make a smooth and workmanlike transition. Patched work shall match existing adjacent work in texture and appearance so that the patch or transition is invisible.
5. Protect existing finishes, equipment, and adjacent work that are scheduled to remain, from damage.
6. Promptly repair damages caused to adjacent facilities by demolition operations, at no change in Contract Amount.

C. Painting
1. Use skilled mechanics that are capable of painting audio-visual equipment and hardware to match architectural surroundings, where applicable.

D. Regulatory Requirements
1. Regulations Applicable: including but not limited to those defined in Division 1.
2. Comply with all applicable federal, state, and local labor regulations, and applicable local union and trade regulations.

3. Installation practices shall be in accordance to industry-accepted standards (ANSI, Cal-OSHA, IEC, IEEE, FCC, CEC, NFPA, ICIA, NSCA, CEDIA, BICSI) or local acts, codes and standards enforced at the place of work, whichever is most stringent.
4. Procure and pay for all necessary permits, licenses, inspections, and observe any requirements stipulated therein.
5. Provide UL/ULC fire rated enclosures around all audio-visual floor and back boxes where required by code.

E. Pre-installation Meetings
1. Attend a pre-installation meeting at the project site with the Owner and his representatives in order to coordinate related work and scheduling issues.

F. Verification
1. Verify dimensions and conditions at the Project Site. Submit any conflicts in timely manner for resolution.

G. Shop Fabrication and Testing
1. Assemble and fully wire equipment racks at a fabrication shop off the Project Site. Burn-in for not less than 120 hours. Following burn-in, perform specified adjustment procedures. Provide test equipment and test according to procedures specified herein. Submit verification of shop test in timely manner. Following verification of shop test and when installation locations are ready as specified herein, deliver equipment racks and equipment to the Project Site and install.

H. Project Site Installation and Testing
1. Install as specified herein.
a. Perform specified adjustment procedures. Provide test equipment and test according to procedures specified herein. Request verification of Project Site test in timely manner.

I. Verification of Submitted Test Data
1. Re-test in presence of designated representative(s) of the Owner at reasonable mutual convenience. Provide services of the designated supervisor and an additional technician familiar with work of this Section. Provide all test equipment. Provide complete set of latest stamped submittals of record for reference. Provide complete set of Shop and Project Site Test Reports, as applies. Provide a complete set of manufacturers' original operation, instruction and service manuals for each equipment item for reference.

J. Reference/Project Record Documents
1. At all times when the work is in progress, maintain at the workplace, fabrication shop or Project Site as applies, a complete set of the latest stamped, action submittals of record for reference. Also maintain a separate, clean, undamaged set for preparation of Project Record Documents. Also maintain at the workplace a complete set of manufacturers' original operation, instruction and service manuals for each equipment item for reference.

1.7 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading

1. The Contractor will take receipt of all Owner Furnished Equipment at the project site or at a local warehouse.
2. Deliver materials in manufacturer's original undamaged packages or in bulk packing which provides equivalent protection from rough handling, dust and dirt.
3. Deliver all assembled equipment racks in custom manufactured wood crates to avoid damage during shipping. Contractor is to hire a crate manufacturer to build crates prior to delivering racks to the jobsite.
4. All packing, shipping, insurance, handling and storage costs of equipment and materials shall be the responsibility of the Contractor.
5. The Contractor shall be responsible for ensuring all equipment and installation materials stored in their shop facilities until it is delivered to the Project Site and a delivery acknowledgement is received from the Owner or its authorized representative.
6. Equipment unpacked for inspection but not ready for permanent installation must be returned to its protective packing.
7. The Contractor shall be responsible for furnishing a temporary substitute for equipment that could not be delivered in time for system operation. All costs associated for renting, shipping and handling temporary substitute equipment shall be the responsibility of the Contractor.
8. In the event the equipment or installation material delivery is delayed, the Contractor must employ the fastest means of delivery service available to deliver the equipment on time. All costs for expediting the delivery of equipment shall be the responsibility of the Contractor.
9. Store packaged materials off the ground or slab in a manner to protect them from elements, especially moisture damage.
10. Deliver completed, wired, tested equipment racks to associated equipment rooms at the Project Site when major work of all other separate contracts is complete, equipment room ventilation is operating with clean filters in place, the area is clean and free from airborne contaminates, and continuing work of other trades will not produce airborne contaminates or permit transport of such airborne contaminates to the equipment rooms.

B. Acceptance at Site
1. All equipment and installation material delivered to the Owner shall be properly documented in the form of delivery receipts.
2. Equipment delivered to the Project Site must have a delivery receipt signed by the Owner or its representative. Issue a signed copy of the delivery receipt to the Owner and file the signed copy for future reference.
3. The Contractor shall be responsible for the insurance coverage and security of equipment delivered to the Project Site until it receives an acknowledgement of delivery from the Owner or its authorized representative.

C. Storage and Protection
1. The Contractor shall provide a safe and secure storage location for all equipment and installation materials until they are delivered to the Project Site, and it receives an acknowledgement of delivery from the Owner or its authorized representative.
2. For equipment assembled and tested at the Contractor’s shop facility and delivered to the Project Site, ensure that the equipment is properly protected from improper handling, rain, water, humidity, moisture, heat, direct exposure to sunlight, dust and dirt during delivery and storage on or off the Project Site.
3. Do not remove protective packing from equipment until they are ready to be installed.
4. If, after equipment is installed, the Project Site cannot be cleaned or is still not clean because of on-going work by others, provide protective covering and protection to prevent airborne dust and dirt originating from damaging equipment.

1.8 PROJECT SITE CONDITIONS

A. Environment Requirements
   1. The spaces where audio-visual system assemblies are installed shall meet the following requirements:
      a. Free from dust generated from construction.
      b. The room temperature shall be within the specified operating temperature recommended by the manufacturer.

1.9 SEQUENCING

A. Submit all testing documentation to the Owner's Representative for review prior to requesting the Fabrication Inspection and Substantial Completion inspections.

B. Allow adequate time for corrections to be made after inspections to maintain the Project Schedule.

1.10 SCHEDULING

A. Temporary Equipment: Provide and operate, without claim for additional cost or time, temporary equipment and/or systems to provide reasonably equivalent function, as determined by the Owner, in lieu of the Work of this Section which is incomplete or found not in conformance with the Contract Documents as of seven days prior to the completion date. Provide such temporary equipment until Acceptance of the Work of this Section. Thereafter, remove such temporary equipment.

B. It shall be a common understanding that there is a time constraint when executing this work. The Contractor shall use all means and resources to complete this project on or before the specified schedule at no additional cost to the Owner. This includes working beyond normal business hours and days, additional manpower, additional tools, etc.

1.11 WARRANTY SERVICE

A. Warrant all Work of this Section to be free from defects in materials and workmanship for a minimum of 2 years from the date of Owner acceptance of the Work of this Section.

B. All manufacturers' equipment warranties shall be activated in the Owner's name and shall commence on the date of system acceptance. In the case of Contractor modified equipment, the manufacturer's warranty may be voided. In such cases, provide a warranty equivalent to that of the original manufacturer.

C. All high-level software shall follow the warranty conditions specified by the manufacturer. Immediately update or upgrade the Owner's installed software as soon as new versions, updates or patches become available from the manufacturer at no additional cost to the Owner within this warranty period.

D. Response Time: Provide a qualified technician familiar with the work at the Project Site within 12 hours after receiving a notice of malfunction. Provide the Owner with the telephone number attended 8 hours a day, 5 days a week, and an answering service or equivalent facility attended 24 hours a day, 7 days a week, to be called in the event of a malfunction. Provide repairs at no expense to the Owner and at the Owner's request, alternate facilities, services and systems for the duration of the repairs to any defective work of this Section. Provide a complete and operational System, within 48 hours after notification of a malfunction.

E. All work requested due to warranty issues shall be performed during regular working hours unless the Owner agrees to pay the difference in labor rates for overtime or nighttime work.

F. The Contractor shall use qualified service personnel to respond to all warranty issues or calls.

G. Off Site Service: Conduct all warranty repairs and services at the Project Site, unless in violation of manufacturer's standard product warranty. Provide substitute systems, equipment, and/or devices acceptable to the Owner for the duration of off-site repairs. Provide transportation for substitute and/or test systems, equipment, devices, materials, parts and personnel to and from the Project Site.

1.12 OWNER'S INSTRUCTIONS

A. General
   1. Conduct training on the completed system at a reasonable convenience of the Owner during normal Owner business hours. Contractor is to assess the complexity of the system and shall fully train the operation and maintenance staff named by the Owner.
   2. Do not start training until all systems have been commissioned, training manuals are approved and an agenda along with schedule of each departmental training session has been submitted to the owner.
   3. Training will be conducted in the actual room that is the topic of the training session.
   4. The client asserts legal and beneficial ownership of all training materials which are specifically commissioned for this project.

B. Operator Training – Do not start training before system is in full operation and all components have been signed off by owner's representative. Use the items covered in the commissioning portion of this specification as a basis for the training curriculum.
   1. At least two 4-hour sessions of instruction will be given to familiarize the Owner with the operation of the system.

C. Maintenance Training
   1. At least three 2-hour sessions of instruction will be given to learn how to maintain and troubleshoot the system. A maintenance binder shall be provided by the Contractor with all manufacturer-specific operating and maintenance information for each piece of equipment used. On large jobs, the binders will be sub-divided into individual audio, video and control binders. Provide training on at least the following system features:
      a. Firmware upgrades
      b. Helpdesk features
      c. Complete use of system as outlined in the Commissioning section plus advanced troubleshooting.

D. Training Video
   1. A training video shall be produced and cover all aspects of the systems' operation.
   2. Each page of all user interfaces shall be explained and recorded while gestures are made on the screen. Each button on the user interface shall be explained and demonstrated.
   3. All portable equipment that connects to the system shall be demonstrated both in their physical connection and routing method at the user interface.
   4. All patch bays shall be explained and demonstrated.
   5. All source equipment shall be explained in both physical loading of media and transport control as well as user interface control.
   6. Demonstrate on basic troubleshooting.
   7. Provide training on items as outlined in the Commissioning section of this document.
   8. Demonstrate system start up and shut down.
   9. Explain and demonstrate help files associated with touch panels.

10. Audio and video files shall be combined and burned to DVD for distribution to each department.
11. Provide professional DVD with searchable index of topics covered.
12. Provide label with client's logo, room name/number, title, length and topics covered.

E. A training manual specific to this system will be written covering the basic and advanced functional techniques necessary to operate the system in a reliable and fully functional condition. The Contractor shall submit hard color copies of the training manual as well as a soft copy in PDF or DOC format. Provide a hard copy of the training manual for each person to be trained. This manual will include:
   1. All contact information, including emergency and after-hours phone and pager numbers, for requesting service assistance from the Contractor.
   2. A 11x17 set of as-built drawings of the completed project (a full-sized set will be issued to the client for their use; a half-size set will be attached to the inside back door of the main equipment rack).
   3. A table of contents at the beginning of the manual.
      a. The manual will begin by explaining basic information such as manual references, abbreviations, any assumptions made by the author, prerequisites required, numbering convection, etc.
      b. It will then proceed to the manual objectives.
      c. Explain what the end user should understand after reading the manual.
      d. It will cover the basics of the user interface including start up and shut down procedures, log on procedures, access privileges, operator password, levels of security, file structure, etc.
      e. The manual will proceed to describe each user interface and its function. It will cover every layer of the interface and how to navigate through them.
      f. Each of the system presets will be explained and the physical setup of the equipment and floor plan during presets will be illustrated. Source equipment such as CD players, Cassette, VCR, etc. shall have their routing scheme explained and illustrated. Portable equipment and its connection to the system shall be explained and illustrated.
      g. The manual will end by explaining basic troubleshooting procedures and equipment care instruction.
   4. The Contractor's maintenance instructions, which will include the manufacturer's maintenance instructions found on the factory manuals to keep the manufacturer's warranty in force.
   5. A list of consumables (lamps, fuses, batteries, etc.) required to keep the system operating over time, along with sources of supply (if not readily available).
   6. The Contractor will compile and submit all factory warranty registration forms or cards for each piece of equipment furnished for this project.
   7. A form requesting feedback from the end user as to how the manual should be improved and a section to report errors discovered.
      a. The Contractor will make the corrections and improvement suggestions after receiving feedback from the users. This will be completed at no charge to the client. The manual will contain a date stamp and version number. Each feedback and error correction manual reissue will include a new version number.

F. Initial Use Support
   1. Provide standby trainer/system engineer during the first two public events.

1.13 WARRANTY

A. The Contractor shall, within the warranty period, schedule two visits to inspect the system. The first visit shall be six months after the commencement of the warranty period. The last visit shall be just prior to the end of the warranty period.

B. Return 90 to 120 days after the system has been turned over to the Owner for additional programming and system fine-tuning. Conduct interviews with the user group via telephone to acquire information needed to complete this task. Allow for one full day of programming in your initial bid to complete. Provide a per hour programming fee that will be charged if additional programming is needed.

C. Cache for event logging must be set to record unlimited events until the Contractor's first warranty site visit. After the Contractor's first site visit, the cache can be limited to the Owner specified level.

D. The Contractor shall use qualified service personnel to conduct all maintenance work.

E. All warranty work shall be performed during regular working hours unless the Owner to pay the difference in labor rates for overtime or nighttime work.

PART 2 - PRODUCTS

2.1 GENERAL

A. Quality of Products
   1. Materials and equipment specified herein have been selected as the basis of acceptable quality and performance and have been coordinated to function as components of the specified systems.
   2. Where a particular material, device, piece of equipment or system is specified directly, the current manufacturer's specification for the same shall be considered to be a part of these specifications, as if completely contained herein in every detail.
   3. Each material, device or piece of equipment provided herein shall comply with all the manufacturer's published specifications for that item.
   4. Equipment shall be from the manufacturers' current stock and shall not be stored longer than 1 year prior to installation, unless written approval to do otherwise is provided by the manufacturer and submitted for review by the Owner.
   5. All products will be a product of firms regularly engaged in the manufacturing of electrical, electronic or optical equipment. The equipment will be the latest model or type offered which meets the applicable specifications at the time of the submittal. Discontinued items replaced by newer models or versions are prohibited and should not be submitted for review.
   6. Quality of workmanship and fabrication of all equipment and components, which are custom fabricated, shall be comparable to professional equipment produced by specialized manufacturers of the trade involved and will be verified by inspection. Only firms having 5 years of experience in all aspects of the fabrication and installation of similar systems will be allowed to perform the work.
   7. All materials and products will be new and of professional quality. Unless specifically stated in the drawings or specifications, no existing or used materials will be installed.

B. Quantity
   1. Provide the quantity of products as shown on the Contract Drawings, or as otherwise indicated herein.

2. The equipment listed in section 2.2 consists of all major equipment for the project. The Contractor will integrate into the system design and provide any additional components, wiring, programming, etc., to complete a functional system operating as described within the specifications and the category AV drawings.
3. Components or equipment not specified or indicated on the drawings that are required to make a fully functional systems per the Owner's requirements and the design intent, shall be furnished and installed by the Contractor, and shall be submitted for Owner review.

C. Preference
1. Where more than one manufacturer is listed herein as acceptable or equivalent, no preference is intended or implied by the order of listing.

D. If a specified piece of equipment or product has been superseded, discontinued or is no longer available from the manufacturer, the Contractor shall submit a request for substitution of the originally specified product. The substitute product shall be the manufacturer's most current model of the specified product, or if the line has been discontinued, a product by the same manufacturer with specifications meeting or exceeding, and as close as possible to those of the originally specified product. Refer to Alternatives and Substitutes section for clarification.

E. Deferred purchase of equipment, including computers, touch panels, flat panel displays and video projectors with short market life expectancy
1. Applies to the installation of equipment that is scheduled to take place more than 8 months after the bid has been awarded.
2. Contractor shall, with his bid, break out pricing for the above mentioned equipment and provide an allowance for these items.
3. Ninety Days prior to its purchase, the Contractor shall submit for the Consultant’s approval a list of the equipment that has replaced or superseded the specified equipment.
4. The submittal will include the manufacturer’s specification sheets and other documentation to verify that the equipment meets the standards of the original specification.
5. If the Contractor’s allowance for the equipment to be installed exceeds the current pricing, the price differential shall be returned to the Owner as a credit. The credit shall include the current price differential plus markups for overhead and profit and shall be documented in writing.
6. If the current pricing exceeds the allowance, the Contractor shall submit a detailed cost breakdown clearly indicating the current pricing differential and all markups requested.

F. Provide Complete
1. Provide all auxiliary and incidental materials and equipment necessary for the operation and protection of the Work of this Section as if specified in full herein.

G. Provide New
1. All materials provided under the Work of this Section shall be new, shall be the manufacturer's latest design/model, and shall be permanently labeled with the manufacturer's name, model number and serial number.
2. Products and materials shall be clean, free of defects, damage and corrosion.

H. Similar
1. Similar devices shall be of the same manufacturer, unless specifically noted otherwise in these specifications.

I. Safety Agency Listing

1. All devices provided under the Work of this Section that are connected to the Project electrical system shall be listed by Underwriters Laboratories (UL) or other Nationally Recognized Electrical Testing Laboratory acceptable to the Authorities having jurisdiction at the Project site and shall be so labeled. Absent such listing, comply with Regulatory Requirements applicable to Unlisted Equipment.

J. Unlisted Equipment
1. Certain equipment specified herein may not bear listing by a Nationally Recognized Testing Laboratory. Such equipment is specified herein only where no equipment is known to exist bearing such listing which that perform the function required by the Owner. In such case, apply for field inspection of such equipment. The Contractor is responsible for the payment of such inspection costs.

K. Power Rating
1. All devices provided under the Work of this Section that are connected to the Project electrical system shall provide stable performance in full accordance with these specifications when operated on main service which complies with ANSI standard tolerances for voltage, frequency, transients and related parameters.

L. Circuit Protection
1. All active devices shall have integral fuse or circuit breaker protection.
2. All circuit breakers shall be fully magnetic.
3. Protection devices shall be located to facilitate examination, resetting and/or replacement without the need to disassemble or demount the associated device.
4. Contractor-fabricated items shall be provided with either indicating type circuit breakers or fuses of the clear glass cartridge type, mounted in fuse holders which will indicate a blown or defective fuse.

M. Continuous Use
1. All active circuitry shall be solid state and shall be rated for continuous use. All circuit components shall be operated in full compliance with the manufacturer's recommendations and shall contain sufficient permanent identification to facilitate replacement.

N. Construction
1. All electronic equipment shall be of the "dead-front" type and shall be designed for standard 19" EIA rack mounting, unless otherwise indicated.
2. Steel frames and enclosures shall be designed and wired to eliminate all induced currents within both the units and the systems.
3. All bolted connections shall be made with self-locking devices.
4. Coordinate all consoles and panels so that the general appearance is similar, or as directed by the Owner.
5. All operating panels shall be at least 1/8" thick aluminum.
6. Provide locking panel covers on all recessed, semi-recessed or surface mounted control panels not located in the equipment rooms, unless specifically noted otherwise. Panel locks shall be flush with no protrusions beyond the panel face when the door is closed. Recessed control panels shall be recessed within the back box to a depth sufficient to permit a locking hinged panel cover to completely close without affecting any device within the enclosed area.

O. Circuit Boards/Modules

1. All printed circuit boards or modules shall be mechanically secured by bolt or friction-loading guide, in addition to any electrical connector attachment, and shall include an integral extraction grip.
2. Printed circuit boards shall be connected to associated circuitry via soldered connections or precious metal positively keyed card edge connectors.
3. All Contractor-fabricated printed circuit boards shall be at least 1/16" thick G-10 glass fabric epoxy base, copper plated to a minimum density of 2.0 oz./sq. ft. on one or both sides and finished with 60/40 tin/lead solder either hot rolled or plated over the copper. All holes through the boards shall be plated through and solder filled. All boards shall be permanently identified with a designation that matches that of the mating connector or board position in the assembly.

P. Identification
1. Provide permanent intelligible identification on, or adjacent to, all connectors, receptacles, controls, fuses, circuit breakers, patching jacks, and the like. This identification shall clearly and distinctly indicate the function of the item and shall be numbered or lettered to correspond with the function, circuit and location consistent with field and shop drawings. Refer to section 3.5 for clarification.

Q. Modular Products
1. The drawings show conventionally packaged components to convey design intent.
2. Card cages to have front and rear closure panels to provide a finished appearance.
3. Except as noted below, modules of different functional types are permitted to share the same card cage/mounting frame and/or power supplies as applicable and if mechanically and electrically compatible.
4. With amplifier input driven 10 dB beyond input level required to produce full rated output, amplifiers shall withstand indefinitely any of the following load conditions without instability of operation of main over current protection (i.e. no blown fuses or circuit breakers).
   a. "Short" circuit of 0.1 ohm.
   b. Open circuit (no load).
   c. Rated load impedance.
5. Maintain sense of signal polarity from input to output.

R. Keys
1. Key all boxes, cabinets, enclosures, panels, controls, doors and related provided for similar usage within a system identically. For each unique key type, provide a quantity of ten. Stamp each key with a reference designation. Provide a master keying system.
2. Submit a schedule of keying to the Owner. Where so noted, provide Project Standard lock cylinders and keys; coordinate with the work of other Sections.

S. Lectern Power Cord
1. The power outlet connecting the lectern to the floor box must be twist-lock type. The power cord connecting the podium to the floor box must be 12 inches shorter than the low voltage cable connecting it. This will protect the low voltage cable from damage if the podium was to be moved inadvertently without disconnecting the cables. The power cable shall include a wire-rope strain relief to keep the power cord from damage. See cable details on plan-set for more information.

T. Projection Screens
1. Provide extra screen material drop to locate the projection screen at the optimum viewing angle where required. Verify screen drop requirements with architectural sections and elevations.

U. Provide enclosure systems including, but not limited to racks, cabinets, cases and related panels and accessories as specified herein, or approved equivalent. Provide size and quantity as shown on drawings. Provide color as specified by Architect. If no color is shown on drawings, submit manufacturer's standard color chips for selection.

V. Rack Panels and Accessories: Rack Mounting Screws: Screws 10-32; length as required for at least 1/4" excess when fully seated; oval head with black plastic non marring cup washer or equivalent ornamental head; nickel, cadmium or black plated; Phillips, Allen Hex, Square-Tip or Torx drive. Slotted screws are not acceptable
   1. Blank Panels:
      a. Atlas/Soundolier S19 Series.
      b. Zero ZP112000 Series.
      c. House of Metal Enclosures (HOME) Series PM.
      d. Middle Atlantic Products BL, SB or HBL Series.

   2. Vent Panels:
      a. Middle Atlantic ETF Series.
      b. Equal by Atlas/Soundolier.
      c. Equal by Zero.
      d. Equal by House of Metal Enclosures (HOME).
   3. Shelf:
      a. Middle Atlantic Products U Series.
      b. Atlas/Soundolier SH19 Series.
      c. Zero A52 Series.
   4. Drawer:
      a. Atlas/Soundolier SD Series.
      b. Middle Atlantic Products UD Series.
      c. House of Metal Enclosures (HOME) SD Series.
      d. Zero A43/A36 Series.
   5. Equipment Custom Rackmount Shelf: Middle Atlantic Products Model RSH-4A Series.
   6. Horizontal Lacer Bars
      a. Mid Atlantic LBP-IR4, LBP-1S, LBP-1P.
      b. Equal by Atlas/Soundolier.

W. Equipment Enclosure Power and Signal Grounding: Comply with applicable Codes and applicable portions of Division 26. Provide UL Listed devices, Specification or Hospital Grade. Provide all junction boxes, raceway, fittings, wire, supports and fastenings as required for complete installation. Unless otherwise noted, provide receptacles of NEMA 5-15R configuration.
   1. Full height receptacle strip, Isolated Ground:
      a. Wiremold 3000 Plugmold IG Series.
      b. Middle Atlantic PD series vertical power strips.
   2. Full height receptacle strip, three or more circuits, Isolated Ground:
      a. Wiremold 3000 Series with Specification Grade IG 5262 Series receptacles.
      b. Middle Atlantic PD series vertical power strip.
   3. Wireway, lay in, NEMA 1: Any meeting NEMA 1 and UL870. Size as required.
   4. Flexible metal conduit: Comply with Division 26.
   5. Sequencing Power System:

a. The Contractor is to design and build power sequencing and surge suppression systems that will control and distribute power in the equipment racks. The system will be designed to sequentially connect power to all of the audio-visual equipment in the equipment racks. Outlets are mounted to the unit's back plate or on a remote strip. If the project utilizes a control system, the sequencing power system will be controlled by the software configurable control system. The touch panel's shut down button will prompt a second time asking, "Are you sure you want to shut the system down?" A positive response will activate system shut down. A push button control station's shut down button will be pressed twice to shut down the system. If the project does not include a control system, the Contractor is to provide a dedicated sequential controller in the equipment racks.
   1) 15 amp or greater power capacity.
   2) 3-prong 15 amp 120VAC isolated ground outlets (provide required amount).
   3) Individual sequencing steps for each outlet.
   4) Adjustable power-up time delay and outlet sequencing intervals.
   5) Modular power raceway systems shall be constructed of 18-gauge min-spangle galvanized steel.
   6) Remote controllable via contact closures (if applicable).
   7) Status indicator on touch panel (if applicable).
b. Approved subject to above:
   1) Middle Atlantic RLM-XX, RM-XX, R-XX or M-XX Modular Power Raceway Series.
   2) Middle Atlantic USC-6R Universal Sequencing Controller.
   3) Equal by Atlas Soundolier.

6. Signal Grounding bus bar, insulated from enclosure frame:
   a. Atlas/Soundolier BBG Series mounted on standoff insulators.
   b. Zero A32 Series.
   c. Middle Atlantic.
   d. Panelboard Isolated Ground bus kit by manufacturer of Project Panelboards specified in Division 26.
7. Multi-Outlet Assembly, Surge Suppressing, UL Listed. Comply with ANSI/IEEE C62.41-1980. Provide at least six receptacles. Provide equivalent to:
   a. Surgex SX RT series.
   b. EFI Electronics Corporation Model 153.
   c. MCG Electronics, Inc. Model 296 (subject to UL Listing).
8. Computer Grade Uninterruptible Power System, UL Listed. Provide continuous, no-break power with sine wave output. Provide Transient Over-Voltage (TOV) Surge Suppression; comply with ANSI/IEEE C62.41-1980, Category A and Category B. Provide complete isolation from Line. Provide output voltage regulation to ANSI C84.1 for computing equipment. Provide output KVA, switch-mode power supply rated, not less than 150% of connected load indicated. Provide one for each Central Processing Unit, Digital Signal Processor and automated control console. Provide equivalent to:
   a. Best Power Technology, Inc. "Micro-Ferrups" Series.
   b. Best Power Technology, Inc. "Axxium" Series.

2.2 MAJOR SYSTEM COMPONENTS

Notes: 1. Extron products are the District Standards, no substitutions allowed.

RANCHO SANTIAGO COMMUNITY COLLEGE

BUILDING H - CLASSROOMS

DEVICE ID	DESCRIPTION	MANUFACTURER	MODEL	ACCESSORIES
CPU	(E) CENTRAL PROCESSING UNIT	EXISTING TO REMAIN	EXISTING TO REMAIN	
CVM	(E) COMPUTER VIDEO MONITOR	EXISTING TO REMAIN	EXISTING TO REMAIN	
DC	(E) DOCUMENT CAMERA	EXISTING TO REMAIN	EXISTING TO REMAIN	
ERK1	(CFCI) RACK	NOVA SOLUTIONS	P/O 66-SS305730LX	
HD	(CFCI) USB-HDMI CONVERTER	EXTRON	HD101: 60-1883-01	
KB	(E) KEYBOARD	EXISTING TO REMAIN	EXISTING TO REMAIN	
LEC1	(E) LECTERN	EXISTING TO REMAIN	EXISTING TO REMAIN	
M	(E) MOUSE	EXISTING TO REMAIN	EXISTING TO REMAIN	
PI	(CFCI) POE POWER INJECTOR	EXTRON	115-60-1233-02	
PRS	(CFCI) PROJECTION SCREEN	DALITE TENSIONED ADVANTAGE W/ SIGHTLINE	DL15002LS (92"W X 57.5"H) 109" DIA.	W/ SINGLE MOTOR LOW VOLTAGE CONTROL (LVC)
RX1	(CFCI) RECEIVER	EXTRON	DTP HDMI 4K 230 Rx	
SC1	(CFCI) CEILING SPEAKER	EXTRON	FF 220T	
SPD	(CFCI) SURGE PROTECTION DEVICE	SURGEX	SX-1120-RT	RACK MOUNTED
SYSW1	(CFCI) SYSTEM SWITCHER	EXTRON	DTP CROSSPOINT 82 4K: 60-1583-93	W/LINKLINCENSE
TPC	(CFCI) TOUCH PANEL CONTROL	EXTRON	TLP PRO 1025T: 6-1565-12	
TTP1	(CFCI) TABLETOP PANEL	EXTRON	CABLE CUBBY 700-60-1893-02	AS REQUIRED ACCESSORIES AND CONFIGURATON
VPJ1	(CFCI) VIDEO PROJECTOR	EPSON	PowerLite L690U WXGA W/ BMS LCD LOC II SW (WHITE), KEY#13	AS REQUIRED MOUNTING HARDWARE AND ACCESSORIES

A. The above list of Major System Components only outlines the major items necessary to allow the system to function as designed. It lists no power supplies, balancing transformers, power splitters, modular cards or other auxiliary components required to achieve a functioning system. Contractor is required to supply all components needed to provide a complete and operable system as outlined in the contract documents. The full set of construction documents are to be used when preparing a bid. This list is not intended to provide a full bill of materials.

2.3 FINISHES

A. Any item or component of the Work of this Section which is visible shall comply with the following. Finishes noted or scheduled on the Contract Drawings shall take precedence. Submit all color samples of all items visible to public for approval.
   1. Where finishes are not noted or otherwise defined in the Contract Documents, submit manufacturer's standard finish samples for selection by the Owner.
   2. Paint loudspeaker cabinets to match exactly the surrounding and adjacent surfaces. Submit paint sample to Owner's representative for approval.
   3. Unless otherwise noted, receptacle or device plates subject to connection or operating force shall be stainless steel or hard anodized aluminum. Provide plates which generally match the appearance of project standard receptacle or device plates in view in the same area. For anodized aluminum, submit samples of standard colors for selection by Owner.
   4. Operating panels shall be steel, primed, painted with thermosetting epoxy paint, with legends silk-screened in contrasting color, and coated with clear epoxy thermosetting coating; or aluminum, hard anodized, with legends engraved and filled with contrasting color, all coated with clear epoxy thermosetting coating.
   5. All steel surfaces shall be treated with primer equivalent to zinc phosphate and finish painted with baked enamel or painted with a thermo setting epoxy paint.
   6. All aluminum surfaces, except those used as operating surfaces, shall be anodized and then painted with a thermo setting epoxy paint.

B. Custom Fabricated Plate Screws
   1. Match the finish of the screws used to mount the custom fabricated plates with the finish of the custom fabricated plate.

C. Ceiling Loudspeaker Grilles
   1. Paint loudspeaker grilles to match exactly the surrounding and adjacent surfaces (when speakers are recessed). Apply paint to permit servicing of loudspeakers without damage to finish of adjacent or adjoining surfaces. Provide uniform appearance. Do not obstruct grille openings with paint. Submit paint sample to Owner's representative for approval.

D. Manufacturer's logos
   1. Remove all manufacturers' names, logos, or other symbols from speakers or other objects placed in view of the public.

PART 3 - EXECUTION

3.1 GENERAL

A. Perform the Work of this Section in accordance with acknowledged industry and professional standards and practices, and the procedures specified herein.

B. Furnish and install (herein, "provide") all materials, devices, components, and equipment required for complete, operational systems.

C. Contractor is to supervise the installation of back boxes and terminal cabinets installed by the Division 26 Contractor. Contractor is to verify that correct boxes are installed in their proper locations before any drywall has been installed.

3.2 EXAMINATION

A. Immediately report to the Consultant any discrepancies between the specifications and drawings. This includes discrepancies between the technical specification documents and actual field dimensions or findings that may hinder installation work, conflict with other trades, or cause delays.

B. Carefully examine all details that affect all aspects of the systems described in the specifications and drawings.
   1. Examine, coordinate and confirm all drawings and details.
   2. Examine, coordinate and confirm all electrical power requirements, conduits, raceways, boxes, and etc.
   3. Examine, coordinate and confirm work of other trades that may influence the outcome of the design, specification, and performance of the systems.

3.3 PREPARATION

A. This installation section is only meant as a guideline for the Contractor. The Contractor shall be responsible for executing all installation work in a manner that is in accordance with industry-accepted standards or governing codes, whichever is more stringent. Installation activities shall be executed in an organized and orderly manner. These steps include, but are not limited to, pre-delivery testing, delivery, unloading, installation, equipment / cable labeling, programming, set-up / calibration / alignment / adjustment, testing, commissioning, training, and documentation.

B. Protect all existing work surfaces, furniture, equipment, fixtures and etc. before commencing installation work. Any damage to the existing physical and electrical property due to installation work shall be the responsibility of the Contractor.

C. Immediately hand over any de-installed equipment to the Owner for disposal or safe keeping.

D. Carefully remove any obstructions such as fixed seating, ceiling tiles, furniture, equipment and etc. that would obstruct or hinder the installation work. Damage caused by undue care in moving these items shall be responsibility of the Contractor.

E. Examine, coordinate, and confirm the cleanliness of the work site before commencing the portion of the installation work that involves dust-sensitive electronic or electrical equipment such as audio mixers, switchers, projectors, control processors, computers, cameras, etc. Dust-sensitive equipment that is installed in a work site with a lot of airborne dust and dirt shall be properly protected. For example, a video camera on a wall-mounted bracket is protected by a clean plastic bag to prevent dust from contaminating it. Seal the bag's opening using adhesive tape.

F. Prior to commencing installation work, ensure that the surrounding areas are clean and promote ease of installation work.

G. Ensure that all equipment rack and equipment locations are clean before commencing installation work.

H. Unless specified otherwise, furnished products / equipment shall be tested, delivered and installed. And all systems shall be tested and commissioned to fully operational and properly configured condition.

I. All electrical equipment shall be burned-in or tested at the Contractor's shop before delivery. This pre-installation test shall reveal any equipment that is faulty, malfunctioning or dead out of the box ahead of time.

J. All radio frequency (RF) operated devices shall be tested on-site prior to installation to determine blind spots, RF interference, or any other transmission / reception problems. The Contractor shall be responsible for costs associated with providing additional support or accessory equipment (antennas, amplifiers, cables, etc.) and / or services to improve signal transmission / reception.

K. Provide all support equipment (ladders, man-lifts, tools, etc.) required to complete the installation work in a safe and expeditious manner.

L. Obtain any plan approvals, permits and licenses required by inspection authorities prior to execution of any installation work. The Contractor shall be responsible for all associated fees and costs incurred while fulfilling this requirement.

M. Ensure that all equipment is accessible for operation and maintenance work. Under no circumstance shall equipment be inaccessible or inconveniently located.

N. Aside from the systems' operational features, provide equal attention to the overall aesthetics of the installed equipment and cabling. Special attention to aesthetics shall be extended to equipment or cabling in public spaces.

O. Firmly secure all fixed equipment and hardware in place and ensure that they are plumb and / or square. An exception to this shall be portable or movable equipment.

P. Structurally mounted equipment: All equipment shall be mounted in accordance to all applicable safety codes, standards and practices. The one that provides for the most stringent rule shall prevail. All mounting hardware shall have a load rating by, at least, a factor of 5 (500% or greater) in reference to the weight of the equipment to be mounted or suspended. An exception to the rule shall be existing local safety codes or standards requiring greater load capacities.

Q. Seismic restraints: Abide by all the seismic restraint requirements described in all applicable building codes in force at the work site. If no provisions exist for a particular situation, follow these minimal recommendations.
   1. Fixed equipment: Mount and brace to the building structure to minimize potential hazards to personnel and damage to property during any kind of seismic event.
   2. Floor mounted equipment: Bolt equipment securely to the floor to prevent it from toppling during any kind of seismic event
   3. Vertical-mounted columns: Apply braces to the vertical column in four opposing directions back to the mounting surface. This will minimize sway in any direction. Provide a separate, flexible restraint (e.g. aluminum-braided aircraft cable) with a capacity of 5 times the weight of the total mounting system. The same applies to the anchor to which the flexible restraint is attached and the method of attachment to the structure.
   4. No equipment, equipment supports, or mounts must fail before the structure fails.
   5. Seismic restraint measures must not interfere with fire stopping.
   6. Notwithstanding compliance with these minimum recommendations, it is the Contractor's responsibility to ensure that the seismic restraint measures taken are adequate for the circumstances, including, if required, verification by an independent structural engineer. The cost of all such engineering shall be the responsibility of the Contractor.
   7. Penetration of the Slab: Verify that any mounting or restraint work that requires deep or thorough penetration of the slab shall not damage embedded materials including, but not limited to, slab tensioning devices or conduit. Verify the slab by X-ray or other method before proceeding. The Contractor shall be responsible for all costs associated with this investigation.

3.4 INSTALLATION

A. Follow manufacturer's instructions for installing, operating, configuring, and programming their equipment. Do not perform modifications to equipment that would void its warranty.

B. Pull and terminate all cables and interconnect all equipment and components in accordance with approved drawings. Install audio-visual cover plates and faceplates onto all boxes.

C. Loudspeaker Assembly Installation
   1. Loudspeakers:
      a. Verify proper installation of loudspeaker enclosures and related support.
      b. Verify that no loudspeaker assembly is subjected to stresses or loading effects in any way contributing to possible extraordinary failure.
      c. Connect loudspeaker assemblies to the appropriate 70 volt-line transformer tap as applies. Verify specified polarity. Use insulated crimp connectors or insulated "bobtail" splices applied with manufacturer's recommended ratchet tooling. Wago Wall-Nuts 773 Series or equal are acceptable. Wire nuts or "Scotchlock" connectors shall not be acceptable.
      d. Verify that loudspeaker grille openings and loudspeaker components are clear of paint after finishing.
      e. Perform preliminary loudspeaker tests specified herein. Correct non-conforming conditions.
      f. Adjust 70 volt-line transformer taps as required to realize uniform sound pressure level as specified herein. Document final 70 volt-line transformer taps on the Record Drawings.
      g. Correct all conditions giving rise to noise, rattle or other extraneous sounds owing to operation of a loudspeaker assembly under any specified operating condition.

D. Video Projectors
   1. Projectors shall be centered laterally to the projection screens.
   2. Projectors shall be mounted such that digital keystone compensation shall not be required.
   3. Selected projectors shall have lamp replacement and filter cleaning doors located in such a way that these items may be serviced while the projector is installed.
   4. Projectors shall be mounted such that their optical zoom settings shall not be set at either their widest or narrowest extreme, but shall be used in their mid-range.

3.5 LABELING AND IDENTIFICATION

A. All cables and connecting blocks shall be clearly, logically and permanently marked and identified by the following means:
   1. Use cable labels similar to the Panduit Polyolefin Self-Laminating Labels for inkjet or LaserJet printers or any other means acceptable to the Consultant. Cable labels should be machine printed and not handwritten.
   2. Cable labels should be placed approximately 12 cm. from each end of the cable.
   3. Labeling conventions shall be clear, logical, and must be acceptable to the Consultant.
   4. Include all cable identification numbers on all wiring diagrams and cable schedules.
   5. For fiber optic cables, use cable identification products such as the Panduit Label core series or any other means acceptable to the Consultant.
   6. For connector and terminal blocks, label using any means acceptable to the Consultant.

B. All cover plate, switches, panels, outlets, etc. labeling shall be engraved and filled, or silk-screened or by any other means acceptable to the Consultant. Do not use Dymo, Brother, or other similar labeling products.

C. Protective Devices

1. Identification of fuses and circuit breakers shall indicate protected circuitry, rating of protective device and voltage across open circuited protected device.

D. Panels and Receptacles
1. Panel surfaces shall be engraved and filled or silk screened with identification or shall be provided with 1/16 inch (minimum) thick laminated plastic labels with engraved block characters at least 1/8 inch high fastened to the equipment by stainless steel screws or rivets. Provide white characters on black background unless otherwise noted. Embossed plastic (Dymo) labels shall not be acceptable.

E. All equipment shall be labeled in a clear, logical manner or by any other means acceptable to the Consultant.
1. For Control Knobs and Sliders: Use 6mm (1/4") round labels, such as the Avery 057xx series, to indicate level settings. Neatly draw an arrow on the label using a fine tip permanent marker to accurately indicate the position of the control knob. If a control knob or slider has multiple level settings, use a logical and consistent color scheme to identify each setting. Illustrate all equipment settings in the Operation Manual.
2. For equipment identification, use 'badges' made of aluminum or plastic or any other acceptable material with engraved and filled, or silk-screened labeling. Stick these badges using industrial-strength doubled-sided 3M adhesive tape. Note: Label schemes should be clear, logical, and simple or by any other means acceptable to the Consultant. Indicate equipment labeling schemes on all elevation and plan drawings showing the front and / or rear of the equipment racks. The reader should be able to easily reference the label description to specific equipment in the Operation and / or Maintenance Manuals.

3.6 WIRING

A. General
1. This section does not apply if the drawings incorporate a wire schedule.

B. Audio Signal Wiring Classification:
1. Type A-l: Microphone level wiring less than -30 dBu, 20 Hz to 20 kHz.
2. Type A-2: Line level wiring -30 dBu to +24 dBu, 20 Hz to 20 kHz.
3. Type A-3: Loudspeaker level or circuit wiring greater than +24 dBu, from 20 Hz to 20 kHz.

C. Video/Graphics and Related Signal Wiring Classification:
1. Type V-1: Baseband and composite video wiring 1 volt peak-to-peak into 75 ohms, 0 to 100.0 MHz.
2. Type V-2: Synchronization and switching pulse wiring 4 volts peak-to-peak into 75 ohms, 15.62 to 15.75 kHz.
3. Type V-3: Color subcarrier wiring 0 to 4 volts peak-to-peak into 75 ohms, 3.57 to 4.43 MHz.

D. Control Signal Wiring Classifications:
1. Type C-1: DC control wiring 0 to 50 volts.
2. Type C-2: Synchronous control or data wiring 0 to 40 volts, peak-to-peak.
3. Type C-3: AC control wiring 0 to 48 volts, 60 Hz.

E. Additional Wiring Classifications:
1. Type M-1: DC power wiring 0 to 48 volts.
2. Type M-2: AC power wiring greater than 50 volts, 60 Hz.

F. Wiring Combinations: Except as indicated herein, conduit, wire ways and cable bundles shall contain only wiring of a single classification. The following combinations are acceptable in conduit, or cable harnesses. Additional acceptable combinations may be indicated on the Contract Drawings.
   1. Types A-1, C-1, and M-1.
   2. Types A-2, C-l, C-2, and M-l, runs less than 20 feet.
   3. Types A-2, C-1, and M-1.
   4. Types A-3, C-1, C-2, and M-1.
   5. Types A-2, V-1, and V-3.
   6. Types V-1, V-2, V-3, and C-1.
   7. Types M-2 and C-3.

3.7 WIRE AND CABLE INSTALLATION

A. Provide permanent identification of run destination at all raceway terminations.

B. All wire and cable shall be continuous and splice-free for the entire length of run between designated connections or terminations.

C. All shielded cables shall be insulated. Do not permit shields to contact conduit, raceway, boxes, panels, connector shell or equipment enclosures.

D. Within buildings, make splices only in designated terminal cabinets and/or on designated equipment backboards. Outside buildings, make splices only in designated manholes and/or hand holes. Protect splices outside of buildings with splicing kits equivalent to Scotch-cast Re-enterable. Make splices only with connectors or terminal devices specified herein. Document all splices on Record Drawings.

E. Verify that all raceway has been de-burred and properly joined, coupled, and terminated prior to installation of cables. Verify that all raceway is clear of foreign matter and substances prior to installation of wire or cable.

F. Inspect all conduit bends to verify proper radius. Comply with Code for minimum permissible radius and maximum permissible deformation.

G. Apply a chemically inert lubricant to all wire and cable prior to pulling in conduit. Do not subject wire and cable to tension greater than that recommended by the manufacturer. Use multi-spool rollers where cable is pulled in place around bends. Do not pull reverse bends.

H. Provide a box loop for all wire and cable routed through junction boxes or distribution panels. Provide tool formed thermal expansion loops at cable at manholes, handholes and at both sides of all fixed mounted equipment. Cable loops and bends shall not be bent at a radius greater than that recommended by the manufacturer.

I. Secure all wire and cable run vertically for continuous distances greater than 30 feet. Secure robust non-coaxial cables with screw-flange nylon cable ties or similar approved devices appropriate to weight of cable. For all other cables, provide symmetrical conforming nonmetallic bushings or woven cable grips appropriate to weight of cable.

J. All Category type cable, connectors and plugs shall be color coded for easy visual distinction. Color coded insert type boots shall be installed on all Category type plugs. A colored coded ring will be provided on all chassis connectors (i.e. Neutrik ACRF-#). Cable connecters shall be equipped with Neutrik BSE-# color coded bushings. The Color code shall be as follows:
   1. Digital Video / AV UTP =Green
   2. LAN =Yellow
   3. Audio Network =Red
   4. AV Local Area Network =Orange
   5. Digital Media =Blue
   6. Computer Training KVM =Grey
   7. AV UTP =White

3.8 CONNECTOR AND SIGNAL POLARITY CONVENTION

A. Maintain consistent absolute signal polarity at all connectors, patch points and connection points accessible in the system. Where applicable, a positive polarity electrical signal shall yield positive acoustic pressure from the loudspeakers.

B. Audio signal connector convention: AES14-1992 (ANSI S4.48-1992) AES standard for professional audio equipment - Application of connectors, Part 1, XLR-type polarity and gender.

Signal	Connector	Wire
Signal Phase	Pin 2	Red or White
Signal Anti-Phase	Pin 3	Black
Signal Ground	Pin 1	Drain Wire

C. Video and RF/MATV Connector Convention:

Signal	Connector	Wire
Signal Phase	Center Pin	Center conductor
Signal Anti-Phase	Shell	Shield
Signal Ground	Shell	Shield

D. Voice/Data Connector Convention: Comply with EIA/TIA-568C.

3.9 WIRING PRACTICE

A. Land all non-coaxial field wiring entering each equipment rack at specified terminal devices prior to connection to any equipment or devices within racks. At Contractor's option, such terminals may be located in the equipment racks or at backboards provided. Coordinate such selection with Project construction sequence and test procedures specified herein.

B. Identify all wire and cable clearly with permanent labels wrapped about the full circumference within one inch of each connection. Indicate the number designated on the associated field or shop drawing or run sheet, as applies. Assign wire or cable designations consistently throughout a given system. Each wire or cable shall carry the same labeled designation over its entire run, regardless of intermediate terminations. Provide any of the following:
   1. Continuous permanent imprint; equivalent to Clifford of Vermont, Inc. "Quik-Pull".
   2. Direct hot stamp.
   3. Heat shrinkable factory hot stamped; equivalent to Brady sleeve Heat shrink.

4. Adhesive strip printed labels wrapped the full circumference of the wire and sealed with clear heat shrink tubing; equivalent to Thomas and Betts or Panduit Insta-code with clear heat-shrunk tubing equivalent to Alpha.

C. Apply all crimp connectors only with manufacturer's recommended ratchet type tooling and correct crimp dies for connector and wire size. Plier type crimp tooling shall not be acceptable.

D. Coordinate insulation displacement (quick connect) terminal devices with wire size and type. Comply with manufacturer's recommendations. Make connections with automatic impact type tooling set to recommended force.

E. Make all connections to screw-type barrier blocks with insulated crimp-type spade lugs. Lugs are not required at captive compression terminal type blocks. Provide permanent designation strips designed for use with the terminal blocks provided. Make neat, intelligible markings with indelible markers equivalent to "Sharpie".

F. Tin terminated shield drain wires and insulate with heat shrinkable tubing.

G. Use only rosin core 60/40 tin/lead solder for all solder connections.

H. Dress, lace or harness all wire and cable to prevent mechanical stress on electrical connections. No wire or cable shall be supported by a connection point. Provide service loops where harnesses of different classes cross, or where hinged panels are to be interconnected.

I. Termination and build out resistors and related circuit correction components shall be visible. Do not install in connector shells or internally modify equipment. Show locations on Record Drawings.

J. Correct any and all of the following unacceptable wiring conditions:
   1. Deformed, brittle or cracked insulation.
   2. Insulation shrunken or stripped further than 1/8-inch away from the actual point of connection within a connector, or on a punch block.
   3. Cold solder joints.
   4. Flux joints.
   5. Solder splatter.
   6. Non-grommet, non-bushed, or non-insulated wire or cable entries.
   7. Deformation or improper radius of wire or cable

3.10 SIGNAL GROUNDING PROCEDURES

A. Comply with National Electrical Code.

B. Unless otherwise noted maintain a unipoint ground scheme.

C. Signal and electrical system grounds shall be isolated except at the Project ground field connection.

D. Equipment enclosures shall not be permitted to touch each other unless bolted together and electrically bonded.

E. Ground and bond equipment racks and similar equipment enclosures containing powered equipment exclusively via the Isolated Ground conductors provided under Division 26. INSULATE RACK MOUNTING, ANCHORAGE, AND RACEWAY CONNECTIONS.

F. At each rack, provide an Isolated Ground bus within the rack. At each rack, provide a lug bonded to the rack frame with a #8 TW stranded wire to the rack Isolated Ground bus.

G. At each ensemble of racks, provide a single labeled Isolated Ground tubular-clamp bus bar terminal strip to land the individual rack Isolated Ground bus ground conductors. Connect the main Isolated Ground conductor from the Technical Power panel board at this point.

H. Equipment signal ground shall be to the Isolated Ground System via the green wire of the equipment power cord. Where equipment uses two wire power cord, provide #12 green bond wire to rack IG bus bar. At equipment, provide crimp lug and suitable hardware for bonding.

I. Shielded cables of this section shall be grounded exclusively to Isolated Ground by a single path. Shield shall be tied to Isolated Ground at one end only, i.e., at the low potential (receiving) end of run, unless otherwise noted.

J. Unless otherwise noted, at audio jackfields, tie source shield at jackbay frame. Float shields at connections to output jacks. Bus each row of jack frames and run individual #12 green ground wire for each row to rack IG bus bar.

K. Signal Ground provisions shall realize less than 0.15 ohms to the primary ground connection.

3.11 EQUIPMENT ENCLOSURE (RACK) AND EQUIPMENT BACKBOARD FABRICATION

A. Combustible material, other than incidental trim of indicated equipment, is prohibited within equipment racks.

B. Within each equipment enclosure, provide a full-height multi-circuit ISOLATED GROUND outlet strip with branch circuit count as shown on drawings; locate on the left side of the equipment enclosure, as viewed from the rear. In each enclosure provide number of receptacles required by present and future equipment indicated on drawings, plus at least two spare receptacles. Provide flexible steel raceway and junction box for connection of power service. Bond internal raceway to rack frame.

C. Provide a permanent label on the front of each equipment rack including the rack designation, and the circuit breaker number and associated electrical distribution panel designation servicing same.

D. Maintain separation of wiring classifications as specified herein. Separately dress, route and land microphone and line level cables and related on the right side of the equipment enclosure, as viewed from the rear; dress, route, and land loudspeaker level and control cables on the left side of the equipment enclosure, as viewed from the rear.

E. Access shall not require demounting or de-energizing of equipment. Install access covers, hinged panels, or pull-out drawers to insure complete access to terminals and interior components.

F. Fasten removable covers containing any wired component with a continuous hinge along one side, with associated wiring secured and dressed to provide an adequate service loop. Provide an appropriate stop locks to hold all hinged panels and drawers in a serviceable position.

G. Provide permanent labels for all equipment and devices. Where possible, fasten such labels to the rack frame or to blank or vent panels which will remain in place when active equipment is removed for possible service.

H. At jackfields, provide service loop to permit removal of jackfields from rack sufficient to conveniently access all jack contacts for routine cleaning and maintenance. Organize the service loop and harness such that reasonable reconnection of jacks and jack normals is possible without cutting apart the harness.

I. Coordinate the design and execution of wire harnessing of multi-bay rack ensembles with conditions of delivery to installation locations at Project Site, and with the requirement herein for test of the completely wired system in the shop prior to delivery to the Project Site. Organize the wiring harnesses such that they will fold within one shippable unit without risk of damage or provide polarized multipin connectors and related interconnect systems as specified elsewhere herein.

J. At each equipment backboard, provide UL Listed surge suppressing multi-outlet assembly with at least six receptacles.

3.12 ADJUSTING AND TESTING

A. Test Equipment
   1. Furnish, store and maintain test equipment at the fabrication shop and the job site for both routine and Acceptance Testing of the Work of this Section. Maintain all test equipment at the job site while work is in progress from installation of equipment racks until Owner Acceptance of this Work; thereafter remove all of this test equipment from the job site. Provide all required test cables, jigs and adapters. Provide at least one of the following items or approved functional equivalents:
   2. Audio Systems:
      a. Wide Band Oscilloscope (Tektronix THS700 Series).
      b. True RMS Analog / Digital Volt-Ohm Multimeter (Fluke 187 Series or equal).
      c. Low Distortion Audio Frequency Sine Wave Oscillator (Gold Line TS1).
      d. Measurement Microphones (Earthworks M30, Bruel & Kjaer 4007, Josephson 550).
      e. Sound System Optimization and Acoustic Measurement Analyzer (Goldline TEF, Meyers SIM, SIA Smaart, WinMLS, EASERA).
      f. Harmonic Distortion Analyzer (Sound Technology or Tektronix AA 501A) or Swept Spectrum Analyzer, HP 3580A, or Swept Test System, Audio Precision or Neutrik).
   3. Video Systems:
      a. Wide Band Oscilloscope (Tektronix THS700 Series).
      b. Sync & Test Generator (Tektronix 1470).
      c. Waveform/Vector Monitor (Tektronix 1740).
      d. Color Picture Monitor, Precision.
   4. Communications and Related:
      a. Level II, Cat5e Cable Pair Tester (Microtest, HP, Scope, Fluke or Siemons set up to meet Category 5e parameters).
      b. Outside Plant Voice Cabling Plant Tester – capable of detecting shorts, opens, reversals, mis-wiring and crosstwists (Siemon STM-8 or equal by Mod-Tap).

c. Metallic cable pair tester (Wavetek Corporation, Instruments Division, model LANTech 100).
d. Tone Test Set.
e. Optical Time Domain Reflectometer (OTDR) for fiber optics.
f. Any other items of equipment or materials required to demonstrate conformance with the Contract Documents.

B. System Performance Testing and Adjusting Procedures
1. Upon completion of the installation of all equipment in an area, perform the following tests and record results. Verify safe and proper operation of all components, devices, or equipment, establish nominal signal levels within the systems and verify the absence of extraneous or degrading signals. Make all preliminary adjustments and document the setting of all controls, parameters of all corrective networks, voltages at key system interconnection points, gains and losses, as applicable. Submit test report. Correct all non-conforming conditions prior to requesting Acceptance Review and Testing. Perform at least the following procedures:
2. Mechanical: Verify:
   a. Integrity of all support provisions.
   b. Absence of debris of any kind, tools, etc.
3. Power and Isolated Ground: Verify:
   a. Isolation of Isolated Ground system from raceway and related ground.
   b. Grounding of devices and equipment. Integrity of signal and technical power system ground connections.
   c. Proper provision of power to devices and equipment.
4. Signal Wiring: Verify:
   a. Integrity of all insulation, shield terminations and connections.
   b. Integrity of soldered connections. Absence of solder splatter, solder bridges.
   c. Routing and dressing of wire and cable.
   d. Continuity, including conformance with wire designations on running sheets, field and shop drawings.
   e. Absence of ground faults.
   f. Polarity.
5. Use the proper sequence of energizing systems to minimize the risk of damage.
6. Audio Systems:
   a. Electronic Tests; confirm:
      1) Gain at 1 kHz.
      2) Maximum output.
      3) Input clipping level.
      4) Frequency response.
      5) Total harmonic distortion.
      6) Signal-to-Noise ratio.
      7) Signal-to-Crosstalk ratio.
   b. Electro/Acoustic Tests:
      1) Uniformity of coverage.
      2) Electronic and acoustic frequency response/one-third octave equalization. Transfer function measurement shall be as close to flat as possible. Measure at ear level. Representative of the Owner will direct final adjustment.
      3) Maximum continuous sound pressure level (in the reverberant field). Drive systems with broadband pink noise. Sustain for at least five minutes with no system damage. Measure for "A" and "C" weightings at ear level on loudspeaker axis. Turn off noise.

4) Acoustic signal-to-noise ratio referenced to the specified maximum continuous sound pressure level in the reverberant field. Measure for "A" and "C" weightings at ear level on loudspeaker axis with mechanical systems operating. Present comparison with previous measurement.
5) Acoustic gain before feedback. Locate acoustic source (4 inch loudspeaker/pink noise generator) two feet from system microphone. Measure at system microphone position and at most distant listener position at ear level. Present comparison.

7. Video Systems:
   a. Video Monitors:
      1) Apply crosshatch. Verify linearity.
      2) Apply red field. Adjust purity.
      3) Apply SMPTE bars and PLUGE. Adjust to standards.
   b. Video Path Test: Use NTC-7 procedures. Use full field or line signals. Alternately, conduct copper time domain reflectometer test.
8. Fiber System:
   a. Fiber:
      1) Conduct optical loss test.
      2) Conduct optical time domain reflectometer test.
9. Diagnostic Monitoring System:
   a. Demonstrate complete operation.
10. System Overall:
   a. Verify levels.
   b. Provide permanent "wedge" type labels on all controls, as applies, to indicate correct settings after systems performance testing and adjustment procedures have been successfully completed.

C. Loudspeaker Assembly Testing and Adjusting Procedures
1. Upon completion of the installation of all loudspeakers in an area, perform the following tests and record results. Correct non-conforming conditions, unless the cause is clearly outside the Work of this Section, in which case submit the apparent cause to the Owner.
2. Loudspeaker Line Impedance: At terminal cabinets at equipment rooms, measure the impedance of each loudspeaker line. Sweep from at least 20 Hz to at least 16 kHz.
3. Loudspeaker Polarity: Test the acoustic polarity of all loudspeakers using an Acoustic Polarity Tester.
4. Freedom From Buzzes, Rattles and Objectionable Distortion: Individually apply to each loudspeaker line a slow sine wave sweep from 50 Hz to 5 kHz at a level of 6 dB below rated power amplifier output voltage. Listen carefully for buzzes, rattles and objectionable distortion.
5. Uniformity of Coverage: Apply broadband Pink Noise. Adjust level to approximately 70-80 dBA at measurement locations. Measure in 4 kHz octave band at ear level. Adjust loudspeaker aiming and 70 Volt loudspeaker taps for uniformity of coverage.

D. Equipment Rack and Equipment Testing and Adjusting Procedures
1. Conduct procedures in fabrication shop. Verify safe and proper operation of all components, devices, or equipment, establish nominal signal levels within the systems and verify the absence of extraneous or degrading signals. Make all preliminary adjustments and document the setting of all controls, parameters of all corrective networks, voltages at key system interconnection points, gains and losses, as applicable. Submit test report with color photographs of each equipment rack, front and back. Request and coordinate verification of submitted test data by the representative of the Owner. Correct all non-conforming conditions prior to shipment to Project Site. Perform at least the following procedures:

2. Preliminary: Verify:
   a. Grounding of devices and equipment. Integrity of signal and electrical system ground connections.
   b. Proper provision of power to devices and equipment.
   c. Integrity of all insulation, shield terminations and connections.
   d. Integrity of soldered connections. Absence of solder splatter, solder bridges.
   e. Absence of debris of any kind, tools, etc.
   f. Routing and dressing of wire and cable.
   g. All wiring, including polarity and continuity, including conformance with wire designations on running sheets, field and shop drawings.
   h. Mechanical integrity of all support provisions.
3. Rig temporary power and grounding: Comply with all applicable Codes, regulations and ordinances.
4. Determine the proper sequence of energizing systems to minimize the risk of damage. Energize. Burn in for at least 120 hours.

E. Telecommunications Cabling Testing
1. Perform telecommunications cabling inspection, verification, and performance tests in accordance with TIA-568-C.1, TIA-568-C.2 and TIA-568-C.3. Perform optical fiber field inspection tests via attenuation measurements on factory reels and provide results along with manufacturer certification for factory reel tests. Remove failed cable reels from project site upon attenuation test failure.
2. Visually inspect UTP and optical fiber jacket materials for UL or third party certification markings. Inspect cabling terminations in telecommunications rooms and at workstations to confirm color code for T568A or T568B pin assignments and inspect cabling connections to confirm compliance with TIA-568-C.1, TIA-568-C.2 and TIA-568-C.3. Visually confirm Category 6 marking of outlets, cover plates, outlet/connectors, and patch panels.
3. UTP backbone copper cabling shall be tested for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors, and between conductors and shield, if cable has overall shield. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connected.
4. For multimode optical fiber, perform optical fiber end-to-end attenuation tests in accordance with TIA-568- C.3 and TIA-526-14-A using Method A, Optical Power Meter and Light Source for multimode optical fiber. For single-mode optical fiber, perform optical fiber end-to-end attenuation tests in accordance with TIA-568- C.3 and TIA-526-7 using Method A, Optical Power Meter and Light Source]. Perform verification acceptance tests.
5. Perform testing for each outlet as follows:
   a. Perform Category 6 link tests in accordance with TIA-568-C.1 and TIA/EIA-568-B.2. Tests shall include wire map, length, insertion loss, NEXT, PSNEXT, ELFEXT, PSELFEXT, return loss, propagation delay, and delay skew.
   b. Optical fiber Links. Perform optical fiber end-to-end link tests in accordance with TIA-568-C.3. E. Final Verification Tests
   c. Perform verification tests for UTP and optical fiber systems after the complete telecommunications cabling and workstation outlet/connectors are installed.

3.13 CLEANING

A. Clean each section or area of where the work was conducted after completion to permit immediate use of the area. Remove and discard all refuse, rubbish, and debris.

B. The Contractor shall ensure that all recyclable and environmentally-hazardous waste materials are disposed properly.

C. Make good all existing structures, surfaces, and utilities affected by cutting, coring, mounting, drilling, or other new work.

D. Clean all furnished equipment of dust, dirt, finger prints, smudge, and other material prior to calling for a Substantial Performance of Work Review or Completion of Work Review.

3.14 PROTECTION

A. During the installation phase and up to the date of achieving Substantial Performance of Work, protect finished or unfinished work against damage or loss. In the event of such damage or loss, immediately replace or repair such work or equipment at no cost to the Owner.

3.15 ACCEPTANCE REVIEW, TESTING PROCEDURES AND COMMISSIONING

A. Complete all Work of this Section. Submit Test Report. Submit review copies of Operating and Maintenance Manuals, less reduced set of Record Drawings. Notify the Owner in writing that the Work of this Section is complete and fully complies with the Contract Documents. Request Acceptance Review and Testing by returning Attachment “A” to the Design Consultant. The representative of the Owner will conduct Verification of Submitted Test Data, and otherwise direct testing and adjustment of this Work. These Procedures may be performed at any hour of the day or night as required by the representative of the Owner to comply with the Project Schedule and avoid conflict with these procedures from possible ongoing work of other Separate Contracts and/or the Owner's operations. Provide all specified personnel and equipment at any time without claim for additional cost or time.

B. Personnel: Provide services of the designated supervisor and additional technicians familiar with work of this Section. Provide quantity of technicians as required to comply with Project Schedule.

C. In Addition, Provide:
   1. Set of hand and power tools appropriate for performance of adjustment of and corrections to this Work.
   2. Include spare wire and connectors and specified tooling for application.
   3. Ladders, scaffolding and/or lifts as required to access loudspeakers and other high devices.
   4. Test equipment to include but not limited to:
      a. Dual channel FFT-based audio analyzer
      b. Video test generator with color bars, grayscale, alternating pixel, multi-burst, crosshatch and % windows.
      c. InfoComm Projection Shoot-Out DVD
      d. Digital Video Essential Professional DVD
      e. Category cable tester, cable length, short, open and miswire test.
   5. Complete set of latest stamped, actioned submittals of record for reference.
   6. Complete set of Shop and Project Site Test Reports.
   7. Complete set of manufacturer's original operation, instruction and service manuals for each equipment item for reference.

D. Demonstrate: Complete operation of all systems and equipment, including Portable Equipment.
   1. General
      a. Configure room for each type of event and demonstrate audio-visual system.
      b. Connection of portable equipment. (Laptop, document camera, etc.)

c. Demonstrate to the Consultant that all functions and equipment for the system work properly when installed as a complete system.
d. The Contractor shall demonstrate the satisfactory operation of all controls and adjustment circuits of the system.
e. Demo room scheduling software where applicable.
f. Room combining and dividing presets.
g. Demonstrate system startup and shut down procedures.

2. Audio
   a. Route audio to program speakers.
   b. Route audio to monitor speakers.
   c. Patch each audio tie line into system.
   d. Route audio signal to auxiliary speakers.
   e. Demonstrate and document gain structure through the system.
   f. Demonstrate and document with a dual channel FFT-based audio meter the following:
      1) Polarity of each driver in each cabinet.
      2) Crossover point of high, mid and low section of each loudspeaker.
      3) dB SPL levels from 1-4 kHz at various position in the audience area.
      4) dB SPL level of high, mid, low and sub frequency bandwidth at crossover.
   g. Audio routed to ceiling speakers.
   h. Audio Conferencing.
   i. Demonstrate that the audio system is properly time aligned and equalized.
   j. Assistive listening system.
3. Video
   a. Route source equipment (Blu-ray Player, TV tuner, test generators, etc.) to video displays and projectors.
   b. Set up rooms for each type of event that may take place and demo each.
   c. Recording of a distance learning session.
4. Control
   a. Communication between control system and AV equipment, including feedback if device supports 2-way communication
   b. User interface operation.
   c. Password protection of user interface.
   d. Help desk features.
   e. All programmed presets.
5. The Contractor 's personnel and test equipment shall be made available to the Consultant in order that:
   a. Selected tests and measurements previously made by the Contractor can re-run.
   b. Other tests may be made at Consultant's discretion.
   c. Additional tests or measurements may be made due to changes in field conditions.
6. It is estimated that the acceptance tests and demonstrations will require approximately *four hours*, unless construction or installation problems or deviations from the specifications are discovered.

E. Adjust: As directed by the representative of the Owner.

F. Correct: In timely manner, failure to comply with the Contract Documents, as reasonably determined by the representative of the Owner.

G. Acceptance Documentation
   1. Official acceptance of the system covered by this specification will occur when the Design-Builder receives the following written documents:

a. A letter from the Consultant to the Architect acknowledging Final Acceptance of the system stating compliance with all articles of the specifications.
b. A letter from the Architect to the Contractor stating that all related work has been completed to his satisfaction. Until these documents are received, the installation is not formally complete. The official date of acceptance shall be the date of the letter from the Architect to the Contractor described above.

3.16 CLOSEOUT

A. Punch List: Perform any and all remedial work, at no claim for additional cost or time. Where required, retest and submit Test Report. Notify Owner of completion of Punch List.

B. Portable Equipment: Furnish all portable equipment and spares to the designated representative of the Owner, along with complete documentation of the materials presented. Where applicable, furnish portable equipment in the original manufacturer's packing.

C. Operating and Maintenance Data: Install framed operating and maintenance instructions. Submit Manuals.

D. Project Record Documents: Submit.

E. Keys: If applicable, replace construction locks with permanent locks. Transmit keys to Owner.

F. Training: Conduct specified training and submit training manuals.

G. Warranty: Submit Warranty dated to run from date of Acceptance of the Work of this Section.

3.17 OWNER’S RIGHT TO USE EQUIPMENT

A. Acceptance of the Work of this Section will be after completion of corrections and adjustments required by the "Punch List" which results from Acceptance Review and Testing of the completed installation. The Owner reserves the right to use equipment, material and services provided as part of the Work of this Section prior to Acceptance without incurring any obligation to Accept any equipment or completed systems until all Punch List work is complete and all systems comply with the Contract Documents; or accept any claim for additional cost or time.

Attachment "A"

NOTICE OF COMPLETION
&
REQUEST FOR FINAL INSPECTION

We hereby give notice that the work associated with the Audio-Visual system, at the project named below, is completed and fully complies with the contract documents issued to the Contractor. The required submittals below have been marked as completed.

- ☐ Programming
- ☐ Test Reports
- ☐ Operation Manual
- ☐ Maintenance Manual
- ☐ Training Manual
- ☐ Training
- ☐ Warranty Certificates
- ☐ Record Drawings

We request commissioning and verification testing be scheduled with the Owner's Representative for final system sign off. Attached is a list of test equipment for review and acceptance.

PROJECT INFORMATION

Project Name:	Project Phase:
Project Address:	

CONTRACTOR INFORMATION

Name:	Company:
Address:	
Signature:	Date:

Note to Contractor: Provide all test equipment for final inspection as described in the specification.

Please complete and fax or email this form to IDS Group attention Architectural Department
Fax 949.387.0800 Email: quentin.montrie@idsgi.com

END OF SECTION