

Agenda



County of Inyo Board of Supervisors

Board of Supervisors Room
County Administrative Center
224 North Edwards
Independence, California

All members of the public are encouraged to participate in the discussion of any items on the Agenda. Anyone wishing to speak, please obtain a card from the Board Clerk and indicate each item you would like to discuss. Return the completed card to the Board Clerk before the Board considers the item (s) upon which you wish to speak. You will be allowed to speak about each item before the Board takes action on it.

Any member of the public may also make comments during the scheduled "Public Comment" period on this agenda concerning any subject related to the Board of Supervisors or County Government. No card needs to be submitted in order to speak during the "Public Comment" period.

Public Notices: (1) In Compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting please contact the Clerk of the Board at (760) 878-0373. (28 CFR 35.102-35.104 ADA Title II). Notification 48 hours prior to the meeting will enable the County to make reasonable arrangements to ensure accessibility to this meeting. Should you because of a disability require appropriate alternative formatting of this agenda, please notify the Clerk of the Board 72 hours prior to the meeting to enable the County to make the agenda available in a reasonable alternative format. (Government Code Section 54954.2). (2) If a writing, that is a public record relating to an agenda item for an open session of a regular meeting of the Board of Supervisors, is distributed less than 72 hours prior to the meeting, the writing shall be available for public inspection at the Office of the Clerk of the Board of Supervisors, 224 N. Edwards, Independence, California and is available per Government Code § 54957.5(b)(1).

Note: Historically the Board does break for lunch; the timing of a lunch break is made at the discretion of the Chairperson and at the Board's convenience.

March 3, 2020 - 8:30 AM

AMENDED

1. **PUBLIC COMMENT**

CLOSED SESSION

2. **CONFERENCE WITH LEGAL COUNSEL – ANTICIPATED LITIGATION –** Significant exposure to potential litigation pursuant to paragraph (2) of subdivision (d) of Government Code §54956.9: one potential case. Circumstances: threatened litigation regarding road issue in Keeler.
3. **CONFERENCE WITH COUNTY'S LABOR NEGOTIATORS –** Regarding employee organizations: Deputy Sheriff's Association (DSA); Elected Officials Assistant Association (EOAA); Inyo County Correctional Officers Association (ICCOA); Inyo County Employees Association (ICEA); Inyo County Probation Peace Officers Association (ICPPOA); IHSS Workers; Law Enforcement Administrators' Association (LEAA). Unrepresented employees: all. County designated representatives – Administrative Officer Clint Quilter, Assistant County Administrator Leslie Chapman, Deputy Personnel Director Sue Dishion, County Counsel Marshall Rudolph, Health and Human Services Director Marilyn Mann, and Chief Probation Officer Jeff Thomson.

OPEN SESSION (With the exception of timed items, all open-session items may be considered at any time and in any order during the meeting in the Board's discretion.)

10 A.M.

4. **PLEDGE OF ALLEGIANCE**
5. **REPORT ON CLOSED SESSION AS REQUIRED BY LAW.**
6. **PUBLIC COMMENT**
7. **COUNTY DEPARTMENT REPORTS** (Reports limited to two minutes)

8. **INTRODUCTIONS** - The following new employees will be introduced to the Board: Tiffany Montanez, Social Services Aid, Health & Human Services; and Cianni Martinez, Public Safety Dispatcher, Sheriff's Office.

DEPARTMENTAL - PERSONNEL ACTIONS

9. **County Administrator - Parks & Recreation** - Request Board find that, consistent with the adopted Authorized Position Review Policy: A) the availability of funding for the requested positions exists in the General Fund, as certified by the Assistant County Administrator and concurred with by the County Administrator and Auditor-Controller; B) where internal candidates may meet the qualifications for the position, the vacancy could possibly be filled through an internal recruitment, but an open recruitment is more appropriate to ensure qualified applicants apply; and C) approve the hiring of three (3) seasonal Park and Campground Maintenance Helpers, Range PT50 (\$15.66 - \$19.01/hr.) and one (1) seasonal Park and Campground Attendant, Range PT50 (\$15.66 – \$19.01/hr.).
10. **County Administrator - Recycling & Waste Management** - Request Board find that, consistent with the adopted Authorized Position Review Policy: A) the availability of funding for the requested position exists, as certified by the Assistant County Administrator and concurred with by the County Administrator and Auditor-Controller; and B) authorize the hiring of one (1) Gate Attendant at Range 48 (\$2,795-\$3,386) from the recently established eligibility list.

CONSENT AGENDA (Approval recommended by the County Administrator)

11. **County Administrator - Advertising County Resources** - Request Board approve a final payment of \$1,000 from the 2018-19 Advertising County Resources Budget to the Bishop Area Chamber of Commerce and Visitors Bureau for the 2019 Inyo County Familiarization Tours.
12. **County Administrator - Emergency Services** - Request Board: A) declare Environmental Systems Research Institute, Inc. (ESRI) of Redlands, CA a sole-source provider of Geographic Information System software; B) approve the purchase of a three (3) year renewal of the ESRI Enterprise License Agreement (ELA) in an amount not to exceed \$81,000; and C) authorize the County Administrator to sign on behalf of the County of Inyo to enter into the three-year ELA with ESRI, for the time period of March 14, 2020 through March 14, 2023.
13. **County Administrator - Motor Pool** - Request Board declare Vehicle No. 9277 as surplus and authorize Motor Pool to dispose of the vehicle as scrap.
14. **County Administrator - Recycling & Waste Management** - Request Board approve Amendment No. 1 to the contract between the County of Inyo and Bishop Waste Disposal increasing the contract limit payable under the agreement from \$17,271 to \$22,271, for processing of recyclables collected at the Bishop-Sunland Landfill, and authorize the Chairperson to sign, contingent upon all appropriate signatures being obtained.
15. **Health & Human Services - Social Services** - Request Board: A) approve the Joint Powers Agreement (JPA) between the counties of Kern, Inyo, and Mono to specify

their responsibilities under the Workforce Investment Opportunity Act to be operated in the Workforce Development Area; B) authorize the HHS Director to sign the JPA indicating approval of content; C) authorize the Chairman to sign the JPA and have the Board Clerk attest the signature; and D) authorize County Counsel to sign the JPA indicating approval as to form.

16. **Planning Department** - Request Board re-appointment Brian Webb, Kathi Hall and Linda Haun to the Lone Pine Architectural Design Review Board, pursuant to Section 18.69.020(B) (1), (4) & (5) of the Inyo County Code, with Mr. Webb to serve as the "Qualified Licensed Architect;" Ms. Hall to serve as the "Lone Pine Chamber of Commerce" member; and Ms. Haun to serve as the "public" member.
17. **Public Works** - Request Board: A) approve the plans and specifications for the Annex HVAC Retrofit Project; B) authorize the Public Works Director to advertise and bid the project; and C) authorize the Public Works Director to re-advertise and re-bid the Annex IS Server Room HVAC Retrofit Project.

DEPARTMENTAL (To be considered at the Board's convenience)

18. **County Administrator - Parks & Recreation** - Request Board approve twenty five (25) year leases between Inyo County and Los Angeles Department of Water and Power (LADWP) for the period beginning December 1, 2020 and ending November 30, 2045, for six (6) County campgrounds, and authorize the Chairperson to sign.
19. **County Administrator - Emergency Services** - Request Board receive a presentation from Los Angeles Department of Water and Power staff on LADWP's 2020 Wildfire Mitigation Plan for the Owens Valley.
20. **Public Works** - Request Board: A) approve the plans and specifications for the Lone Pine Dog Park Project; and B) authorize the Public Works Director to advertise and bid the Project contingent on LADWP's approval of the plans and specifications.
21. **Public Works** - Request Board ratify and approve the contract between the County of Inyo and Preferred Septic and Disposal, Inc. for the provision of Trash Disposal and Recycling Services in an amount not to exceed \$180,000.00 for the period of March 1, 2020 through February 28, 2023, contingent upon the Board's approval of future budgets, and authorize the Chairperson to sign, contingent upon all appropriate signatures being obtained.
22. **Health & Human Services - Social Services** - Request Board ratify and approve the contract between the County of Inyo and the Regents of the University of California, on behalf of its Davis Campus University Extension, for training services in an amount not to exceed \$127,500.00 for the period of July 1, 2020 through June 30, 2021, contingent upon the Board's adoption of the Fiscal Year 2020-21 budget; and authorize the Chairperson to sign.
23. **Clerk of the Board** - Request Board appoint Mr. Toby Dickinson to the Inyo Fish and Wildlife Commission, to an unexpired four-year term ending October 6, 2021. (*Notice of Vacancy resulted in letter of interest only from Mr. Dickinson.*)

TIMED ITEMS (Items will not be considered before scheduled time but may be considered any time after the scheduled time.)

24. **CORRECTION:**
11 A.M. - HEALTH & HUMAN SERVICES - Public Health and Prevention -
Request Board: A) conduct a public hearing on a proposed ordinance titled, "An Ordinance of the Board of Supervisors of the County of Inyo, State of California Amending the Inyo County Code to Add Chapter 5.45 to the Inyo County Code Regarding the Regulation of Tobacco Product Sales and Requiring the Licensure of Tobacco Retailers;" and B) waive further reading of said ordinance and schedule enactment for 11:00 am on March 10, 2020 in the Board of Supervisors Chamber, County Administrative Center, Independence.

COMMENT (Portion of the Agenda when the Board takes comment from the public and County staff)

25. **PUBLIC COMMENT**

BOARD MEMBERS AND STAFF REPORTS



County of Inyo



County Administrator - Parks & Recreation

DEPARTMENTAL - PERSONNEL ACTIONS - ACTION REQUIRED

MEETING: March 3, 2020

FROM: Leslie Chapman

SUBJECT: Request to Hire Three Seasonal Park and Campground Maintenance Helpers and one Park and Campground Attendant for the Parks and Recreation Dept.

RECOMMENDED ACTION:

Request Board find that, consistent with the adopted Authorized Position Review Policy: A) the availability of funding for the requested positions exists in the General Fund, as certified by the Assistant County Administrator and concurred with by the County Administrator and Auditor-Controller; B) where internal candidates may meet the qualifications for the position, the vacancy could possibly be filled through an internal recruitment, but an open recruitment is more appropriate to ensure qualified applicants apply; and C) approve the hiring of three (3) seasonal Park and Campground Maintenance Helpers, Range PT50 (\$15.66 - \$19.01/hr.) and one (1) seasonal Park and Campground Attendant, Range PT50 (\$15.66 – \$19.01/hr.).

SUMMARY/JUSTIFICATION:

Operation of the County parks and campgrounds relies on help from seasonal employees during the summer. The department is requesting that four seasonal employees be hired for the period from May through October to assist regular County staff in maintaining the facilities during our busy summer season. These positions were included in the approved 2019/2020 budget.

Staff recommends filling the seasonal parks and campground maintenance positions through an open recruitment.

BACKGROUND/HISTORY OF BOARD ACTIONS:

ALTERNATIVES AND CONSEQUENCES OF NEGATIVE ACTION:

Your Board could choose not to authorize filling these positions, however, this is not recommended, as the positions are needed to properly maintain the facilities.

OTHER AGENCY INVOLVEMENT:

FINANCING:

Funding for these positions is included in the FY 2019-2020 Parks and Recreation Budget 076999 object code 5012.

ATTACHMENTS:

APPROVALS:

Teresa Elliott	Created/Initiated - 2/7/2020
Darcy Ellis	Approved - 2/11/2020
Teresa Elliott	Approved - 2/11/2020
Leslie Chapman	Approved - 2/20/2020
Sue Dishion	Approved - 2/24/2020
Amy Shepherd	Approved - 2/24/2020
Marshall Rudolph	Approved - 2/24/2020
Leslie Chapman	Final Approval - 2/25/2020



County of Inyo



County Administrator - Recycling & Waste Management

DEPARTMENTAL - PERSONNEL ACTIONS - ACTION REQUIRED

MEETING: March 3, 2020

FROM: Leslie Chapman

SUBJECT: Request to fill vacant Recycling Waste Management Gate Attendant position.

RECOMMENDED ACTION:

Request Board find that, consistent with the adopted Authorized Position Review Policy: A) the availability of funding for the requested position exists, as certified by the Assistant County Administrator and concurred with by the County Administrator and Auditor-Controller; and B) authorize the hiring of one (1) Gate Attendant at Range 48 (\$2,795-\$3,386) from the recently established eligibility list.

SUMMARY/JUSTIFICATION:

The FY 2019-20 Manpower Report (approved by your Board as part of the FY 2019-20 County Budget) identifies the landfill Gate Attendant position (Range 48) as being assigned to the County's Recycling Waste Management program to provide necessary landfill waste load inspections and reporting. This position is critical to the operation of the County landfills. The gate attendants perform high volume waste disposal monitoring and reporting including load checking, to determine charges and to inspect for unacceptable hazardous waste items. The gate attendant will collect disposal fees, issue receipts and maintain accurate records on the fees collected and the volume of waste disposed.

The current gate attendant position became vacant with the recent resignation of an incumbent.

BACKGROUND/HISTORY OF BOARD ACTIONS:

ALTERNATIVES AND CONSEQUENCES OF NEGATIVE ACTION:

Your Board could choose not to authorize filling the vacant position, however, this is not recommended, as the functionality of the Recycling Waste Management programs will suffer. When a gate attendant position is vacant the other gate attendants and equipment operators backfill the position resulting in increased overtime and requiring the gate attendant to work their scheduled days off.

OTHER AGENCY INVOLVEMENT:

Personnel

FINANCING:

Funding for this position is included in the FY 2019-2020 Solid Waste Budget, 045700.

ATTACHMENTS:

APPROVALS:

Teresa Elliott	Created/Initiated - 2/21/2020
Darcy Ellis	Approved - 2/21/2020
Teresa Elliott	Approved - 2/21/2020
Leslie Chapman	Approved - 2/21/2020
Sue Dishion	Approved - 2/21/2020
Amy Shepherd	Approved - 2/21/2020
Leslie Chapman	Final Approval - 2/24/2020



County of Inyo



County Administrator - Advertising County Resources

CONSENT - ACTION REQUIRED

MEETING: March 3, 2020

FROM: Jon Klusmire

SUBJECT: Final Payment for completion of one Community Project Sponsorship Grant.

RECOMMENDED ACTION:

Request Board approve a final payment of \$1,000 from the 2018-19 Advertising County Resources Budget to the Bishop Area Chamber of Commerce and Visitors Bureau for the 2019 Inyo County Familiarization Tours.

SUMMARY/JUSTIFICATION:

The Bishop Chamber of Commerce and Visitors Bureau was awarded a FY 2018-19 County of Inyo Annual New Community Project Sponsorship Grant in the amount of \$2,000 to help sponsor the 2019 Inyo County Familiarization (FAM) Tours project. After contracts were finalized, 50% of the grant funds were disbursed to the Chamber. The event organizers have provided staff with sufficient documentation of acceptable expenses for reimbursement for a final payment of \$1,000. The Chamber also provided evidence that Inyo County was prominently mentioned as a sponsor of the event in ads and other promotional material.

BACKGROUND/HISTORY OF BOARD ACTIONS:

ALTERNATIVES AND CONSEQUENCES OF NEGATIVE ACTION:

The Board could deny the final payment request.

OTHER AGENCY INVOLVEMENT:

County Administrator's Office; Inyo County Auditor/Controller.

FINANCING:

The Community Project Sponsorship Grant Program is part of the Advertising County Resources budget and is financed from the General Fund. Funds for this grant have been budgeted in the FY 2018-19 Advertising County Resources Budget (011400) in the Object Codes noted, 5511.

ATTACHMENTS:

1. 2019 FAM Tours Final Bishop CC

APPROVALS:

Jon Klusmire

Darcy Ellis

Jon Klusmire

Leslie Chapman

Marshall Rudolph

Amy Shepherd

Created/Initiated - 2/19/2020

Approved - 2/21/2020

Approved - 2/21/2020

Approved - 2/21/2020

Approved - 2/21/2020

Final Approval - 2/21/2020

Attachment A



FINAL REPORT COMMUNITY PROJECT SPONSORSHIP PROGRAM GRANT

General Information

Name of Organization: Bishop Area Chamber of Commerce & Visitors Bureau

Number of people in attendance: 20

Name and description of Event/Program/Project: Fam Tours for Frontline Hospitality Providers

Host field trips or "Fam Tours" of various Inyo County destinations for the purpose of familiarizing local residents

of the many recreational, cultural, and scenic opportunities in our area so that they will be more informed

and enthusiastic gues hosts for our visitors.

Describe how this event/program/project benefited the community:

Two separate fam tours with a total of 20 participants had first-hand learning experiences they can now share with others.

The first trip included birding locations and was led by an expert from the Eastern Sierra Audubon Society.

Following the birding field trip, we toured several galleries and shops in downtown to highlight unique offerings.

The second trip was an OHV adventure in the Buttermilk Recreation area and we partnered with GSC Offroad Adventures.

All participants said they were grateful for their first-time experiences and promise to share what they learned with others.

There are two main benefits (1) guests with more things to do will stay longer in our area and contribute to the local economy;

(2) local employees appreciated and enjoyed the training; happy employees are better employees!

Financial Information

Total Cost of the Event/Program/Project: \$ 2,031.84

Amount of Inyo County CPSP Grant: \$ 2,000.00

Other sources of funding: Chamber "match funds,"
donated items for snacks, volunteers.

Expenditures (Attach Receipts totaling amount of CPSP grant or more):

Budget Category	Description	Cost
Staff	Logistics planning for tours, record keeping	\$753.50
Services and Supplies	Van rental, lunch for participants, expert guides	\$1,278.34
Other (describe)		
Total Expenditures		\$2031.84

Additional Information:

Expense Report and Reimbursement Request

Employee/Volunteer Name Joe Pollini Request Date 1/5/2020

Period Covered: From 1/4/2020 To 1/5/2020

Purpose/Event To PAID. NET PRE. TOUR (FAM) FIELD TRIP FOR 1/9/2020
 BISHOP AREA CHAMBER OF COMMERCE & VISITORS BUREAU 17498

Joseph P. Pollini 1/7/2020
 ADMIN: Local Travel visit venues for Fam Tour 26.33

PAYMENT RECORD

ESCB Checking

26.33



Date	Round Trip	Travel From/To	Purpose	Acct.	Mileage
1/4/2020	45	BISHOP TO SEVERAL AREA BIRDING LOCATIONS	TO PRE-RUN LOCAL BIRD AREAS FOR UPCOMING TOUR		45

Total Miles 45
 Reimbursement @ \$.585 per mile \$ 26.33

Account Distribution

Code	Account	Amount

Total Expense and Mileage	
Less: Travel Advance	
Amount due to Chamber	
Amount due to Employee/Volunteer	\$ 26.33

Submitted By Joe Pollini Approved By _____

LOS ANGELES, 187 W LINE ST, BISHOP, CA 935143401 (760) 873-3704

Erick Schat's Bakery
763 N. Main St
Bishop CA 93514
760-873-7156

Server: . DOB: 01/09/2020
1:59 AM 01/09/2020
00043/1 5/50142

SALE

isa 5243017
Card #XXXXXXXXXXXX0347
Magnetic card present: Yes
Card Entry Method: S

Approval: 15044G

Amount: \$76.67

I agree to pay the above
total amount according to the
card issuer agreement.

Chuck K.

Guest Copy

*Change to CPSP
one*

isa #XXXXXXXXXXXX0347 76.67
Auth:15044G

SIGNATURE : Chuck K.

Check out our Website!
www.ErickSchatsBakery.com

--- Check Closed ---

ARY OF CHARGES

Description	Date	Quantity	Per	Rate	Total
DISTANCE	01/08 - 01/09	1	DAY	\$89.99	\$89.99
LING CHARGE	01/08 - 01/09				\$0.00
Subtotal:					\$89.99
& Surcharges					
TAX	01/08 - 01/09			7.75%	\$6.97
LE LICENSE RECOVERY	01/08 - 01/09	1	DAY	\$3.94	\$3.94
Total Charges:					\$100.90
/ Deposits					
ITS					(\$100.90)

Estimated Amount Due \$0.00

ENT INFORMATION

NT PAID	TYPE	CREDIT CARD NUMBER
0	Visa	XXXXXXXXXXXX0347

Charge *Charge to CPSP*
Jul

**BISHOP AREA CHAMBER OF COMMERCE
& VISITORS BUREAU**
690 N. Main Street
Bishop, CA 93514
(760) 873-8405

ESTN SIERRA CMTY BANK, A DIV
BISHOP, CA 93514
90-4211/1211

17513

1/13/2020

PAY TO THE ORDER OF Eastern Sierra Audubon Society

\$**150.00

One Hundred Fifty and 00/100***** DOLLARS

PROTECTED AGAINST FRAUD

Eastern Sierra Audubon Society

Dawn Johnson

⑈017513⑈ ⑆121142119⑆ 006 102344⑈

BISHOP AREA CHAMBER OF COMMERCE & VISITORS BUREAU

17513

Eastern Sierra Audubon Society

1/13/2020

TOUR:Event Exp.:FAM Tour for Frontline Donation for Birding Tour on 1/9/2020

150.00

ESCB Checking

150.00

BISHOP AREA CHAMBER OF COMMERCE & VISITORS BUREAU

17513

Eastern Sierra Audubon Society

1/13/2020

TOUR:Event Exp.:FAM Tour for Frontline Donation for Birding Tour on 1/9/2020

150.00

PAYMENT
RECORD

ESCB Checking

150.00



104141

GSC Off Road Adventures

174 A South Main Street
Bishop, CA 93514

Invoice

DATE	INVOICE #
1/29/2020	207408

*@PSP Buttermilk
Tour
Invoice*

BILL TO
Bishop Chamber of Commerce 690 North Main Street Bishop, Ca. 93514

P.O. NO.	TERMS	DUE DATE	ACCOUNT NUMBER
		1/29/2020	

DESCRIPTION	AMOUNT
2 UTV's with drivers for Chamber Ride of 8 staff members (Tungsten Hills/Buttermilk)	850.00

APPROVED FOR PAYMENT
By: *[Signature]*
Acct. # _____
Amt. _____
Cycle _____

Total	\$850.00
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CPSP Tour Lunch

Erick Schat's Bakery
763 N. Main St
Bishop CA 93514
760-873-7156

50004

Host: .	01/29/2020
50004	8:15 AM
REPRINT# 1	50004
Roast Beef Sandwich (7 @8.95)	62.65
Turkey Sandwich (2 @8.95)	17.90
20% Off	-16.11
Subtotal	64.44
Tax	0.00
To Go Total	64.44
Visa #XXXXXXXXXXXX0347	64.44
Auth:82204G	

SIGNATURE : 

Check out our Website!
www.ErickSchatsBakery.com

--- Check Closed ---



BISHOP AREA CHAMBER OF COMMERCE & VISITORS BUREAU
690 N. MAIN STREET, BISHOP, CALIFORNIA 93514

January 12, 2020

Grocery Outlet
1320 N. Main St.
Bishop, CA 93514

Sarah & Dennis Freundt

Dear Sarah & Dennis,

I would like to thank you for your generous donation of snacks, drinks and ice for the Bishop Chamber of Commerce's recent familiarization tour we conducted on January 9, 2020. Your donation of product and time was a great contribution to the success of the tour helping front line hospitality providers learn about bird watching venues and local business boutiques.

Your support over the last several months to the area's numerous events has been a wonderful addition to our community of caring individuals.

If there is anything the chamber can do for you, please let me know.

Sincerely,

Tawni Thomson
Executive Director—Bishop Chamber of Commerce & Visitors Bureau



County of Inyo



County Administrator - Emergency Services

CONSENT - ACTION REQUIRED

MEETING: March 3, 2020

FROM: Kelley Williams

SUBJECT: Declare Environmental Systems Research Institute, Inc.(ESRI) a Sole Source Provider of Geographic Information System Software and Approve the Renewal of Inyo County's ESRI-Enterprise License Agreement

RECOMMENDED ACTION:

Request Board: A) declare Environmental Systems Research Institute, Inc. (ESRI) of Redlands, CA a sole-source provider of Geographic Information System software; B) approve the purchase of a three (3) year renewal of the ESRI Enterprise License Agreement (ELA) in an amount not to exceed \$81,000; and C) authorize the County Administrator to sign on behalf of the County of Inyo to enter into the three-year ELA with ESRI, for the time period of March 14, 2020 through March 14, 2023.

SUMMARY/JUSTIFICATION:

On November 12, 2019, your Board approved the submittal of Inyo County's 2019 Homeland Security Grant Program (HSGP) application. One of the priorities of the Federal Fiscal Year 2019 HSGP was to support investments that improve the ability of jurisdictions to respond quickly to save lives, protect property and the environment, and to meet basic human needs in the aftermath of a catastrophic incident.

Inyo County's Geographic Information System (GIS) is an important part of the County's emergency preparedness and disaster response system and it directly addresses catastrophic planning and interoperable communication capabilities. Law enforcement, fire and other emergency responders all use GIS to locate and respond to emergency situations as well as using it to identify potential threats and hazards. In addition, GIS is an important tool that can be used during an emergency evacuation to identify the frail and elderly, shut-ins, as well as the access and functional needs population. In the aftermath of a disaster, GIS can be used to identify shelters and provide information on road closures and alternate routes.

The GIS system also plays an important role in identifying Southern California Edison's (SCE) utility circuits that have been recognized as being within High Fire Risk Areas (HFRA). The possible de-energization of these SCE HFRA circuits during severe weather events to prevent wildfire, alternately cause other issues within the communities. The GIS system can help with early identification of critical facilities and vulnerable populations that could be impacted by a de-energization event.

The County GIS system uses ESRI software. The software requires the purchase of an Enterprise License Agreement (ELA) to run the system. The City of Bishop's Police and Fire Departments partner with Inyo County under the same ELA. The current 3 year ELA the County holds with ESRI was purchased in February of 2017 (for the period of March 2017-March 2020) and was purchased with Federal Fiscal Year 2016 HSGP funds.

Renewing the ELA with ESRI is imperative to continuing emergency preparedness and disaster response functions that are detailed above. Inyo County will use a portion of the 2019 HSGP funds to purchase the renewal of the ELA. The balance of the renewal fee will be coming from reallocated project funds that remain in the 2017 HSGP budget.

BACKGROUND/HISTORY OF BOARD ACTIONS:

The renewal of the ESRI-ELA was identified as a project within the Board approved 2019 Homeland Security Grant Program application.

ALTERNATIVES AND CONSEQUENCES OF NEGATIVE ACTION:

Your Board could choose not to declare ESRI a Sole Source Provider of GIS software, and could decline the renewal of the ELA. This alternative is not recommended.

OTHER AGENCY INVOLVEMENT:

Bishop Police Department and Bishop Volunteer Fire Department

FINANCING:

The ESRI ELA renewal is included in Fiscal Year 2019-2020 Board approved Budget within the 2017 Homeland Security Grant Program (Budget #623717), Professional Services (Object Code #5265) in the amount of \$15,093; and the 2019 Homeland Security Grant Program (Budget #623719), Professional Services (Object Code #5265) in a not to exceed amount of \$70,614.

ATTACHMENTS:

1. ESRI-Inyo Enterprise License Agreement

APPROVALS:

Kelley Williams	Created/Initiated - 2/19/2020
Darcy Ellis	Approved - 2/19/2020
Kelley Williams	Approved - 2/20/2020
Marshall Rudolph	Approved - 2/20/2020
Amy Shepherd	Approved - 2/20/2020
Scott Armstrong	Approved - 2/20/2020
Jeffrey Hollowell	Approved - 2/21/2020
Clint Quilter	Final Approval - 2/27/2020



January 14, 2020

Ms. Carma Roper
County of Inyo
163 May St
Bishop, CA 93514-2709

Dear Carma,

The Esri Small Municipal and County Government Enterprise Agreement (EA) is a three-year agreement that will grant your organization access to Esri® term license software on an unlimited basis including maintenance on all software offered through the EA for the term of the agreement. The EA will be effective on the date executed and will require a firm, three-year commitment.

Based on Esri's work with several organizations similar to yours, we know there is significant potential to apply geographic information system (GIS) technology in many operational and technical areas within your organization. For this reason, we believe that your organization will greatly benefit from an enterprise agreement.

An EA will provide your organization with numerous benefits including:

- A lower cost per unit for licensed software
- Substantially reduced administrative and procurement expenses
- Maintenance on all Esri software deployed under this agreement
- Complete flexibility to deploy software products when and where needed

The following business terms and conditions will apply:

- All current departments, employees, and in-house contractors of the organization will be eligible to use the software and services included in the EA.
- If your organization wishes to acquire and/or maintain any Esri software during the term of the agreement that is not included in the EA, it may do so separately at the Esri pricing that is generally available for your organization for software and maintenance.
- The organization will establish a single point of contact for orders and deliveries and will be responsible for redistribution to eligible users.
- The organization will establish a Tier 1 support center to field calls from internal users of Esri software. The organization may designate individuals as specified in the EA who may directly contact Esri for Tier 2 technical support.
- The organization will provide an annual report of installed Esri software to Esri.

- Esri software and updates that the organization is licensed to use will be automatically available for downloading.
- The fee and benefits offered in this EA proposal are contingent upon your acceptance of Esri's Small Municipal and County Government EA terms and conditions.
- Licenses are valid for the term of the EA.

This program offer is valid for 90 days. To complete the agreement within this time frame, please contact me within the next seven days to work through any questions or concerns you may have. To expedite your acceptance of this EA offer:

1. Sign and return the EA contract with a Purchase Order or issue a Purchase Order that references this EA Quotation and includes the following statement on the face of the Purchase Order: "**THIS PURCHASE ORDER IS GOVERNED BY THE TERMS AND CONDITIONS OF THE ESRI SMALL MUNICIPAL AND COUNTY GOVERNMENT EA, AND ADDITIONAL TERMS AND CONDITIONS IN THIS PURCHASE ORDER WILL NOT APPLY.**" Have it signed by an authorized representative of the organization.
2. On the first page of the EA, identify the central point of contact/agreement administrator. The agreement administrator is the party that will be the contact for management of the software, administration issues, and general operations. Information should include name, title (if applicable), address, phone number, and e-mail address.
3. In the purchase order, identify the "Ship to" and "Bill to" information for your organization.
4. Send the purchase order and agreement to the address, email or fax noted below:

Esri
Attn: Customer Service SG-EA
380 New York Street
Redlands, CA 92373-8100

e-mail: service@esri.com fax
documents to: 909-307-3083

I appreciate the opportunity to present you with this proposal, and I believe it will bring great benefits to your organization.

Thank you very much for your consideration.

Best Regards,

Crystal Dorn



Environmental Systems Research Institute, Inc.
 380 New York St
 Redlands, CA 92373-8100
 Phone: (909) 793-2853 Fax: (909) 307-3049
 DUNS Number: 06-313-4175 CAGE Code: OAMS3

Quotation # Q-397743

Date: January 14, 2020

Customer # 395771 Contract #

County of Inyo
 IS Dept
 163 May St
 Bishop, CA 93514-2709

ATTENTION: Carma Roper
 PHONE: 760-878-0383
 EMAIL: croper@inyocounty.us

To expedite your order, please attach a copy of this quotation to your purchase order.
 Quote is valid from: 1/14/2020 To: 4/13/2020

Material	Qty	Term	Unit Price	Total
168177	1	Year 1	\$25,000.00	\$25,000.00
Populations of 0 to 25,000 Small Government Term Enterprise License Agreement				
168177	1	Year 2	\$25,000.00	\$25,000.00
Populations of 0 to 25,000 Small Government Term Enterprise License Agreement				
168177	1	Year 3	\$25,000.00	\$25,000.00
Populations of 0 to 25,000 Small Government Term Enterprise License Agreement				

Subtotal:	\$75,000.00
Sales Tax:	\$0.00
Estimated Shipping and Handling (2 Day Delivery):	\$0.00
Contract Price Adjust:	\$0.00
Total:	\$75,000.00

Esri may charge a fee to cover expenses related to any customer requirement to use a proprietary vendor management, procurement, or invoice program.

For questions contact:
 Crystal Dorn

Email:
 cdorn@esri.com

Phone:
 (909) 793-2853 x1027

The items on this quotation are subject to and governed by the terms of this quotation, the most current product specific scope of use document found at <https://assets.esri.com/content/dam/esrisites/media/legal/product-specific-terms-of-use/e300.pdf>, and your applicable signed agreement with Esri. If no such agreement covers any item quoted, then Esri's standard terms and conditions found at <https://go.esri.com/MAPS> apply to your purchase of that item. Federal government entities and government prime contractors authorized under FAR 51.1 may purchase under the terms of Esri's GSA Federal Supply Schedule. Supplemental terms and conditions found at <https://www.esri.com/en-us/legal/terms/state-supplemental> apply to some state and local government purchases. All terms of this quotation will be incorporated into and become part of any additional agreement regarding Esri's offerings. Acceptance of this quotation is limited to the terms of this quotation. Esri objects to and expressly rejects any different or additional terms contained in any purchase order, offer, or confirmation sent to or to be sent by buyer. Unless prohibited by law, the quotation information is confidential and may not be copied or released other than for the express purpose of system selection and purchase/license. The information may not be given to outside parties or used for any other purpose without consent from Esri. Delivery is FOB Origin.

DORNC

This offer is limited to the terms and conditions incorporated and attached herein.

Esri Use Only:
 Cust. Name _____
 Cust. # _____
 PO # _____
 Esri Agreement # _____



**SMALL ENTERPRISE AGREEMENT
 COUNTY AND MUNICIPALITY GOVERNMENT
 (E214-1)**

This Agreement is by and between the organization identified in the Quotation ("**Customer**") and **Environmental Systems Research Institute, Inc. ("Esri")**.

This Agreement sets forth the terms for Customer's use of Products and incorporates by reference (i) the Quotation and (ii) the Master Agreement. Should there be any conflict between the terms and conditions of the documents that comprise this Agreement, the order of precedence for the documents shall be as follows: (i) the Quotation, (ii) this Agreement, and (iii) the Master Agreement. This Agreement shall be governed by and construed in accordance with the laws of the state in which Customer is located without reference to conflict of laws principles, and the United States of America federal law shall govern in matters of intellectual property. The modifications and additional rights granted in this Agreement apply only to the Products listed in Table A.

**Table A
 List of Products**

Uncapped Quantities

Desktop Software and Extensions (Single Use)

ArcGIS Desktop Advanced
 ArcGIS Desktop Standard
 ArcGIS Desktop Basic
 ArcGIS Desktop Extensions: ArcGIS 3D Analyst, ArcGIS Spatial Analyst, ArcGIS Geostatistical Analyst, ArcGIS Publisher, ArcGIS Network Analyst, ArcGIS Schematics, ArcGIS Workflow Manager, ArcGIS Data Reviewer

Enterprise Software and Extensions

ArcGIS Enterprise and Workgroup (Advanced and Standard)
 ArcGIS Enterprise Extensions: ArcGIS 3D Analyst, ArcGIS Spatial Analyst, ArcGIS Geostatistical Analyst, ArcGIS Network Analyst, ArcGIS Schematics, ArcGIS Workflow Manager

Enterprise Additional Capability Servers

ArcGIS Image Server

Developer Tools

ArcGIS Engine
 ArcGIS Engine Extensions: ArcGIS 3D Analyst, ArcGIS Spatial Analyst, ArcGIS Engine Geodatabase Update, ArcGIS Network Analyst, ArcGIS Schematics
 ArcGIS Runtime (Standard)
 ArcGIS Runtime Analysis Extension

Limited Quantities

One (1) Professional subscription to ArcGIS Developer*
 Two (2) Esri CityEngine Single Use Licenses
 50 ArcGIS Online Viewers
 50 ArcGIS Online Creators
 10,000 ArcGIS Online Service Credits
 50 ArcGIS Enterprise Creators
 2 Insights in ArcGIS Enterprise
 2 Insights in ArcGIS Online

OTHER BENEFITS

Number of Esri User Conference registrations provided annually	2
Number of Tier 1 Help Desk individuals authorized to call Esri	2
Maximum number of sets of backup media, if requested**	2
Self-Paced e-Learning	Uncapped
Five percent (5%) discount on all individual commercially available instructor-led training classes at Esri facilities purchased outside this Agreement (Discount does not apply to Small Enterprise Training Package)	

* Maintenance is not provided for these items

**Additional sets of backup media may be purchased for a fee

Customer may accept this Agreement by signing and returning the whole Agreement with (i) the Quotation attached, (ii) a purchase order, or (iii) another document that matches the Quotation and references this Agreement ("**Ordering Document**"). **ADDITIONAL OR CONFLICTING TERMS IN CUSTOMER'S PURCHASE ORDER OR OTHER DOCUMENT WILL NOT APPLY, AND THE TERMS OF THIS AGREEMENT WILL GOVERN.** This Agreement is effective as of the date of Esri's receipt of an Ordering Document, unless otherwise agreed to by the parties ("**Effective Date**").

Term of Agreement: Three (3) years

This Agreement supersedes any previous agreements, proposals, presentations, understandings, and arrangements between the parties relating to the licensing of the Products. Except as provided in Article 4—Product Updates, no modifications can be made to this Agreement.

Accepted and Agreed:

(Customer)

By: _____
Authorized Signature

Printed Name: _____

Title: _____

Date: _____

CUSTOMER CONTACT INFORMATION

Contact: _____

Telephone: _____

Address: _____

Fax: _____

City, State, Postal Code: _____

E-mail: _____

Country: _____

Quotation Number (if applicable): _____

1.0—ADDITIONAL DEFINITIONS

In addition to the definitions provided in the Master Agreement, the following definitions apply to this Agreement:

"Case" means a failure of the Software or Online Services to operate according to the Documentation where such failure substantially impacts operational or functional performance.

"Deploy", "Deployed" and "Deployment" mean to redistribute and install the Products and related Authorization Codes within Customer's organization(s).

"Fee" means the fee set forth in the Quotation.

"Maintenance" means Tier 2 Support, Product updates, and Product patches provided to Customer during the Term of Agreement.

"Master Agreement" means the applicable master agreement for Esri Products incorporated by this reference that is (i) found at <https://www.esri.com/en-us/legal/terms/full-master-agreement> and available in the installation process requiring acceptance by electronic acknowledgment or (ii) a signed Esri master agreement or license agreement that supersedes such electronically acknowledged master agreement.

"Product(s)" means the products identified in Table A—List of Products and any updates to the list Esri provides in writing.

"Quotation" means the offer letter and quotation provided separately to Customer.

"Technical Support" means the technical assistance for attempting resolution of a reported Case through error correction, patches, hot fixes, workarounds, replacement deliveries, or any other type of Product corrections or modifications.

"Tier 1 Help Desk" means Customer's point of contact(s) to provide all Tier 1 Support within Customer's organization(s).

"Tier 1 Support" means the Technical Support provided by the Tier 1 Help Desk.

"Tier 2 Support" means the Esri Technical Support provided to the Tier 1 Help Desk when a Case cannot be resolved through Tier 1 Support.

2.0—ADDITIONAL GRANT OF LICENSE

2.1 Grant of License. Subject to the terms and conditions of this Agreement, Esri grants to Customer a personal, nonexclusive, nontransferable license solely to use, copy, and Deploy quantities of the Products listed in Table A—List of Products for the Term of Agreement (i) for the applicable Fee and (ii) in accordance with the Master Agreement.

2.2 Consultant Access. Esri grants Customer the right to permit Customer's consultants or contractors to use the Products exclusively for Customer's benefit. Customer will be solely responsible for compliance by consultants and contractors with this Agreement and will ensure that the consultant or contractor discontinues use of Products upon completion of work for Customer. Access to or use of Products by consultants or contractors not exclusively for Customer's benefit is prohibited. Customer may not permit its consultants or contractors to install Software or Data on consultant, contractor, or third-party computers or remove Software or Data from Customer locations, except for the purpose of hosting the Software or Data on Contractor servers for the benefit of Customer.

3.0—TERM, TERMINATION, AND EXPIRATION

3.1 Term. This Agreement and all licenses hereunder will commence on the Effective Date and continue for the duration identified in the Term of Agreement, unless this Agreement is terminated earlier as provided herein. Customer is only authorized to use Products during the Term of Agreement. For an Agreement with a limited term, Esri does not grant Customer an indefinite or a perpetual license to Products.

3.2 No Use upon Agreement Expiration or Termination. All Product licenses, all Maintenance, and Esri User Conference registrations terminate upon expiration or termination of this Agreement.

3.3 Termination for a Material Breach. Either party may terminate this Agreement for a material breach by the other party. The breaching party will have thirty (30) days from the date of written notice to cure any material breach.

3.4 Termination for Lack of Funds. For an Agreement with government or government-owned entities, either party may terminate this Agreement before any subsequent year if

Customer is unable to secure funding through the legislative or governing body's approval process.

3.5 Follow-on Term. If the parties enter into another agreement substantially similar to this Agreement for an additional term, the effective date of the follow-on agreement will be the day after the expiration date of this Agreement.

4.0—PRODUCT UPDATES

4.1 Future Updates. Esri reserves the right to update the list of Products in Table A—List of Products by providing written notice to Customer. Customer may continue to use all Products that have been Deployed, but support and upgrades for deleted items may not be available. As new Products are incorporated into the standard program, they will be offered to Customer via written notice for incorporation into the Products schedule at no additional charge. Customer's use of new or updated Products requires Customer to adhere to applicable additional or revised terms and conditions in the Master Agreement.

4.2 Product Life Cycle. During the Term of Agreement, some Products may be retired or may no longer be available to Deploy in the identified quantities. Maintenance will be subject to the individual Product Life Cycle Support Status and Product Life Cycle Support Policy, which can be found at <https://support.esri.com/en/other-resources/product-life-cycle>. Updates for Products in the mature and retired phases may not be available. Customer may continue to use Products already Deployed, but Customer will not be able to Deploy retired Products.

5.0—MAINTENANCE

The Fee includes standard maintenance benefits during the Term of Agreement as specified in the most current applicable Esri Maintenance and Support Program document (found at <https://www.esri.com/en-us/legal/terms/maintenance>). At Esri's sole discretion, Esri may make patches, hot fixes, or updates available for download. No Software other than the defined Products will receive Maintenance. Customer may acquire maintenance for other Software outside this Agreement.

a. Tier 1 Support

1. Customer will provide Tier 1 Support through the Tier 1 Help Desk to all Customer's authorized users.
2. The Tier 1 Help Desk will be fully trained in the Products.
3. At a minimum, Tier 1 Support will include those activities that assist the user in resolving how-to and operational questions as well as questions on installation and troubleshooting procedures.
4. The Tier 1 Help Desk will be the initial point of contact for all questions and reporting of a Case. The Tier 1 Help Desk will obtain a full description of each reported Case and the system configuration from the user. This may include obtaining any customizations, code samples, or data involved in the Case.
5. If the Tier 1 Help Desk cannot resolve the Case, an authorized Tier 1 Help Desk individual may contact Tier 2 Support. The Tier 1 Help Desk will provide support in such a way as to minimize repeat calls and make solutions to problems available to Customer's organization.
6. Tier 1 Help Desk individuals are the only individuals authorized to contact Tier 2 Support. Customer may change the Tier 1 Help Desk individuals by written notice to Esri.

b. Tier 2 Support

1. Tier 2 Support will log the calls received from Tier 1 Help Desk.
2. Tier 2 Support will review all information collected by and received from the Tier 1 Help Desk including preliminary documented troubleshooting provided by the Tier 1 Help Desk when Tier 2 Support is required.
3. Tier 2 Support may request that Tier 1 Help Desk individuals provide verification of information, additional information, or answers to additional questions to supplement any preliminary information gathering or troubleshooting performed by Tier 1 Help Desk.
4. Tier 2 Support will attempt to resolve the Case submitted by Tier 1 Help Desk.

5. When the Case is resolved, Tier 2 Support will communicate the information to Tier 1 Help Desk, and Tier 1 Help Desk will disseminate the resolution to the user(s).

6.0—ENDORSEMENT AND PUBLICITY

This Agreement will not be construed or interpreted as an exclusive dealings agreement or Customer's endorsement of Products. Either party may publicize the existence of this Agreement.

7.0—ADMINISTRATIVE REQUIREMENTS

7.1 OEM Licenses. Under Esri's OEM or Solution OEM programs, OEM partners are authorized to embed or bundle portions of Esri products and services with their application or service. OEM partners' business model, licensing terms and conditions, and pricing are independent of this Agreement. Customer will not seek any discount from the OEM partner or Esri based on the availability of Products under this Agreement. Customer will not decouple Esri products or services from the OEM partners' application or service.

7.2 Annual Report of Deployments. At each anniversary date and ninety (90) calendar days prior to the expiration of this Agreement, Customer will provide Esri with a written report detailing all Deployments. Upon request, Customer will provide records sufficient to verify the accuracy of the annual report.

8.0—ORDERING, ADMINISTRATIVE PROCEDURES, DELIVERY, AND DEPLOYMENT

8.1 Orders, Delivery, and Deployment

- a. Upon the Effective Date, Esri will invoice Customer and provide Authorization Codes to activate the nondestructive copy protection program that enables Customer to download, operate, or allow access to the Products. If this is a multi-year Agreement, Esri may invoice the Fee before the annual anniversary date for each year.
- b. Undisputed invoices will be due and payable within thirty (30) calendar days from the date of invoice. Esri's federal ID number is 95-2775-732.

- c. If requested, Esri will ship backup media to the ship-to address identified on the Ordering Document, FOB Destination, with shipping charges prepaid. Customer acknowledges that should sales or use taxes become due as a result of any shipments of tangible media, Esri has a right to invoice and Customer will pay any such sales or use tax associated with the receipt of tangible media.

8.2 Order Requirements. Esri does not require Customer to issue a purchase order. Customer may submit a purchase order in accordance with its own process requirements, provided that if Customer issues a purchase order, Customer will submit its initial purchase order on the Effective Date. If this is a multi-year Agreement, Customer will submit subsequent purchase orders to Esri at least thirty (30) calendar days before the annual anniversary date for each year.

- a. All orders pertaining to this Agreement will be processed through Customer's centralized point of contact.
- b. The following information will be included in each Ordering Document:
 - (1) Customer name; Esri customer number, if known; and bill-to and ship-to addresses
 - (2) Order number
 - (3) Applicable annual payment due

9.0—MERGERS, ACQUISITIONS, OR DIVESTITURES

If Customer is a commercial entity, Customer will notify Esri in writing in the event of (i) a consolidation, merger, or reorganization of Customer with or into another corporation or entity; (ii) Customer's acquisition of another entity; or (iii) a transfer or sale of all or part of Customer's organization (subsections i, ii, and iii, collectively referred to as "**Ownership Change**"). There will be no decrease in Fee as a result of any Ownership Change.

- 9.1 If an Ownership Change increases the cumulative program count beyond the maximum level for this Agreement, Esri reserves the right to increase the Fee or terminate this Agreement and the parties will negotiate a new agreement.
- 9.2 If an Ownership Change results in transfer or sale of a portion of Customer's organization, that portion of Customer's organization will transfer

the Products to Customer or uninstall, remove, and destroy all copies of the Products.

9.3 This Agreement may not be assigned to a successor entity as a result of an Ownership Change unless approved by Esri in writing in advance. If the assignment to the new entity is not approved, Customer will require any successor entity to uninstall, remove, and destroy the Products. This Agreement will terminate upon such Ownership Change.



County of Inyo



County Administrator - Motor Pool

CONSENT - ACTION REQUIRED

MEETING: March 3, 2020

FROM: Leslie Chapman

SUBJECT: Request to Dispose of Surplus Motor Pool Vehicle

RECOMMENDED ACTION:

Request Board declare Vehicle No. 9277 as surplus and authorize Motor Pool to dispose of the vehicle as scrap.

SUMMARY/JUSTIFICATION:

Motor Pool vehicle # 9277, a 2013 Toyota Sienna, was recently severely damaged in an accident and has become inoperable. Therefore, it is requested that your Board declare this vehicle as surplus. Rather than making the vehicle available for auction, with your Board's approval, Motor Pool intends to dispose of vehicle as scrap.

BACKGROUND/HISTORY OF BOARD ACTIONS:

ALTERNATIVES AND CONSEQUENCES OF NEGATIVE ACTION:

Unless the vehicle is declared as surplus it cannot be disposed of and will be stored in the County yard. While an attempt could be made to auction the vehicle, due to the severity of the damage the department expects that there would be no interest in the vehicle.

OTHER AGENCY INVOLVEMENT:

Auditor

FINANCING:

It is anticipated that there will be insurance proceeds from this vehicle which will go to the Motor Pool Replacement fund.

ATTACHMENTS:

APPROVALS:

Teresa Elliott
Darcy Ellis

Created/Initiated - 2/13/2020
Approved - 2/13/2020

Teresa Elliott
Leslie Chapman
Marshall Rudolph
Amy Shepherd
Leslie Chapman

Approved - 2/13/2020
Approved - 2/21/2020
Approved - 2/21/2020
Approved - 2/21/2020
Final Approval - 2/24/2020



County of Inyo



County Administrator - Recycling & Waste Management

CONSENT - ACTION REQUIRED

MEETING: March 3, 2020

FROM: Leslie Chapman

SUBJECT: Approval of Amendment No. 1 to the agreement with Bishop Waste Disposal for processing of recyclables collected at the Bishop-Sunland Landfill.

RECOMMENDED ACTION:

Request Board approve Amendment No. 1 to the contract between the County of Inyo and Bishop Waste Disposal increasing the contract limit payable under the agreement from \$17,271 to \$22,271, for processing of recyclables collected at the Bishop-Sunland Landfill, and authorize the Chairperson to sign, contingent upon all appropriate signatures being obtained.

SUMMARY/JUSTIFICATION:

On July 11, 2017 your Board entered into a three year agreement with Bishop Waste Disposal for the purpose of processing recyclables collected at the Inyo County Landfills. At the same time your Board entered into an agreement with the Fort Independence Tribe for recycling purposes. The Tribe shut down their operation in April of 2018 with a balance of \$4506 on their contract. All recycling bins are now handled by Bishop Waste which has lead to a shortfall of funds for the remaining 5 months of their contract.

BACKGROUND/HISTORY OF BOARD ACTIONS:

ALTERNATIVES AND CONSEQUENCES OF NEGATIVE ACTION:

If the amendment is not approved by your Board recycling will not be collected from the landfill.

OTHER AGENCY INVOLVEMENT:

None

FINANCING:

Funds for this service are included in the Recycling & Waste Management budget unit 045700, object 5265.

ATTACHMENTS:

1. Bishop Waste Amendment 1

APPROVALS:

Teresa Elliott	Created/Initiated - 2/11/2020
Darcy Ellis	Approved - 2/11/2020
Teresa Elliott	Approved - 2/12/2020
Leslie Chapman	Approved - 2/21/2020
Amy Shepherd	Approved - 2/21/2020
Marshall Rudolph	Approved - 2/21/2020
Leslie Chapman	Final Approval - 2/24/2020

**AMENDMENT NUMBER 1 TO
AGREEMENT BETWEEN THE COUNTY OF INYO AND
MADERA DISPOSAL INC. DBA BISHOP WASTE
FOR THE PROVISION OF INDEPENDENT CONTRACTOR SERVICES**

WHEREAS, the County of Inyo (hereinafter referred to as "County") and MADERA DISPOSAL INC. DBA BISHOP WASTE, of BISHOP, CALIFORNIA (hereinafter referred to as "Contractor"), have entered into an Agreement for the Provision of Independent Contractor Services dated JULY 11, 2017, on County of Inyo Standard Contract No. 116, for the term from JULY 11, 2017 to JUNE 30, 2020.

WHEREAS, County and Contractor do desire and consent to amend such Agreement as set forth below;

WHEREAS, such Agreement provides that it may be modified, amended, changed, added to, or subtracted from, by the mutual consent of the parties thereto, if such amendment or change is in written form, and executed with the same formalities as such Agreement, and attached to the original Agreement to maintain continuity.

County and Contractor hereby amend such Agreement as follows:

3. D. LIMIT UPON AMOUNT PAYABLE UNDER AGREEMENT.

Increase the contract limit upon amount to payable of this Agreement from \$17,271.00 to \$22,271.00

The effective date of this Amendment to the Agreement is 03/03/2020.

All the other terms and conditions of the Agreement are unchanged and remain the same.

AMENDMENT NUMBER 1 TO
AGREEMENT BETWEEN THE COUNTY OF INYO AND
MADERA DISPOSAL INC. DBA BISHOP WASTE
FOR THE PROVISION OF INDEPENDENT CONTRACTOR SERVICES

IN WITNESS THEREOF, THE PARTIES HERETO HAVE SET THEIR HANDS AND SEALS THIS
____ DAY OF _____, _____.

COUNTY OF INYO

By: _____

Dated: _____

CONTRACTOR

By: _____

Signature

Type or Print

Dated: _____

APPROVED AS TO FORM AND LEGALITY:

County Counsel

APPROVED AS TO ACCOUNTING FORM:

County Auditor

APPROVED AS TO PERSONNEL REQUIREMENTS:

Personnel Services

APPROVED AS TO RISK ASSESSMENT:

County Risk Manager



County of Inyo



Health & Human Services - Social Services

CONSENT - ACTION REQUIRED

MEETING: March 3, 2020

FROM: Tyler Davis

SUBJECT: Approval of the Joint Powers Agreement (JPA) with the County of Kern and the County of Mono.

RECOMMENDED ACTION:

Request Board: A) approve the Joint Powers Agreement (JPA) between the counties of Kern, Inyo, and Mono to specify their responsibilities under the Workforce Investment Opportunity Act to be operated in the Workforce Development Area; B) authorize the HHS Director to sign the JPA indicating approval of content; C) authorize the Chairman to sign the JPA and have the Board Clerk attest the signature; and D) authorize County Counsel to sign the JPA indicating approval as to form.

SUMMARY/JUSTIFICATION:

In February of 2001, Inyo County entered into a Joint Powers Agreement (JPA) with the County of Kern and the County of Mono to fulfill the requirements of providing services funded through the Workforce Investment Act (WIA). In 2014, the Congress of the United States enacted the Workforce Innovation and Opportunity Act (WIOA) (Public Law 105-220), making changes to the Workforce Investment Act of 1998.

The WIOA provides for the delivery of WIOA-funded services through Local Workforce Development Areas. The Governor of the State of California has designated the Counties of Kern, Inyo and Mono (KIM) as a single Workforce Development Area.

With the transition from WIA to WIOA, KIM has been operating under the original JPA, establishing Memorandum of Understandings periodically to reflect the shift to WIOA. The JPA before your Board has been updated to ensure the appropriate requirements and administrative framework is in place for the Counties of Kern, Inyo and Mono to continue operating WIOA-funded programs and administer other WIOA requirements. It is the parties' intent to both maximize local control and decision-making over their individual programs and to work together regionally, when appropriate.

The initial JPA, effective February 13, 2001, remains in effect until this JPA is approved and adopted by all three counties.

BACKGROUND/HISTORY OF BOARD ACTIONS:

NA

ALTERNATIVES AND CONSEQUENCES OF NEGATIVE ACTION:

Your Board could refuse approval of the JPA, which would leave Inyo County without access to WIOA funding and services provided through the JPA

OTHER AGENCY INVOLVEMENT:

County of Kern, County of Mono.

FINANCING:

There is no financing involved in this request.

ATTACHMENTS:

1. Kern, Inyo, Mono Joint Powers Agreement

APPROVALS:

Tyler Davis	Created/Initiated - 2/19/2020
Darcy Ellis	Approved - 2/19/2020
Marilyn Mann	Approved - 2/19/2020
Melissa Best-Baker	Approved - 2/19/2020
Marshall Rudolph	Approved - 2/19/2020
Marilyn Mann	Final Approval - 2/19/2020

**JOINT POWERS AGREEMENT
(Workforce Innovation and Opportunity Act)**

THIS AGREEMENT, made and entered into this _____ day of _____, 2020, by and among the COUNTY OF KERN, COUNTY OF INYO, and COUNTY OF MONO, each a political subdivision of the State of California;

WITNESSETH:

WHEREAS:

- (a) In 2014, the Congress of the United States enacted the Workforce Innovation and Opportunity Act (P.L. 105-220; hereinafter "WIOA") for the purpose of consolidating, coordinating and improving employment, training, literacy, and vocational rehabilitation programs, and for other purposes; and
- (b) The WIOA provides for the delivery of WIOA-funded services through Local Workforce Development Areas; and
- (c) The Governor of the State of California has designated the Counties of Kern, Inyo, and Mono as a single Workforce Development Area; and
- (d) Government Code §26227 authorizes counties to establish programs necessary to meet the social needs of their population; Government Code §53703 authorizes counties to do all acts necessary to participate in programs whereby federal funds are granted to counties for purposes of education and welfare, including the authority to contract and cooperate with other local public agencies; and Government Code §6500 et seq. authorizes counties to jointly exercise any power common to them all; and
- (e) The parties hereto desire to enter into an agreement to specify their responsibilities under the WIOA to be operated in the Workforce Development Area comprising Kern, Inyo, and Mono Counties;

NOW, THEREFORE, IT IS MUTUALLY AGREED by the COUNTY OF KERN, COUNTY OF INYO, and COUNTY OF MONO as follows:

1. Definitions. Except as otherwise set forth herein, all terms shall have the same meaning as set forth in the WIOA or its implementing regulations.
2. Purpose. This Agreement will provide the administrative framework for the Counties of Kern, Inyo, and Mono to cooperate in undertaking the WIOA-funded programs and other WIOA responsibilities to be operated within their jurisdictions. It is the parties' intent to both maximize local control and decision-making over their individual programs and to work together regionally, when appropriate.
3. Establishment of the Kern, Inyo, and Mono Workforce Development Board.
 - a. Pursuant to §107a of the WIOA, there is a Workforce Development Board for the Kern, Inyo, and Mono Counties Workforce Development Area.

- b. The Board of Supervisors of each County (or their respective authorized representatives), subject to the State Workforce Development Board's and Governor's certification, shall appoint members to the Local Workforce Development Board (hereinafter "Local Board") in the manner provided in the WIOA.
- c. Inyo and Mono Counties may each appoint one member and Kern County will appoint the balance. Should Inyo and/or Mono Counties not appoint a member, Kern County will appoint members, as necessary.
- d. The Local Board shall initially be composed of 33 members. Thereafter, the number of members of the Local Board shall be determined by the Local Board.
- e. The Local Board shall function pursuant to the requirements of the WIOA (§107d) and shall have the authority to, among other things, enter into agreements with the Counties of Kern, Inyo, and Mono; and select a grant recipient and entity to administer the workforce development plan.
- f. The Local Board shall review, monitor, and evaluate the programs conducted under the workforce development plan.
- g. The Local Board shall develop its own operating procedures.
- h. The Counties of Kern, Inyo, and Mono may establish individual advisory councils for the purpose of advising the Local Board on the training needs within their individual jurisdictions.

4. Duties and Responsibilities of the Counties.

- a. Acting within the parameters of the WIOA, its implementing regulations, all applicable laws, and as authorized by the Local Board, each County will be responsible for operating WIOA-funded programs within its own jurisdiction. Program operations shall include, but not be limited to, recruitment, determination of participant eligibility, assessment, counseling, placement, training, follow-up, grievance procedures, providing required insurance, and other workforce development plan activities, including Basic Career Services, Individual Career Services and Training Services.
- b. Each County shall develop mechanisms for coordinating its programs with public and private service deliverers within its own jurisdiction.
- c. Each County may enter into vendor agreements, Individual Training Accounts and/or subcontracts with public and private agencies as necessary, to fulfill its responsibilities under the WIOA and the workforce development plan, subject to the terms of any agreement between the Counties and the Local Board.
- d. Each County shall implement any and all accounting and reporting procedures necessary to assure compliance with the requirements of the WIOA. The Counties of Inyo and Mono shall submit any and all necessary information, documentation, and reports to Kern County in a timely manner.

5. Additional Duties and Responsibilities of Kern County. Due to its large population (in comparison to Inyo and Mono Counties) and its experience as an Administrative Entity and Grant Recipient under the Job Training Partnership Act and the Workforce Investment Act, Kern County will undertake the following duties:

- a. Receive WIOA funding from the State and develop necessary accounting and disbursement systems for providing such funding to the Counties of Kern, Inyo, and Mono.
- b. With the assistance and cooperation of Inyo and Mono Counties, compile and submit WIOA reports as required by the State.
- c. Provide support staff to the Local Board.
- d. Provide monitoring and auditing services to Inyo and Mono Counties, which services shall be available on a cost reimbursement basis.
- e. Provide additional services to Inyo and Mono Counties as needed on a cost reimbursement basis.

6. Allocation and Disbursement of Funds.

- a. WIOA funds received by Kern County shall be disbursed to each County in the same proportion as determined by the formulas in the WIOA and using the same data sources used for the Workforce Development Area allocation; except that individual allocations for each County will be used, if provided by the State.
- b. Funding to individual Counties may be withheld if there is a determination that a County is not in compliance with this Agreement, an agreement with the Local Board, the WIOA or its implementing regulations, or existing laws.
- c. There shall be strict accountability for all WIOA funds and each County shall provide all necessary reports of all receipts and disbursements.

7. Term. This Agreement shall become effective upon its execution by all parties hereto and shall continue in effect until terminated in the manner hereafter provided.

8. Termination. This Agreement may be terminated by:

- a. Appropriate action of the State of California or the U.S. Department of Labor;
- b. The State of California designating an alternate Workforce Development Area involving a party to this Agreement; or
- c. A party hereto withdrawing, following 90 days written notice to the Local Board and each of the other Counties.
- d. In the event this Agreement is terminated, all real and personal property and WIOA funds in the possession of the administering entity shall be disbursed pursuant to WIOA requirements or State or U.S. Department of Labor orders. Absent such requirements or orders, said property and funds shall be distributed to the parties in accordance with the "population basis" formula initially employed in disbursing the funds, after payment of any outstanding debts or reimbursable costs.

9. Amendments/Modifications. This Agreement may only be amended or modified by the written consent of all parties hereto.

10. Liability of the Parties.

a. Each of the parties hereto shall be liable for the activities conducted within its own jurisdiction pursuant to this Agreement.

b. No debt, liability, or obligation of any one party to this Agreement shall constitute the debt, liability, or obligation of any of the other parties to this Agreement.

c. Each of the parties to this Agreement shall indemnify and hold harmless the other parties to this Agreement for any damages, costs, or liabilities arising out of the acts or omissions of its own officers, agents, and employees.

d. All of the privileges and immunities from liability, exemptions from laws, ordinances and rules, all pension, relief, disability, worker's compensation, and other benefits which apply to the activity of officers, agents, or employees of any party to this Agreement when performing their respective functions within the territorial limits of their county of employment or agency, shall apply to them to the same degree and extent while engaged in the performance of any of their functions and duties extraterritorially under the provisions of this Agreement.

11. Successors. This Agreement shall be binding upon and shall inure to the benefit of any successors to or assigns of the parties.

12. Pledge of Cooperation. Each of the parties hereto pledges its cooperation to the other parties hereto in attempting to accomplish the purposes of this Agreement and the WIOA.

13. Compliance with Laws. Each of the parties hereto shall comply with the provisions of the WIOA and its implementing regulations, and any and all applicable federal and state laws.

14. Severability. Should any part, term, portion, or provision of this Agreement be finally decided to be in conflict with any law of the United States or of the State of California, or otherwise be unenforceable or ineffectual, the validity of the remaining parts, terms, portions, or provisions shall be deemed severable and shall not be affected thereby, provided such remaining portions or provisions can be construed in substance to constitute the Agreement which the parties intended to enter into in the first instance.

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IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their respective officers and agents on the day and year first written above.

COUNTY OF KERN

ATTEST _____
Clerk, Board of Supervisors

Chairman
Board of Supervisors

COUNTY OF INYO

ATTEST _____
Clerk, Board of Supervisors

Chairman
Board of Supervisors

COUNTY OF MONO

ATTEST _____
Clerk, Board of Supervisors

Chairman
Board of Supervisors

RECOMMENDED AND APPROVED
AS TO CONTENT - KERN COUNTY

APPROVED AS TO FORM
OFFICE OF COUNTY COUNSEL
KERN COUNTY

RECOMMENDED AND APPROVED
AS TO CONTENT - INYO COUNTY

APPROVED AS TO FORM
OFFICE OF COUNTY COUNSEL
INYO COUNTY

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RECOMMENDED AND APPROVED
AS TO CONTENT - MONO COUNTY

APPROVED AS TO FORM
OFFICE OF COUNTY COUNSEL
MONO COUNTY

TH/eb



County of Inyo



Planning Department

CONSENT - ACTION REQUIRED

MEETING: March 3, 2020

FROM:

SUBJECT: Reappointment of three members to the Lone Pine Architectural Design Review Board.

RECOMMENDED ACTION:

Request Board re-appointment Brian Webb, Kathi Hall and Linda Haun to the Lone Pine Architectural Design Review Board, pursuant to Section 18.69.020(B) (1), (4) & (5) of the Inyo County Code, with Mr. Webb to serve as the "Qualified Licensed Architect;" Ms. Hall to serve as the "Lone Pine Chamber of Commerce" member; and Ms. Haun to serve as the "public" member.

SUMMARY/JUSTIFICATION:

Inyo County Code Section 18.69.020 describes these appointments to the Lone Pine Architectural Design Review Board:

- "A qualified licensed architect"
- Chamber of Commerce Member: "A member of the Chamber of Commerce representing the town or locale in which the D District (i.e., Design District) has been designated, recommended jointly to the Board of Supervisors by that Chamber of Commerce and the Planning Commissioner representing the Supervisorial district in which the D District has been designated."
- Public Member: "A member of the public residing in the town or locale in which the D District has been designated, recommended jointly to the Board of Supervisors by the Chamber of Commerce representing that town or locale and the Planning Commissioner representing the Supervisorial district in which the D District has been designated."

These appointments will be for a term of two years, to expire March 2022.

Mr. Brian Webb (licensed architect member), Ms. Kathi Hall ("Chamber of Commerce" Board member) and Ms. Linda Haun ('Public' Board member) have been serving in these positions for the past several terms and have expressed interest in continuing their service as Board Members. Mr. Webb meets the qualifications as a licensed architect and Ms. Hall and Ms. Haun have been recommended by the Lone Pine Chamber of Commerce, as well as, Planning Commissioner Scott Kemp, representing the Fifth District, to serve another term. As a result, planning staff recommends the reappointment of all three to the Board.

Attached are letters of recommendation from the Lone Pine Chamber of Commerce and Fifth District Planning Commissioner Scott Kemp, as required by Section 18.69.020.

BACKGROUND/HISTORY OF BOARD ACTIONS:

ALTERNATIVES AND CONSEQUENCES OF NEGATIVE ACTION:

Do not reappoint the three currently serving Lone Pine Architectural Design Review Board members. This is not recommended as these three people have served very well as board members and care for the integrity of design in Lone Pine.

OTHER AGENCY INVOLVEMENT:

Lone Pine Chamber of Commerce, Inyo County Planning Commission.

FINANCING:

ATTACHMENTS:

1. Design Review Board Letter of Recommendation - 5th District Planning Commissioner
2. Letter from LP Chamber Design Recommending Kathi Hall and Linda Haun

APPROVALS:

Cathreen Richards	Created/Initiated - 2/10/2020
Darcy Ellis	Approved - 2/11/2020
Marshall Rudolph	Approved - 2/11/2020
Cathreen Richards	Final Approval - 2/12/2020

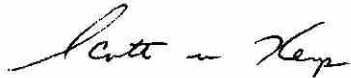
January 31, 2020

Scott Kemp
PO Box 1205
Lone Pine, CA 93545

Inyo County Board of Supervisors:

I am writing to recommend the reappointment of Ms. Kathi Hall and Ms. Linda Haun to the Lone Pine Architectural Design Review Board. Both have served on the Board for many years and are dedicated to the community of Lone Pine.

Thank you for your consideration,

A handwritten signature in cursive script that reads "Scott Kemp".

Scott Kemp,
Inyo County Fifth District Planning Commissioner



LONE PINE CHAMBER OF COMMERCE

120 South Main Street ~ P.O. Box 749 ~ Lone Pine, CA 93545
(760) 876-4444 ~ Fax (760) 264-9675

January 31, 2020

**County of Inyo Planning Department
PO Box L
Independence CA 93549**

Attn: Cathreen

Dear Cathreen,

This is to inform you the Lone Pine Chamber supports the reappointment of Kathi Hall, and Linda Haun both of Lone Pine, to serve on the Design Review Board for another two year term. Both have served on the Board for many years and are dedicated to the Design Review Board and the community of Lone Pine.

**Sincerely,
Kathleen New
President/CEO**



County of Inyo



Public Works

CONSENT - ACTION REQUIRED

MEETING: March 3, 2020

FROM: Greg Waters

SUBJECT:

RECOMMENDED ACTION:

Request Board: A) approve the plans and specifications for the Annex HVAC Retrofit Project; B) authorize the Public Works Director to advertise and bid the project; and C) authorize the Public Works Director to re-advertise and re-bid the Annex IS Server Room HVAC Retrofit Project.

SUMMARY/JUSTIFICATION:

The entire Annex Building HVAC System is past its effective service life. The aging components are beginning to fail and replacement parts are becoming unavailable. The scope-of-work represented within the attached bid package is focused on retrofitting the existing HVAC system for the Annex Building including the IS Server Room, the plans for which were previously approved by the Board. In addition to requesting the Board approve the plans and specifications attached, the Public Works Director would like to advertise and bid both projects together with the expectation that there will be some scales of economy realized and that significantly more bidders will respond, resulting in more competitive bids submitted.

BACKGROUND/HISTORY OF BOARD ACTIONS:

The Annex IS Server HVAC Retrofit Project portion of the attached plans and specifications was previously approved by the Board of Supervisors in the Fall of 2019. Unfortunately, despite aggressively marketing the project only one contractor responded. Both the Public Works Engineer and the Mechanical Engineer-of-Record anticipated that the bids should come in around \$50,000. The solitary respondent's bid was in the neighborhood of \$115,000. The bid was summarily rejected and the decision was made to put that portion out to bid as part of the larger 'whole house' HVAC system with the expectation that significantly more and larger mechanical contractors would be attracted by a much larger scope-of-work.

ALTERNATIVES AND CONSEQUENCES OF NEGATIVE ACTION:

The Board could choose to disapprove the request.

OTHER AGENCY INVOLVEMENT:

FINANCING:

As part of the 2018-2019 approved Deferred Maintenance Budget, Code 5640, \$50,000 was budgeted for

improvements to the HVAC system for the Annex IS Server Room. This was carried over to the 2019-2020 approved Deferred Maintenance Budget. Subsequently, as part of the 2019-2020 approved Deferred Maintenance Budget, an additional \$450,000 was appropriated within Code 5191 for \$400,000 for the Main Annex System and within Code 5640 for \$50,000 for the Annex IS Server Room. The total of all appropriations for the construction of both systems is \$500,000.

ATTACHMENTS:

1. Annex HVAC Retrofit Bid Package
2. Inyo Annex Server IT Revised Set
3. Annex Inyo HVAC Retrofit Permit Set

APPROVALS:

Greg Waters	Created/Initiated - 1/24/2020
Darcy Ellis	Approved - 1/24/2020
Greg Waters	Approved - 2/19/2020
Breanne Nelums	Approved - 2/19/2020
Michael Errante	Approved - 2/19/2020
Marshall Rudolph	Approved - 2/20/2020
Amy Shepherd	Approved - 2/20/2020
Michael Errante	Final Approval - 2/20/2020

BID PACKAGE AND SPECIAL PROVISIONS



FOR CONSTRUCTION OF

ANNEX HVAC RETROFIT PROJECT

Project No. ZP-19-003

**FOR USE IN CONNECTION WITH INYO COUNTY
STANDARD SPECIFICATIONS, DATED OCTOBER 2015,
GENERAL PREVAILING WAGE RATES IN EFFECT
ON THE DATE THE WORK IS ACCOMPLISHED**

February, 2020

Prepared By: Inyo County Public Works

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NOTICE INVITING BIDS

For The

ANNEX HVAC RETROFIT PROJECT

Independence, CA

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COUNTY OF INYO

DEPARTMENT OF PUBLIC WORKS

NOTICE INVITING BIDS

The Inyo County Public Works Department is soliciting bids for:

ANNEX HVAC RETROFIT PROJECT

Bid Packages, which include the Notice Inviting Bids, Bid Proposal Forms, Contract and Bond Forms, Special Provisions, and Plans, may only be obtained from the Inyo County (County) Public Works Department (Department) at 168 North Edwards, P. O. Drawer Q, Independence, CA 93526, telephone (760) 878-0201. A non-refundable price of \$100.00 will be charged for each set of Bid Packages requested. The Bid Packages are available for inspection at the Department during regular business hours. Checks are to be made out to "Inyo County Public Works Department." The Bid Package is also available at no charge at the County of Inyo website at www.inyocounty.us. Bidders who obtain Bid Packages over the internet are responsible for notifying Inyo County Public Works Department that they are plan holders. Bidders who fail to notify the Department that they are plan holders may not be notified should any Addenda be issued. If the Department issues any Addenda to the Bid Package that is not acknowledged, the Bid Proposal may be rejected. This project is subject to the State of California Department of Industrial Relations (DIR) prevailing wage labor rates.

Bids must be submitted in a sealed envelope clearly marked with the bidder's name and address, the word "BID", and the Project Title:

ANNEX HVAC RETROFIT PROJECT

To be considered, **bids must be received by the Inyo County Clerk of the Board of Supervisors, 224 North Edwards Street (mailing address: P.O. Box N), Independence, California 93526 at or before 3:30 P.M. on April 1st, 2020** at which time they will be publicly opened and read aloud. No oral, telegraphic, telephonic, or fax proposals or modifications will be accepted.

General Work Description: This Project is an amalgamation of two sets of plans and specifications (Annex IS Server HVAC Retrofit Project and Annex HVAC Retrofit Project).

A job walk will be held on **March 18th, 2020 at 10:00 a.m.** at 168 N. Edwards Street in Independence, CA.

All project work is more particularly described in the plans and special provisions. All of the work shall be in accordance with all applicable Federal, State, and local laws, codes, and regulations.

For technical questions related to project work, site conditions, or to schedule a site visit, please contact Greg Waters of the Public Works Department at gwaters@inyocounty.us , Mobile (760) 709-2232, or Land Line (760) 878-0201.

Bids shall conform to and be responsive to the Contract Documents. Bids are required for the entire work described in the Contract Documents.

Each Bid must be submitted on the Bid Proposal Forms furnished as a part of the Bid Package. Each Bid must be accompanied by a Proposal Guarantee in the amount and form described in the Bid Package, in an amount not less than 10% of the amount of the bid, made payable to the order of the County of Inyo. The check or bond shall be given as security that the bidder will enter into the Contract with the County and furnish the required Faithful Performance Bond, Labor and Materials Payment Bond, Certificates and/or original endorsements of insurance, or other required documents. The check or bond may be retained by the County for sixty (60) days or until the Contract is fully executed by the successful bidder and the County, whichever first occurs.

The successful bidder shall be required to furnish a Faithful Performance Bond and a Labor and Materials Payment Bond on the forms provided in the Bid Package and in the amount of 100% of the Contract amount.

The successful bidder must be licensed as required by law, and consistent with the Contract Documents, at the time the contract is awarded, which license shall be a current California Class B - General Building Contractor license or a combination of all specialty classifications that will be required for complete performance of all of the work in accordance with the Contract Documents, and if applicable, a joint venture license as defined in the **Business and Professions Code, Section 7029**. Failure of the bidder to obtain proper and adequate licensing for an award of a contract shall constitute failure to execute the contract and shall result in the forfeiture of the security of the bidder.

In addition to the requirements set forth in this Notice Inviting Bids, all bids shall be subject to the requirements set forth in the Special Provisions, Standard Specifications of the Inyo County Public Works Department, dated October, 2015, Contract Documents and other applicable law.

The Contract is subject to the State Contract nondiscrimination and compliance requirements pursuant to **Government Code, Section 12990**, and other applicable law.

The Contract is also subject to and incorporates by reference the provisions of **Public Contract Code, Section 22300**, pursuant to which, the Contractor is permitted to substitute securities for earned retention or have them placed in escrow at the Contractor's expense, as also set forth in Section 1150.15 of the Standard Specifications.

Pursuant to **Section 1725.5 of the Labor Code**, the bidder is required to certify that they, and all subcontractors listed on the submitted Bid Form documents, are registered with the California Department of Industrial Relations.

Pursuant to **Section 1773 of the Labor Code**, the general prevailing wage rates in Inyo County have been determined by the Director of the State Department of Industrial Relations. These wage rates appear in the Department of Transportation publication entitled "General Prevailing Wage Rates," in effect at the time the project is advertised. Future effective wage rates, which have been predetermined and are on file with the State Department of Industrial Relations are referenced, but not printed, in said publication. Such rates of wages are on file with the State Department of Industrial Relations and the Public Works Department of the County of Inyo and are available to any interested party upon request.

Inyo County reserves the right at any stage of these proceedings to reject any or all Bids or to waive any immaterial defect in any Bid if it is deemed to be in the best interest of the County.

Each bidder must supply all the information required by the Contract Documents, Special Provisions and Standard Specifications.

County of Inyo
Department of Public Works

A handwritten signature in blue ink, appearing to read "Michael Errante", written over a horizontal line.

Michael Errante
Director

Dated: January 28th, 2020

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BID PROPOSAL FORMS

For The

ANNEX HVAC RETROFIT PROJECT

Independence, CA

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BID PROPOSAL FORM

TO: COUNTY OF INYO
Attn.: Inyo County Clerk of Board of Supervisors
224 North Edwards Street, P.O. Box N
Independence, California 93526
(Herein called the "County")

FROM: _____

(Herein called "Bidder")

FOR: ANNEX HVAC RETROFIT PROJECT
(Herein called "Project")

In submitting this Bid, Bidder understands and agrees that:

- 1. BID DEADLINE.** Bids must be received no later than 3:30 P.M. on April 1st, 2020 by the **Inyo County Assistant Board Clerk, 224 North Edwards Street (mailing address: P.O. Box N), Independence, CA 93526**, at which time they will be publicly opened and read aloud. No oral, electronic, telephonic or fax proposals or modifications will be accepted.
- 2. BID AMOUNT TOTAL.** The total amount of this Bid for provision of the services and/or materials for completion of the Project in accordance with the Contract Documents is set forth herein as:
- 3. BID ADDITIVES.** The County reserves the right to award the base bid and any combination, including neither, of the bid additives.

BASE PROJECT BID FORM – UNIT PRICE BID:

ABBREVIATIONS:

LS = LUMP SUM

SF = SQUARE FEET

LF = LINEAR FEET

Item No.	Description	Quantity	Unit	Unit Price	Total Price
1	Mobilization and Demobilization	1	LS	\$	\$
2	Scope of Work per Sheet T0.1 IT (Power from Panel X, not Panel EM. Cost of Panel EM and Manual Transfer Switch is carried as Alternate #3 below)	1	LS	\$	\$
3	Scope of Work per Sheet T0.1 R	1	LS	\$	\$
4	Replacement & Restoration of Finishes Removed or Damaged During Construction	1	LS	\$	\$
5	Start-Up, Commissioning, and Training	1	LS	\$	\$
TOTAL BASE BID AMOUNT:					\$

PROJECT BID AMOUNT - UNIT PRICE BID:

BID TOTAL (IN NUMBERS): \$ _____

BID TOTAL (IN WORDS): _____

ALTERNATE PROJECT BID FORM – UNIT PRICE BID:

ABBREVIATIONS:

LS = LUMP SUM

SF = SQUARE FEET

LF = LINEAR FEET

Alt No.	Description	Quantity	Unit	Unit Price	Total Price
1	Demolition of Existing Condenser per Sheet M1.1 IT & Replacement per Sheet M0.1 IT	0	LS	Work Completed	Work Completed
3	Addendum No. 2, Revision 1 Cost of Panel EM, Manual Transfer Switch and all related conduit, electrical equipment, and wiring	1	LS	\$	\$

Alternate #3, Addendum No. 2 BID AMOUNT - UNIT PRICE BID:

BID TOTAL (IN NUMBERS): \$ _____

BID TOTAL (IN WORDS): _____

No provision in this section is intended or shall be construed to alter the terms and conditions specified in the Contract Documents for payment of any amounts in the event the Project contract is awarded to Bidder pursuant to this Bid.

3. INCLUSION OF ALL COSTS. This Bid includes all costs for all labor, materials, tools, taxes, insurance, transportation, and other related supplies and services to perform all services and provide all materials as required by, and in accordance with, the Contract Documents for the Project.

4. CONTRACT DOCUMENTS. The Contract Documents shall constitute the Contract between the parties, which will come into full force and effect upon acceptance, approval, and execution by the Inyo County Board of Supervisors. The Contract Documents are complementary and are incorporated herein by reference and made a part hereof with like force and effect as if all of said documents were set forth in full herein. The Contract Documents include all documents defined as "Contract Documents" in the Standard Specifications of the Inyo County Public Works Department, dated October, 2015.

5. ACCEPTANCE. County reserves the right to reject any and all Bids, or part of any Bid, to postpone the scheduled Bid deadline date(s), to make an award in its own best interest, and to waive any irregularities or technicalities that do not significantly affect or alter the substance of an otherwise responsible Bid and that would not affect a Bidder's ability to perform the work adequately as specified. However, this Bid shall remain open and shall not be withdrawn for a period of sixty (60) calendar days after the date designated in the Notice Inviting Bids for publicly opening this Bid. If Bidder receives written notice of the award of the Project Contract to Bidder on or before the sixtieth day, Bidder shall execute the Contract and deliver to County the executed Contract and all of the bonds, certificates and/or endorsements of insurance coverage, and other required documents no later than fifteen (15) calendar days after the date on which Bidder receives such notice.

This solicitation in no way obligates County to award a Bid Contract described herein, nor will County assume any liability for the costs incurred in the preparation and transmittal of Bids in response to this solicitation. County reserves the right to not accept any Bid, to reject any or all Bids, to reject any part of any Bid proposal, to negotiate and modify any Bid, and to waive any defects or irregularities in any Bid at County's sole discretion. Furthermore, County shall have the sole discretion to award a Bid Contract as it may deem appropriate to best serve the interests of County. In this regard, County may consider demonstrated quality of work, responsiveness, comparable experience, professional qualifications, references, and proposed fees. Awards will not be based on cost alone. County does not guarantee a minimum or maximum dollar value for any Contract(s) resulting from this solicitation.

If the Contract Documents require or permit this Bid to include two or more Alternates, County reserves the right to award the Contract for that Alternate which County, in its sole discretion, determines at the time of award to be in County's best interest.

6. TIME OF COMPLETION. The Bidder further specifically agrees to complete all the work no later than the Time for Completion specified in the Contract Special Provisions.

7. ADDENDA. The Bidder acknowledges receipt of the following Addenda and has provided for all Addenda changes in this Bid.

(Fill in Addendum numbers and dates Addenda have been received.
If none have been received, enter "NONE".)

WARNING: IF AN ADDENDUM OR ADDENDA HAVE BEEN ISSUED BY THE COUNTY AND NOT NOTED ABOVE AS BEING RECEIVED BY THE BIDDER, THIS PROPOSAL MAY BE REJECTED.

8. BIDDER'S BUSINESS INFORMATION. Bidder provides the following information concerning its business:

Bidder's Name: _____

Address: _____

_____ Zip Code _____
(The above address will be used to send notices or requests for additional information.)

Telephone: () _____

Federal Identification No.: _____

Contractor's License No.: _____ State: _____

Classification: _____ Expiration Date: _____

Type of Business (check one):

Individual (), Partnership (), Joint Venture ()

Corporation (), Other (Specify) : _____ ()

Owners, Officers, Partners, or Other Authorized Representatives:

IMPORTANT NOTICE: If bidder or other interested person is a corporation, state legal name of corporation above and list below, names of the president, secretary, treasurer, and chief executive officer/manager thereof; if a partnership, joint venture, or other business entity, state true name of firm above and list below, names of all partners, joint venturers, or for other entities, parties having authority to act on behalf of the entity, such as officers, owners, directors; if bidder or other interested person is an individual, state first, middle, and last names in full above and write "N/A" below.

9. PROPOSAL GUARANTEE. As security for the Bid, this Bid includes one of the following proposal guarantee instruments (the "Proposal Guarantee"), in the amount required by this section, as checked:

- (a) _____ Bid Bond from a corporate surety admitted to issue such bonds in the State of California; or

- (b) ____ Cashier's Check or Certified Check, made payable to the County of Inyo, attached to the form entitled Cashier's or Certified Check; or
- (c) ____ Cash, in legal tender of the United States of America, enclosed in a separate envelope marked " Cash Proposal Guarantee."

The Proposal Guarantee is in the amount of Ten Percent (10%) of the total amount of the Bid. If the Contract Documents require or permit this Bid to include two or more Alternates, the amount of the Proposal Guarantee must not be less than Ten Percent (10%) of the amount of the bid total submitted for the alternate having the highest total bid amount. Only one form of Proposal Guarantee may be submitted with each Bid.

Bidder hereby agrees that County shall be entitled to payment by forfeiture of the Proposal Guarantee if County awards the Project Contract to Bidder, but Bidder fails or refuses to execute the Contract and/or furnish all of the bonds, certificates and/or endorsements of insurance coverage, and other required documents no later than fifteen (15) calendar days after the date on which Bidder receives notice of the award from County.

10. BID PROTEST. In the event a dispute arises concerning the bid process prior to the award of the contract, the party wishing resolution of the dispute shall submit an appeal request in writing to the County Director of Purchasing. Bidder may appeal the recommended award or denial of award, provided the following stipulations are met:

1. Only a bidder who has actually submitted a Bid Proposal is eligible to submit an appeal request/bid protest against another bidder. Subcontractors are not eligible to submit bid protests. A bidder may not rely on the bid protest submitted by another bidder, but must timely pursue its own protest.
2. Appeal must be in writing. The appeal must contain a complete statement of the basis for the protest and all supporting documentation. Materials submitted after the Bid Protest Deadline will not be considered. The protest must refer to the specific portion or portions of the Contract Documents upon which the protest is based. The protest must include the name, address and telephone number of the person representing the protesting bidder if different from the protesting bidder.
3. A copy of the protest and all supporting documents must also be transmitted by fax or by e-mail, by or before the Bid Protest Deadline, to the protested bidder and any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest.
4. Must be submitted within ten (10) calendar days of the date of the recommended award or denial of award letters.
5. An appeal of a denial of award can only be brought on the following grounds:
 - a. Failure to follow the selection procedures and adhere to requirements specified in the Bid Package or any addenda or amendments.

- b. There has been a violation of conflict of interest as provided by California Government Code Section 87100 et seq.
 - c. A violation of State or Federal law.
6. Appeals will not be accepted for any other reasons than those stated above. All appeals must be sent to:

Clint Quilter, Director
County of Inyo
Purchasing Department
224 N. Edwards St.
Independence, CA 93526

County's Purchasing Director shall make a decision concerning the appeal, and notify the Proposer making the appeal, within a reasonable timeframe prior to the tentatively scheduled date for awarding the contract. The decision of County's Purchasing Director shall be deemed final.

11. ADDITIONAL REQUIRED DOCUMENTS. Bidder agrees that, in addition to the Proposal Guarantee, Bidder is required to submit, as a part of this Bid, the following forms properly completed, and signed as required, all of which accompany this Bid Proposal Form and are incorporated herein by this reference:

- (1) Designation of Subcontractors (Public Contract Code section 4100 et seq.)
- (2) Certification Regarding Equal Employment Opportunity (Government Code section 12900 et seq., sections 11135-11139.5)
- (3) Contractor's Labor Code Certification (Labor Code section 3700)
- (4) Contractor and Subcontractor Dept. of Industrial Relations (DIR) Registration (Labor Code section 1725.5)
- (5) Non-Collusion Affidavit (Public Contract Code Section 7106)
- (6) Public Contract Code Section 10162 Questionnaire
- (7) Public Contract Code Statement (Section 10232)
- (8) Small Business Enterprise Commitment (Construction Contracts)
- (9) Small Business Enterprise Final Report of Utilization of Small Business Enterprise

12. DEFINITIONS. The definition and meaning of the words used in this Bid Proposal Form are the same as set forth in **Section 1070, "Abbreviations, Symbols and Definitions,"** of the Standard Specifications of the Inyo County Public Works Department, dated October, 2015.

THE UNDERSIGNED HEREBY DECLARES, UNDER PENALTY OF PERJURY ACCORDING TO THE LAWS OF THE STATE OF CALIFORNIA, THAT THE STATEMENTS, DESIGNATIONS, CERTIFICATIONS, AND REPRESENTATIONS MADE IN THIS BID PROPOSAL, INCLUDING ALL ATTACHMENTS, ARE TRUE AND CORRECT AND HE OR SHE IS THE INDIVIDUAL, MANAGING PARTNER, CORPORATE OFFICER, OR OTHER REPRESENTATIVE, DULY AUTHORIZED BY LAW TO MAKE THIS BID ON BEHALF OF BIDDER, AND BY SIGNING BELOW, MAKES THIS BID ON BEHALF OF BIDDER ACCORDING TO ALL OF THE TERMS AND CONDITIONS SET FORTH OR INCORPORATED BY REFERENCE HEREIN.

(Signature of Authorized Person)

(Date)

(Printed Name)

(Printed Title)

INYO COUNTY PUBLIC WORKS DEPARTMENT

ANNEX HVAC RETROFIT PROJECT

BID BOND

(BID PROPOSAL GUARANTEE)

(Not required if a certified or cashier's check or a cash deposit accompanies the bid as a proposal guarantee)

KNOW ALL MEN BY THESE PRESENTS: That we, _____

_____ as Principal, and
(Name of Bidder)

_____ (Name of Corporate Surety)

as Corporate Surety admitted to issue such bonds in the State of California, are held and firmly bound unto the County of Inyo, State of California, in the sum of _____ dollars (\$ _____) for the payment whereof we hereby bind ourselves, our successors, heirs, executors, and administrators, jointly and severally, firmly by these presents.

The condition of the foregoing obligation is such that whereas the above bounded Principal is about to submit to the Board of Supervisors of the County of Inyo a bid for the construction of the **ANNEX HVAC RETROFIT PROJECT**, in compliance with the Contract therefor:

Now, if the bid of the Principal shall be accepted and the Contract awarded to the Principal by said Board of Supervisors, and if the Principal shall fail or neglect to enter into the Contract therefor in accordance with the terms of the Principal's bid and the terms set forth in the Bid Package, or to furnish the required Faithful Performance and Labor and Materials Payment Bonds, Certificates of insurance, and other required documents, to the satisfaction of the Board of Supervisors of said County, no later than fifteen (15) calendar days after the Principal has received notice from the County that the Contract has been awarded to the Principal, then the sum guaranteed by this Bond is forfeited to the County of Inyo.

It is expressly agreed and understood that any errors, clerical, mathematical, or otherwise, in the bid shall not be or constitute a defense to a forfeiture of this Bond.

WITNESS our hands and seals this _____ day of _____, 20 ____ A.D.

Principal

(SEAL)

By: _____
(Title of Authorized Person)

(Address for Notices to be Sent)

Surety

(SEAL)

By: _____
(Title of Authorized Person)

(Address for Notices to be Sent)

NOTE:

THE SIGNATURES OF THE PRINCIPAL (BIDDER) AND THE SURETY MUST EACH BE ACKNOWLEDGED BEFORE A NOTARY PUBLIC (OR OTHER OFFICER AUTHORIZED UNDER CALIFORNIA LAW) AND THE ACKNOWLEDGMENTS MUST BE ATTACHED TO THIS BOND. The Bid Bond must be executed on this form by a corporate surety admitted to issue such bonds in the State of California. No substitutions will be accepted. If an attorney-in-fact signs for the surety, an acknowledged statement from the surety appointing and empowering the attorney-in-fact to execute such bonds in such amounts on behalf of the surety, must accompany the Bid Bond.

ADDRESS OF COUNTY FOR NOTICES TO BE SENT:

**County of Inyo (Attn.: Public Works Director)
224 North Edwards Street, P.O. Box N
Independence, California 93526**

ANNEX HVAC RETROFIT PROJECT

CASHIER'S OR CERTIFIED CHECK
(BID PROPOSAL GUARANTEE)

(Not required if Bid Bond accompanies the bid as a proposal guarantee)

A cashier's or certified check in the amount required as a proposal guarantee for the Bid and made payable to the County of Inyo is attached below:

[]

ATTACH CHECK HERE

[]

Bidder (print name) : _____

ANNEX HVAC RETROFIT PROJECT

DESIGNATION OF SUBCONTRACTORS

In compliance with the provisions of the **Subletting and Subcontracting Fair Practices Act (Section 4100 et. seq. of the Public Contract Code of the State of California)**, the undersigned bidder has set forth below the full name, and the location of the place of business of each Subcontractor who will perform work or labor or render service to the Prime Contractor in or about the construction of the work or improvement, or a Subcontractor licensed by the State of California who, under subcontract to the Prime Contractor, specifically fabricates and installs a portion of the work or improvement according to detailed drawings contained in the Plans and Specifications to which the attached bid is responsive, and the portion of the work which will be done by each Subcontractor for each subcontract in excess of one-half of one percent of the Prime Contractor's total bid, or \$10,000.00, whichever is greater.

The Bidder understands that if he fails to specify a Subcontractor for any portion of the work to be performed under the Contract in excess of one-half of one percent of his bid, or \$10,000.00, whichever is greater, he shall be deemed to have agreed to perform such portion himself, and that he shall not be permitted to sublet or subcontract that portion of the work except in cases of public emergency or necessity, and then only after a finding, produced to writing as a public record of the Awarding Authority, setting forth the facts constituting the emergency or necessity. If no Subcontractors are to be employed on the project, enter the word "none".

ITEM NO.	DESCRIPTION OF WORK	% OF TOTAL CONTRACT	SUBCONTRACTOR'S LICENSE TYPE, NUMBER, EXPIRATION DATE	NAME, ADDRESS, PHONE NUMBER

 Signature of Authorized Person) (Title)

 (Printed Name) (Date)

CERTIFICATION REGARDING EQUAL EMPLOYMENT OPPORTUNITY

(Government Code Section 12900 et seq., Sections 11135-11139.7)

ANNEX HVAC RETROFIT PROJECT

During the performance of this Contract, the Contractor and its subcontractors shall not unlawfully deny the Contract's benefits to any person, nor shall any person be unlawfully subjected to discrimination under the contract and its performance on the basis of religion, color, ethnic group identification, sex, age, or disability. In addition, the Contractor and its subcontractors shall not discriminate unlawfully against any employee or applicant for employment because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, age, or sex. The Contractor shall insure that the evaluation and treatment of employees and applicants for employment are free from such discrimination.

The Contractor shall comply with the provisions of the Fair Employment and Housing Act (**Government Code, Section 12900 et seq.**), the regulations promulgated thereunder (**California Code of Regulations, Title 2, Section 7285.0 et seq.**), and the Provisions of **Article 9.5, Chapter 1, Part 1, Division 3, Title 2 of the Government Code (Government Code, Sections 11135-11139.7)**.

Contractor and its subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.

The Contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under the contract.

(Name and Title of Signer)

Signature

Date

Company Name _____

Business Address _____

CONTRACTOR'S LABOR CODE CERTIFICATION

(Labor Code Section 3700 et seq.)

ANNEX HVAC RETROFIT PROJECT

I am aware of the provisions of Section 3700 and following of the Labor Code which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract.

(Name and Title of Signer)

Signature

Date

Company Name _____

Business Address _____

CONTRACTOR AND SUBCONTRACTOR REGISTRATION

**With
CA Department of Industrial Relations (DIR)
(CA LABOR CODE SECTION 1725.5)**

Bidder hereby certifies that they, and all subcontractors listed on the submitted Bid Form documents, are Registered with the CA Department of Industrial Relations pursuant to requirements of CA Labor Code Section 1725.5 and will comply with all requirements as noted in the aforementioned CA Labor Code Section.

Signed Name

Date

Printed Name

CA DIR Registration No.

NON-COLLUSION AFFIDAVIT

(Public Contract Code Section 7106)
(Code of Civil Procedure Section 2015.5)

ANNEX HVAC RETROFIT PROJECT

The undersigned declares:

I am the _____ of _____, the party making the foregoing bid. The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose. Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on

_____, at _____, _____
(Date) (City) (State)

(Name and Title of Signer)

Signature

Date

Company Name _____

Business Address _____

PUBLIC CONTRACT CODE SECTION 10162 QUESTIONNAIRE

ANNEX HVAC RETROFIT PROJECT

In accordance with Public Contract Code Section 10162, the Bidder shall complete, under penalty of perjury, the following questionnaire:

Has the Bidder, any officer of the Bidder, or any employee of the Bidder who has a proprietary interest in the Bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a federal, state, or local government project because of a violation of law or a safety regulation:

Yes _____ No _____

If the answer is yes, explain the circumstances in the following space.

By bidder's signature on the Bid Proposal Form, Bidder certifies, under penalty of perjury under the laws of the State of California, that the foregoing statements in accordance with Public Contract Code Section 10162 are true and correct.

PUBLIC CONTRACT CODE STATEMENT (SECTION 10232)

ANNEX HVAC RETROFIT PROJECT

In accordance with **Public Contract Code Section 10232**, the Contractor hereby states under penalty of perjury, that no more than one final unappealable finding of contempt of court by a federal court has been issued against the Contractor within the immediately preceding two year period because of the Contractor's failure to comply with an order of a federal court which orders the Contractor to comply with an order of the National Labor Relations Board.

By Bidder's signature on the Bid Proposal Form, Bidder certifies, under penalty of perjury under the laws of the State of California, that the foregoing statements in accordance with **Public Contract Code Section 10232** are true and correct.

(Name and Title of Signer)

Signature

Date

Company Name _____

Business Address _____

LOCAL BUSINESS PREFERENCES

INYO COUNTY ORDINANCE No. 1156

ANNEX HVAC RETROFIT PROJECT

ORDINANCE NO. 1156

AN ORDINANCE OF THE BOARD OF SUPERVISORS OF THE COUNTY OF INYO, STATE OF CALIFORNIA, ADDING CHAPTER 6.06 TO THE INYO COUNTY CODE TO PROVIDE CONTRACTING PREFERENCES FOR LOCAL AND SMALL BUSINESSES

The Board of Supervisors of the County of Inyo ordains as follows:

SECTION 1. PURPOSE AND AUTHORITY

The purpose of this ordinance is to contribute to the economic and social well-being of all the citizens of the County by providing a contracting preference for local and small businesses. As a market participant, and pursuant to Public Contract Code § 2002, the County may award a purchasing preference to certain entities to vindicate the governmental purpose of encouraging County and regional economic development.

SECTION 2. ADDITION OF CHAPTER 6.06 TO INYO COUNTY CODE.

Chapter 6.06 is added to the Inyo County Code to read as follows:

Chapter 6.06

CONTRACTING PREFERENCES

Sections:

- 6.06.010 Findings.**
- 6.06.020 Definitions.**
- 6.06.030 General Provisions.**
- 6.06.040 Local Business and Small Business Preference.**
- 6.06.050 Small Business Subcontracting Preference.**
- 6.06.060 Limit On Contracting Preference.**

6.06.010 Findings

Businesses located in Inyo County contribute to the economic and social well-being of all the citizens of the County. Such businesses provide convenient services within the County and provide employment for County citizens. Further, the payroll paid by and income earned by local businesses tend to be largely expended within the County, which enhances the business environment in the County and the well-being of its citizens. It is in the public interest to encourage a vibrant business environment in the County. Providing modest purchasing preferences for County businesses furthers the goal of building a healthy economy in the County. Further, providing contracting preferences for all small businesses is allowed by State law, expands the types of contracts for which preferences may be given, and benefits local small businesses, also furthering the goal of building and maintaining a healthy local economy.

6.06.020 Definitions.

- A. A **Small Business** is a business which is certified by the State of California or the Small Business Administration as a small business.
- B. A **Local Business** is a business which:
 - 1. Has its headquarters, distribution point or locally-owned franchise located in or having a street address within the County for at least six months immediately prior to the issuance of the request for competitive bids by the County; and
 - 2. Holds any required business license by a jurisdiction located in Inyo County; and
 - 3. Employs at least one full-time or two part-time employees whose primary residence is located within Inyo County, or if the business has no employees, shall be at least fifty percent owned by one or more persons whose primary residence is located within Inyo County.

4. Meets the conditions of one through three of this subsection, but within Mono or Inyo and Mono Counties, if no Inyo County local business submits a bid that is within eight percent of the lowest bid submitted.

C. A **Responsive Bid** is a bid which responds to the requirements of the request for bids and is submitted by a responsible bidder.

6.06.030 General Provisions.

A. The preferences provided in this chapter are intended to extend to the limit of the jurisdiction of Inyo County under California law. Such preferences do not apply where prohibited by Federal or State law. Such preferences do not apply where funding agencies prohibit such preferences as a condition of providing funding for the anticipated project. Where this Chapter provides preferences for multiple classes of entities, and one or more of those classes of entities are disallowed contracting preference by Federal or State law or by the funding agency, those disallowed entities will not be provided preferences, but the remaining classes of entities shall receive preferences.

B. Requests for bids or proposals issued by the County shall specify the applicable contracting preferences available pursuant to this Chapter.

6.06.040 Local Business and Small Business Preference.

Except as excluded by Section 6.06.030(A), for all contracts awarded by Inyo County, if the lowest responsive bid is submitted by a local business or a small business, that business shall be awarded the contract. If the lowest responsive bid is not submitted by a local business or a small business, the lowest responsive bid submitted by a local business that is within eight percent of the lowest responsive bid or by a small business that is within five percent of the lowest responsive bid shall be considered the low bid and that business shall be awarded the contract. To be eligible, a local business or a small business shall provide certification with its bid that it is such business as herein defined.

6.06.050 Small Business Subcontracting Preference.

For public works and road construction contracts awarded by Inyo County, where no entity qualifying under this Chapter for a contracting preference submits a responsive bid that is the lowest or within five percent of the lowest responsive bid, there shall be a preference given to bids in which at least ten percent of the monetary value of the work to be performed is subcontracted to a small business or businesses. If such bid is the lowest responsive bid, that contractor shall be awarded the contract. If such bid is not the lowest responsive bid, any such bid that is within five percent of the lowest responsive bid shall be considered the low bid, and that contractor shall be awarded the contract.

6.06.060 Limit On Contracting Preferences.

Contracting preferences under this Chapter shall not exceed \$10,000.00 for any one solicitation and award determination.

SECTION 3. SEVERABILITY

If any section, subsection, sentence, clause or phrase of this ordinance is for any reason held to be unconstitutional or invalid, such decision shall not affect the validity of the remaining portions of this ordinance. The Board of Supervisors hereby declares that it would have passed this ordinance and every section, subsection, sentence, clause or phrase not declared invalid or unconstitutional, without regard to whether any portion of this ordinance would be subsequently declared unconstitutional or invalid.

SECTION 4. EFFECTIVE DATE


This Ordinance shall take effect and be in full force and effect thirty (30) days after its adoption. Before the expiration of fifteen (15) days from the adoption hereof, this Ordinance shall be published as required by Government Code Section 25124. The Clerk of the Board is hereby instructed and ordered to so publish this Ordinance together with the names of the Board members voting for and against the same.

PASSED AND ADOPTED this 25th day of May, 2010, by the following vote:

AYES: Supervisors Arcularius, Cash, Brown, Fortney and Cervantes
NOES: -0-
ABSTAIN: -0-
ABSENT: -0-


Richard Cervantes, Chairperson
Inyo County Board of Supervisors

ATTEST: Kevin Carunchio
Clerk of the Board

By: 
Patricia Gunsolley, Assistant

s/Ordinance/ContractingPrefSmBusiness

4/29/10

ALL BIDDERS:

PLEASE NOTE: It is the bidder’s responsibility to verify that the Small Business Enterprise (SBE) subcontractors are certified by the proper certifying authorities, and submit evidence of that certification with the bid. If a SBE prime contractor is not certified on the date of the bid opening, the SBE prime contractor will not qualify for the contracting preference. If the SBE subcontractor or subcontractors are not certified on the date of bid opening, that portion of that firm’s participation will not count toward the minimum ten percent of the monetary value of the work needed to qualify for the contracting preference.

The form requires specific information regarding the construction contract: Total Contract Amount, Bid Opening Date, and Bidder’s Name.

Indicate the appropriate bid item number (or numbers); Item of Work and description or services to be subcontracted or materials to be provided by the SBE; the SBE’s business license information/expiration date, certification number and its expiration date; the SBE’s contact information, including company and contact name, address, and telephone number; and the dollar amount expected to be paid to the SBE.

IMPORTANT: Identify **all** SBE firms participating in the project regardless of tier, including the prime contractor, if an SBE. Names of the First Tier SBE Subcontractors and their respective item(s) of work listed should be consistent, where applicable, with the names and items of work in the "List of Subcontractors" submitted with your bid. **Provide copies of the SBEs’ quotes, and if applicable,** a copy of joint venture agreements pursuant to the Subcontractors Listing Law and the Special Provisions.

There is a column for the total SBE dollar amount. Enter the Total Claimed SBE Participation dollars and percentage amount of items of work submitted with your bid pursuant to the special provisions. (If 100% of item is not to be performed or furnished by the SBE, describe exact portion of time to be performed or furnished by the SBE.)

This form must be submitted with the bid if the bidder is attempting to qualify for the SBE contracting preference. If the bidder is not attempting to qualify for the SBE contracting preference the form does not need to be submitted.

FINAL REPORT – UTILIZATION OF SMALL BUSINESS ENTERPRISES

(SBE), FIRST-TIER SUBCONTRACTORS

PROJECT: ANNEX HVAC RETROFIT PROJECT						CONTRACT COMPLETION DATE	
PRIME CONTRACTOR			BUSINESS ADDRESS			ESTIMATED CONTRACT AMOUNT	
BID ITEM NO.	SUBCONTRACTOR NAME, BUSINESS ADDRESS, AND PHONE	DESCRIPTION OF WORK PERFORMED	SBE CERT. NUMBER	CONTRACT PAYMENTS		DATE WORK COMPLETE	DATE OF FINAL PAYMENT
				NON-SBE	SBE		
				\$	\$		
				\$	\$		
				\$	\$		
				\$	\$		
				\$	\$		
				\$	\$		
				\$	\$		
			TOTAL	\$	\$		
(i) Original Commitment							
\$ _____							
2) I CERTIFY THAT THE ABOVE INFORMATION IS COMPLETE AND CORRECT							
CONTRACTOR REPRESENTATIVES SIGNATURE				BUSINESS PHONE NUMBER		DATE	
4) TO THE BEST OF MY KNOWLEDGE, THE ABOVE INFORMATION IS COMPLETE AND CORRECT							
RESIDENT ENGINEER'S SIGNATURE				BUSINESS PHONE NUMBER		DATE	
To be completed by the contractor and submitted to the Resident Engineer upon project completion							

INSTRUCTIONS - FINAL REPORT - UTILIZATION OF SMALL BUSINESS ENTERPRISES (SBE), FIRST-TIER SUBCONTRACTORS

The form requires specific information regarding the construction project, including the prime contractor name and address, contract completion date, and estimated contract amount. The objective of the form is to describe who did what by bid item numbers and description, asking for specific dollar values of item work completed broken down by subcontractors who performed the work, SBE and non-SBE work forces. SBE prime contractors are required to show the date of work performed by their own forces along with the corresponding dollar value of work.

Indicate appropriate bid item number or numbers, a description of work performed or materials provided, and subcontractor name and address. For those firms who are SBE, enter the SBE certification number. The SBE shall provide their certification number to the contractor and notify the contractor in writing with the date of decertification if their status changes during the course of the project.

The form has two columns for the dollar value to be entered for the item work performed by the subcontractor. The non-SBE column is used to enter the dollar value of work performed by firms who are not certified SBEs. Enter the dollar value of work performed by firms who are SBEs in the SBE column.

If the prime contractor or a subcontractor performing work as a SBE on the project becomes decertified and still performs work after their decertification date, enter the total value performed by the contractor/subcontractor under the appropriate SBE identification column.

If the prime contractor or a subcontractor performing work as a non-SBE on the project becomes certified as a SBE, enter the dollar value of all work performed after certification as a SBE under the appropriate SBE identification column.

Enter the total of each column on the form.

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CONTRACT AND BOND FORMS

For

ANNEX HVAC RETROFIT PROJECT

Independence, CA

ENCLOSURES:

Contract: Inyo County Standard Contract No. 147
Faithful Performance Bond
Labor and Material Payment Bond

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**CONTRACT
BY AND BETWEEN
THE COUNTY OF INYO
and**

_____, **CONTRACTOR**

for the

_____ **PROJECT**

THIS CONTRACT is awarded by the COUNTY OF INYO to CONTRACTOR on and made and entered into effective, _____, 20____, by and between the COUNTY OF INYO, a political subdivision of the State of California, (hereinafter referred to as "COUNTY"), and _____ (hereinafter referred to as "CONTRACTOR"), for the construction or removal of _____ **PROJECT** (hereinafter referred to as "PROJECT"), which parties agree, for and in consideration of the mutual promises, as follows:

1. SERVICES TO BE PERFORMED. CONTRACTOR shall furnish, at his/her own expense, all labor, materials, methods, processes, implements, tools, machinery, equipment, transportation, permits, services, utilities, and all other items, and related functions and otherwise shall perform all work necessary or appurtenant to construct the Project in accordance with the Special Provisions, which are incorporated herein by reference per section 4(c) of this Contract, within the Time for Completion set forth, as well as in all other in the Contract Documents, for:

Title: _____ **PROJECT**

2. TIME OF COMPLETION. Project work shall begin within _____ calendar days after receipt of the Notice to Proceed (NTP) (or on the start of work date identified in the NTP) and shall continue until all requested services are completed. Said services shall be completed no later than the Time of Completion as noted in the Project's Special Provisions. Procedures for any extension of time shall be complied with as noted in the Project's Special Provisions.

3. PAYMENT/CONSIDERATION. For the performance of all such work, COUNTY shall pay to CONTRACTOR for said work the total amount of: _____ dollars (\$_____), adjusted by such increases or decreases as authorized in accordance with the Contract Documents, and payable at such times and upon such conditions as otherwise set forth in the Contract Documents.

4. ALL PROVISIONS SET FORTH HEREIN. CONTRACTOR and COUNTY agree that this Contract shall include and consist of:

- a. All of the provisions set forth expressly herein;
- b. The Bid Proposal Form, the Faithful Performance Bond, and the Labor and Materials Payment Bond, all of which are incorporated herein and made a part hereof by this reference; and

c. All of the other Contract Documents, as described in **Section 5-1.02, "Definitions,"** of the Standard Specifications of the Inyo County Public Works Department, dated October, 2015, all of which are incorporated herein and made a part of this Contract by this reference, including without limitation, the Bid Package, the Standard Specifications of the Inyo County Public Works Department, dated October, 2015, and the Special Provisions concerning this Project including the Appendices, the Plans, any and all amendments or changes to any of the above-listed documents, including, without limitation, contract change orders, and any and all documents incorporated by reference into any of the above-listed documents.

5. STANDARD OF PERFORMANCE. Contractor represents that he/she is qualified and licensed to perform the work to be done as required in this Contract. County relies upon the representations of Contractor regarding professional and/or trade training, licensing, and ability to perform the services as a material inducement to enter into this Contract. Acceptance of work by the County does not operate to release Contractor from any responsibility to perform work to professional and/or trade standards. Contractor shall provide properly skilled professional and technical personnel to perform all services under this Contract. Contractor shall perform all services required by this Contract in a manner and according to the standards observed by a competent practitioner of the profession. All work products of whatsoever nature delivered to the County shall be prepared in a manner conforming to the standards of quality normally observed by a person practicing in Contractor's profession and/or trade.

6. INDEPENDENT CONTRACTOR. Nothing contained herein or any document executed in connection herewith, shall be construed to create an employer-employee, partnership or joint venture relationship between County and Contractor, nor to allow County to exercise discretion or control over the manner in which Contractor performs the work or services that are the subject matter of this Contract; provided, however, the work or services to be provided by Contractor shall be provided in a manner consistent with reaching the County's objectives in entering this Contract.

Contractor is an independent contractor, not an employee of County or any of its subsidiaries or affiliates. Contractor will not represent him/herself to be nor hold her/himself out as an employee of County. Contractor acknowledges that s/he shall not have the right or entitlement in or to any of the pension, retirement or other benefit programs now or hereafter available to County's employees. The consideration set forth in Paragraph 3 shall be the sole consideration due Contractor for the services rendered hereunder. It is understood that County will not withhold any amounts for payment of taxes from the Contractor's compensation hereunder. Any and all sums due under any applicable state, federal or municipal law or union or professional and/or trade guild regulations shall be Contractor's sole responsibility. Contractor shall indemnify and hold County harmless from any and all damages, claims and expenses arising out of or resulting from any claims asserted by any third party, including but not limited to a taxing authority, as a result of or in connection with payments due it from Contractor's compensation.

7. ASSIGNMENT AND SUBCONTRACTING. The parties recognize that a substantial inducement to County for entering into this Contract is the professional reputation, experience and competence of Contractor. Assignments of any and/or all rights, duties or obligations of the Contractor under this Contract will be permitted only with the express consent

of the County. Contractor shall not subcontract any portion of the work to be performed under this Contract without the written authorization of the County. If County consents to such subcontract, Contractor shall be fully responsible to County for all acts or omissions of the subcontractor. Nothing in this Contract shall create any contractual relationship between County and subcontractor, nor shall it create any obligation on the part of the County to pay any monies due to any such subcontractor, unless otherwise required by law.

8. CLAIMS RESOLUTION. Pursuant to **Section 9204 of the Public Contract Code**, any and all claims submitted by Contractor to County will follow the provisions as set forth in the Project's Special Provisions.

9. INSURANCE INDEMNIFICATION. Contractor shall hold harmless, defend and indemnify County and its officers, officials, employees and volunteers from and against all claims, damages, losses, and expenses, including attorney fees arising out of the performance of the work described herein, caused in whole or in part by any negligent act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, except where caused by the active negligence, sole negligence, or willful misconduct of the County.

10. INSURANCE. For the duration of this Agreement, Contractor shall procure and maintain insurance of the scope and amount specified in Attachment 3 and with the provisions specified in that attachment.

11. POLITICAL REFORM ACT. Contractor is not a designated employee within the meaning of the Political Reform Act because Contractor:

- a. Will conduct research and arrive at conclusions with respect to his/her rendition of information, advice, recommendation or counsel independent of the control and direction of the County or of any County official, other than normal Contract monitoring; and
- b. Possesses no authority with respect to any County decision beyond rendition of information, advice, recommendation or counsel [FPPC Reg. 18700(a)(2)].

12. COMPLIANCE WITH ALL LAWS.

Performance Standards: Contractor shall use the standard of care in its profession and/or trade to comply with all applicable federal, state and local laws, codes, ordinances and regulations that relate to the work or services to be provided pursuant to this Contract.

a. Safety Training:

i. Contractor shall provide such safety and other training as needed to assure work will be performed in a safe and healthful manner "in a language" that is understandable to employees receiving the training. The training shall in all respects be in compliance with CAL OSHA; and

ii. Contractor working with employees shall maintain a written Injury and Illness Prevention (IIP) Program, a copy of which must be maintained at each worksite or at a central worksite identified for the employees, if the Contractor has non-fixed worksites; and

iii. Contractor using subcontractors with the approval of the County to perform the work which is the subject of this Contract shall require each subcontractor working with employees to comply with the requirements of this section.

b. Child, Family and Spousal Support reporting Obligations:

i. Contractor shall comply with the state and federal child, family and spousal support reporting requirements and with all lawfully served wage and earnings assignment orders or notices of assignment relating to child, family and spousal support obligations.

c. Nondiscrimination:

i. Contractor shall not discriminate in employment practices or in the delivery of services on the basis of membership in a protected class which includes any class recognized by law and not limited to race, color, religion, sex (gender), sexual orientation, marital status, national origin (Including language use restrictions), ancestry, disability (mental and physical, including HIV and Aids), medical Conditions (cancer/genetic characteristics), age (40 and above) and request for family care leave.

ii. Contractor represents that it is in compliance with federal and state laws prohibiting discrimination in employment and agrees to stay in compliance with the Americans with Disabilities Act of 1990 (42 U.S.C. sections 12101, et. seq.), Age Discrimination in Employment Act of 1975 (42 U.S.C. 5101, et. seq.), Title VII (42 U.S.C. 2000, et. seq.), the California Fair Employment Housing Act (California Government Code sections 12900, et. seq.) and regulations and guidelines issued pursuant thereto.

13. LICENSES. Contractor represents and warrants to County that it has all licenses, permits, qualifications, insurance and approvals of whatsoever nature which are legally required of Contractor to practice its trade and/or profession. Contractor represents and warrants to County that Contractor shall, at its sole cost and expense, keep in effect or obtain at all times during the term of this Contract, any licenses, permits, insurance and approvals which are legally required of Contractor to practice its and/or profession.

14. PREVAILING WAGE. Pursuant to **Section 1720 et seq. of the Labor Code**, Contractor agrees to comply with the Department of Industrial Relations regulations, to which this Contract is subject, the prevailing wage per diem rates in Inyo County have been determined by the Director of the State Department of Industrial Relations. These wage rates appear in the Department publication entitled "General Prevailing Wage Rates," in effect at the time the project is advertised. Future effective wage rates, which have been predetermined and are on file with the State Department of Industrial Relations are referenced but not printed in said publication. Such rates of wages are also on file with the State Department of Industrial Relations and the offices of the Public Works Department of the County of Inyo and are available to any interested party upon request. Contractor agrees to comply with County and the Department of Industrial Relations regulations in submitting the certified payroll.

15. CONTROLLING LAW VENUE. This Contract is made in the County of Inyo, State of California. The parties specifically agree to submit to the jurisdiction of the Superior Court of California for the County of Inyo.

16. WRITTEN NOTIFICATION. Any notice, demand, request, consent, approval or communication that either party desires or is required to give to the other party shall be in writing and either served personally or sent prepaid, first class mail. Any such notice, demand, et cetera, shall be addressed to the other party at the address set forth herein below. Either party

may change its address by notifying the other party of the change of address. Notice shall be deemed communicated within 48 hours from the time of mailing if mailed as provided in this section.

If to County: County of Inyo
Public Works Department
Attn: _____
168 N. Edwards
PO Drawer Q
Independence, CA 93526

If to Contractor: _____

17. AMENDMENTS. This Contract may be modified or amended only by a written document executed by both Contractor and County and approved as to form by Inyo County Counsel.

18. WAIVER. No failure on the part of either party to exercise any right or remedy hereunder shall operate as a waiver of any other right or remedy that party may have hereunder.

19. TERMINATION. This Contract may be terminated for the reasons stated below:

- a. Immediately for cause, if either party fails to perform its responsibilities under this Contract in a timely and professional manner and to the satisfaction of the other party or violates any of the terms or provisions of this Contract. If termination for cause is given by either party to the other and it is later determined that the other party was not in default or default was excusable, then the notice of termination shall be deemed to have been given without cause pursuant to paragraph “b” of this section; or
- b. By either party without cause upon fifteen (15) days' written notice of termination. Upon termination, Contractor shall be entitled to compensation for services performed up to the effective date of termination; or
- c. By County upon oral notice from the Board of Supervisors based on funding ending or being materially decreased during the term of this Contract.

20. TIME IS OF THE ESSENCE. Time is of the essence for every provision.

21. SEVERABILITY. If any provision of this Contract is held to be invalid, void or unenforceable, the remainder of the provision and/or provisions shall remain in full force and effect and shall not be affected, impaired or invalidated.

22. CONTRACT SUBJECT TO APPROVAL BY BOARD OF SUPERVISORS. It is understood and agreed by the parties that this Contract is subject to the review and approval by the Inyo County Board of Supervisors upon Notice and Public Hearing. In the event that the Board of Supervisors declines to enter into or approve said Contract, it is hereby agreed to that

there is, in fact, no binding agreement, either written or oral, between the parties herein.

23. ATTACHMENTS. All attachments referred to are incorporated herein and made a part of this Contract.

24. EXECUTION. This Contract may be executed in several counterparts, each of which shall constitute one and the same instrument and shall become binding upon the parties. In approving this Contract, it shall not be necessary to produce or account for more than one such counterpart.

25. ENTIRE AGREEMENT. This Contract, including the Contract Documents and all other documents which are incorporated herein by reference, constitutes the complete and exclusive agreement between the County and Contractor. All prior written and oral communications, including correspondence, drafts, memoranda, and representations, are superseded in total by this Contract.

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IN WITNESS WHEREOF, COUNTY and CONTRACTOR have each caused this Contract to be executed on its behalf by its duly authorized representative, effective as of the day and year first above written.

COUNTY

CONTRACTOR

COUNTY OF INYO

By: _____

By: _____

Name: _____

Name: _____

Title: _____

Title: _____

Dated: _____

Dated: _____

APPROVED AS TO FORM AND LEGALITY:

County Counsel

APPROVED AS TO ACCOUNTING FORM:

County Auditor

APPROVED AS TO INSURANCE REQUIREMENTS:

County Risk Manager

ATTACHMENT 1

PROJECT

FAITHFUL PERFORMANCE BOND
(100% OF CONTRACT AMOUNT)

KNOW ALL MEN BY THESE PRESENTS: That

(Name of Contractor) as Principal, hereinafter "Contractor,"

and (Name of Corporate Surety)

as Corporate Surety, hereinafter called Surety, are held and firmly bound unto the County of Inyo as Obligee, hereinafter called County, in the amount of dollars (\$.), for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assignees, jointly and severally, firmly by these presents.

WHEREAS, Contractor has, by written Contract, dated , 20 , entered into an Contract with the County for the Construction of the PROJECT (hereinafter referred to as "Project"), to be constructed in accordance with the terms and conditions set forth in the Contract for the Project, which contract is by reference incorporated herein and is hereinafter referred to as the "Contract."

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the County.

Whenever Contractor shall be, and is declared by County to be, in default under the Contract, the County having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly either:

- 1. Complete the Contract in accordance with its terms and conditions; or,
2. Obtain a Bid or Bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible Bidder, or if the County elects, upon determination by the County and the Surety jointly of the lowest responsible Bidder, arrange for a Contract between such Bidder and County, and make available as work progresses (even though there should be a default or a succession of defaults under the Contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The

term "balance of the Contract price", as used in this paragraph, shall mean the total amount payable by County to Contractor under the Contract and any amendments thereto, less the amount properly paid by County to Contractor.

Any suit under this Bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due, or the date on which any warranty or guarantee period expires, whichever is later.

No right of action shall accrue on this Bond to or for the use of any person or corporation other than the County named herein.

---o0o---

Signed and sealed this _____ day of _____, 20 ____.

(Name of Corporate Surety)

By: _____
(Signature)

(SEAL)

(Title of Authorized Person)

(Address for Notices to be Sent)

(Name of Contractor)

By: _____
(Signature)

(SEAL)

(Title of Authorized Person)

(Address for Notices to be Sent)

NOTE: THE SIGNATURES OF THE CONTRACTOR AND THE SURETY MUST EACH BE ACKNOWLEDGED BEFORE A NOTARY PUBLIC (OR OTHER OFFICER AUTHORIZED UNDER CALIFORNIA LAW) AND THE ACKNOWLEDGMENTS MUST BE ATTACHED TO THIS BOND.

The Faithful Performance Bond must be executed by a corporate surety on this form. No substitutions will be accepted. If an attorney-in-fact signs for the surety, an acknowledged statement from the surety appointing and empowering the attorney-in-fact to execute such bonds in such amounts on behalf of the surety must accompany the Faithful Performance Bond.

ADDRESS OF COUNTY FOR NOTICES TO BE SENT:

County of Inyo
224 North Edwards Street, P.O. Box N
Independence, California 93526

ATTACHMENT 2

PROJECT

LABOR AND MATERIALS PAYMENT BOND
(100% OF CONTRACT AMOUNT)

KNOW ALL MEN BY THESE PRESENTS, that (Name of Contractor)

as Principal, hereinafter "CONTRACTOR,"

and (Name of Corporate Surety)

as Corporate Surety, hereinafter called SURETY, are held and firmly bound unto the County of Inyo as Obligee, hereinafter called COUNTY, for the use and benefit of claimants as hereinafter defined in the amount of dollars (\$) for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assignees, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written contract dated , 20 , entered into an Contract with the County for the construction of the PROJECT (hereinafter referred to as "PROJECT"), to be constructed in accordance with the terms and conditions set forth in the contract for the PROJECT, which contract is by reference incorporated herein, and is hereinafter referred to as the "CONTRACT."

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly make payment to all claimants as hereinafter defined, for all labor and materials used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise, it shall remain in full force and effect, subject, however, to the following conditions:

- 1. A claimant is defined as one having a direct contract with the Contractor, or with a Subcontractor of the Contractor, for labor, materials, or both, used or reasonably required for use in the performance of the Contract. Labor and materials is construed to include, but not limited to, that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.
2. The above named Contractor and Surety hereby jointly agree with the County that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) calendar days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this Bond for the benefit of such claimant, prosecute the suit to final judgment for such

sum or sums as may be justly due claimant, and have execution thereon. The County shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:

a) Unless claimant, other than one having a direct contract with the Contractor, shall have given written notice to any two of the following: the Contractor, the County, or the Surety above named, within ninety (90) calendar days after such claimant did or performed the last of the work or labor, or furnished the last of the material for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in any envelope addressed to the Contractor, County, or Surety, at the address below, or at any place where an office is regularly maintained for the transaction of their business. Such notice may also be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

b) After the expiration of one (1) year following the date on which County accepted the work done under the Contract. However, if any limitation embodied in this Bond is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

c) Other than in a State Court of competent jurisdiction in and for the County or other political subdivision of the state in which the Project, or any part thereof, is situated, and not elsewhere.

4. The amount of this Bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed or recorded against said Project, whether or not claim for the amount of such lien be presented under and against this Bond.

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Signed and sealed this _____ day of _____, 20 ____.

(Name of Contractor)

By: _____
(Signature)

(SEAL)

(Title of Authorized Person)

(Address for Notices to be Sent)

(Name of Corporate Surety)

By: _____
(Signature)

(SEAL)

(Title of Authorized Person)

(Address for Notices to be Sent)

NOTE:

THE SIGNATURES OF THE CONTRACTOR AND THE SURETY MUST BE ACKNOWLEDGED BEFORE A NOTARY PUBLIC (OR OTHER OFFICER AUTHORIZED UNDER CALIFORNIA LAW).

The Labor and Materials Payment Bond must be executed by a corporate surety on this form. No substitutions will be accepted. If an attorney-in-fact signs for the surety, an acknowledged statement from the surety appointing and empowering the attorney-in-fact to execute such bonds in such amounts on behalf of the surety, must accompany the Labor and Materials Payment Bond.

ADDRESS OF COUNTY FOR NOTICES TO BE SENT TO:

**County of Inyo
224 N. Edwards, P.O. Box N
Independence, California 93526**

ATTACHMENT 3

AGREEMENT BETWEEN THE COUNTY OF INYO AND

FOR THE _____ PROJECT

TERM:

FROM: _____ TO: _____

SEE ATTACHED INSURANCE PROVISIONS

Specifications 5

Insurance Requirements for Construction Contracts

Contractor shall procure and maintain for the duration of the contract, insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees, or subcontractors.

MINIMUM SCOPE AND LIMIT OF INSURANCE

Coverage shall be at least as broad as:

1. **Commercial General Liability (CGL):** Insurance Services Office Form CG 00 01, including products and completed operations, with limits of no less than \$_____ per occurrence for bodily injury, personal injury, and property damage. If a general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.
2. **Automobile Liability:** Insurance Services Office Form Number CA 0001 covering Code 1 (any auto), with limits no less than **\$1,000,000** per accident for bodily injury and property damage.
3. **Workers' Compensation** insurance as required by the State of California, with Statutory Limits, and Employers' Liability insurance with a limit of no less than \$1,000,000 per accident for bodily injury or disease.
4. **Builder's Risk** (Course of Construction) insurance utilizing an "All Risk" (Special Perils) coverage form, with limits equal to the completed value of the project and no coinsurance penalty provisions.
5. **Surety Bonds** as described below.
6. **Professional Liability** (if Design/Build), with limits no less than \$1,000,000 per occurrence or claim, and \$2,000,000 policy aggregate.
7. **Contractors' Pollution Legal Liability** and/or Asbestos Legal Liability and/or Errors and Omissions (if project involves environmental hazards) with limits no less than \$1,000,000 per occurrence or claim, and \$2,000,000 policy aggregate.

Deductibles and Self-Insured Retentions

Any deductibles or self-insured retentions must be declared to and approved by the Entity. At the option of the Entity, either: the contractor shall cause the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the Entity, its officers, officials, employees, and volunteers; or the Contractor shall provide a financial guarantee satisfactory to the Entity guaranteeing payment of losses and related investigations, claim administration, and defense expenses.

Other Insurance Provisions

The insurance policies are to contain, or be endorsed to contain, the following provisions:

1. **The Entity, its officers, officials, employees, and volunteers are to be covered as additional insureds** on the CGL and automobile liability policies with respect to liability arising out of with respect to liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts, or equipment furnished in connection with such work or operations and automobiles owned, leased, hired, or borrowed by or on behalf of the Contractor. General liability coverage can be provided in the form of an endorsement to the Contractor's insurance (at least as broad as ISO Form CG 20 10, 11 85 or both CG 20 10 and CG 23 37 forms if later revisions used).
2. For any claims related to this project, the **Contractor's insurance coverage shall be primary** insurance as respects the Entity, its officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by the Entity, its officers, officials, employees, or volunteers shall be excess of the Contractor's insurance and shall not contribute with it.
3. Each insurance policy required by this clause shall provide that coverage shall not be canceled, except with notice to the Entity.

Builder's Risk (Course of Construction) Insurance

Contractor may submit evidence of Builder's Risk insurance in the form of Course of Construction coverage. Such coverage shall **name the Entity as a loss payee** as their interest may appear.

If the project does not involve new or major reconstruction, at the option of the Entity, an Installation Floater may be acceptable. For such projects, a Property Installation Floater shall be obtained that provides for the improvement, remodel, modification, alteration, conversion or adjustment to existing buildings, structures, processes, machinery and equipment. The Property Installation Floater shall provide property damage coverage for any building, structure, machinery or equipment damaged, impaired, broken, or destroyed during the performance of the Work, including during transit, installation, and testing at the Entity's site.

Claims Made Policies

If any coverage required is written on a claims-made coverage form:

1. The retroactive date must be shown, and this date must be before the execution date of the contract or the beginning of contract work.
2. Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of contract work.
3. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a retroactive date prior to the contract effective, or start of work date, the Contractor must purchase extended reporting period coverage for a minimum of five (5) years after completion of contract work.
4. A copy of the claims reporting requirements must be submitted to the Entity for review.
5. If the services involve lead-based paint or asbestos identification/remediation, the Contractors Pollution Liability policy shall not contain lead-based paint or asbestos exclusions. If the services involve mold identification/remediation, the Contractors

Pollution Liability policy shall not contain a mold exclusion, and the definition of Pollution shall include microbial matter, including mold.

Acceptability of Insurers

Insurance is to be placed with insurers with a current A.M. Best rating of no less than A: VII, unless otherwise acceptable to the Entity.

Waiver of Subrogation

Contractor hereby agrees to waive rights of subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss. Contractor agrees to obtain any endorsement that may be necessary to effect this waiver of subrogation. **The Workers' Compensation policy shall be endorsed with a waiver of subrogation** in favor of the Entity for all work performed by the Contractor, its employees, agents and subcontractors.

Verification of Coverage

Contractor shall furnish the Entity with original certificates and amendatory endorsements, or copies of the applicable insurance language, effecting coverage required by this contract. All certificates and endorsements are to be received and approved by the Entity before work commences. However, failure to obtain the required documents prior to the work beginning shall not waive the Contractor's obligation to provide them. The Entity reserves the right to require complete, certified copies of all required insurance policies, including endorsements, required by these specifications, at any time.

Subcontractors

Contractor shall require and verify that all subcontractors maintain insurance meeting all the requirements stated herein.

Surety Bonds

Contractor shall provide the following Surety Bonds:

1. Bid bond
2. Performance bond
3. Payment bond
4. Maintenance bond

The Payment Bond and the Performance Bond shall be in a sum equal to the contract price. If the Performance Bond provides for a one-year warranty a separate Maintenance Bond is not necessary. If the warranty period specified in the contract is for longer than one year a Maintenance Bond equal to 10% of the contract price is required. Bonds shall be duly executed by a responsible corporate surety, authorized to issue such bonds in the State of California and secured through an authorized agent with an office in California.

Special Risks or Circumstances

Entity reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other circumstances.

SPECIAL PROVISIONS

FOR

ANNEX HVAC RETROFIT PROJECT

Independence, CA

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COUNTY OF INYO
DEPARTMENT OF PUBLIC WORKS

SPECIFICATIONS APPROVAL

ANNEX HVAC RETROFIT PROJECT
Independence, CA

These Special Provisions have been prepared by the Inyo County Public Works Department and the County's consultant, Etchemendy Engineering under the direction of the undersigned and are approved for the work contemplated herein.



Director of Public Works

02/04/2020
Specifications Approval Date

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INTRODUCTION / GENERAL:

The ANNEX HVAC RETROFIT PROJECT, a public works project of Inyo County, is to be constructed and completed in accordance with these Special Provisions, the Project Plans, and, insofar as they are referenced herein, the Standard Specifications of the Inyo County Public Works Department dated October, 2015 (Standard Specifications). The Special Provisions, the Project Plans, and the sections of the Standard Specifications referenced herein, constitute a portion of the “Contract Documents” governing the project and shall therefore be binding upon and observed by the person/entity with whom the County of Inyo enters into contract for construction of the Project.

Copies of the Project Plans may be obtained from the Inyo County Public Works Department in Independence, California, or online at: [Bid Requests & RFPs](#)

Unless indicated otherwise, all references in this document to sections are to those in the Standard Specifications or to other sections in these Special Provisions. In case of any irreconcilable conflict between the requirements of the Standard Specifications referenced herein and these Special Provisions, the latter shall prevail and be observed.

PROJECT DESCRIPTION:

This Project includes the selective demolition of finishes and ductwork, installation of ductwork and equipment, and restoration of finishes as described in the Special Provisions and Project Plans, at the Inyo Annex Building, Independence, CA.

A job walk will be held on **March 18th, 2020, at 10:00 a.m.** at 168 N. Edwards Street in Independence, CA.

The work is more particularly described in the Plans and below, in the Project Special Provisions. All of the work shall be in accordance with all applicable State and local laws, codes, and regulations.

SECTION 3 CONTRACT AWARD AND EXECUTION

3-1.04 CONTRACT AWARD

Section 3-1.04 of the Standard Specifications shall be amended as follows:

Whenever possible, the award to the lowest bidder, if made, will be made no later than thirty (30) calendar days after the opening of bid proposals. However, failure of the County to make award within thirty (30) calendar days after the opening of the bid proposals shall not relieve the Contractor of its requirement to deliver an executed contract and bonds, and any other required documents, within 15 days of Notification of Award, as further described in Section 3-1.18: Contract Execution.

3-1.05 CONTRACT BONDS (PUB CONT CODE §§ 10221 AND 10222)

The successful bidder must furnish 2 bonds:

1. Payment bond to secure the claim payments of laborers, workers, mechanics, or materialmen providing goods, labor, or services under the Contract. This bond must be equal to at least 100 percent of the Contract amount.
2. Performance bond to guarantee the faithful performance of the Contract. This bond must be equal to at least 100 percent of the Contract amount.

The bond forms are in the Bid Book.

3-1.06 CONTRACTOR LICENSE

For a federal-aid contract, the Contractor must be properly licensed as a contractor from contract award through Contract acceptance (Pub Cont Code § 10164).

For a non-federal-aid contract:

1. The Contractor must be properly licensed as a contractor from bid opening through Contract acceptance (Bus & Prof Code § 7028.15)
2. Joint venture bidders must obtain a joint venture license before contract award (Bus & Prof Code § 7029.1)

3-1.07 INSURANCE POLICIES

The successful bidder must submit:

1. Copy of its commercial general liability policy and its excess policy or binder until such time as a policy is available, including the declarations page, applicable endorsements, riders, and other modifications in effect at the time of contract execution. Standard ISO form no. CG 0001 or similar exclusions are allowed if not inconsistent with section 7-1.06. Allowance of additional exclusions is at the discretion of the Department.
2. Certificate of insurance showing all other required coverages. Certificates of insurance, as evidence of required insurance for the auto liability and any other required policy, shall set forth deductible amounts applicable to each policy and all exclusions that are added by endorsement to each policy. The evidence of insurance shall provide that no cancellation, lapse, or reduction of coverage will occur without 10 days prior written notice to the Department.
3. A declaration under the penalty of perjury by a CPA certifying the accountant has applied GAAP guidelines confirming the successful bidder has sufficient funds and resources to cover any selfinsured retentions if the self-insured retention is over \$50,000.

If the successful bidder uses any form of self-insurance for workers compensation in lieu of an insurance policy, it shall submit a certificate of consent to self-insure under Labor Code § 3700.

3-1.08 SMALL BUSINESS ENTERPRISE PARTICIPATION

This section is amended as follows.

This project is subject to Inyo County Ordinance No. 1156, *An Ordinance of the Board of Supervisors of the County of Inyo, State of California, Adding Chapter 6.06 to the Inyo County Code to Provide Contacting Preferences for Local and Small Businesses*, which is included in the bid package.

Take necessary and reasonable steps to ensure that small business enterprises (SBEs) have opportunity to participate in the contract.

Make work available to SBEs and select work parts consistent with available SBE subcontractors and suppliers.

To qualify for the SBE contracting preference as described in Inyo County Ordinance No. 1156 (Ordinance No. 1156), Section 6.06.040, the bidder must show that he/she is a SBE as described in Ordinance No. 1156 Section 6.06.020.

To qualify for the SBE subcontracting preference as described in Ordinance No. 1156, Section 6.06.050, the bidder must show that the subcontractor(s) proposed for work on the project is/are a SBE(s) as described in Ordinance No. 1156 Section 6.06.020.

It is the bidders responsibility to verify that the SBE(s) is certified as a small business enterprise at the date of bid opening.

SBE Contracting Preference Commitment Submittal

If the bidder is claiming the SBE contracting preference, submit SBE information on the “Small Business Enterprise Commitment (Construction Contracts),” form included in the Bid Package. If the bidder is not claiming the SBE contracting preference remove the form from the Bid Package before submitting your bid.

Submit written confirmation from each SBE subcontractor stating that it is participating in the contract. Include confirmation with the SBE Commitment form. A copy of a SBE subcontractor’s quote will serve as written confirmation that the SBE is participating in the contract.

SUBCONTRACTOR AND SBE RECORDS. The Contractor shall maintain records showing the name and business address of each first-tier subcontractor. The records shall also show the name and business address of every SBE subcontractor, SBE vendor of materials and SBE trucking company, regardless of tier. The records shall show the date of payment and the total dollar figure paid to all of these firms. SBE prime contractors shall also show the date of work performed by their own forces along with the corresponding dollar value of the work.

Upon completion of the contract, a summary of these records shall be prepared on “Final Report – Utilization of Small Business Enterprises - (SBE), First-Tier Subcontractors,” certified correct

by the Contractor or his authorized representative, and submitted to the Engineer. The form shall be furnished to the Engineer within 90 days from the date of contract acceptance.

3-1.18 CONTRACT EXECUTION

The successful bidder must sign the Contract form.

Deliver two (2) fully executed (except for the County's signature) to the Office Engineer:

1. Signed Contract form
2. Contract bonds
3. Documents identified in section 3-1.07
4. Payee Data Record
5. Small Business (SB) Participation Report form
6. For a federal-aid contract, Caltrans Bidder - DBE Information form

The Office Engineer must receive these documents before the 10th business day after the bidder receives the contract.

The bidder's security may be forfeited for failure to execute the contract within the time specified (Pub Cont Code §§ 10181, 10182, and 10183).

A copy of the Contract form is included in your bid book.

SECTION 7 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

Amended to read as follows:

7-1.02K (2) WAGES

The general prevailing wage rates, determined by the Department of Industrial Relations, for Inyo County, are available at the County of Inyo address or the California DIR web site at <http://www.dir.ca.gov>. Changes are available at the same locations. These wage rates are not included in the Contract Documents. All labor will be paid at not less than these minimum wage rates.

ADD TO 7-1.02K (3) CERTIFIED PAYROLL RECORDS (LABOR CODE §1776)

Keep accurate payroll records. Submit a copy of your certified payroll records, weekly, including those of subcontractors to the following:

1. Inyo County Department of Public Works
2. Division of Labor Standards Enforcement of the Department of Industrial Relations
3. Division of Apprenticeship Standards of the Department of Industrial Relations

Include:

1. Each employee's:
 - 1.1. Full name
 - 1.2. Address

- 1.3. Social security number
 - 1.4. Work classification
 - 1.5. Straight time and overtime hours worked each day and week
 - 1.6. Actual wages paid for each day to each:
 - 1.6.1. Journeyman
 - 1.6.2. Apprentice
 - 1.6.3. Worker
 - 1.6.4. Other employee you employ for the work
 - 1.7. Pay rate
 - 1.8. Itemized deductions made
 - 1.9. Check number issued
2. Apprentices and the apprentice-to-journeyman ratio

Each certified payroll record must include a Statement of Compliance signed under penalty of perjury that declares:

1. The information contained in the payroll record is true, correct, and complete
2. The employer has complied with the requirements of sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project
3. The wage rates paid are at least those required by the Contract

7-1.05 INDEMNIFICATION

Contractor shall hold harmless, defend, and indemnify the County of Inyo and its officers, officials, employees, and volunteers from and against all claims, damages, losses, and expenses including attorney fees and litigation costs, arising out of the performance of the work described herein, caused in whole or in part by any negligent act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, except where caused by the active negligence, sole negligence, or willful misconduct of the County.

7-1.06 INSURANCE

Please see ‘Insurance Requirements for Construction Contracts’

SECTION 8 PROSECUTION AND PROGRESS

Amended to read as follows:

ADD TO 8-1.05 TIME

The Contractor shall complete all designated portions of the work required to be provided pursuant to the contract no later than **One Hundred Twenty (120) Calendar Days** from and including the Starting Date, plus such additional days, if any, which are expressly granted as extensions of time by Contract Change Orders signed and issued by the County. Such total number of days shall be referred to herein as the "Time for Completion".

ALL WORK WITHIN THE IS SERVER ROOM MUST BE COMPLETED BEFORE THE MAIN CHILLER IS REMOVED FROM SERVICE AND WILL BE LIMITED TO A MAXIMUM OF TWO WEEKENDS. THE SERVERS WILL NEED TO BE SHUT DOWN AND SHRINK WRAPPED BY THE INFORMATION SERVICES STAFF ON EACH FRIDAY AFTERNOON AND RESTARTED ON MONDAY MORNING. NO PREMIUM OR OVERTIME CHARGES WILL BE ALLOWED. PLEASE CONSIDER THIS REQUIREMENT WHEN PREPARING YOUR BID.

Failure of the Contractor to perform any covenant or condition contained in the Contract Documents within the time period specified shall constitute material breach of this Contract entitling the County to terminate the Contract unless the Contractor applies for, and receives, an extension of time in accordance with the procedures set forth in Section 1017.09 SS, "EXTENSION OF TIME."

8-1.10 LIQUIDATED DAMAGES

In accordance with Government Code Section 53069.85, the Contractor shall pay to the County of Inyo, liquidated damages in the amounts of:

\$500.00 per day for each and every calendar day delay in finishing the work in excess of the Time for Completion specified.

The County shall be entitled to deduct the amounts of liquidated damages from any payment otherwise due to the Contractor.

PUBLIC CONTRACT CODE SECTION 9204

(a) The Legislature finds and declares that it is in the best interests of the state and its citizens to ensure that all construction business performed on a public works project in the state that is complete and not in dispute is paid in full and in a timely manner.

(b) Notwithstanding any other law, including, but not limited to, Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2, Chapter 10 (commencing with Section 19100) of Part 2, and Article 1.5 (commencing with Section 20104) of Chapter 1 of Part 3, this section shall apply to any claim by a contractor in connection with a public works project.

(c) For purposes of this section:

(1) "Claim" means a separate demand by a contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:

(A) A time extension, including, without limitation, for relief from damages or penalties for delay assessed by a public entity under a contract for a public works project.

(B) Payment by the public entity of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public works project and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled.

(C) Payment of an amount that is disputed by the public entity.

(2) "Contractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who has entered into a direct contract with a public entity for a public works project.

(3) (A) "Public entity" means, without limitation, except as provided in subparagraph (B), a state agency, department, office, division, bureau, board, or commission, the California State University, the University of California, a city, including a charter city, county, including a charter county, city and county, including a charter city and county, district, special district, public authority, political subdivision, public corporation, or nonprofit transit corporation wholly owned by a public agency and formed to carry out the purposes of the public agency.

(B) "Public entity" shall not include the following:

(i) The Department of Water Resources as to any project under the jurisdiction of that department.

(ii) The Department of Transportation as to any project under the jurisdiction of that department.

(iii) The Department of Parks and Recreation as to any project under the jurisdiction of that department.

(iv) The Department of Corrections and Rehabilitation with respect to any project under its jurisdiction pursuant to Chapter 11 (commencing with Section 7000) of Title 7 of Part 3 of the Penal Code.

(v) The Military Department as to any project under the jurisdiction of that department.

(vi) The Department of General Services as to all other projects.

(vii) The High-Speed Rail Authority.

(4) "Public works project" means the erection, construction, alteration, repair, or improvement of any public structure, building, road, or other public improvement of any kind.

(5) "Subcontractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who either is in direct contract with a contractor or is a lower tier subcontractor.

(d) (1) (A) Upon receipt of a claim pursuant to this section, the public entity to which the claim applies shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the claimant a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, a public entity and a contractor may, by mutual agreement, extend the time period provided in this subdivision.

(B) The claimant shall furnish reasonable documentation to support the claim.

(C) If the public entity needs approval from its governing body to provide the claimant a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the public entity shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the claimant a written statement identifying the disputed portion and the undisputed portion.

(D) Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. If the public entity fails to issue a written statement, paragraph (3) shall apply.

(2) (A) If the claimant disputes the public entity's written response, or if the public entity fails to respond to a claim issued pursuant to this section within the time prescribed, the claimant may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the public entity shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(B) Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the public entity shall provide the claimant a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. Any disputed portion of the claim, as identified by the contractor in writing, shall be submitted to nonbinding mediation, with the public entity and the claimant sharing the associated costs equally. The public entity and claimant shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside this section.

(C) For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

(D) Unless otherwise agreed to by the public entity and the contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

(E) This section does not preclude a public entity from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this section does not resolve the parties' dispute.

(3) Failure by the public entity to respond to a claim from a contractor within the time periods described in this subdivision or to otherwise meet the time requirements of this section shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the public entity's failure to have responded to a claim, or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the claimant.

(4) Amounts not paid in a timely manner as required by this section shall bear interest at 7 percent per annum.

(5) If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a public entity because privity of contract does not exist, the contractor may present to the public entity a claim on behalf of a

subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that the contractor present a claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the claim be presented to the public entity shall furnish reasonable documentation to support the claim. Within 45 days of receipt of this written request, the contractor shall notify the subcontractor in writing as to whether the contractor presented the claim to the public entity and, if the original contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.

(e) The text of this section or a summary of it shall be set forth in the plans or specifications for any public works project that may give rise to a claim under this section.

(f) A waiver of the rights granted by this section is void and contrary to public policy, provided, however, that (1) upon receipt of a claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable; and (2) a public entity may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of this section, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in this section.

(g) This section applies to contracts entered into on or after January 1, 2017.

(h) Nothing in this section shall impose liability upon a public entity that makes loans or grants available through a competitive application process, for the failure of an awardee to meet its contractual obligations.

(i) This section shall remain in effect only until January 1, 2020, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2020, deletes or extends that date.

ANNEX SERVER HVAC RETROFIT PROJECT

PROJECT MANUAL

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Reno, Nevada 89521
(775) 853-1131 – Fax (775) 852-2352

Inyo **Annex Server IT**
HVAC Retrofit
168 N Edwards St.
Independence, California

Project Manual
November 04, 2019

SECTION 230500 - MECHANICAL GENERAL CONDITIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The Drawings and General provisions of the Contract including the "General Conditions", "Supplementary Conditions", and "General Requirements" of the Contract as written and referred to here are adopted and made part of Division 16.
- B. The Contract Agreement, Bidding documents, and all Addenda issued prior to Contract Agreement execution form a part of these specifications and apply to all Contracts or Subcontracts relating to the Mechanical systems.

1.02 SUMMARY

- A. The work under this Division shall consist of all labor, materials, equipment, services and related accessories, etc., necessary and required to complete all work as shown or inferred on the Drawings and in the Specifications (Contract Documents).
- B. Provide fixed Mechanical, except where specifically noted otherwise.
- C. Provide portable Mechanical equipment for the complete system(s).
- D. Provide equipment, ducting, piping etc. normally furnished or required for complete Mechanical systems but not specifically specified on the drawings and/or in specifications, as though specified by both.
- E. All equipment, ducting, piping etc. shall be new, except where specifically shown or specified otherwise.

1.03 WORK INCLUDED IN THIS DIVISION

- A. Mechanical work includes, but is not limited to
 - 1. Alterations and additions to existing Mechanical systems.
 - 2. Connection of all appliances and equipment including Owner furnished equipment.
- A. Install work under this Division per drawings, specifications, latest adopted edition of the Local adopted Building Codes, and any special codes having jurisdiction over specific portions of work within complete installation. In event of conflict, install work per most stringent code requirements determined by Engineer. This does not relieve the Contractor from furnishing and installing work shown or specified which may exceed the requirements of such ordinances, laws, regulations and codes.

- B. All materials, products, devices, fixtures, forms or types of construction included in this project shall meet or exceed the published requirements of American Society of Mechanical Engineers (ASME), American National Standards Institute (ANSI), and Institute of Mechanical and Electronics Engineers (IEEE). All equipment shall bear the Underwriter's Laboratories (UL) label or equivalent from approved independent testing laboratory.
- C. Arrange, pay fees for and complete work to pass required tests by agencies having authority over work. Deliver to Engineer copies of the Certificates of Inspection and approval issued by authorities and provide original copy of each certificate to Owner.
- D. When required by law or regulations, the governmental agency having jurisdiction for inspections shall be given reasonable notice and opportunity to inspect the work. Any work that is enclosed or covered up before such inspection and test shall be uncovered at the Contractor's expense; after it has been inspected, the Contractor shall restore the work to its original condition at his own expense.

1.04 INSURANCE

- A. The Contractor shall procure and maintain, at his expense, such insurance as required by law and/or specified in the General Conditions.

1.05 DRAWINGS AND SPECIFICATIONS

- A. Drawings and specifications are complementary. Work called for by one is binding as if called for by both. Any discrepancies between drawings and specifications shall be brought to the attention of the Engineer for clarification during the bidding period. No allowance shall subsequently be made to the Contractor by reason of his failure to have brought said discrepancies to the attention of the Consultant during the bidding period or by reason of any error on the Contractor's part.
- B. Drawings are schematic and diagrammatic in nature. Drawings show general run of distribution and approximate location of equipment. The contractor shall review drawings of all trades to assure coordination prior to placement of work. Right is reserved to change location of equipment and devices, and routing of pipes and ducts within 10 feet, without extra cost to Owner.
- C. Use dimensions in figures, shop drawings, etc. and actual site measurements in preference to scaled dimensions. Do not scale drawings for exact sizes or locations – use dimensioned details or actual field conditions. Verify item mounting heights as required by project conditions prior to rough-in.
- D. Discrepancies between different drawings or between drawings and specifications, or regulations and codes governing the installation shall be brought to the attention of the Engineer in writing for determination.
- E. Layout equipment as shown on drawings as close as possible. Verify access requirements for equipment actually furnished.

- F. Contractor is responsible to field measure and confirm the mounting heights and location of Mechanical equipment with respect to counters, doorways, and other architectural, electrical, fire or structural work. Do not scale distances off the Mechanical drawings: Use actual building dimensions.
- G. Execution of Contract is evidence that Contractor has examined all existing conditions, drawings and specifications related to work, and is informed to extent and character of work. Later claims for labor and materials required due to difficulties encountered, which could have been foreseen had examination been made, will not be recognized.
- H. All work called for in this Section of the plans and specifications shall be performed under this Section, regardless of whether such work may also have been called for in other Section(s). Discrepancies in or conflicts among the various parts of the contract drawings shall not relieve Contractor of his obligation to perform.
- I. No attempt has been made to establish the required sections or splits of equipment relative to the size of access into the space, building, etc. Contractor shall establish all said splits, sections, etc. necessary to install equipment complete without undue disassembly of equipment or demolition of building parts at site of work.
- J. Charges for extra work are not allowed unless work is authorized by written order from the Owner's Representative approving charges for work.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All material shall be new, and have a UL label where available. If UL label is not available, material shall be manufactured in accordance with applicable ASME, ANSI, IEEE and Federal Standards. Use UL labeled components in assemblies that do not have overall UL label.
- B. Utilize one of the manufacturers listed to furnish all of the major equipment required for this project.

2.02 SUBSTITUTIONS

- A. All equipment and materials scheduled on the drawings or listed in the specifications are the "basis of design;" equipment and materials used on the project are subject to compliance with all listed requirements. In submitting a bid to complete services in this project, the contractor represents that its bid is based on materials and equipment described in the contract documents, including addenda. Contractors are encouraged to request a review of substitute materials and equipment. Substitutes will be considered only if they keep with the general intent of the contract documents, including quality of work and product, and are fully documented. All requests for review of alternates shall be submitted to the engineer 7 working days prior to the date of bid opening. Substitutes not properly submitted may be rejected without cause. In requesting a review of substitutes the contractor is to provide and item-by-item comparison of the alternate product to the basis of design. Comparisons shall include but are not limited to: size, weight, capacity, construction, warranty, finish, etc. Contractors will not be granted extended con-

tract time or fees in connection with the rejection of a substitute product. Contractor shall fabricate, furnish, install and pay for any additional materials and/or services by any other trade required to facilitate the use of a substituted item.

2.03 SUBMITTALS

- A. Before ordering any equipment contractor is to provide 6 sets of submittals for all equipment, accessories, test and balance, startup, fixtures, etc. That bare importance on proper project completion. All certifications for welders, balance contractors and startup technicians are to be provided in their appropriate sections. Submittals expected for final review are to be submitted a minimum of 14 working days prior to the required review and return time. The contractor is included 2 reviews of said submittals; any time incurred by additional submittal reviews caused by rejected or unacceptable submittals will be charged to the contractor at the engineer's hourly billing rate. Submittals will not be accepted that have not been reviewed and approved by the general contractor and/or construction manager having authority on the project. Incomplete submittals will not be accepted; a single fully encompassing submittal is to be provided by each trade. Contractors will not be granted extended contract time or fees in connection with the rejection of submittals or delays caused by unhurried submittal delivery.
- B. Standard factory brochures will not suffice as product submittals; factory submittal packages indicating the products, performance, dimensions, clearances, colors, testing and listing certifications and all accessories to be used are to be provided. In the case of alternates comparison documentation is to be provided showing proof of equality.
- C. In the case that additional design services are required by a registered professional the contractor is to provide sealed and signed documentation of work to be completed depicting necessary designs, and performance in accordance with all adopted codes.

PART 3 - EXECUTION

3.01 VISIT TO SITE

- A. Visit site, and survey existing conditions affecting work prior to bid. Include necessary materials and labor to accomplish the Mechanical work, including relocation of existing services and utilities on building site in bid. No consideration shall be given to future claims due to existing conditions. Any discrepancies or interference's shall be reported immediately to the Engineer.

3.02 WORKMANSHIP

- A. All work performed shall be first class work in every aspect. The work shall be performed by mechanics skilled in their respective trades, who shall at all times be under the supervision of competent persons.
- B. Work under this Division shall be first class with emphasis on neatness and workmanship. All work shall be installed square and plumb and concealed where possible. Work that is deficient, defective, poorly laid out, not perfectly aligned, or that is not consistent with the requirements generally accepted in the trade for "first class work" will not be acceptable.

- C. In addition to the materials specified elsewhere, furnish and install all other miscellaneous items necessary for the completion of the work to the extent that all systems are complete and operative.
- D. All work under this Section shall be performed in cooperation with the work performed under all other Sections of the Specifications for the Project in order to avoid interference with other work and to secure the proper installation of all work. Refer the Drawings and Specifications covering the work to be performed under all Sections, so that the relation and extent of the work of this Section with respect to the work of all other Sections is understood. Give right of way to raceways and piping systems installed at a required slope.
- E. Install work using competent mechanics, under supervision of foreman, all duly certified by local authorities. The installation shall be subject to the Engineer's observation, and final acceptance. The Engineer may reject unsuitable work.

3.03 CHANGE ORDERS

- A. Additional work may be required on the project, which is outside the scope of the contract. Such additional work will be described in Supplemental Instructions and/or Clarifications, to be estimated and priced by the Contractor, and accepted by the Owner, prior to commencing work.
- B. Acceptable charges will be limited to the following:
 - a. Labor hours shall be calculated, and shall be priced based on actual paid cost, not to exceed local Prevailing Wage Rates.
 - b. Supervision and Support shall not exceed 15% of labor charges. This blanket percentage shall cover foreman, tools, vehicles, record drawings, etc.
 - c. Charges for material shall be charged at actual unit prices quoted by suppliers, supported by a true copy of the written price quotation.
 - d. Major equipment items shall be charged at actual unit prices quoted by suppliers, supported by a true copy of the written price quotation.
 - e. Handling charges for material shall not exceed 5% of material and equipment charges. This blanket percentage shall cover freight, cartage, wastage, etc.
 - f. Should the Owner or Engineer find reason to dispute or challenge the Contractor's pricing of additional work, one of the following solutions may be imposed
 - g. Contractor shall be directed to proceed with the work, and submit his proposed charges for arbitration at the conclusion of the project.
 - h. Contractor shall maintain a separate labor log and obtain daily signatures thereon, and shall be prepared to submit a certified, audited payroll report to support his claims.

- i. Owner shall purchase the disputed equipment and/or material, and provide same to Contractor at job site for installation, along with a copy of the invoice. Contractor may add a 10% charge to cover handling and warranty administration.
- j. Owner shall contract with a separate licensed Mechanical Contractor to perform the extra work. In this event, the originally-contracted work shall be completed by Contractor and accepted by the Owner, following inspection and recommendation by the Engineer. This Contractor shall cause no impediment to the work of the separate contractor, and shall maintain full warranty on his originally-installed equipment and workmanship.

3.04 GUARANTEE

- A. Furnish the Owner a written guarantee, stating that if the workmanship and/or material executed under this Division are proven defective within one (1) year after final acceptance by the Owner, such defects and other work damaged will be repaired and/or replaced. Submit with Operations and Maintenance Manuals.
- B. Obtain from the various manufacturers or vendors guarantees or warranties for their particular equipment or components, and deliver them to the Owner. All guarantees and warranties provided shall be referenced to this project.
- C. In event that systems are placed in operation in several phases at the Owner's request, guarantee will begin on date each system or item of equipment is accepted for service by the Owner. Provide O&M manuals for all equipment when equipment is accepted for service by the Owner.
- D. All guarantees and warranties shall include labor and material at the site of installation for the duration of the guarantee period.

3.05 COOPERATION

- A. Carefully coordinate work with other contractors and subcontractors. Refer conflicts between trades to Engineer. Provide necessary information to other trades for such coordination. Such information shall include Shop Drawings, Product Data and all other required data.
- B. Whenever such information is not provided in a timely manner or whenever such information is incorrect, this contractor shall bear all costs for providing or correcting affected work of related trades with no change to the Contract Price or Construction Schedule.
- C. Work to be installed as progress of project will allow. Schedule of work determined by General Contractor, Owner, and/or Architect/Engineer.

3.06 HVAC CONTROL WIRING

- A. Control Wiring including low voltage and line voltage interlock wiring will be furnished and installed under Division 16.

3.07 PROTECTING

- A. Provide warning lights, bracing, shoring, rails, guards and covers necessary to prevent damage or injury. All persons working around Mechanical equipment shall have Mechanical shock and flash protection per OSHA 1910.301-309 & 331-335.
- B. Do not leave exposed or unprotected, Mechanical items carrying current. Protect visitors and workers from exposure to contact with Mechanically energized surfaces, parts, etc. in accordance with OSHA standards.

3.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver equipment and materials to job site in original, unopened, labeled container. Products shall be properly identified with names, model numbers, types, grades, compliance labels and other information needed for identification. Store to prevent damage and injury. Store materials to prevent corroding. Store finished materials and equipment to prevent staining and discoloring. Store materials affected by condensation in warm dry areas. Provide heaters. Contractor shall verify the availability of on site storage space, if no on site storage space is available then the contractor shall cover the cost for off site storage. Materials stored at the project site that becomes soiled with construction dirt, concrete, or moisture shall be removed from the site and replaced with new. Do not install soiled material.
- B. Protect work and materials from damage by weather, entrance of water or dirt. Cap and mark piping and ductwork during installation.
- C. Avoid damage to materials and equipment in place. Repair, or remove and replace damaged work and materials.
- D. Protection and safekeeping of products stored on premises is responsibility of Contractor supplying products.
- E. Schedule of deliveries and unloading to prevent traffic congestion blocking of access or interference with work. Arrange deliveries to avoid larger accumulations of materials than can be suitably stored at site.
- F. Install equipment per manufacturer's recommendations. Conflicts between contract documents and these recommendations shall be referred to Engineer for remedy.
- G. Mechanical or electronic equipment that has been damaged, exposed to weather or is, in the opinion of the Engineer or Architect, otherwise unsuitable because of improper fabrication, storage or installation shall be removed and replaced by this Contractor at his expense.

3.09 CLEANING AND PAINTING

- A. Clean equipment furnished in this Division after completion of work. Clean wipe the interior of all ducting, pipes, equipment soiled with dirt and debris prior to installation of wiring.
- B. Touch-up or re-paint damaged painted finishes as determined by the Engineer.
- C. Contractor is to paint out all diffuser, grille and internal ductwork portions visible behind terminations in space. All ductwork installed exposed within the space is to be

painted per the architectural requirements. Coordinate exact requirements with architectural drawings.

D. Remove debris, packing cartons, scrap, etc., from site daily.

3.10 STARTUP

A. All mechanical and high efficiency plumbing equipment is to be started up by a factory trained and certified technician

3.11 TRAINING

A. Training for operation and maintenance of new systems or modifications to existing systems is specified in Technical sections. Contractor shall submit with record documents an itemized receipt signed by Owner's representative that all specified training has been received.

3.12 ACCESS PANELS

A. The contractor shall furnish all access panels for walls, partitions, etc., and shall give access panel to the General Contractor for installation at locations as directed by the Mechanical Contractor. It shall be the responsibility of the Mechanical Contractor that access panels are provided for access to all equipment and accessories, which may be concealed by building construction to provide adequate service space and comply with the manufacturers listed requirements. Access panels shall be installed so as not to interfere with building and other system arrangements.

END OF SECTION 230500

SECTION 230518 - ESCUTCHEONS FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Escutcheons.
 - 2. Floor plates.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

- A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

2.2 FLOOR PLATES

- A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.
- B. Split-Casting Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.

- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.
 - 1. Escutcheons for New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece.
 - b. Chrome-Plated Piping: One-piece, cast-brass type with polished, chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
 - e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
 - f. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type.
 - g. Bare Piping in Equipment Rooms: One-piece, stamped-steel type.
- C. Install floor plates for piping penetrations of equipment-room floors.
- D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
 - 1. New Piping: One-piece, floor-plate type.
 - 2. Existing Piping: Split-casting, floor-plate type.

3.2 FIELD QUALITY CONTROL

- A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION 230518

SECTION 220548 - VIBRATION AND SEISMIC CONTROLS FOR HVAC

PART 1: GENERAL

1.1 WORK INCLUDED

- A. This section provides minimum acceptance requirements for vibration isolation and seismic/wind restraints for all plumbing equipment and piping.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Concrete work is provided in Division 03.
- B. Seismic restraints for fire suppression systems are provided in Division 21.
- C. Vibration isolation and seismic/wind restraints for HVAC systems are provided in Division 23.
- D. Vibration isolation and seismic restraints for electrical systems are provided in Division 26.

1.3 QUALITY ASSURANCE

- A. Unless otherwise directed by the local authority having jurisdiction, the following codes and standards will apply:
 - 1. 2018 International Building Code (2018 IBC)
 - 2. American Society of Civil Engineers 7-10
- B. Manufacturer's Qualifications: Firms regularly engaged in manufacture of vibration control and restraint products of type, size, and capacity required, whose products have been in satisfactory use in similar service for not less than 5 years.
- C. The following guides may be used for supplemental information on typical seismic installation practices. Where a conflict exists between the guides and these construction documents, the construction documents will preside.
 - 1. Federal Emergency Management Agency (FEMA) manuals 412, *Installing Seismic Restraints for Mechanical Equipment* and 414, *Installing Seismic Restraints for Ductwork and Pipe*.
 - 2. Sheet Metal and Air-conditioning Contractors' National Association's (SMACNA) *Seismic Restraint Manual Guidelines for Mechanical Systems, 3rd ed., 2008*

3. American Society for Heating, Refrigerating and Air-conditioning Engineers' (ASHRAE) *A Practical Guide to Seismic Restraint*

1.4 SUBMITTALS

- A. All vibration isolation and seismic/wind restraint systems shall be by one manufacturer.
- B. All outdoor mounted equipment shall be restrained for the highest wind speed as specified by the project's structural engineer, the governing building code(s) or the authority having jurisdiction.
- C. Submit shop drawings for all items/devices requiring restraint. Those items/devices not requiring restraint shall be indicated in a stamped letter from the design professional. Submittals shall indicate full compliance with the device specification in Part 2. Any deviation shall be specifically noted and subject to engineer approval. Submittals shall include device dimensions, placement, attachment and anchorage requirements.
- D. Provide calculations for selection of seismic/wind restraints, certified by a qualified professional engineer, licensed in the state of the project.
- E. Seismic/Wind Restrain Design Criteria: Per the local authority and code requirements.

PART 2: PRODUCTS

2.1 VIBRATION ISOLATION AND RESTRAINTS:

- A. Springs: All springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. All springs except internal nested springs shall have an outside diameter not less than 0.8 of the compressed height of the spring. Ends of springs shall be square and ground for stability. Laterally stable springs shall have k_x/k_y ratios of at least 0.9. All springs shall be fully color-coded to indicate capacity – color striping is not considered adequate.
- B. Corrosion Protection: All springs shall be powder-coated enamel. Housings shall be hot dipped galvanized (located outdoors), powder-coated enamel, or painted with rust-resistant paint.
- C. Provide positive attachment for seismic and wind restraints on those systems and components required by the applicable building code and by the local authority having jurisdiction.
- D. Provide restraint devices as required, specified, and as scheduled for isolated and non-isolated systems and equipment. Provide calculations to determine restraint loadings for all restrained systems and equipment resulting from seismic forces.

- E. See the vibration isolation and seismic restraint schedule on the drawings for equipment specific values to be used in calculating the seismic restraint forces, including component importance factor, I_p .
- F. Bases:
1. Concrete Inertia Base: Inertia bases shall be of welded steel construction with concrete in-fill supplied by the installing contractor on site and shall incorporate minimum #4 or minimum 10M reinforcing bars, welded 12" (300 mm) to 18" (455 mm) maximum on centers each way. Inertia bases for split case pumps shall be of sufficient size to accommodate supports for pipe elbows at pump suction and discharge connections. Inertia bases for fans shall include motor slide rails as required. The weight of each inertia base shall be at least equal to the weight of the equipment mounted thereon. Inertia bases shall be of minimum 6" (150 mm) thickness. Height-saving brackets or welded steel pockets shall be incorporated to ensure a 1-1/2" (40 mm) minimum clearance under each base. Bases for exterior use shall be painted or hot dipped galvanized for complete corrosion resistance. Equipment bolting templates shall be provided when required.
 - a. Type CIB – Rectangular frame concrete inertia base
- G. Isolators:
1. Vibration Isolation Pads: Type N – Neoprene pad type isolators, 3/8" (10 mm) minimum thick, ribbed on both sides. Type NSN – Sandwich neoprene pad type isolators, with 3/8" (10 mm) minimum thick ribbed neoprene pads bonded to each side of a 10 ga (3.5 mm) minimum galvanized metal plate. Isolator pads shall be selected to ensure that deflection does not exceed 20% of isolator free height.
 2. Grommet Washers: Type GW - Neoprene grommet washers of sufficient size to accommodate USS standard washers, long enough to sleeve through 1/4" (6 mm) plate material, and with at least 1/8" (3 mm) thick material around the bolt hole.
 3. Seismic/Wind Spring Floor Mounts: Type SFS – Laterally stable, restrained spring type with support for bolting to the equipment. Springs shall be supported either with a neoprene cup or a metal base plate complete with a neoprene noise isolation pad, minimum 1/4" (6 mm) thick, bonded to the base plate. Mount shall include integral all-directional limit stops with elastomeric grommets preventing metal-to-metal contact and with minimum 1/4" clearance under normal operation.
 4. Seismic/Wind Restrained Spring Isolator: Type SCSR – Laterally stable, restrained spring type with housings and heavy top plates for supporting the equipment and resisting seismic and wind loading. Housings shall be of welded steel construction and include vertically restraining limit stops. Maximum clearance around the restraining bolts shall be 1/4" (6 mm).

Top plate and restraining bolts shall be out of contact with the housing during normal operation and neoprene grommets shall be incorporated to minimize short-circuiting of restraining bolts. Housing must be hot-dip galvanized for outdoor applications. For indoor applications, powder-coated finish is acceptable for the housing.

5. Spring Hangers: Vibration isolator hanger supports with steel springs and welded steel housings. Hangers shall be designed for a minimum of 15 degree angular misalignment from vertical before support rod contacts housing; hangers serving lightweight loads 0.90 kN (200 lbs) and less may be exempt from this requirement. Provide a vertical uplift stop-washer on spring hangers for seismically restrained equipment, duct or piping.
 - a. Type SHRB – Spring hanger with neoprene and bottom cup isolators complete with spring, compression cup, neoprene “double-deflection” element at top of hanger, and neoprene cup under the spring.

H. Restraints:

1. Seismic Cable Restraints: Type BulletBrace™ – Preassembled Adjustable Seismic cable sway bracing restraints shall consist of 7x19 galvanized steel aircraft cable sized to resist seismic loads. Cable restraint system shall be completely preassembled to eliminate onsite assembly of restraint components and must allow quick and easy adjustment on the length of the cable after the installation to remove excessive sag on the cable. Cable end connections shall use heavy brackets, thimbles, and wire rope clips or compression sleeves.
2. Rigid Restraints: Type RRK-V – Seismic rigid sway bracing restraints shall include heavy duty brackets made of high-strength, low alloy steel designed to provide enough strength to withstand seismic load. To prevent any confusion, brackets should be universal to be used for both structure and equipment attachments and should accommodate post-installation of seismic restraints without the requirement of disassembling the hanger rod or any component of the equipment. No drilling should be required to secure rigid restraint brackets to the rigid brace, and rigid restraint system must include special grade hardware for attachments. Rigid restraint brackets must be color-coded for capacity identification.
3. Hanger Rod Stiffener: Structural steel angle attached with a formed steel clamp (Type VAC) to threaded rod support. Steel angle to be provided by contractor; steel clamp to be provided by seismic restraint manufacturer.
4. Seismic Pipe/Duct Stand: Type SPS-6 and SPSA-6 (Adjustable Height) – rigid support pipe stands made of high-strength steel rigid restraints, low alloy designed to support the dead load, and provide enough strength to withstand at least 1 g of lateral seismic force. In addition to providing

allowance for roof slopes, the adjustable height stands shall be used to accommodate changing pipe sizes.

5. Seismic Restraint Brackets: Type SRB – Formed steel brackets for securing floor-mounted equipment complete with pre-drilled holes. Brackets shall be galvanized or powder coated enamel for corrosion protection.
6. Concrete Anchors: Post-installed anchors in concrete shall be qualified for seismic/wind restraint application.
 - a. Mechanical anchor bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. (In accordance with ACI 355.2 and ICC-ES AC193)
 - b. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. (In accordance with ACI 355.4 and ICC-ES AC308)

I. Flexible Connectors:

1. Rubber Expansion Joints: Rubber expansion joints are constructed of synthetic rubber tube and cover, which are molded and cured in hydraulic presses. They are reinforced with multi-ply Nylon tire cord fabric. Internal reinforcing of metal wire or embedded rings are not acceptable. Rubber expansion joints will either be single sphere or double sphere. Double sphere rubber expansion joints shall have a factory installed steel body ring between the two spheres to control ballooning under high pressure/temperature situations. Rubber expansion joints for pipe sizes 1-1/2" and up will have floating steel flanges. The mating surface will be 100% rubber. For sizes 3/4" up to 3", threaded female union connectors are also accepted. Control rods shall be installed to prevent excessive elongation where required. Control rods shall utilize 1/4" thick neoprene grommets to limit vibration transfer.
2. Metal Bellows Expansion Joints: Type EJM – Bellow pump connectors are constructed with series 300 stainless steel multi-ply bellows welded to 150 lbs carbon steel flanges. Three tie rods are factory installed to prevent excessive elongation and to control the static pressure thrust at full rated working pressure of the connector. Tie rods shall utilize rubber grommets to limit vibration transfer.
3. Braided Metal Flexible Connectors: Connectors shall have copper sweat ends or copper hex male threaded ends for copper piping. Connectors for steel piping shall have flanged, carbon steel male threaded, grooved or a

combination of grooved and flanged ends. Utilize connectors of 300 series stainless steel corrugated hose and braid and carbon steel fittings for connection to steel piping. Reducing sizes shall be available with combinations of all end fittings. Connectors for copper piping shall be constructed of bronze hose and braid with copper end connections.

4. Thermal and Seismic V-Connectors: V connectors shall allow standard 2", 3", 4" or greater movements along the 6 directions of XY, YZ and XZ planes. V-connectors use two 45° elbows and one 90° elbow for a total of 180° in pipe change. Large connectors shall be supplied with shipping bars tack welded at factory to maintain designed length. For steam applications, a drain port and plug shall be specified and factory installed into the bottom of the 90° elbow to allow condensate to be drained. Flange, weld, threaded, groove or copper tube end fittings are provided to match connecting pipe.

PART 3: EXECUTION

3.1 GENERAL:

- A. Coordinate size, doweling, and reinforcing of concrete equipment housekeeping pads and piers with vibration isolation and seismic restraint device manufacturer to ensure adequate space and prevent edge breakout failures. Pads and piers must be adequately doweled in to structural slab.
- B. Coordinate locations and sizes of structural supports with locations of vibration isolators and seismic/wind restraints (e.g., roof curbs, cooling towers, air-cooled chillers, etc.).
- C. Isolated and restrained equipment, duct and piping located on roofs must be attached to the structure. Intermediate supports between the restraint and structure that are not attached to the structure must be approved by the restraint manufacturer.

3.2 VIBRATION ISOLATION:

- A. Block and shim all bases level so that all ductwork, piping and electrical connections can be made to a rigid system at the proper operating level, before isolators are adjusted. Ensure that there are no rigid connections or incidental physical contacts between isolated equipment and the building structure or nearby systems.
- B. Ensure housekeeping pads have adequate space to mount equipment and isolator housings and shall also be large enough to ensure adequate edge distance for isolator anchors.
- C. Select and locate vibration isolation equipment to give uniform loading and deflection, according to weight distribution of equipment.

- D. Mount fans, as indicated on the drawings, on structural steel vibration bases common to both fan and motor. There shall be a minimum operating clearance of 1" (25 mm) between steel bases and the structure.
- E. Mount pumps and equipment, as indicated on the drawings, on concrete-filled inertia bases. Concrete in-fill shall be supplied by the installing contractor on site. There shall be a minimum operating clearance of 2" (50 mm) between each inertia base and its foundation.
- F. Extent of Piping Isolation:
 - 1. Isolate all piping larger than 1" (25 mm) dia. connected to spring isolated equipment with 0.75" (25 mm) static deflection spring hangers at spacing intervals in accordance with the following:

Pipe Diameter	Distance from Vibrating Equipment
1-1/4" to 4"	40'
6" and 8"	50'
10" and larger	60'
 - 2. Spring hanger isolators shall be cut in to the hanger rods and installed after the system is filled. Alternatively, provisions must be made to ensure piping does not change height during installation and start-up.

3.3 SEISMIC/WIND RESTRAINTS:

- A. General:
 - 1. All equipment, piping and ductwork shall be restrained to resist seismic/wind forces per the applicable building code(s) as a minimum. Restraint attachments shall be made by bolts, welds or a positive fastening method. Friction shall not be considered. All attachments shall be proven capable of accepting the required wind load by calculations. Additional requirements specified herein are included specifically for this project.
 - 2. Install seismic and wind restraint devices per the manufacturer's submittals. Any deviation from the manufacturer's instructions shall be reviewed and approved by the manufacturer.
 - 3. Attachment to structure for suspended equipment, pipe and duct: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
 - 4. Wall penetrations may be used as bracing locations provided the wall can provide adequate resistance without damage.

5. Coordinate sizes and locations of cast-in-place inserts for post-tensioned slabs with seismic restraint manufacturer.
6. Provide hanger rod stiffeners where indicated or as required to prevent buckling of rods due to seismic forces.
7. Where rigid restraints are used on equipment, ductwork or piping, support rods for the equipment, ductwork or piping at restraint locations must be supported by anchors rated for seismic use. Post-installed concrete anchors must be in accordance with ACI 355.2.
8. Ensure housekeeping pads have adequate space to mount equipment and seismic restraint devices and shall also be large enough to ensure adequate edge distance for restraint anchor bolts to avoid housekeeping pad breakout failure.

B. Concrete Anchor Bolts:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid pre- or post-tensioned tendons, electrical and telecommunications conduit, and gas lines. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
 - 1.
 2. Mechanical Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
 - 2.
 3. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
 - 3.
 4. Set anchors to manufacturer's recommended torque, using a torque wrench.

C. Equipment Restraints:

1. Seismically restrain equipment as indicated on the schedule. Install fasteners, straps and brackets as required to secure the equipment.

2. Install neoprene grommet washers on equipment anchor bolts where clearance between anchor and equipment support hole exceeds 1/8" (3.2 mm).
 3. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- D. Piping Systems:
1. Unless otherwise indicated on the drawings, the component importance factor (Ip) for all piping systems shall be assigned a 1.5. therefore all piping with a diameter greater than 1" (25 mm) or trapeze-supported piping with combined operating weight over 10 lbs./ft. (15 kg/m) shall be restrained.
 2. Restraint spacing:
 - a. For ductile piping, space lateral supports a maximum of 40' (12 m) o.c., and longitudinal supports a maximum of 80' (24 m) o.c.
 - b. For non-ductile piping (e.g., cast iron, PVC) space lateral supports a maximum of 20' (6 m) o.c., and longitudinal supports a maximum of 40' (12 m) o.c.
 - c. For piping with hazardous material inside (e.g., natural gas, medical gas) space lateral supports a maximum of 20' (6 m) o.c., and longitudinal supports a maximum of 40' (12 m) o.c.
 - d. For pipe risers, restrain the piping at floor penetrations using the same spacing requirements as above.
 3. Brace a change of direction longer than 10' (3.7 m).
 4. Longitudinal restraints for single pipe supports shall be attached directly to the pipe, not to the pipe hanger.
 5. For supports with multiple pipes (trapezes), secure pipes to trapeze member with clamps approved for application.
 6. Piping on roller supports shall include a second roller support located on top of the pipe at each restraint location to provide vertical restraint.
 7. Install restraint cables so they do not bend across edges of adjacent equipment or building structure.
 8. Install flexible metal hose loops in piping which crosses building seismic joints, sized for the anticipated amount of movement.

9. Install flexible piping connectors where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment.
10. Coordinate seismic restraints with thermal expansion compensators, guides and anchor points. Thermal expansion anchor points shall be designed to accommodate seismic forces.

E. Extent of Piping Isolation:

1. The equipment to be restrained shall be per the following schedule:
 - a. HP – Heat Pump
 - 1) Ground Mounted
 - 2) IP 1.5
 - b. AHU – Air Handler
 - 1) Ceiling Mounted
 - 2) IP 1.5
 - c. Ductwork
 - 1) Suspended Mounting
 - 2) IP 1.5

3.4 INSPECTION AND CERTIFICATION:

- A. After installation of restraints, arrange and pay for the seismic restraint product manufacturer, or representative, to visit the site to verify that the seismic and wind restraint systems are installed properly. The manufacturer or representative shall submit a certification stating such.

END OF SECTION 220548

SECTION 230553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Equipment labels.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:
 - 1. Material and Thickness: Brass, 0.032-inch, stainless steel, 0.025-inch, aluminum, 0.032-inch or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Letter Color: White.
 - 3. Background Color: Black.
 - 4. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 - 5. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately

larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.

6. Fasteners: Stainless-steel rivets.
 7. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.
- C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number, and identify Drawing numbers where equipment is indicated (plans, details, and schedules) and the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

3.3 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

END OF SECTION 230553

SECTION 230593
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Balancing Air Systems:
 - a. Constant-volume air system.
 - 2. Testing, adjusting, and balancing existing systems and equipment.

1.3 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. BAS: Building automation systems.
- C. NEBB: National Environmental Balancing Bureau.
- D. TAB: Testing, adjusting, and balancing.
- E. TABB: Testing, Adjusting, and Balancing Bureau.
- F. TAB Specialist: An independent entity meeting qualifications to perform TAB work.
- G. TDH: Total dynamic head.

1.4 PREINSTALLATION MEETINGS

- A. TAB Conference: If requested by the Owner, conduct a TAB conference at Project site after approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Provide a minimum of 14 days' advance notice of scheduled meeting time and location.
 - 1. Minimum Agenda Items:

- a. The Contract Documents examination report.
- b. The TAB plan.
- c. Needs for coordination and cooperation of trades and subcontractors.
- d. Proposed procedures for documentation and communication flow.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
- B. Contract Documents Examination Report: Within 30 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.
- C. Strategies and Procedures Plan: Within 30 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.
- D. System Readiness Checklists: Within 30 days of Contractor's Notice to Proceed, submit system readiness checklists as specified in "Preparation" Article.
- E. Examination Report: Submit a summary report of the examination review required in "Examination" Article.
- F. Certified TAB reports.
- G. Sample report forms.
- H. Instrument calibration reports, to include the following:
 1. Instrument type and make.
 2. Serial number.
 3. Application.
 4. Dates of use.
 5. Dates of calibration.

1.6 QUALITY ASSURANCE

- A. TAB Specialists Qualifications: Certified by AABC.
 1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC.
 2. TAB Technician: Employee of the TAB specialist and certified by AABC as a TAB technician.
- B. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."

- C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
- D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.7 FIELD CONDITIONS

- A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.
- B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.
- B. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.
- F. Examine equipment performance data including fan and pump curves.
 - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- H. Examine test reports specified in individual system and equipment Sections.
- I. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.
- J. Examine operating safety interlocks and controls on HVAC equipment.
- K. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

- A. Prepare a TAB plan that includes the following:
 1. Equipment and systems to be tested.
 2. Strategies and step-by-step procedures for balancing the systems.
 3. Instrumentation to be used.
 4. Sample forms with specific identification for all equipment.
- B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:
 1. Airside:
 - a. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
 - b. Duct systems are complete with terminals installed.
 - c. Volume, smoke, and fire dampers are open and functional.
 - d. Clean filters are installed.
 - e. Fans are operating, free of vibration, and rotating in correct direction.
 - f. Variable-frequency controllers' startup is complete and safeties are verified.
 - g. Automatic temperature-control systems are operational.
 - h. Ceilings are installed.
 - i. Windows and doors are installed.
 - j. Suitable access to balancing devices and equipment is provided.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance", ASHRAE 111 and SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
 - 2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 233300 "Air Duct Accessories."
 - 3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 230713 "Duct Insulation," Section 230716 "HVAC Equipment Insulation," and Section 230719 "HVAC Piping Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Cross-check the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.
- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.

- J. Check condensate drains for proper connections and functioning.
- K. Check for proper sealing of air-handling-unit components.
- L. Verify that air duct system is sealed as specified in Section 233113 "Metal Ducts."

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 - 1. Measure total airflow.
 - a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
 - b. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
 - c. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
 - d. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.
 - 2. Measure fan static pressures as follows:
 - a. Measure static pressure directly at the fan outlet or through the flexible connection.
 - b. Measure static pressure directly at the fan inlet or through the flexible connection.
 - c. Measure static pressure across each component that makes up the air-handling system.
 - d. Report artificial loading of filters at the time static pressures are measured.
 - 3. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
 - 4. Obtain approval from Architect and Owner for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
 - 5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.

1. Measure airflow of submain and branch ducts.
 2. Adjust submain and branch duct volume dampers for specified airflow.
 3. Re-measure each submain and branch duct after all have been adjusted.
- C. Adjust air inlets and outlets for each space to indicated airflows.
1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
 2. Measure inlets and outlets airflow.
 3. Adjust each inlet and outlet for specified airflow.
 4. Re-measure each inlet and outlet after they have been adjusted.
- D. Verify final system conditions.
1. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to design if necessary.
 2. Re-measure and confirm that total airflow is within design.
 3. Re-measure all final fan operating data, rpms, volts, amps, and static profile.
 4. Mark all final settings.
 5. Test system in economizer mode. Verify proper operation and adjust if necessary.
 6. Measure and record all operating data.
 7. Record final fan-performance data.

3.6 TOLERANCES

- A. Set HVAC system's airflow rates and water flow rates within the following tolerances:
1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
 2. Air Outlets and Inlets: Plus or minus 10 percent.
- B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.7 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 2. Include a list of instruments used for procedures, along with proof of calibration.
 3. Certify validity and accuracy of field data.
- B. Final Report Contents: In addition to certified field-report data, include the following:
1. Fan curves.
 2. Manufacturers' test data.

3. Field test reports prepared by system and equipment installers.
 4. Other information relative to equipment performance; do not include Shop Drawings and Product Data.
- C. General Report Data: In addition to form titles and entries, include the following data:
1. Title page.
 2. Name and address of the TAB specialist.
 3. Project name.
 4. Project location.
 5. Architect's name and address.
 6. Engineer's name and address.
 7. Contractor's name and address.
 8. Report date.
 9. Signature of TAB supervisor who certifies the report.
 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 11. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 12. Nomenclature sheets for each item of equipment.
 13. Data for terminal units, including manufacturer's name, type, size, and fittings.
 14. Notes to explain why certain final data in the body of reports vary from indicated values.
 15. Test conditions for fans and pump performance forms including the following:
 - a. Settings for outdoor-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
 2. Water and steam flow rates.
 3. Duct, outlet, and inlet sizes.
 4. Balancing stations.
 5. Position of balancing devices.
- E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:
1. Unit Data:
 - a. Unit identification.

- b. Location.
 - c. Make and type.
 - d. Model number and unit size.
 - e. Manufacturer's serial number.
 - f. Unit arrangement and class.
 - g. Discharge arrangement.
 - h. Sheave make, size in inches, and bore.
 - i. Center-to-center dimensions of sheave and amount of adjustments in inches.
 - j. Number, make, and size of belts.
 - k. Number, type, and size of filters.
2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave and amount of adjustments in inches.
3. Test Data (Indicated and Actual Values):
 - a. Total airflow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Filter static-pressure differential in inches wg.
 - f. Preheat-coil static-pressure differential in inches wg.
 - g. Cooling-coil static-pressure differential in inches wg.
 - h. Heating-coil static-pressure differential in inches wg.
 - i. Outdoor airflow in cfm.
 - j. Return airflow in cfm.
 - k. Outdoor-air damper position.
 - l. Return-air damper position.
 - m. Vortex damper position.
- F. Apparatus-Coil Test Reports:
1. Coil Data:
 - a. System identification.
 - b. Location.
 - c. Coil type.
 - d. Number of rows.
 - e. Fin spacing in fins per inch o.c.
 - f. Make and model number.
 - g. Face area in sq. ft..

- h. Tube size in NPS.
 - i. Tube and fin materials.
 - j. Circuiting arrangement.
2. Test Data (Indicated and Actual Values):
- a. Airflow rate in cfm.
 - b. Average face velocity in fpm.
 - c. Air pressure drop in inches wg.
 - d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
 - e. Return-air, wet- and dry-bulb temperatures in deg F.
 - f. Entering-air, wet- and dry-bulb temperatures in deg F.
 - g. Leaving-air, wet- and dry-bulb temperatures in deg F.
 - h. Water flow rate in gpm.
 - i. Water pressure differential in feet of head or psig.
 - j. Entering-water temperature in deg F.
 - k. Leaving-water temperature in deg F.
 - l. Refrigerant expansion valve and refrigerant types.
 - m. Refrigerant suction pressure in psig.
 - n. Refrigerant suction temperature in deg F.
 - o. Inlet steam pressure in psig.
- G. Fan Test Reports: For supply, return, and exhaust fans, include the following:
1. Fan Data:
- a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and size.
 - e. Manufacturer's serial number.
 - f. Arrangement and class.
 - g. Sheave make, size in inches, and bore.
 - h. Center-to-center dimensions of sheave and amount of adjustments in inches.
2. Motor Data:
- a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 - g. Number, make, and size of belts.
3. Test Data (Indicated and Actual Values):

- a. Total airflow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Suction static pressure in inches wg.
- H. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
1. Report Data:
 - a. System and air-handling-unit number.
 - b. Location and zone.
 - c. Traverse air temperature in deg F.
 - d. Duct static pressure in inches wg.
 - e. Duct size in inches.
 - f. Duct area in sq. ft..
 - g. Indicated airflow rate in cfm.
 - h. Indicated velocity in fpm.
 - i. Actual airflow rate in cfm.
 - j. Actual average velocity in fpm.
 - k. Barometric pressure in psig.

3.8 VERIFICATION OF TAB REPORT

- A. The TAB specialist's test and balance engineer shall conduct the inspection in the presence of Owner and commissioning authority.
- B. Owner or Commissioning authority shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
- C. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
- D. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
- E. If TAB work fails, proceed as follows:
 1. TAB specialists shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
 2. If the second final inspection also fails, Owner may contract the services of another TAB specialist to complete TAB work according to the Contract

Documents and deduct the cost of the services from the original TAB specialist's final payment.

3. If the second verification also fails, Owner and/or design professional may contact AABC Headquarters regarding the AABC National Performance Guaranty.

- F. Prepare test and inspection reports.

3.9 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 230593

SECTION 230713 - DUCT INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes insulating the following duct services:
 - 1. Indoor, concealed supply and outdoor air.
 - 2. Indoor, concealed supply and outdoor air.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 - 2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
 - 3. Detail application of field-applied jackets.
 - 4. Detail application at linkages of control devices.
- C. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:
 - 1. Sheet Form Insulation Materials: 12 inches square.
 - 2. Sheet Jacket Materials: 12 inches square.
 - 3. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of

insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

- C. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

1.8 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the For operating temperatures higher than 250 deg F (121 deg C), use blanket insulation in first paragraph below. Retain ASTM C 1290 types as follows: Type I for insulation without jackets, Type II for insulation with vinyl jackets, and Type III for insulation with FSK or FSP jackets.
- F. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. Knauf Insulation.
 - c. Manson Insulation Inc.
 - d. Owens Corning.

2.2 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 - 1. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- C. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
 - 1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.3 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
 - 1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.
 - 1. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
 - 2. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 3. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
 - 4. Color: White.
- C. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.
 - 1. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
 - 2. Service Temperature Range: 0 to 180 deg F.
 - 3. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
 - 4. Color: White.
- D. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
 - 1. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
 - 2. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 3. Solids Content: 60 percent by volume and 66 percent by weight.
 - 4. Color: White.

2.4 SEALANTS

- A. FSK and Metal Jacket Flashing Sealants:
 - 1. Materials shall be compatible with insulation materials, jackets, and substrates.
 - 2. Fire- and water-resistant, flexible, elastomeric sealant.
 - 3. Service Temperature Range: Minus 40 to plus 250 deg F.
 - 4. Color: Aluminum.

5. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. ASJ Flashing Sealants, and Vinyl and PVC Jacket Flashing Sealants:
1. Materials shall be compatible with insulation materials, jackets, and substrates.
 2. Fire- and water-resistant, flexible, elastomeric sealant.
 3. Service Temperature Range: Minus 40 to plus 250 deg F.
 4. Color: White.
 5. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.5 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
 3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
 4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.
 5. Vinyl Jacket: White vinyl with a permeance of 1.3 perms when tested according to ASTM E 96/E 96M, Procedure A, and complying with NFPA 90A and NFPA 90B.

2.6 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.
- C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
1. Adhesive: As recommended by jacket material manufacturer.
 2. Color: White.

2.7 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Width: 3 inches.
 2. Thickness: 11.5 mils.
 3. Adhesion: 90 ounces force/inch in width.
 4. Elongation: 2 percent.
 5. Tensile Strength: 40 lbf/inch in width.
 6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
1. Width: 3 inches.
 2. Thickness: 6.5 mils.
 3. Adhesion: 90 ounces force/inch in width.
 4. Elongation: 2 percent.
 5. Tensile Strength: 40 lbf/inch in width.
 6. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- C. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
1. Width: 2 inches.
 2. Thickness: 3.7 mils.
 3. Adhesion: 100 ounces force/inch in width.
 4. Elongation: 5 percent.
 5. Tensile Strength: 34 lbf/inch in width.

2.8 SECUREMENTS

- A. Bands:
1. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316; 0.015 inch thick, 1/2 inchwide with wing seal.
 2. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inchwide with wing seal.
- B. Insulation Pins and Hangers:
1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch-diameter shank, length to suit depth of insulation indicated.
 2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch-diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
 3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:

- a. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - b. Spindle: Copper- or zinc-coated, low-carbon steel, aluminum or stainless steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
 - c. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
4. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
- a. Baseplate: Perforated, nylon sheet, 0.030 inch thick by 1-1/2 inches in diameter.
 - b. Spindle: Nylon, 0.106-inch-diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.
 - c. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
5. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
- a. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - b. Spindle: Copper- or zinc-coated, low-carbon steel, aluminum or stainless steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
 - c. Adhesive-backed base with a peel-off protective cover.
6. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, galvanized-steel, aluminum or stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
- a. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
7. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.

- D. Wire: 0.062-inch soft-annealed, stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 - 1. Verify that systems to be insulated have been tested and are free of defects.
 - 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.
- B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Keep insulation materials dry during application and finishing.
- G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- H. Install insulation with least number of joints practical.
- I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.

2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
- J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- K. Install insulation with factory-applied jackets as follows:
1. Draw jacket tight and smooth.
 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.
- L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.

3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 4. Seal jacket to wall flashing with flashing sealant.
- C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
1. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 INSTALLATION OF MINERAL-FIBER INSULATION

- A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
1. Apply adhesives according to manufacturer's recommended coverage rates.
 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
 3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not over-compress insulation during installation.
 - e. Impale insulation over pins and attach speed washers.

- f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
 4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
 - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
 5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
 6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
 7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.
- B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
1. Apply adhesives according to manufacturer's recommended coverage rates.
 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
 3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, space pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.

- d. Do not over compress insulation during installation.
 - e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1-inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
 - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
 5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
 6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.6 FIELD-APPLIED JACKET INSTALLATION

- A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.
 1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
 2. Embed glass cloth between two 0.062-inch-thick coats of lagging adhesive.
 3. Completely encapsulate insulation with coating, leaving no exposed insulation.
- B. Where FSK jackets are indicated, install as follows:
 1. Draw jacket material smooth and tight.
 2. Install lap or joint strips with same material as jacket.
 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.
 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

- C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.
 - 1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.7 FINISHES

- A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

3.8 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation.
- C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.9 DUCT INSULATION SCHEDULE, GENERAL

- A. Plenums and Ducts Requiring Insulation:
 - 1. Indoor, concealed supply and return air.
- B. Items Not Insulated:

1. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
2. Factory-insulated flexible ducts.
3. Factory-insulated plenums and casings.
4. Flexible connectors.
5. Vibration-control devices.
6. Factory-insulated access panels and doors.
7. Indoor, exposed supply and return air

3.10 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

- A. Concealed, round and flat-oval, supply-air duct insulation shall be the following:
 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-6 minimum.
- B. Concealed, round and flat-oval, return-air duct insulation shall be the following:
 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-6 minimum.
- C. Concealed, rectangular, supply-air duct insulation shall be one of the following:
 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-6 minimum.
 2. Polyolefin: 1 inch thick and an installed isolating value of R-6 minimum.
- D. Concealed, rectangular, return-air duct insulation shall be one of the following:
 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-6 minimum.
 2. Polyolefin: 1 inch thick and an installed isolating value of R-6 minimum.

END OF SECTION 230713

SECTION 233113 - METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Single-wall rectangular ducts and fittings.
 - 2. Single-wall round ducts and fittings.
 - 3. Sheet metal materials.
 - 4. Sealant and gaskets.
 - 5. Hangers and supports.
- B. Related Sections:
 - 1. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
 - 2. Section 233300 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and ASCE/SEI 7.
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of the following products:
 - 1. Sealants and gaskets.

2. Seismic-restraint devices.

B. Delegated-Design Submittal:

1. Sheet metal thicknesses.
2. Joint and seam construction and sealing.
3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.
5. Design Calculations: Calculations including analysis data signed and sealed by the qualified professional engineer responsible for their preparation for selecting hangers and supports and seismic restraints.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
2. Suspended ceiling components.
3. Structural members to which duct will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Penetrations of smoke barriers and fire-rated construction.
6. Items penetrating finished ceiling including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Perimeter moldings.

B. Welding certificates.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up."

- C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SINGLE-WALL ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
- B. Flat-Oval Ducts: Indicated dimensions are the duct width (major dimension) and diameter of the round sides connecting the flat portions of the duct (minor dimension).
- C. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. Transverse Joints in Ducts Larger Than 32 Inches in Diameter: Flanged.

- D. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
 - 2. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.
- E. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G90.
 - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.
- D. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
 - 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.
- E. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.4 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:
 - 1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
 - 2. Tape Width: 4 inches.
 - 3. Sealant: Modified styrene acrylic.
 - 4. Water resistant.
 - 5. Mold and mildew resistant.
 - 6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
 - 7. Service: Indoor and outdoor.
 - 8. Service Temperature: Minus 40 to plus 200 deg F.
 - 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
 - 10. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 11. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Water-Based Joint and Seam Sealant:
 - 1. Application Method: Brush on.
 - 2. Solids Content: Minimum 65 percent.
 - 3. Shore A Hardness: Minimum 20.
 - 4. Water resistant.
 - 5. Mold and mildew resistant.
 - 6. VOC: Maximum 75 g/L (less water).
 - 7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
 - 8. Service: Indoor or outdoor.
 - 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

2.5 HANGERS AND SUPPORTS

- A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
- B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

- C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- D. Trapeze and Riser Supports:
 - 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
 - 2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
 - 3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- J. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Section 233300 "Air Duct Accessories" for fire and smoke dampers.

- K. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

3.2 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
 - 1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 2. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
 - 3. Unconditioned Space, Return-Air Ducts: Seal Class B.
 - 4. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
 - 5. Conditioned Space, Return-Air Ducts: Seal Class C.

3.3 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Where practical, install concrete inserts before placing concrete.
 - 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 - 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 - 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
 - 5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.

- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.4 SEISMIC-RESTRAINT-DEVICE INSTALLATION

- A. Install ducts with hangers and braces designed to support the duct and to restrain against seismic forces required by applicable building codes. Comply with ASCE/SEI 7.
 - 1. Space lateral supports per the delegated design requirements.
 - 2. Brace a change of direction longer per the delegated design requirements.
- B. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.
- C. Install cables so they do not bend across edges of adjacent equipment or building structure.
- D. Install cable restraints on ducts that are suspended with vibration isolators.
- E. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction.
- F. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, to upper truss chords of bar joists, or to concrete members.

3.5 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 PAINTING

- A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Leakage Tests:
 - 1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
- C. Duct System Cleanliness Tests:
 - 1. Visually inspect duct system to ensure that no visible contaminants are present.
 - 2. Test sections of metal duct system, chosen randomly by Owner, for cleanliness according to "Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems."
 - a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.
- D. Duct system will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

3.8 DUCT CLEANING

- A. Clean new and existing duct system(s) before testing, adjusting, and balancing.
- B. Use service openings for entry and inspection.
 - 1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Section 233300 "Air Duct Accessories" for access panels and doors.
 - 2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
 - 3. Remove and reinstall ceiling to gain access during the cleaning process.
- C. If duct system is considered defective due to cleanliness the entire duct system shall be mechanically, and surface, cleaned per the specifications below.

3.9 START UP

- A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.10 DUCT SCHEDULE

A. Supply Ducts:

1. Ducts Connected to Constant-Volume Air-Handling Units:
 - a. Pressure Class: Positive at pressures indicated in the project schedules.
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 12.
 - d. SMACNA Leakage Class for Round and Flat Oval: 6.

B. Return Ducts:

1. Ducts Connected to Air-Handling Units:
 - a. Pressure Class: Negative at pressures indicated in the project schedules.
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 6.
 - d. SMACNA Leakage Class for Round and Flat Oval: 3.
2. Ducts Connected to Equipment Not Listed Above:
 - a. Pressure Class: Positive or negative at pressures indicated in the project schedules.
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 6.
 - d. SMACNA Leakage Class for Round and Flat Oval: 3.

C. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel.

D. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
 - a. Velocity 1000 fpm or Lower:
 - 1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
 - 2) Mitered Type RE 4 without vanes.
 - b. Velocity 1000 to 1500 fpm:
 - 1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.

- 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
- c. Velocity 1500 fpm or Higher:
 - 1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
 - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."
 - a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
 - 1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
 - 2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
 - 3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
 - 4) Radius-to Diameter Ratio: 1.5.
 - b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
 - c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam.
- E. Branch Configuration:
 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."

- a. Rectangular Main to Rectangular Branch: 45-degree entry.
2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.
 - a. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION 233113

SECTION 233300 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Manual volume dampers.
 - 2. Turning vanes.
 - 3. Flexible connectors.
 - 4. Flexible ducts.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.
 - 1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:
 - a. Special fittings.
 - b. Manual volume damper installations.
 - c. Control-damper installations.
 - d. Fire-damper, smoke-damper, combination fire- and smoke-damper, ceiling, and corridor damper installations, including sleeves; and duct-mounted access doors and remote damper operators.
 - e. Duct security bars.
 - f. Wiring Diagrams: For power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from Installers of the items involved.

- B. Source quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 MATERIALS

- A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G90.
 - 2. Exposed-Surface Finish: Mill phosphatized.
- B. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

2.3 MANUAL VOLUME DAMPERS

- A. Low-Leakage, Steel, Manual Volume Dampers:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Nailor Industries Inc.
 - b. Pottorff.
 - c. Ruskin Company.
 - d. Vent Products Co., Inc.
 - 2. Comply with AMCA 500-D testing for damper rating.
 - 3. Low-leakage rating, with linkage outside airstream, and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.

4. Suitable for horizontal or vertical applications.
5. Frames:
 - a. Raised Hat shape.
 - b. 0.094-inch-thick, galvanized sheet steel.
 - c. Mitered and welded corners.
 - d. Flanges for attaching to walls and flangeless frames for installing in ducts.
6. Blades:
 - a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Galvanized, roll-formed steel, 0.064 inch thick.
7. Blade Axles: Stainless steel.
8. Blade Seals: Vinyl or Neoprene.
9. Jamb Seals: Cambered stainless steel or aluminum.
10. Tie Bars and Brackets: Galvanized steel.
11. Accessories:
 - a. Include locking device to hold single-blade dampers in a fixed position without vibration.

B. Jackshaft:

1. Size: 0.5-inch diameter.
2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.

C. Damper Hardware:

1. Zinc-plated, die-cast core with dial and handle made of 3/32-inch-thick zinc-plated steel, and a 3/4-inch hexagon locking nut.
2. Include center hole to suit damper operating-rod size.
3. Include elevated platform for insulated duct mounting.

2.4 TURNING VANES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CL WARD & Family Inc.
2. Ductmate Industries, Inc.
3. Duro Dyne Inc.
4. METALAIRE, Inc.
5. SEMCO LLC.

- B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
 - 1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.
- C. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
- D. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows."
- E. Vane Construction: Single and Double wall.
- F. Vane Construction: Single wall for ducts up to 48 inches wide and double wall for larger dimensions.

2.5 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CL WARD & Family Inc.
 - 2. Ductmate Industries, Inc.
 - 3. Duro Dyne Inc.
- B. Materials: Flame-retardant or noncombustible fabrics.
- C. Coatings and Adhesives: Comply with UL 181, Class 1.
- D. Metal-Edged Connectors: Factory fabricated with a fabric strip 5-3/4 inches wide attached to two strips of 2-3/4-inch-wide, 0.028-inch-thick, galvanized sheet steel or 0.032-inch-thick aluminum sheets. Provide metal compatible with connected ducts.
- E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
 - 1. Minimum Weight: 26 oz./sq. yd..
 - 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
 - 3. Service Temperature: Minus 40 to plus 200 deg F.

2.6 FLEXIBLE DUCTS

- A. Insulated, Flexible Duct: UL 181, Class 1, 2-ply vinyl film supported by helically wound, spring-steel wire; fibrous-glass insulation; polyethylene vapor-barrier film.

1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
 2. Maximum Air Velocity: 4000 fpm.
 3. Temperature Range: Minus 10 to plus 160 deg F.
 4. Insulation R-value: R-8
- B. Flexible Duct Connectors:
1. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action in sizes 3 through 18 inches, to suit duct size.
 2. Non-Clamp Connectors: Liquid adhesive plus tape.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Compliance with ASHRAE/IESNA 90.1-2004 includes Section 6.4.3.3.3 - "Shutoff Damper Controls," restricts the use of backdraft dampers, and requires control dampers for certain applications. Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.
- D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
 1. Install steel volume dampers in steel ducts.
- E. Set dampers to fully open position before testing, adjusting, and balancing.
- F. Install flexible connectors to connect ducts to equipment.
- G. Connect diffusers to ducts directly or with maximum 60-inch lengths of flexible duct clamped or strapped in place.
- H. Connect flexible ducts to metal ducts with liquid adhesive plus tape or draw bands as listed above.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operate dampers to verify full range of movement.
2. Inspect locations of access doors and verify that purpose of access door can be performed.
3. Operate fire, smoke, and combination fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.
4. Inspect turning vanes for proper and secure installation.
5. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION 233300

SECTION 233713.13 - AIR DIFFUSERS

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Perforated diffusers.
- B. Related Requirements:
 - 1. Section 233300 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers.
 - 2. Section 233713.23 "Air Registers and Grilles" for adjustable-bar register and grilles, fixed-face registers and grilles, and linear bar grilles.
 - 3. Section 233713.43 "Security Registers and Grilles" for security registers and security grilles.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
 - 2. Diffuser Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.
- B. Samples: For each exposed product and for each color and texture specified. Actual size of smallest diffuser indicated.
- C. Samples for Initial Selection: For diffusers with factory-applied color finishes. Actual size of smallest diffuser indicated.
- D. Samples for Verification: For diffusers, in manufacturer's standard sizes to verify color selected. Actual size of smallest diffuser indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Ceiling suspension assembly members.
 2. Method of attaching hangers to building structure.
 3. Size and location of initial access modules for acoustical tile.
 4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 5. Duct access panels.
- B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 PERFORATED DIFFUSERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Krueger.
 2. Nailor Industries Inc.
 3. Price Industries.
 4. Titus
 5. Tuttle & Bailey
- B. Devices shall be specifically designed for variable-air-volume flows.
- C. Material: Steel backpan and pattern controllers, with steel face Finish: Per the project drawings.
- D. Mounting: Per the drawings
- E. Pattern: Core style per the drawings.
- F. Dampers: Radial opposed blade as required by drawings.
- G. Accessories:
1. Square to round neck adaptor.

2.2 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate diffusers according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where diffusers are installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install diffusers level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install diffusers with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

- A. After installation, adjust diffusers to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713.13

SECTION 233713.23 - AIR REGISTERS AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Fixed face egg crate grilles.
- B. Related Requirements:
 - 1. Section 233300 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to registers and grilles.
 - 2. Section 233713.13 "Air Diffusers" for various types of air diffusers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
 - 2. Register and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.
- B. Samples: For each exposed product and for each color and texture specified. Smallest size register and grille indicated.
- C. Samples for Initial Selection: For registers and grilles with factory-applied color finishes. Smallest size register and grille indicated.
- D. Samples for Verification: For registers and grilles, in manufacturer's standard sizes to verify color selected. Smallest size register and grille indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Ceiling suspension assembly members.
 2. Method of attaching hangers to building structure.
 3. Size and location of initial access modules for acoustical tile.
 4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 5. Duct access panels.
- B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 GRILLES

- A. Fixed Face Egg Crate Grille:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Krueger.
 - b. Nailor Industries Inc.
 - c. Price Industries.
 - d. Titus.
 - e. Tuttle & Bailey.
 2. Finish: Baked enamel, white.
 3. Face Arrangement: [1/2-by-1/2-by-1/2-inchgrid core.
 4. Core Construction: Removable.
 5. Frame: 1-1/4wide.
 6. Mounting: Lay in.

2.2 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate registers and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where registers and grilles are installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install registers and grilles level and plumb.
- B. Outlets and Inlets Locations: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install registers and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

- A. After installation, adjust registers and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713.23

SECTION 238129 - MINI-SPLIT HVAC SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes complete HVAC system(s) including, but not limited to, delegated design and the following components to make a complete operating system(s) according to requirements indicated:
 - 1. Indoor, suspended, ceiling-mounted units.
 - 2. Outdoor, air-source, heat-pump units.
 - 3. System controls.
 - 4. System refrigerant and oil
 - 5. System condensate drain piping.
 - 6. System refrigerant piping.
 - 7. Metal hangers and supports.
 - 8. Metal framing systems.
 - 9. Fastener systems.
 - 10. Miscellaneous support materials.
 - 11. Piping and tubing insulation.

1.3 DEFINITIONS

- A. Air-Conditioning System Operation: System capable of operation with all zones in cooling only.
- B. Heat-Pump System Operation: System capable of operation with all zones in either heating or cooling, but not with simultaneous heating and cooling zones that transfer heat between zones.
- C. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.
- D. Plenum: A space forming part of the air distribution system to which one or more air ducts are connected. An air duct is a passageway, other than a plenum, for transporting air to or from heating, ventilating, or air-conditioning equipment.
- E. Two-Pipe System Design: One refrigerant vapor line and one refrigerant liquid line connect a single outdoor unit to associated indoor units.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for indoor and outdoor units.
 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
 3. Include operating performance at design conditions and at extreme maximum and minimum outdoor ambient conditions.
 4. Include description of system controllers, dimensions, features, control interfaces and connections, power requirements, and connections.
 5. Include system operating sequence of operation in narrative form for each unique indoor- and outdoor-unit.
 6. Include description of control software features.
 7. Include total refrigerant required and a comprehensive breakdown of refrigerant required by each system installed.
 8. Include refrigerant type and data sheets showing compliance with requirements indicated.
 9. For system design software.
 10. Indicate location and type of service access.
- B. Shop Drawings: For Mini-split HVAC systems.
1. Include plans, elevations, sections, and mounting/attachment details.
 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 3. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.
 4. Include diagrams and details of refrigerant piping and tubing showing installation requirements for manufacturer-furnished divided flow fittings.
 5. Include diagrams for power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data:
1. For Installer: Certificate from Mini-split HVAC system manufacturer certifying that Installer is a factory authorized technician and has successfully completed prerequisite training administered by manufacturer for proper installation of systems, including but not limited to, equipment, piping, controls, and accessories indicated and furnished for installation.
 - a. Retain copies of Installer certificates on-site and make available on request.

- B. Seismic Qualification Data: Certificates, for equipment, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Source quality-control reports.
- D. Field quality-control reports.
- E. Sample Warranties: For manufacturer's warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For Mini-split HVAC systems to include in emergency, operation, and maintenance manuals.
- B. Software and Firmware Operational Documentation:
 - 1. Software operating and upgrade manuals.
 - 2. Program Software Backup: On CD or DVD, USB media, or approved cloud storage platform, complete with data files.
 - 3. Device address list.
 - 4. Printout of software application and graphic screens.

1.7 QUALITY ASSURANCE

- A. Factory-Authorized Service Representative Qualifications:
 - 1. Authorized representative of, and trained by, Mini-split HVAC system manufacturer.
 - 2. In-place facility located within 30 miles of Project.
 - 3. Demonstrated past experience with products being installed for period within three consecutive years before time of bid.
 - 4. Demonstrated past experience on five projects of similar complexity, scope, and value.
 - a. Each person assigned to Project shall have demonstrated past experience.
 - 5. Staffing resources of competent and experienced full-time employees that are assigned to execute work according to schedule.

6. Service and maintenance staff assigned to support Project during warranty period.
 7. Product parts inventory to support ongoing system operation for a period of not less than five years after Substantial Completion.
 8. Mini-split HVAC system manufacturer's backing to take over execution of Work if necessary to comply with requirements indicated. Include Project-specific written letter, signed by manufacturer's corporate officer, if requested.
- B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by Mini-split HVAC system manufacturer.
1. Each employee shall be certified by manufacturer for proper installation of systems, including, but not limited to, equipment, piping, controls, and accessories indicated and furnished for installation.
 2. Installer certification shall be valid and current for duration of Project.
 3. Retain copies of Installer certificates on-site and make available on request.
 4. Each person assigned to Project shall have demonstrated past experience.
 - a. Demonstrated past experience with products being installed for period within three consecutive years before time of bid.
 - b. Demonstrated past experience on five projects of similar complexity, scope, and value.
 5. Installers shall have staffing resources of competent, trained, and experienced full-time employees that are assigned to execute work according to schedule.
- C. ISO Compliance: System equipment and components furnished by Mini-split HVAC system manufacturer shall be manufactured in an ISO 9001 and ISO 14001 facility.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in a clean and dry place.
- B. Comply with manufacturer's written rigging and installation instructions for unloading and moving to final installed location.
- C. Handle products carefully to prevent damage, breaking, denting, and scoring. Do not install damaged products.
- D. Protect products from weather, dirt, dust, water, construction debris, and physical damage.
 1. Retain factory-applied coverings on equipment to protect finishes during construction and remove just prior to operating unit.
 2. Cover unit openings before installation to prevent dirt and dust from entering inside of units. If required to remove coverings during unit installation, reapply coverings over openings after unit installation and remove just prior to operating unit.

- E. Replace installed products damaged during construction.

1.9 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace equipment and components that fail(s) in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Faulty operation.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Period:
 - a. For Compressor: 5 year(s) from date of Substantial Completion.
 - b. For Parts, Including Controls: 5 year(s) from date of Substantial Completion.
 - c. For Labor: 1 year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Daikin AC (Americas), Inc.
 - 2. LG Electronics.
 - 3. Mitsubishi Electric & Electronics USA, Inc.
- B. Source Limitations: Obtain products from single source from single manufacturer including, but not limited to, the following:
 - 1. Indoor and outdoor units, including accessories.
 - 2. Controls and software.
 - 3. Refrigerant isolation valves.
 - 4. Specialty refrigerant pipe fittings.

2.2 SYSTEM DESCRIPTION

- A. Direct-expansion (DX) Mini-split HVAC system(s) with variable capacity in response to varying cooling and heating loads. System shall consist of multiple indoor units, outdoor unit(s), piping, controls, and electrical power to make complete operating system(s) complying with requirements indicated.

1. Two-pipe system design.
 2. System(s) operation, air-conditioning, heat pump as indicated on Drawings.
 3. Each system with one refrigerant circuit shared by all indoor units connected to system.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. AHRI Compliance: System and equipment performance certified according to AHRI 1230 and products listed in AHRI directory.
- D. ASHRAE Compliance:
1. ASHRAE 15: For safety code for mechanical refrigeration.
 2. ASHRAE 62.1: For indoor air quality.
 3. ASHRAE 135: For control network protocol with remote communication.
 4. ASHRAE/IES 90.1 Compliance: For system and component energy efficiency.
- E. UL Compliance: Comply with UL 1995.

2.3 PERFORMANCE REQUIREMENTS

- A. Service Access:
1. Provide and document service access requirements.
 2. Locate equipment, system isolation valves, and other system components that require service and inspection in easily accessible locations. Avoid locations that are difficult to access if possible.
 3. Where serviceable components are installed behind walls and above inaccessible ceilings, provide finished assembly with access doors or panels to gain access. Properly size the openings to allow for service, removal, and replacement.
 4. If less than full and unrestricted access is provided, locate components within an 18-inch reach of the finished assembly.
 5. Where ladder access is required to service elevated components, provide an installation that provides for sufficient access within ladder manufacturer's written instructions for use.
 6. Comply with OSHA regulations.
- B. System Design and Installation Requirements:
1. Design and install systems indicated according to manufacturer's recommendations and written instructions.
 2. Where manufacturer's requirements differ from requirements indicated, contact Architect for direction. The most stringent requirements should apply unless otherwise directed in writing by Architect.

- C. Isolation of Equipment: Provide isolation valves to isolate each indoor unit and outdoor unit for service, removal, and replacement without interrupting system operation.
- D. System Capacity Ratio: The sum of connected capacity of all indoor units shall be within the following range of outdoor-unit rated capacity:
 - 1. Not less than 60 percent.
 - 2. Not more than 130 percent.
 - 3. Range acceptable to manufacturer.
- E. System Auto Refrigerant Charge: Each system shall have an automatic refrigerant charge function to ensure the proper amount of refrigerant is installed in system.
- F. Outdoor Conditions:
 - 1. Suitable for outdoor ambient conditions encountered.
 - a. Design equipment and supports to withstand wind loads of governing code and ASCE/SEI 7.
 - b. Design equipment and supports to withstand snow and ice loads of governing code and ASCE/SEI 7.
 - 2. Maximum System Operating Outdoor Temperature: 110 F.
 - 3. Minimum System Operating Outdoor Temperature: -12 F.
- G. Seismic Performance: Mini-split HVAC system(s) shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the system will remain in place without separation of any parts when subjected to the seismic forces specified."
 - 2. Component Importance Factor: 1.0.
- H. Sound Performance: Sound levels generated by operating HVAC equipment shall be within requirements indicated.
 - 1. Indoor: Within design guidelines of "2015 ASHRAE HANDBOOK- HVAC Applications."
 - 2. Outdoor: Sound pressure levels shall not exceed 52 dB (A) during cooling operation for Heat Pump.
- I. Thermal Movements: Allow for controlled thermal movements from ambient, surface, and system temperature changes.
- J. Capacities and Characteristics: As indicated on Drawings.

2.4 INDOOR, SUSPENDED, CEILING-MOUNTED UNITS

- A. Description: Factory-assembled complete unit with components, piping, wiring, and controls required for mating to piping, power, and controls field connections.
- B. Cabinet:
1. Material: Painted steel, or coated steel frame covered by a plastic cabinet, with an architectural acceptable finish suitable for tenant occupancy on exposed surfaces.
 2. Insulation: Manufacturer's standard internal insulation, complying with ASHRAE 62.1, to provide thermal resistance and prevent condensation.
 3. Mounting: Manufacturer-designed provisions for field installation.
 4. Internal Access: Removable panels of adequate size for field access to internal components for inspection, cleaning, service, and replacement.
- C. DX Coil Assembly:
1. Coil Casing: Aluminum, galvanized, or stainless steel.
 2. Coil Fins: Aluminum, mechanically bonded to tubes, with arrangement required by performance.
 3. Coil Tubes: Copper, of diameter and thickness required by performance.
 4. Expansion Valve: Electronic modulating type with linear or proportional characteristics.
 5. Unit Internal Tubing: Copper tubing with brazed joints.
 6. Unit Internal Tubing Insulation: Manufacturer's standard insulation, of thickness to prevent condensation.
 7. Field Piping Connections: Manufacturer's standard.
 8. Factory Charge: Dehydrated air or nitrogen.
 9. Testing: Factory pressure tested and verified to be without leaks.
- D. Drain Assembly:
1. Pan: Non-ferrous material, with bottom sloped to low point drain connection.
 2. Condensate Removal: Unit-mounted pump or other integral lifting mechanism, capable of lifting drain water to the appropriate drawing location. Routing, elevation and termination locations is to be coordinated with Plumbing Design Drawings.
 3. Field Piping Connection: Non-ferrous material.
 4. Drain Pan Sensor: Drain pan sensor shall be provided and interlocked with unit operation. Upon detection of excess condensate, indoor unit is to shut down.
- E. Fan and Motor Assembly:
1. Fan(s):
 - a. Direct-drive arrangement.

- b. Single or multiple fans connected to a common motor shaft and driven by a single motor.
 - c. Fabricated from non-ferrous components or ferrous components with corrosion protection finish.
 - d. Wheels statically and dynamically balanced.
2. Motor: Brushless dc or electronically commutated with permanently lubricated bearings.
 3. Motor Protection: Integral protection against thermal, overload, and voltage fluctuations.
 4. Speed Settings and Control: Two (low, high), three (low, medium, high), or more than three speed settings or variable speed with a speed range of least 50 percent.
- F. Filter Assembly:
1. Access: Front, to accommodate filter replacement without the need for tools.
 2. Washable Media: Manufacturer's standard filter with antimicrobial treatment.
- G. Discharge-Air Grille Assembly: Mounted in front of unit cabinet.
1. Discharge Pattern: One-way throw.
 2. Discharge Pattern Adjustment: Field-adjustable limits for range of pattern.
 3. Motorized Vanes: Modulating up and down flow pattern for uniform room air distribution.
- H. Return-Air Grille Assembly: Manufacturer's standard.
- I. Outdoor Air Ventilation Connection: Sheet metal knockout for optional connection to outdoor air ventilation duct.
- J. Unit Accessories:
1. Remote Room Temperature Sensor Kit: Wall-mounted, hardwired room temperature sensor kit for use in rooms that do not have room temperature measurement.
 2. Condensate Pump: Integral reservoir and control with electrical power connection through unit power.
- K. Vibration Control: Integral isolation to dampen vibration transmission. Filter Assembly:
1. Access: Front, to accommodate filter replacement without the need for tools.
 2. Washable Media: Manufacturer's standard filter with antimicrobial treatment.
- L. Unit Accessories:
1. Thermostat interface Card: Interface shall be provided to allow the indoor unit to interface with third-party controller provided by controls contractor.
 2. Condensate Pump: Integral reservoir and control with electrical power connection through unit power.

3. Communication: Network communication with other indoor and outdoor units.
4. Cable and Wiring: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
5. Field Connection: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.

M. Unit Electrical:

1. Enclosure: Manufacturer's standard, and suitable for indoor locations.
2. Field Connection: Single point connection to power entire unit and integral controls.
3. Disconnecting Means: Factory-mounted circuit breaker or switch, complying with NFPA 70.
4. Control Transformer: Manufacturer's standard. Coordinate requirements with field power supply.
5. Wiring: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
6. Raceways: Enclose line voltage wiring in raceways to comply with NFPA 70.

2.5 OUTDOOR, AIR-SOURCE HEAT-PUMP UNITS

- A. Description: Factory-assembled and -tested complete unit with components, piping, wiring, and controls required for mating to piping, power, and controls field connections.

1. Specially designed for use in systems with either all heating or all cooling demands, but not for use in systems with simultaneous heating and cooling.
2. Systems shall consist of one unit, or multiple unit modules that are designed by variable refrigerant system manufacturer for field interconnection to make a single refrigeration circuit that connects multiple indoor units.
3. All units installed shall be from the same product development generation.

B. Cabinet:

1. Galvanized steel and coated with a corrosion-resistant finish.
 - a. Coating with documented salt spray test performance of 1000 hours according ASTM B 117 surface scratch test (SST) procedure.
2. Mounting: Manufacturer-designed provisions for field installation.
3. Internal Access: Removable panels or hinged doors of adequate size for field access to internal components for inspection, cleaning, service, and replacement.

C. Compressor and Motor Assembly:

1. One or more positive-displacement, direct-drive and hermetically sealed scroll compressor(s).

2. Protection: Integral protection against the following:
 - a. High refrigerant pressure.
 - b. Low oil level.
 - c. High oil temperature.
 - d. Thermal and overload.
 - e. Voltage fluctuations.
 - f. Phase failure and phase reversal.
 - g. Short cycling.
 3. Speed Control: Variable to automatically maintain refrigerant suction and condensing pressures while varying refrigerant flow to satisfy system cooling and heating loads.
 4. Vibration Control: Integral isolation to dampen vibration transmission.
 5. Oil management system to ensure safe and proper lubrication over entire operating range.
 6. Crankcase heaters with integral control to maintain safe operating temperature.
 7. Fusible plug.
 8. Low ambient kits
- D. Condenser Coil Assembly:
1. Plate Fin Coils:
 - a. Casing: Aluminum, galvanized, or stainless steel.
 - b. Fins: Aluminum or copper, mechanically bonded to tubes, with arrangement required by performance.
 - c. Tubes: Copper, of diameter and thickness required by performance.
 2. Aluminum Microchannel Coils:
 - a. Series of flat tubes containing a series of multiple, parallel-flow microchannels layered between refrigerant header manifolds.
 - b. Single- or multiple-pass arrangement.
 - c. Construct fins, tubes, and header manifolds of aluminum alloy.
 3. Corrosion Protection: Coating with documented salt spray test performance of 1000 hours according ASTM B 117 surface scratch test (SST) procedure.
 4. Hail Protection: Provide condenser coils with louvers, baffles, or hoods to protect against hail damage.
- E. Condenser Fan and Motor Assembly:
1. Fan(s): Propeller type.
 - a. Direct-drive arrangement.
 - b. Fabricated from non-ferrous components or ferrous components with corrosion protection finish to match performance indicated for condenser coil.

- c. Dynamically balanced.
 2. Fan Guards: Removable safety guards complying with OSHA regulations. If using metal materials, coat with corrosion-resistant coating to match performance indicated for condenser coil.
 3. Motor(s): Brushless dc or electronically commutated with permanently lubricated bearings and rated for outdoor duty.
 4. Motor Protection: Integral protection against thermal, overload, and voltage fluctuations.
 5. Speed Settings and Control: Variable speed with a speed range of least 75 percent.
 6. Vibration Control: Integral isolation to dampen vibration transmission.
- F. Drain Pan: If required by manufacturer's design, provide unit with non-ferrous drain pan with bottom sloped to a low point drain connection.
- G. Unit Controls:
1. Enclosure: Manufacturer's standard, and suitable for unprotected outdoor locations.
 2. Factory-Installed Controller: Configurable digital control.
 3. Factory-Installed Sensors:
 - a. Refrigerant suction temperature.
 - b. Refrigerant discharge temperature.
 - c. Outdoor air temperature.
 - d. Refrigerant high pressure.
 - e. Refrigerant low pressure.
 - f. Oil level.
 4. Features and Functions: Self-diagnostics, time delay, auto-restart, fuse protection, auto operation mode , manual operation mode , night setback control, run test switch equalize run time between multiple same components.
 5. Communication: Network communication with indoor units and other outdoor unit(s).
 6. Cable and Wiring: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
 7. Field Connection: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
 8. Factory Bacnet interface
- H. Unit Electrical:
1. Enclosure: Metal, similar to enclosure, and suitable for unprotected outdoor locations.
 2. Field Connection: Single point connection to power entire unit and integral controls.
 3. Disconnecting Means: Factory-mounted circuit breaker or switch, complying with NFPA 70.

4. Control Transformer: Manufacturer's standard. Coordinate requirements with field power supply.
 5. Wiring: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
 6. Raceways: Enclose line voltage wiring in raceways to comply with NFPA 70.
- I. Unit Hardware: Zinc-plated steel, or stainless steel. Coat exposed surfaces with additional corrosion-resistant coating if required to prevent corrosion when exposed to salt spray test for 1000 hours according ASTM B 117.
- J. Unit Piping:
1. Unit Tubing: Copper tubing with brazed joints.
 2. Unit Tubing Insulation: Manufacturer's standard insulation, of thickness to prevent condensation.
 3. Field Piping Connections: Manufacturer's standard.
 4. Factory Charge: Dehydrated air or nitrogen.
 5. Testing: Factory pressure tested and verified to be without leaks.

2.6 SYSTEM CONTROLS

A. General Requirements:

1. Network: Indoor units and outdoor units shall include integral controls and connect through a manufacturer-selected control network.
2. Network Communication Protocol: Control communication between interconnected units.
 - a. Users shall be capable of interface with controllers for indoor units control to extent privileges are enabled. Control features available to users shall include the following:
 - 1) On/off control.
 - 2) Temperature set-point adjustment.

2.7 SYSTEM REFRIGERANT AND OIL

A. Refrigerant:

1. As required by Mini-Split HVAC system manufacturer for system to comply with performance requirements indicated.

B. Oil:

1. As required by Mini-Split HVAC system manufacturer and to comply with performance requirements indicated.

2.8 SYSTEM REFRIGERANT PIPING

A. Refrigerant Tubing Kits:

1. Furnished by Mini-Split HVAC system manufacturer.
2. Factory-rolled and -bundled, soft-copper tubing with tubing termination fittings at each end.
3. Standard one-piece length for connecting to indoor units.
4. Pre-insulated with flexible elastomeric insulation of thickness to comply with governing energy code and sufficient to eliminate condensation.
5. Factory Charge: Dehydrated air or nitrogen.

B. Refrigerant Isolation Ball Valves:

1. Description: Uni-body full port design, rated for maximum system temperature and pressure, and factory tested under pressure to ensure tight shutoff. Designed for valve operation without removing seal cap.
2. Seals: Compatible with system refrigerant and oil. Seal service life of at least 20 years.
3. Valve Connections: Flare or sweat depending on size.

2.9 PIPING AND TUBING INSULATION

A. Comply with requirements in Section 230719 "HVAC Piping Insulation" for system piping insulation requirements.

B. Refrigerant Tubing Insulation and Jacket Requirements:

1. Flexible Elastomeric Insulation:
 - a. Closed-cell, sponge- or expanded-rubber materials, complying with ASTM C 534, Type I for tubular materials.
 - b. Indoors: 1.5 inch thick.
 - c. Outdoors: 2inchthick.
2. Field-Applied Jacket:
 - a. Concealed: None required.
 - b. Indoors, Exposed to View: PVC, 20 mils thick.
 - c. Outdoors, Exposed to View: Aluminum, smooth, 0.020 inch thick

C. Metal Jacket Flashing Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: Aluminum.

2.10 SYSTEM CONTROL CABLE

- A. Cable Rating: Listed and labeled for application according to NFPA 70.
 - 1. Flame Travel and Smoke Density in Plenums: As determined by testing identical products according to NFPA 262, by a qualified testing agency. Identify products for installation in plenums with appropriate markings of applicable testing agency.
 - a. Flame Travel Distance: 60 inches or less.
 - b. Peak Optical Smoke Density: 0.5 or less.
 - c. Average Optical Smoke Density: 0.15 or less.
 - 2. Flame Travel and Smoke Density for Riser Cables in Non-Plenum Building Spaces: As determined by testing identical products according to UL 1666.
 - 3. Flame Travel and Smoke Density for Cables in Non-Riser Applications and Non-Plenum Building Spaces: As determined by testing identical products according to UL 1685.
- B. Low-Voltage Control Cabling:
 - 1. Paired Cable: NFPA 70, Type CMG.
 - a. One pair, twisted, No. 16 AWG, stranded (19x29) or No. 18 AWG, stranded (19x30) tinned-copper conductors as required by Mini-split HVAC system manufacturer.
 - b. PVC insulation.
 - c. Braided or foil shielded.
 - d. PVC jacket.
 - e. Flame Resistance: Comply with UL 1685.
 - 2. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.
 - a. One pair, twisted, No. 16 AWG, stranded (19x29) or No. 18 AWG, stranded (19x30) tinned-copper conductors as required by Mini-split HVAC system manufacturer.
 - b. PVC insulation.
 - c. Braided or foil shielded.
 - d. PVC jacket.
 - e. NFPA 262 includes the standard flame-resistance test criteria in common use for cables and conductors.
 - f. Flame Resistance: Comply with NFPA 262.
- C. TIA-485A Network Cabling:
 - 1. Standard Cable: NFPA 70, Type CMG.

- a. Paired, two pairs, twisted, No. 22 AWG, stranded (7x30) tinned-copper conductors.
 - b. PVC insulation.
 - c. Unshielded.
 - d. PVC jacket.
 - e. Flame Resistance: Comply with UL 1685.
2. Plenum-Rated Cable: NFPA 70, Type CMP.
- a. Paired, No. 22 AWG, stranded (7x30) tinned-copper conductors.
 - b. Fluorinated ethylene propylene insulation.
 - c. Unshielded.
 - d. Fluorinated ethylene propylene jacket.
 - e. NFPA 262 includes the standard flame-resistance test criteria in common use for cables and conductors.
 - f. Flame Resistance: NFPA 262.
- D. Ethernet Network Cabling: TIA-568-C.2 Category 6 cable with RJ-45 connectors.
1. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of category cable indicated.
 2. Conductors: 100-ohm, 23 AWG solid copper.
 3. Shielding: Shielded twisted pairs (FTP).
 4. Cable Rating: By application.
 5. Jacket: Gray thermoplastic.
- E. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems" for control wiring and cable raceways.

2.11 SOURCE QUALITY CONTROL

- A. Factory Tests: Test and inspect factory-assembled equipment.
- B. Equipment will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports for historical record. Submit reports only if requested.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

- B. Examine products before installation. Reject products that are wet, moisture damaged, or mold damaged.
- C. Examine roughing-in for piping and tubing to verify actual locations of connections before equipment installation.
- D. Examine roughing-in for wiring and conduit to verify actual locations of connections before equipment installation.
- E. Examine walls, floors, roofs, and outdoor pads for suitable conditions where equipment will be installed.
- F. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EQUIPMENT INSTALLATION, GENERAL

- A. Clearance:
 - 1. Maintain manufacturer's recommended clearances for service and maintenance.
 - 2. Maintain clearances required by governing code.
- B. Loose Components: Install components, devices, and accessories furnished by manufacturer, with equipment, that are not factory mounted.
 - 1. Loose components shall be installed by manufacturer's service representative or system Installer under supervision of manufacturer's service representative.
- C. Equipment Restraint Installation: Install equipment with seismic-restraint device. Comply with requirements for seismic-restraint devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."

3.3 INSTALLATION OF INDOOR UNITS

- A. Install units to be level and plumb while providing a neat and finished appearance.
- B. Unless otherwise required by Mini-Split HVAC system manufacturer, support ceiling-mounted units from structure above using threaded rods; minimum rod size of 3/8 inch.
- C. Adjust supports of exposed and recessed units to draw units tight to adjoining surfaces.
- D. Protect finished surfaces of ceilings, floors, and walls that come in direct contact with units. Refinish or replaced damaged areas after units are installed.

- E. In rooms with ceilings, conceal piping and tubing, controls, and electrical power serving units above ceilings.
- F. In rooms without ceiling, arrange piping and tubing, controls, and electrical power serving units to provide a neat and finished appearance.
- G. Provide lateral bracing if needed to limit movement of suspended units to not more than 0.25 inch.
- H. For floor- and wall-mounted units that are exposed, conceal piping and tubing, controls, and electrical power serving units within walls.
- I. Attachment: Install hardware for proper attachment to supported equipment.
- J. Grouting: Place grout under equipment supports and make bearing surface smooth.

3.4 INSTALLATION OF OUTDOOR UNITS

- A. Install units to be level and plumb while providing a neat and finished appearance.
- B. Install outdoor units on support structures indicated on Drawings.
- C. Roof-Mounted Installations: Install outdoor units on equipment supports specified in Section 077200 "Roof Accessories." Anchor units to supports with removable, stainless-steel fasteners utilizing vibration pads.

3.5 GENERAL REQUIREMENTS FOR PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping and tubing systems. Install piping and tubing as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping and tubing in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping and tubing at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping and tubing above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping and tubing to permit valve servicing.
- F. Install piping and tubing at indicated slopes.
- G. Install piping and tubing free of sags.
- H. Install fittings for changes in direction and branch connections.

- I. Install piping and tubing to allow application of insulation.
- J. Install groups of pipes and tubing parallel to each other, spaced to permit applying insulation with service access between insulated piping and tubing.
- K. Install sleeves for piping and tubing penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- L. Install escutcheons for piping and tubing penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."

3.6 INSTALLATION OF REFRIGERANT PIPING

- A. Refrigerant Tubing Kits:
 - 1. Unroll and straighten tubing to suit installation. Deviations in straightness of exposed tubing shall be unnoticeable to observer.
 - 2. Support tubing using hangers and supports indicated at intervals not to exceed 5 feet. Minimum rod size, 1/4 inch.
 - 3. Prepare tubing ends and make mating connections to provide a pressure tight and leak-free installation.
- B. Install refrigerant piping according to ASHRAE 15 and governing codes.
- C. Select system components with pressure rating equal to or greater than system operating pressure.
- D. Install piping as short and direct as possible, with a minimum number of joints and fittings.
- E. Arrange piping to allow inspection and service of equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Section 083113 "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.
- F. Install refrigerant piping and tubing in protective conduit where installed belowground.
- G. Install refrigerant piping and tubing in rigid or flexible conduit in locations where exposed to mechanical damage.
- H. Unless otherwise required by Mini-Split HVAC system manufacturer, slope refrigerant piping and tubing as follows:
 - 1. Install horizontal hot-gas discharge piping and tubing with a uniform slope downward away from compressor.
 - 2. Install horizontal suction lines with a uniform slope downward to compressor.

3. Install traps to entrain oil in vertical runs.
 4. Liquid lines may be installed level.
- I. When brazing, remove or protect components that could be damaged by heat.
 - J. Before installation, clean piping, tubing, and fittings to cleanliness level required by Mini-Split HVAC system manufacturer.
 - K. Joint Construction:
 1. Ream ends of tubes and remove burrs.
 2. Remove scale, slag, dirt, and debris from inside and outside of tube and fittings before assembly.
 3. Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.
 - a. Use Type BCuP (copper-phosphorus) alloy for joining copper fittings with copper tubing.
 - b. Use Type BAg (cadmium-free silver) alloy for joining copper with bronze.

3.7 INSTALLATION OF METAL HANGERS AND SUPPORTS

- A. Comply with requirements in Section 230548 "Vibration and Seismic Controls for HVAC" for seismic restraints.
- B. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.
- D. Comply with MFMA-103 for metal framing system selections and applications that are not specified.
- E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- F. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- G. Install lateral bracing with pipe hangers and supports to prevent swaying.
- H. Install building attachments within concrete slabs or attach to structural steel.
 1. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

- I. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- J. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- K. Piping and Tubing Insulation:
 - 1. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - 2. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
- L. Horizontal-Piping Hangers and Supports: Install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
 - 2. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
 - 3. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 - 4. Multiple horizontal pipes located indoors may use metal framing systems with split clamp attachment for each pipe in lieu of individual clevis hangers.
 - 5. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
 - 6. On plastic pipe, install pads or cushions on bearing surfaces to prevent hanger from scratching pipe.
- M. Horizontal Piping Hanger Spacing and Rod Size: Install hangers for drawn-temper copper piping with the following maximum horizontal spacing and minimum rod sizes:
 - 1. Sizes through NPS 3/4: Maximum span, 5 feet; minimum rod size, 1/4 inch.
 - 2. NPS 1: Maximum span, 6 feet; minimum rod size, 1/4 inch.
 - 3. NPS 1-1/4: Maximum span, 7 feet; minimum rod size, 3/8 inch.
 - 4. NPS 1-1/2: Maximum span, 8 feet; minimum rod size, 3/8 inch.
 - 5. NPS 2: Maximum span, 8 feet; minimum rod size, 3/8 inch.
 - 6. NPS 2-1/2: Maximum span, 9 feet; minimum rod size, 3/8 inch.
 - 7. NPS 3 and Larger: Maximum span, 10 feet; minimum rod size, 3/8 inch.
- N. Plastic Pipe Hanger and Support Spacing:
 - 1. Space hangers and supports according to pipe manufacturer's written instructions for service conditions.
 - 2. Maximum spacing, 5 feet; minimum rod size, 1/4 inch.
- O. Vertical-Piping Clamps: Install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8).
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): If longer ends are required for riser clamps.
- P. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified.
- Q. Use hangers, supports, and attachments with galvanized coatings unless otherwise indicated.
- R. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- S. Trim excess length of continuous-thread hanger and support rods to 1/2 inch.
- T. Hanger-Rod Attachments: Install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 3. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 4. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- U. Building Attachments: Install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction, to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:

- a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

3.8 INSTALLATION OF PIPING AND TUBING INSULATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated. Installation to maintain a continuous vapor barrier.
- B. Insulation Installation on Pipe Fittings and Elbows:
 1. Install mitered sections of pipe insulation.
 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Valves and Pipe Specialties:
 1. Install preformed valve covers manufactured of same material as pipe insulation when available.
 2. When preformed valve covers are unavailable, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 3. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.9 INSTALLATION OF DUCT, ACCESSORIES, AND AIR OUTLETS

- A. Where installing ductwork adjacent to equipment, allow space for service and maintenance.

3.10 ELECTRICAL INSTALLATION

- A. Comply with requirements indicated on Drawings and in applicable Division 26 Sections.
- B. To extent electrical power is required for system equipment, components, and controls, and is not indicated on Drawings and addressed in the Specifications, the design for such electrical power shall be delegated to Mini-split HVAC system provider.
 - 1. Delegated design of electrical power to equipment, components and controls, and associated installation shall be included at no additional cost to Owner.
- C. Connect field electrical power source to each separate electrical device requiring field electrical power. Coordinate termination point and connection type with Installer.
- D. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.
- E. Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems" for grounding connections.
- F. Install nameplate or acrylic label with self-adhesive back for each electrical connection indicating electrical equipment designation and circuit number feeding connection.
 - 1. Nameplate shall be laminated phenolic layers of black with engraved white letters. Letters at least 1/2 inch high.
 - 2. Locate nameplate or label where easily visible.
- G. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems" for raceway selection and installation requirements for boxes, conduits, and wireways as supplemented or revised in this Section.
 - 1. Outlet boxes shall be no smaller than 2 inches wide, 3 inches high, and 2-1/2 inches deep.
 - 2. Outlet boxes for cables shall be no smaller than 4 inches square by 1-1/2 inches deep with extension ring sized to bring edge of ring to within 1/8 inch of the finished wall surface.
 - 3. Flexible metal conduit shall not be used.
- H. Comply with TIA-569-D for pull-box sizing and length of conduit and number of bends between pull points.
- I. Install manufactured conduit sweeps and long-radius elbows if possible.
- J. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

3.11 INSTALLATION OF SYSTEM CONTROL CABLE

- A. Comply with NECA 1.
- B. Installation Method:
 - 1. Install cables in raceways except as follows:
 - a. Within equipment and associated control enclosures.
 - b. In accessible ceiling spaces where open cable installation method may be used.
 - c. In gypsum board partitions where cable may be enclosed within wall cavity.
 - 2. Conceal raceway and cables except in unfinished spaces.
- C. General Requirements for Cabling:
 - 1. Comply with TIA-568-C Series of standards.
 - 2. Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems."
 - 3. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
 - 4. Cables may not be spliced and shall be continuous from terminal to terminal. Do not splice cable.
 - 5. Cables serving a common system may be grouped in a common raceway. Install control cable in separate raceway from power wiring. Do not group conductors from different systems or different voltages.
 - 6. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 - 7. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems." Install lacing bars and distribution spools.
 - 8. Do not install bruised, kinked, scored, deformed, or abraded cable. Remove and discard cable if damaged during installation and replace it with new cable.
 - 9. Cold-Weather Installation: Bring cable to room temperature before dereeling. Do not use heat lamps for heating.
 - 10. Pulling Cable: Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems." Monitor cable pull tensions.
 - 11. Support: Do not allow cables to lie on removable ceiling tiles or access panels.
 - 12. Secure: Fasten securely in place with hardware specifically designed and installed so as to not damage cables.
 - 13. Provide strain relief.
 - 14. Keep runs short. Allow extra length for connecting to terminals.
 - 15. Do not bend cables in a radius less than 10 times the cable OD.

16. Use sleeves or grommets to protect cables from vibration at points where they pass around sharp corners and through penetrations.
 17. Ground wire shall be copper, and grounding methods shall comply with IEEE C2. Demonstrate ground resistance.
- D. Balanced Twisted-Pair Cable Installation:
1. Comply with TIA-568-C.2.
 2. Do not untwist balanced twisted-pair cables more than 1/2 inch at the point of termination to maintain cable geometry.
- E. Open-Cable Installation:
1. Suspend copper cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports not more than 24 inches apart.
 2. Cable shall not be run through or on structural members or in contact with pipes, ducts, or other potentially damaging items. Do not run cables between structural members and corrugated panels.
- F. Separation from EMI Sources: Comply with BICSI TDMM and TIA-569-D recommendations for separating unshielded cable from potential EMI sources including electrical power wiring and equipment.

3.12 FIRESTOPPING

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with TIA-569-D, Annex A, "Firestopping."
- C. Comply with BICSI TDMM, "Firestopping" Chapter.

3.13 GROUNDING INSTALLATION

- A. For data communication wiring, comply with TIA-607-B and with BICSI TDMM, "Bonding and Grounding (Earthing)" Chapter.
- B. For low-voltage control cabling, comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

3.14 IDENTIFICATION

- A. Identify system equipment, piping, tubing, and valves. Comply with requirements for identification specified in Section 230553 "Identification for HVAC Piping and Equipment."
- B. Identify system electrical and controls components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

1. Identify each control cable on each end and at each terminal with a numbered identification tag. Each cable shall have a unique tag.

3.15 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage Mini-Split HVAC system manufacturer's representative to advise and assist installers; witness testing; and observe and inspect components, assemblies, and equipment installations, including controls and connections.

3.16 STARTUP SERVICE

- A. Engage a Mini-Split HVAC system manufacturer's approved representative to perform system(s) startup service.
 1. Service representative shall be an employee of Mini-split HVAC system manufacturer.
 2. Complete startup service of each separate system.
 3. Complete system startup service according to manufacturer's written instructions.
- B. Startup checks shall include, but not be limited to, the following:
 1. Check control communications of equipment and each operating component in system(s).
 2. Check each indoor unit's response to demand for cooling and heating.
 3. Check each indoor unit's response to changes in airflow settings.
 4. Check each indoor unit, and outdoor unit for proper condensate removal.
 5. Check sound levels of each indoor and outdoor unit.
- C. Installer shall accompany manufacturer's representative during startup service and provide manufacturer's representative with requested documentation and technical support during startup service.
 1. Installer shall correct deficiencies found during startup service for reverification.
- D. System Operation Report:
 1. After completion of startup service, manufacturer shall issue a report for each separate system.
 2. Report shall include complete documentation describing each startup check, the result, and any corrective action required.
 3. Manufacturer shall electronically record not less than two hours of continuous operation of each system and submit with report for historical reference.
 - a. All available system operating parameters shall be included in the information submitted.

3.17 ADJUSTING

- A. Adjust equipment and components to function smoothly, and lubricate as recommended by manufacturer.
- B. Adjust initial temperature and humidity set points. Adjust initial airflow settings and discharge airflow patterns.
- C. Set field-adjustable switches and circuit-breaker trip ranges according to Mini-split HVAC system manufacturer's written instructions, and as indicated.
- D. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.18 PROTECTION

- A. Protect products from moisture and water damage. Remove and replace products that are wet, moisture damaged, or mold damaged.
- B. Protect equipment from physical damage. Replace equipment with physical damage that cannot be repaired to new condition. Observable surface imperfections shall be grounds for removal and replacement.
- C. Protect equipment from electrical damage. Replace equipment suffering electrical damage.
- D. Cover and seal openings of equipment to keep inside of equipment clean. Do not remove covers until finish work is complete.

3.19 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of system Installer who are manufacturer's authorized service representative. Include four service visits for preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper equipment and system operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

3.20 SOFTWARE SERVICE AGREEMENT

- A. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.

- B. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.
 - 1. Upgrade Notice: At least 30 days to allow Owner to schedule and access the system and to upgrade computer equipment if necessary.

3.21 DEMONSTRATION

- A. Engage a Mini-Split HVAC system manufacturer's factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain entire system.
- B. Location: Owner shall provide a suitable on-site location to host classroom training.
- C. Training Attendance: For record purposes, document training attendees at the start of each new training session. Record attendee's name, signature, phone number, and e-mail address.
- D. Acceptance: Obtain Architect and Owner written acceptance that training is complete and requirements indicated have been satisfied.

END OF SECTION 238129

SECTION 260000 - ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The Drawings and General provisions of the Contract including the "General Conditions", "Supplementary Conditions", and "General Requirements" of the Contract as written and referred to here are adopted and made part of Division 16.
- B. The Contract Agreement, Bidding documents, and all Addenda issued prior to Contract Agreement execution form a part of these specifications and apply to all Contracts or Subcontracts relating to the electrical systems.

1.02 SUMMARY

- A. The work under this Division shall consist of all labor, materials, equipment, services and related accessories, etc., necessary and required to complete all work as shown or inferred on the Drawings and in the Specifications (Contract Documents).
- B. Provide fixed electrical, telecomm, security, and fire alarm equipment, except where specifically noted otherwise.
- C. Provide portable electrical equipment for the complete system(s).
- D. Provide equipment and/or wiring normally furnished or required for complete electrical and fire alarm systems but not specifically specified on the drawings and/or in specifications, as though specified by both.
- E. All equipment and wiring shall be new, except where specifically shown or specified otherwise.

1.03 WORK INCLUDED IN THIS DIVISION

- A. Electrical, telecomm, security, and fire alarm work includes, but is not limited to
 - 1. Removal or relocation of electrical, telecomm, security, and fire alarm services along with electrical work located on or crossing through project property, above or below grade, obstructing construction of project or conflicting with completed project or any applicable code.
 - 2. Alterations and additions to existing electrical and fire alarm systems.
 - 4. Provide fire alarm control panels, booster panels, circuit breakers, power outlets, convenience outlets, switches, fire alarm initiation and annunciation devices and/or other equipment forming part of a system.

5. Connection of all appliances and equipment including Owner furnished equipment.
6. Complete temporary facilities for construction power and fire alarm systems.
7. Complete alterations and additions to existing fire alarm system.

1.04 WORK NOT INCLUDED IN THIS DIVISION (REFER TO OTHER DIVISIONS OF THESE SPECIFICATIONS)

- A. Installation of motors.
- B. Control wiring for mechanical systems, except where specifically indicated to be provided by Electrical Contractor.

1.05 REFERENCES

NEC:	National Electrical Code (latest edition adopted by local authorities unless otherwise noted).
NFPA:	National Fire Protection Association.
OSHA:	Occupational Safety and Health Administration.
UL:	Underwriters Laboratories, Inc.
NEMA:	National Electrical Manufacturer's Association.
IEEE:	Institute of Electrical and Electronic Engineers.
ACI:	American Concrete Institute.
ADA:	American Disabilities Act.
ASTM:	American Society for Testing Materials.
AWS:	American Welding Society.
FM:	Factory Mutual Insurance Association.
IES:	Illumination Engineering Society.
ISA:	Instrument Society of America.
LPI	Lightning Protection Institute.
NACE:	National Association of Corrosion Engineers.
NETA:	International Electrical Testing Association.
UL:	Underwriters Laboratories.
NECA:	National Electrical Contractors Association.
NETA:	National Electrical Testing Association.

1.06 DEFINITIONS

Provide:	Furnish, install, connect and test until complete.
Wire:	Furnish all necessary wiring, connect and test until complete.
Install:	Furnish, set in place, wire and test until complete.
Work:	Materials completely installed, connected, and tested until complete.
AWG:	American Wire Gage.
Equal:	Acceptable equal as determined by the Engineer.

1.07 REQUIREMENTS OF REGULATORY AGENCIES

- A. Obtain and pay for all permits and inspections required for the work prior to the start of work. Where permits are not obtained prior to the commencement of work, all additional equipment required by the permitting process shall be the responsibility of the contractor and shall not be an extra cost to the owner. Comply with all ordinances pertaining to work described herein. Pay all expenses arising from the procurement of these certificates and include in the base Contract Price.
- B. Install work under this Division per drawings, specifications, latest adopted edition of the National Electrical Code, (NFPA-70) including local amendments and interpretations, Local adopted Building Codes, and any special codes having jurisdiction over specific portions of work within complete installation. In event of conflict, install work per most stringent code requirements determined by Engineer. This does not relieve the Contractor from furnishing and installing work shown or specified which may exceed the requirements of such ordinances, laws, regulations and codes.
- C. All materials, products, devices, fixtures, forms or types of construction included in this project shall meet or exceed the published requirements of National Electrical Code (NEC), American National Standards Institute (ANSI), Institute of Electrical and Electronics Engineers (IEEE) and National Electrical Manufacturers Associations (NEMA). All equipment shall bear the Underwriter's Laboratories (UL) label or equivalent from approved independent testing laboratory.
- D. Arrange, pay fees for and complete work to pass required tests by agencies having authority over work. Deliver to Engineer copies of the Certificates of Inspection and approval issued by authorities and provide original copy of each certificate to Owner.
- E. When required by law or regulations, the governmental agency having jurisdiction for inspections shall be given reasonable notice and opportunity to inspect the work. Any work that is enclosed or covered up before such inspection and test shall be uncovered at the Contractor's expense; after it has been inspected, the Contractor shall restore the work to its original condition at his own expense.

1.08 INSURANCE

- A. The Contractor shall procure and maintain, at his expense, such insurance as required by law and/or specified in the General Conditions.

1.09 DRAWINGS AND SPECIFICATIONS

- A. Drawings and specifications are complementary. Work called for by one is binding as if called for by both. Any discrepancies between drawings and

specifications shall be brought to the attention of the Engineer for clarification during the bidding period. No allowance shall subsequently be made to the Contractor by reason of his failure to have brought said discrepancies to the attention of the Consultant during the bidding period or by reason of any error on the Contractor's part.

- B. Drawings are schematic and diagrammatic in nature. Drawings show general run of circuits and approximate location of equipment. The contractor shall review drawings of all trades to assure coordination prior to placement of work. Right is reserved to change location of equipment and devices, and routing of conduits within 10 feet, without extra cost to Owner.
- C. Use dimensions in figures, shop drawings, etc. and actual site measurements in preference to scaled dimensions. Do not scale drawings for exact sizes or locations – use dimensioned details or actual field conditions. Verify item mounting heights as required by project conditions prior to rough-in.
- D. Discrepancies between different drawings or between drawings and specifications, or regulations and codes governing the installation shall be brought to the attention of the Engineer in writing for determination.
- E. Layout equipment as shown on drawings as close as possible. Verify access requirements for equipment actually furnished, and adjust layout to comply with NEC 110. Right is reserved to change layout within 10 feet without additional cost.
- F. Contractor is responsible to field measure and confirm the mounting heights and location of electrical equipment with respect to counters, doorways, and other architectural, mechanical or structural work. Do not scale distances off the electrical drawings: Use actual building dimensions.
- G. Execution of Contract is evidence that Contractor has examined all existing conditions, drawings and specifications related to work, and is informed to extent and character of work. Later claims for labor and materials required due to difficulties encountered, which could have been foreseen had examination been made, will not be recognized.
- H. All work called for in this Section of the plans and specifications shall be performed under this Section, regardless of whether such work may also have been called for in other Section(s). Discrepancies in or conflicts among the various parts of the contract drawings shall not relieve Contractor of his obligation to perform.
- I. No attempt has been made to establish the required sections or splits of equipment relative to the size of access into the space, building, etc. Contractor shall establish all said splits, sections, etc. necessary to install equipment complete without undue disassembly of equipment or demolition of building parts at site of work.

- J. Charges for extra work are not allowed unless work is authorized by written order from the Owner's Representative approving charges for work.
- K. Check all door swings so devices are not located behind doors. Relocate devices as required with the Consultant's review.
- L. Elevators: Coordination of the fire alarm equipment intertie with the elevator equipment and all work involved in the elevator shaft area shall be completed by an approved elevator contractor. The elevator contractor shall be included as a subcontractor to the fire alarm contractor.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All material shall be new, and have a UL label where available. If UL label is not available, material shall be manufactured in accordance with applicable NEMA, IEEE and Federal Standards. Use UL labeled components in assemblies that do not have overall UL label. All equipment shall comply with the terms "listed and labeled" as defined in the NEC 70, Article 100. Submit letter stating compliance with these requirements.
- B. Utilize one of the manufacturers listed to furnish all of the major equipment (i.e., transformers, bus duct, switchgear, circuit breakers, fire alarm panels, booster panels, detection equipment, annunciation equipment, etc.) required for this project.

PART 3 - EXECUTION

3.01 VISIT TO SITE

- A. Visit site, and survey existing conditions affecting work prior to bid. Include necessary materials and labor to accomplish the electrical work, including relocation of existing services and utilities on building site in bid. No consideration shall be given to future claims due to existing conditions. Any discrepancies or interference's shall be reported immediately to the Engineer.

3.02 WORKMANSHIP

- A. All work performed shall be first class work in every aspect. The work shall be performed by mechanics skilled in their respective trades, who shall at all times be under the supervision of competent persons. All work shall be installed to comply with NECA's "Standard of Installation."
- B. Work under this Division shall be first class with emphasis on neatness and workmanship. All work shall be installed square and plumb and concealed where possible. Work that is deficient, defective, poorly laid out, not perfectly aligned, or that is not consistent with the requirements generally accepted in the trade for "first class work" will not be acceptable.

- C. In addition to the materials specified elsewhere, furnish and install all other miscellaneous items necessary for the completion of the work to the extent that all systems are complete and operative.
- D. All work under this Section shall be performed in cooperation with the work performed under all other Sections of the Specifications for the Project in order to avoid interference with other work and to secure the proper installation of all work. Refer the Drawings and Specifications covering the work to be performed under all Sections, so that the relation and extent of the work of this Section with respect to the work of all other Sections is understood. Give right of way to raceways and piping systems installed at a required slope.
- E. Install work using competent mechanics, under supervision of foreman, all duly certified by local authorities. The installation shall be subject to the Engineer's observation, and final acceptance. The Engineer may reject unsuitable work.
- F. Conduit or Wire Mold systems must be complete prior to installation of wiring.

3.03 CHANGE ORDERS

- A. Additional work may be required on the project, which is outside the scope of the contract. Such additional work will be described in Supplemental Instructions and/or Clarifications, to be estimated and priced by the Contractor, and accepted by the Owner, prior to commencing work.
- B. Acceptable charges will be limited to the following
 1. Labor hours shall be calculated per National Electrical Contractors Association (NECA) tables, and shall be priced based on actual paid cost, not to exceed local Prevailing Wage Rates.
 2. Supervision and Support shall not exceed 15% of labor charges. This blanket percentage shall cover foreman, tools, vehicles, record drawings, etc.
 3. Charges for material shall be limited to wholesale customer end-column Electrical Trade Pricing Publication (ETP, also known as "Biddle Book").
 4. Major equipment items (switchgear, lighting fixtures, custom equipment, etc. - known in the trade as "quote" items) shall be charged at actual unit prices quoted by suppliers, supported by a true copy of the written price quotation.
 5. Handling charges for material shall not exceed 5% of material and equipment charges. This blanket percentage shall cover freight, cartage, wastage, etc.
- C. Should the Owner or Engineer find reason to dispute or challenge the Contractor's pricing of additional work, one of the following solutions may be imposed
 1. Contractor shall be directed to proceed with the work, and submit his proposed charges for arbitration at the conclusion of the project.

2. Contractor shall maintain a separate labor log and obtain daily signatures thereon, and shall be prepared to submit a certified, audited payroll report to support his claims.
3. Owner shall purchase the disputed equipment and/or material, and provide same to Contractor at job site for installation, along with a copy of the invoice. Contractor may add a 10% charge to cover handling and warranty administration.
4. Owner shall contract with a separate licensed Electrical Contractor to perform the extra work. In this event, the originally-contracted work shall be completed by Contractor and accepted by the Owner, following inspection and recommendation by the Engineer. This Contractor shall cause no impediment to the work of the separate contractor, and shall maintain full warranty on his originally-installed equipment and workmanship.

3.04 GUARANTEE

- A. Furnish the Owner a written guarantee, stating that if the workmanship and/or material executed under this Division are proven defective within one (1) year after final acceptance by the Owner, such defects and other work damaged will be repaired and/or replaced. Submit with Operations and Maintenance Manuals.
- B. Obtain from the various manufacturers or vendors guarantees or warranties for their particular equipment or components, and deliver them to the Owner. All guarantees and warranties provided shall be referenced to this project.
- C. In event that systems are placed in operation in several phases at the Owner's request, guarantee will begin on date each system or item of equipment is accepted for service by the Owner. Provide O&M manuals for all equipment when equipment is accepted for service by the Owner.
- D. All guarantees and warranties shall include labor and material at the site of installation for the duration of the guarantee period.

3.05 OBSERVATIONS OF WORK AND DEMONSTRATION OF OPERATION (ACCEPTANCE)

- A. At all observations of work, open panel covers, junction box covers, pull box covers, device covers, and other equipment with removable plates for observation. Provide sufficient personnel to expedite cover removal and replacement.
- B. Contractor to demonstrate operation of new equipment and/or systems to satisfaction of Owner/Engineer, and to have manufacturer available for demonstration of equipment and/or systems where requested by Owner/Engineer. Furnish affidavit signed by Owner's representative indicating that demonstration of operation has been performed.

3.06 TESTING OF ELECTRICAL SYSTEMS

- A. Test Completed work as follows
 - 1. Perform tests required as defined in this document to indicate compliance with specifications, drawings, standards and applicable codes. Provide sufficient instruments, labor, technical support and materials for performing these tests. Tests shall be performed to the satisfaction of the Owner/Engineer. One-week prior notice of testing required.
 - 2. Insulation - use 1000 VDC insulation tester (0-2000 megohm full-scale), equivalent to "Megger" as manufactured by Biddle Company. Test conductors and busses of all systems, including feeders, main service busway, motors, devices, equipment, etc. Test feeders, bus ducts, busses, etc., for fifteen (15) minutes with readings at one minute intervals.
- B. Additional Testing and Commissioning of electrical equipment is specified in elsewhere.

3.07 COOPERATION

- A. Carefully coordinate work with other contractors and subcontractors. Refer conflicts between trades to Engineer. Provide necessary information to other trades for such coordination. Such information shall include Shop Drawings, Product Data and all other required data.
- B. Whenever such information is not provided in a timely manner or whenever such information is incorrect, this contractor shall bear all costs for providing or correcting affected work of related trades with no change to the Contract Price or Construction Schedule.
- C. Work to be installed as progress of project will allow. Schedule of work determined by General Contractor, Owner, and/or Architect/Engineer.

3.08 COORDINATION OF UTILITY SERVICES

- A. The contractor shall be responsible for the coordination with all utility connections. This includes, but is not limited to; Power, Telephone and Cable Television.

3.09 PROTECTING

- A. Provide warning lights, bracing, shoring, rails, guards and covers necessary to prevent damage or injury. All persons working around electrical equipment shall have electrical shock and flash protection per OSHA 1910.301-309 & 331-335.
- B. Do not leave exposed or unprotected, electrical items carrying current. Protect visitors and workers from exposure to contact with electrically energized surfaces, parts, etc. in accordance with OSHA standards.

3.10 DELIVERY, STORAGE AND HANDLING

- A. Deliver equipment and materials to job site in original, unopened, labeled container. Products shall be properly identified with names, model numbers, types, grades, compliance labels and other information needed for identification. Store to prevent damage and injury. Store materials to prevent corroding. Store finished materials and equipment to prevent staining and discoloring. Store materials affected by condensation in warm dry areas. Provide heaters. Contractor shall verify the availability of on site storage space, if no on site storage space is available then the contractor shall cover the cost for off site storage. Materials stored at the project site that becomes soiled with construction dirt, concrete, or moisture shall be removed from the site and replaced with new. Do not install soiled material.
- B. Protect work and materials from damage by weather, entrance of water or dirt. Cap and mark conduit during installation.
- C. Avoid damage to materials and equipment in place. Repair, or remove and replace damaged work and materials.
- D. Protection and safekeeping of products stored on premises is responsibility of Contractor supplying products.
- E. Schedule of deliveries and unloading to prevent traffic congestion blocking of access or interference with work. Arrange deliveries to avoid larger accumulations of materials than can be suitably stored at site.
- F. Install equipment per manufacturer's recommendations. Conflicts between contract documents and these recommendations shall be referred to Engineer for remedy.
- G. Electrical or electronic equipment that has been damaged, exposed to weather or is, in the opinion of the Engineer or Architect, otherwise unsuitable because of improper fabrication, storage or installation shall be removed and replaced by this Contractor at his expense.

3.11 ANCHORS

- A. Provide anchors for all equipment, raceways, hangers, etc. to safely support weight of item involved plus 100% for dead loads. Live loads shall be considered in addition to dead loads.
- B. Anchors to consist of expansion type devices similar to "Redhead" or lead expansion anchors. Plastic anchors are not acceptable.
- C. Use preset anchor steel inserts in concrete slabs. Provide preset anchor size and type for anticipated or specified rod/bolt size and live/dead load.

- D. Anchor all wire mold surface raceway, a minimum of 5'-0" on center, and all components to permanent structure when possible. If wire mold and all components cannot be supported by a permanent structure, the contractor shall utilize Steel Hollow Wall Anchors or equal, provide size as required by application.

3.12 CLEANING AND PAINTING

- A. Clean equipment furnished in this Division after completion of work. Clean wipe the interior of all conduit, pull boxes, junction boxes, outlet boxes, and panel board backbones, soiled with dirt and debris prior to installation of wiring.
- B. Touch-up or re-paint damaged painted finishes as determined by the Engineer.
- C. All new conduits, existing wall surfaces (where existing devices have been removed), and other areas damaged by the contractor shall be painted to match the existing wall surface. Colors shall match existing.
- D. Remove debris, packing cartons, scrap, etc., from site daily.

3.13 HOUSEKEEPING PADS

- A. Furnish 2500 # concrete pads, 4" high, unless otherwise noted, for all freestanding equipment, i.e.: switchboards, panels, control panels, motor control centers, transformers, etc. Pads shall have 1" x 45° chamfered edges, and shall extend 2" to 4" beyond equipment mountings. Equipment pads that attach to existing equipment for a continuous line-up shall match existing pad elevations.

3.14 TRAINING

- A. Training for operation and maintenance of new systems or modifications to existing systems is specified in Technical sections. Contractor shall submit with record documents an itemized receipt signed by Owner's representative that all specified training has been received.

3.15 ACCESS PANELS

- A. The contractor shall furnish all access panels for walls, partitions, etc., and shall give access panel to the General Contractor for installation at locations as directed by the Electrical Contractor. It shall be the responsibility of the Electrical Contractor that access panels are provided for access to all boxes, bus joints, equipment, etc., which may be concealed by building construction to comply with the NEC and NFPA. Access panels shall be installed so as not to interfere with lighting arrangements.

END OF SECTION 260000

SECTION 260519 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper building wire rated 600 V or less.
2. Connectors, splices, and terminations rated 600 V and less.

B. Related Requirements:

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: Indicate type, use, location, and termination locations.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

B. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. RoHS compliant.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

C. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.

D. Conductor Insulation:

1. Type THHN and Type THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

2.2 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. All splices of branch circuit conductors shall be done with twist-on wire nuts or insulated mechanical terminations. Push-in terminations are not allowed.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper; solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.
- C. Power-Limited Fire Alarm and Control: Solid for No. 12 AWG and smaller.
- D. No wire smaller than #12 AWG shall be used for light and power circuits.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN/THWN-2, single conductors in raceway.
- B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway.
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.
- E. Exposed Branch Circuits, Including in Crawlspace: Type THHN/THWN-2, single conductors in raceway.

- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.
- G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. All building power, telephone, signal and other wiring (whether plenum rated or not) shall be installed in raceways. Exception: 50V or less cables in a remodeled area where other methods are currently being utilized and approved by a UNR Representative.
- B. **MC Cable shall not be used.** Exception: For a fixture whip (6' maximum length) from a junction box to (1) a recessed fixture above an accessible (lift-out tile) ceiling, or (2) a recessed fixture with at least 4 square feet of surface area in a non-accessible type of ceiling.
- C. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- D. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- E. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- F. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- G. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- H. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."
- I. Instrument cable shall consist of twisted shielded pair or triads.

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - 1. Use oxide inhibitor in each splice, termination, and tap for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.
- C. Provide full size separate color coded neutral conductors with a stripe that corresponds with phase color for each branch circuit. No shared neutral conductors on 120 volt and 277 volt circuits.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

END OF SECTION

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes grounding and bonding systems and equipment.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency and testing agency's field supervisor.
- B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.
 - 1. Plans showing as-built, dimensioned locations of grounding features specified in "Field Quality Control" Article, including the following:
 - a. UFER Grounds.
 - b. Grounding arrangements and connections for separately derived systems.
 - 2. Instructions for periodic testing and inspection of grounding features at test wells grounding connections for separately derived systems based on NFPA 70B.
 - a. Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
 - b. Include recommended testing intervals.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Certified by NETA.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Burndy; Part of Hubbell Electrical Systems.
 - 2. Thomas & Betts Corporation; A Member of the ABB Group.

2.3 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
 - 4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 5. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
- C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches in cross section, with 9/32-inch holes spaced 1-1/8 inches apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- C. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless exothermic-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.
- D. Beam Clamps: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- E. Cable-to-Cable Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- F. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.
- G. Conduit Hubs: Mechanical type, terminal with threaded hub.
- H. Ground Rod Clamps: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- I. Straps: Solid copper, copper lugs. Rated for 600 A.
- J. Water Pipe Clamps:
 - 1. U-bolt type with malleable-iron clamp and copper ground connector rated for direct burial.

2.5 GROUNDING ELECTRODES

- A. Building grounding electrode shall be concrete encased Ufer type.
 - 1. Where building is existing and new service is provided, which requires a new grounding conductor due to increase of grounding conductor size, the ufer ground shall be installed as follows:
 - a. Place ufer in footing for new service entrance exterior pad. Pad shall have a footing which extends 30-inches below finished grade. Install 30-feet of copper conductor per NEC 250 requirements and 260526-3.1(B).
 - b. Place in 30-foot long trench adjacent to the existing stemwall, footing of building. Trench shall be 30-inches in depth and grounding conductor shall be placed in concrete at the bottom of the trench, per NEC 250 requirements and 260526-3.1(B).

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.
 - 1. Bury at least 24 inches below grade.
- C. Underground Medium Voltage Duct Banks: Install bare copper conductor, No. 2/0 AWG minimum.
- D. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 - 1. Install bus horizontally, on insulated spacers 2 inches minimum from wall, 6 inches above finished floor unless otherwise indicated.
- E. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors.
 - 3. Connections to Ground Rods at Test Wells: Welded connectors.
 - 4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING AT THE SERVICE

- A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 GROUNDING SEPARATELY DERIVED SYSTEMS

- A. Generator: Install grounding electrode(s) at the generator location. The electrode shall be connected to the equipment grounding conductor and to the frame of the generator.
- B. Generator grounding shall be considered as a separately derived system and shall meet the requirements of the NEC 250.

3.4 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- B. Pad-Mounted Transformers and Switches: Install two ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than No. 2/0 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inches from the foundation.

3.5 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.
 - 3. Receptacle circuits.
 - 4. Single-phase motor and appliance branch circuits.
 - 5. Three-phase motor and appliance branch circuits.
 - 6. Flexible raceway runs.
 - 7. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
- C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- E. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.6 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.
- C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- D. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
 3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
 4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- C. Grounding system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Report measured ground resistances that exceed the following values:
1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 1 ohm or less.
 2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 1 ohm or less.
 3. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm or less.
 4. Substations and Pad-Mounted Equipment: 1 ohm or less.
- F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Project Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

B. Related Requirements:

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For fabrication and installation details for electrical hangers and support systems.

C. Delegated-Design Submittal: For hangers and supports for electrical systems.

1. Include design calculations and details of trapeze hangers.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, and coordinated with each other, using input from installers of the items involved:

B. Seismic Qualification Certificates: For hangers and supports for electrical equipment and systems, accessories, and components, from manufacturer.

C. Welding certificates.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design hanger and support system.

B. Seismic Performance: Hangers and supports shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the supported equipment and systems will remain in place without separation of any parts when subjected to the seismic forces specified."
2. Component Importance Factor: 1.0.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4 factory-fabricated components for field assembly.
 1. Material: Pre-galvanized steel.
 2. Channel Width: 1-5/8 inches.
 3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 6. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
 7. Channel Dimensions: Selected for applicable load criteria.
- B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.
- D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.
- E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems unless requirements in this Section are stricter.
- B. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMTs, IMCs, and RMCs as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.
- E. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- B. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

- A. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal conduits, tubing, and fittings.
2. Nonmetal conduits, tubing, and fittings.
3. Metal wireways and auxiliary gutters.
4. Boxes, enclosures, and cabinets.
5. Handholes and boxes for exterior underground cabling.

B. Related Requirements:

1. Section 260543 "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.
2. Section 270528 "Pathways for Communications Systems" for conduits, wireways, surface pathways, innerduct, boxes, faceplate adapters, enclosures, cabinets, and handholes serving communications systems.
3. Section 280528 "Pathways for Electronic Safety and Security" for conduits, surface pathways, innerduct, boxes, and faceplate adapters serving electronic safety and security.

1.2 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Sustainable Design Submittals:
- C. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:

1. Structural members in paths of conduit groups with common supports.
 2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.
- B. Seismic Qualification Certificates: For enclosures, cabinets, and conduit racks and their mounting provisions, including those for internal components, from manufacturer.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Fittings for electrical metallic tubing shall be steel, watertight, gland-ring types or steel setscrew types.
- C. GRC: Comply with ANSI C80.1 and UL 6.
- D. ARC: Comply with ANSI C80.5 and UL 6A.
- E. IMC: Comply with ANSI C80.6 and UL 1242.
- F. All metal conduit, couplings, elbows, and fittings buried below grade shall be coated with PVC or ½ -lap wrapped with an approved tape (coating or wrapping shall be a 20 mil total thickness). In lieu of rigid galvanized conduit for horizontal secondary service raceways and branch circuit wiring in or under a floor slab, Schedule 40 PVC may be used with rigid steel conduit termination stub-ups out of the ground or slab and into the building.
- G. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
 1. Comply with NEMA RN 1.
 2. Coating Thickness: 0.040 inch, minimum.
- H. EMT: Comply with ANSI C80.3 and UL 797.
- I. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- J. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
 2. Fittings for EMT:

- a. Material: Steel.
 - b. Type: Setscrew, if in a wet location compression shall be used.
- 3. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
 - 4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.
- K. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 Type 3R unless otherwise indicated, and sized according to NFPA 70.
- 1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

2.3 BOXES, ENCLOSURES, AND CABINETS

- A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- D. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- E. Metal Floor Boxes:
- 1. Material: Cast metal or sheet metal.
 - 2. Type: Semi-adjustable.
 - 3. Shape: Rectangular.

4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- F. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- H. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
- I. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- J. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- K. Gangable boxes are allowed.
- L. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.
 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 2. Nonmetallic Enclosures: Plastic.
 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
- M. Cabinets:
 1. NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 2. Hinged door in front cover with flush latch and concealed hinge.
 3. Key latch to match panelboards.
 4. Metal barriers to separate wiring of different systems and voltage.
 5. Accessory feet where required for freestanding equipment.
 6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.4 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

- A. General Requirements for Handholes and Boxes:

1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
 2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.
1. Standard: Comply with SCTE 77.
 2. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
 3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
 4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 5. Cover Legend: Molded lettering, "ELECTRIC."
 6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
- C. Fiberglass Handholes and Boxes: Molded of fiberglass-reinforced polyester resin, with frame and covers of polymer concrete or hot-dip galvanized-steel diamond plate.
1. Standard: Comply with SCTE 77.
 2. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
 3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
 4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 5. Cover Legend: Molded lettering, "ELECTRIC."
 6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed Conduit: GRC.
 2. Concealed Conduit, Aboveground: GRC.
 3. Underground Conduit: RNC, Type EPC-40-PVC,.
 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated.
1. Exposed, Not Subject to Physical Damage: EMT.
 2. Exposed, Not Subject to Severe Physical Damage: EMT.
 3. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 - d. Gymnasiums.
 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 6. Damp or Wet Locations: GRC.
 7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 nonmetallic in institutional and commercial kitchens and damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 3. EMT: Use setscrew, steel fittings. Comply with NEMA FB 2.10.

- 4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. All fire alarm system conduit shall be manufactured red.
- F. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- G. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- D. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- E. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- F. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines. Conduit shall be routed to minimize penetrations through floor building structural components.
- G. Support conduit within 12 inches of enclosures to which attached.
- H. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of 1 inch of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.

5. Conduits shall stub up through concrete slabs with RGC elbows and risers.
 6. Conduits located in concrete slabs shall not exceed $\frac{3}{4}$ " and shall be spaced no closer than eight inches on center except at panel and junction boxes where they shall be spread as widely as possible. Provide for special framing when required where conduits enter a panel board. In cases where conduits are larger than $\frac{3}{4}$ " are to be placed in a concrete slab, the structural engineering shall be notified/consulted.
- I. Stub-ups to Above Recessed Ceilings:
 1. Use EMT, IMC, or RMC for raceways.
 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
 - J. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
 - K. At damp and wet locations or where exposed to weather, flexible steel conduit, where allowed, shall be liquid tight type.
 - L. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
 - M. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
 - N. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
 - O. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use and label.
 - P. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces.
 - Q. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 2. Where an underground service raceway enters a building or structure.
 3. Where otherwise required by NFPA 70.
- R. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 36 inches of flexible conduit for motor connections, connection between fan plenum and structure, expansion joints with an accessible junction box on each side, recessed and semi-recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
1. Use LFMC in damp or wet locations subject to severe physical damage.
 2. Use LFMC in damp or wet locations not subject to severe physical damage.
- S. For recessed lighting fixtures in an accessible (lift-out tile) ceiling flexible steel conduit shall not exceed 6'.
- T. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to top of box unless otherwise indicated.
- U. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between the box and cover plate or the supported equipment and box.
- V. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- W. Locate boxes so that cover or plate will not span different building finishes.
- X. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- Y. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- Z. Set metal floor boxes level and flush with finished floor surface.
- AA. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.
- 3.3 INSTALLATION OF UNDERGROUND CONDUIT
- A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom for pipe less than 6 inches in nominal diameter.
2. Install backfill.
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as.
4. Install manufactured duct elbows for stub-up at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
 - b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
6. Underground Warning Tape: Comply with requirements in Section 260553 "Identification for Electrical Systems."

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.
- D. Install handholes with bottom below frost line.
- E. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size

holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.6 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.7 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Color and legend requirements for raceways, conductors, and warning labels and signs.
 - 2. Labels.
 - 3. Bands and tubes.
 - 4. Tapes and stencils.
 - 5. Tags.
 - 6. Signs.
 - 7. Cable ties.
 - 8. Paint for identification.
 - 9. Fasteners for labels and signs.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of label and sign to illustrate composition, size, colors, lettering style, mounting provisions, and graphic features of identification products.
- C. Delegated-Design Submittal: For arc-flash hazard study.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1.
- B. Comply with UNR Design and Construction Standards.
- C. Comply with NFPA 70.
- D. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- E. Comply with ANSI Z535.4 for safety signs and labels.
- F. Comply with NFPA 70E requirements for arc-flash warning labels.
- G. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- H. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 600 V or Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage.
- B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.
 - 1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
 - 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - 3. Colors for 480/277-V Circuits:
 - a. Phase A: Brown.

- b. Phase B: Orange.
 - c. Phase C: Yellow.
- 4. Color for Neutral: White.
- 5. Color for Equipment Grounds: Green.
- 6. Colors for Isolated Grounds: Green with white stripe.
- C. Warning Label Colors:
 - 1. Identify system voltage with black letters on an orange background.
- D. Warning labels and signs shall include, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

2.3 LABELS

- A. All labeling shall be done by machine – NO hand written labels.
- B. Provide label on the covers of outlets, switches, and junction boxes. Labels shall indicate panel and circuit numbers.
- C. All Equipment/System/Panel Identification Labels shall include room number, voltage, destination, or origin. Labels shall be engraved type with white letters on black for normal power, white letters on red for emergency power, and white letters on orange for UPS power.
 - 1. Examples: PNL 5L 208-120V 3P 4W
 - Fed from DPL1
 - Located in Rm. E100
 - At Feeder Circuit Breaker in Distribution Panel DPL1:
 - Feeds PNL 5L
 - Located in Rm. E500
- D. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

- E. Snap-around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameter and that stay in place by gripping action.
- F. Self-Adhesive Wraparound Labels: Preprinted, 3-mil-thick, polyester flexible label with acrylic pressure-sensitive adhesive.
 - 1. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
 - 2. Marker for Labels: Permanent, waterproof, black ink marker recommended by tag manufacturer.
 - 3. Marker for Labels: Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.
- G. Self-Adhesive Labels: Polyester, thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
 - 1. Minimum Nominal Size:
 - a. 1-1/2 by 6 inches for raceway and conductors.
 - b. 3-1/2 by 5 inches for equipment.
 - c. As required by authorities having jurisdiction.

2.4 BANDS AND TUBES

- A. Snap-around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches long, with diameters sized to suit diameter and that stay in place by gripping action.

2.5 TAPES AND STENCILS

- A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils thick by 1 to 2 inches wide; compounded for outdoor use.
- C. Tape and Stencil: 4-inch-wide black stripes on 10-inch centers placed diagonally over orange background and is 12 inches wide. Stop stripes at legends.
- D. Floor Marking Tape: 2-inch-wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.
- E. Underground-Line Warning Tape:

1. Tape:
 - a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
 - b. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
 2. Color and Printing:
 - a. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, ANSI Z535.4, and ANSI Z535.5.
 - b. Inscriptions for Red-Colored Tapes: "ELECTRIC LINE, HIGH VOLTAGE".
 - c. Inscriptions for Orange-Colored Tapes: "TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE".
- F. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.6 TAGS

- A. Machine Written Tags:
1. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.7 SIGNS

- A. Baked-Enamel Signs:
1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
 2. 1/4-inch grommets in corners for mounting.
 3. Nominal Size: 7 by 10 inches.
- B. Metal-Backed Butyrate Signs:
1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs, with 0.0396-inch galvanized-steel backing, punched and drilled for fasteners, and with colors, legend, and size required for application.
 2. 1/4-inch grommets in corners for mounting.

3. Nominal Size: 10 by 14 inches.
- C. Laminated Acrylic or Melamine Plastic Signs:
1. Engraved legend.
 2. Thickness:
 - a. For signs up to 20 sq. in., minimum 1/16 inch.
 - b. For signs larger than 20 sq. in., 1/8 inch thick.
 - c. Engraved legend with white letters on a dark gray background.
 - d. Punched or drilled for mechanical fasteners with 1/4-inch grommets in corners for mounting.
 - e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.8 CABLE TIES

- A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
1. Minimum Width: 3/16 inch.
 2. Tensile Strength at 73 Deg F according to ASTM D 638: 12,000 psi.
 3. Temperature Range: Minus 40 to plus 185 deg F.
 4. Color: Black, except where used for color-coding.
- B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
1. Minimum Width: 3/16 inch.
 2. Tensile Strength at 73 Deg F according to ASTM D 638: 12,000 psi.
 3. Temperature Range: Minus 40 to plus 185 deg F.
 4. Color: Black.
- C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.
1. Minimum Width: 3/16 inch.
 2. Tensile Strength at 73 Deg F according to ASTM D 638: 7000 psi.
 3. UL 94 Flame Rating: 94V-0.

4. Temperature Range: Minus 50 to plus 284 deg F.
5. Color: Black.

2.9 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- G. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.
- H. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 1. Secure tight to surface of conductor, cable, or raceway.
- I. System Identification for Raceways and Cables over 600 V: Identification shall completely encircle cable or conduit. Place adjacent identification of two-color markings in contact, side by side.

1. Secure tight to surface of conductor, cable, or raceway.
- J. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- K. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.
- L. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
- M. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage. System legends shall be as follows:
1. "EMERGENCY POWER."
 2. "POWER."
 3. "UPS."
- N. Vinyl Wraparound Labels:
1. Secure tight to surface at a location with high visibility and accessibility.
 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
- O. Snap-around Labels: Secure tight to surface at a location with high visibility and accessibility.
- P. Self-Adhesive Wraparound Labels: Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
- Q. Snap-around Color-Coding Bands: Secure tight to surface at a location with high visibility and accessibility.
- R. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.
- S. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.
1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.
- T. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.

- U. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's written instructions.
- V. Underground Line Warning Tape:
 - 1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches overall.
 - 2. Limit use of underground-line warning tape to direct-buried cables.
 - 3. Install underground-line warning tape for direct-buried cables and cables in raceways.
- W. Machine Written Tags:
 - 1. Place in a location with high visibility and accessibility.
 - 2. Secure using plenum-rated cable ties.
- X. Baked-Enamel Signs:
 - 1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
 - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.
- Y. Metal-Backed Butyrate Signs:
 - 1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
 - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.
- Z. Laminated Acrylic or Melamine Plastic Signs:
 - 1. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
 - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.
- AA. Cable Ties: General purpose, for attaching tags, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

3.2 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels.
 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- D. Accessible Fittings for Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive labels containing the wiring system legend and system voltage. System legends shall be as follows:
 1. "EMERGENCY POWER."
 2. "POWER."
 3. "UPS."
- E. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use snap-around labels to identify the phase.
 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- F. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use write-on tags with the conductor or cable designation, origin, and destination.
- G. Control-Circuit Conductor Termination Identification: For identification at terminations, provide self-adhesive wraparound labels with the conductor designation.

- H. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.
- I. Auxiliary Electrical Systems Conductor Identification: Marker tape that is uniform and consistent with system used by manufacturer for factory-installed connections.
 - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
- J. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.
- K. Workspace Indication: Apply floor marking tape or tape and stencil to finished surfaces. Show working clearances in the direction of access to live parts. Workspace shall comply with NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- L. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.
- M. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive equipment labels.
 - 1. Apply to exterior of door, cover, or other access.
 - 2. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:
 - a. Power-transfer switches.
 - b. Controls with external control power connections.
- N. Arc Flash Warning Labeling: Self-adhesive labels.
- O. Operating Instruction Signs: Self-adhesive labels.
- P. Emergency Operating Instruction Signs: Self-adhesive labels with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.
- Q. Equipment Identification Labels:
 - 1. Indoor Equipment: Baked-enamel signs.
 - 2. Outdoor Equipment: Laminated acrylic or melamine sign.

END OF SECTION 260553

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Distribution panelboards.
 - 2. Lighting and appliance branch-circuit panelboards.

1.2 DEFINITIONS

- A. MCCB: Molded-case circuit breaker.
- B. SPD: Surge protective device.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of panelboard.
- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details.
 - 2. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
 - 3. Detail bus configuration, current, and voltage ratings.
 - 4. Short-circuit current rating of panelboards and overcurrent protective devices.
 - 5. Include evidence of NRTL listing for series rating of installed devices.
 - 6. Include evidence of NRTL listing for SPD as installed in panelboard.
 - 7. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - 8. Include wiring diagrams for power, signal, and control wiring.
 - 9. Key interlock scheme drawing and sequence of operations.
 - 10. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards.

1.4 INFORMATIONAL SUBMITTALS

- A. Panelboard schedules for installation in panelboards.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.6 FIELD CONDITIONS

- A. Service Conditions: NEMA PB 1, usual service conditions, as follows:
 - 1. Ambient temperatures within limits specified.
 - 2. Altitude not exceeding 6600 feet.

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.
 - 1. Panelboard Warranty Period: 18 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANELBOARDS COMMON REQUIREMENTS

- A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces defined in Section 260548.16 "Seismic Controls for Electrical Systems."
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NEMA PB 1.
- D. Comply with NFPA 70.
- E. Enclosures: Flush and Surface-mounted, dead-front cabinets.
 - 1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
 - b. Outdoor Locations: NEMA 250, Type 3R.
 - c. Other Wet or Damp Indoor Locations: NEMA 250, Type 3R.

2. Height: 84 inches maximum.
 3. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims shall cover all live parts and shall have no exposed hardware.
 4. Front Cover: Shall be door-in-door type.
- F. Incoming Mains Location: Convertible between top and bottom.
- G. Phase, Neutral, and Ground Buses: Hard-drawn copper, 98 percent conductivity.
- H. Conductor Connectors: Suitable for use with conductor material and sizes.
1. Material: Hard-drawn copper, 98 percent conductivity.
 2. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.
 3. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.
 4. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
 5. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
- I. NRTL Label: Panelboards shall be labeled by an NRTL acceptable to authority having jurisdiction for use as service equipment with one or more main service disconnecting and overcurrent protective devices. Panelboards shall have meter enclosures, wiring, connections, and other provisions for utility metering. Coordinate with utility company for exact requirements.
- J. Future Devices: Panelboards shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
- K. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

2.3 POWER PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Eaton.
 2. General Electric Company; GE Energy Management - Electrical Distribution.
 3. Siemens Energy.
 4. Square D; by Schneider Electric.
- B. Panelboards: NEMA PB 1, distribution type.
- C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
 1. For doors more than 36 inches high, provide two latches, keyed alike.
- D. Mains: Lugs only.
- E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
- F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers.
- G. Branch Overcurrent Protective Devices: Fused switches.
- H. Contactors in Main Bus: NEMA ICS 2, Class A, electrically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.
 1. External Control-Power Source: 120-V branch circuit.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Eaton.
 2. General Electric Company; GE Energy Management - Electrical Distribution.
 3. Siemens Energy.
 4. Square D; by Schneider Electric.

- B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
- C. Mains: Circuit breaker or lugs only.
- D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- E. Contactors in Main Bus: NEMA ICS 2, Class A, electrically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.
 - 1. External Control-Power Source: 120-V branch circuit.
- F. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.
- G. Column-Type Panelboards: Single row of overcurrent devices with narrow gutter extension and overhead junction box equipped with ground and neutral terminal buses.

2.5 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton.
 - 2. General Electric Company; GE Energy Management - Electrical Distribution.
 - 3. Siemens Energy.
 - 4. Square D; by Schneider Electric.
- B. Molded-case circuit breaker: Comply with UL 489, with interrupting capacity to meet available fault currents.
 - 1. Thermal-Magnetic Circuit Breakers:
 - a. Inverse time-current element for low-level overloads.
 - b. Instantaneous magnetic trip element for short circuits.
 - c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 - 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
 - 3. Electronic Trip Circuit Breakers:
 - a. RMS sensing.
 - b. Field-replaceable rating plug or electronic trip.
 - c. Digital display of settings, trip targets, and indicated metering displays.
 - d. Multi-button keypad to access programmable functions and monitored data.

- e. Ten-event, trip-history log. Each trip event shall be recorded with type, phase, and magnitude of fault that caused the trip.
- f. Integral test jack for connection to portable test set or laptop computer.
- g. Field-Adjustable Settings:
 - 1) Instantaneous trip.
 - 2) Long- and short-time pickup levels.
 - 3) Long and short time adjustments.
 - 4) Ground-fault pickup level, time delay, and I squared T response.
- 4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
- 5. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6-mA trip).
- 6. GFEP Circuit Breakers: Class B ground-fault protection (30-mA trip).
- 7. Arc-Fault Circuit Interrupter Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
- 8. Subfeed Circuit Breakers: Vertically mounted.
- 9. MCCB Features and Accessories:
 - a. Standard frame sizes, trip ratings, and number of poles.
 - b. Breaker handle indicates tripped status.
 - c. UL listed for reverse connection without restrictive line or load ratings.
 - d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
 - e. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and HID lighting circuits.
 - f. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
 - g. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.
 - h. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in off position.
 - i. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

2.6 IDENTIFICATION

- A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.
- B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.

- C. Circuit Directory: Directory card inside panelboard door, mounted in transparent card holder. Directory card shall be typewritten giving circuit numbers and a complete description of all outlets controlled by each panel circuit breaker including room numbers.

2.7 ACCESSORY COMPONENTS AND FEATURES

- A. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.
- B. Install panelboards and accessories according to NECA 407.
- C. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- D. Mount top of trim 70" above finished floor unless otherwise indicated.
- E. Mount panelboard cabinet plumb and rigid without distortion of box.
- F. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- G. Install overcurrent protective devices and controllers not already factory installed.
 - 1. Set field-adjustable, circuit-breaker trip ranges.
- H. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.
- I. Install filler plates in unused spaces.
- J. Where panels are installed flush with the walls, empty conduits shall be extended from the panel to an accessible space above and below. A minimum of one ¾ inch conduit shall be installed for every single pole spare circuit breakers or spaces, or fraction thereof, but not less than two empty conduits.
- K. Where underfloor space is accessible, spare conduits shall be extended there in addition to the ceiling space.

- L. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

3.2 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.
- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- D. Device Nameplates: Label each branch circuit device in power panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- E. Install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems" identifying source of remote circuit.
- F. Ensure all items required by Inyo County Design and Construction Standards are included on labels

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections: (All tests and inspections shall be in accordance with Nevada State Public Works Division Adopted Standards latest edition)
 - 1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- D. Panelboards will be considered defective if they do not pass tests and inspections.

- E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results, with comparisons of the two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION 262416

SECTION 262813 - FUSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cartridge fuses rated 600 V ac and less for use in the following:
 - a. Control circuits.
 - b. Motor-control centers.
 - c. Panelboards.
 - d. Switchboards.
 - e. Enclosed controllers.
 - f. Enclosed switches.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Bussmann, an Eaton business.
 2. Littelfuse, Inc.

2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.
1. Type RK-1: 600-V, zero- to 600-A rating, 200 kAIC, time delay.
 2. Type RK-5: 600-V, zero- to 600-A rating, 200 kAIC, time delay.

3. Type CC: 600-V, zero- to 30-A rating, 200 kAIC, fast acting.
 4. Type CD: 600-V, 31- to 60-A rating, 200 kAIC, fast acting.
 5. Type J: 600-V, zero- to 600-A rating, 200 kAIC, time delay.
 6. Type L: 600-V, 601- to 6000-A rating, 200 kAIC, time delay.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - C. Comply with NEMA FU 1 for cartridge fuses.
 - D. Comply with NFPA 70.
 - E. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.
- B. Install spare-fuse cabinet(s) in location shown on the Drawings or as indicated in the field by Owner.

3.2 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 262813

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fusible switches.
 - 2. Nonfusible switches.
 - 3. Molded-case circuit breakers (MCCBs).
 - 4. Enclosures.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 - 1. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF electronic format.
- B. Shop Drawings: For enclosed switches and circuit breakers.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Include wiring diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.
- C. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Accredited by NETA.
 - 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 5 year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

2.2 GENERAL REQUIREMENTS

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with NFPA 70.

2.3 FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. ABB Inc.
 2. Eaton.
 3. Siemens Industry, Inc.
 4. Square D; by Schneider Electric.
- B. Type HD, Heavy Duty:
1. Single throw.
 2. Three pole.
 3. 600-V ac.
 4. 200 A and smaller.
 5. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses.
 6. Lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 3. Isolated Ground Kit: Internally mounted; insulated, labeled for copper and aluminum neutral conductors.
 4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
 5. Service-Rated Switches: Labeled for use as service equipment.
- 2.4 NONFUSIBLE SWITCHES
- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. Eaton.
 2. Siemens Industry, Inc.

3. Square D; by Schneider Electric.
- B. Type GD, General Duty, Three Pole, Single Throw, 240-V ac, 600 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.
- C. Type HD, Heavy Duty, Three Pole, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- D. Type HD, Heavy Duty, Six Pole, Single Throw, 600-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- E. Type HD, Heavy Duty, Three Pole, Double Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- F. Accessories:
 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 3. Isolated Ground Kit: Internally mounted; insulated, labeled for copper and aluminum neutral conductors.
 4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
 5. Service-Rated Switches: Labeled for use as service equipment.

2.5 MOLDED-CASE CIRCUIT BREAKERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 1. Eaton.
 2. General Electric Company.
 3. Siemens Industry, Inc.
 4. Square D; by Schneider Electric.

- B. Circuit breakers shall be constructed using glass-reinforced insulating material. Current carrying components shall be completely isolated from the handle and the accessory mounting area.
- C. Circuit breakers shall have a toggle operating mechanism with common tripping of all poles, which provides quick-make, quick-break contact action. The circuit-breaker handle shall be over center, be trip free, and reside in a tripped position between on and off to provide local trip indication. Circuit-breaker escutcheon shall be clearly marked on and off in addition to providing international I/O markings. Equip circuit breaker with a push-to-trip button, located on the face of the circuit breaker to mechanically operate the circuit-breaker tripping mechanism for maintenance and testing purposes.
- D. The maximum ampere rating and UL, IEC, or other certification standards with applicable voltage systems and corresponding interrupting ratings shall be clearly marked on face of circuit breaker. Circuit breakers shall be 100 percent rated.
- E. MCCBs shall be equipped with a device for locking in the isolated position.
- F. Lugs shall be suitable for 140 deg F rated wire on 125-A circuit breakers and below.
- G. Standards: Comply with UL 489 and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- H. Thermal-Magnetic Circuit Breakers: Inverse time-current thermal element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
- I. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
- J. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:
 - 1. Long- and short-time pickup levels.
 - 2. Long- and short-time time adjustments.
 - 3. Ground-fault pickup level, time delay, and I-squared t response.
- K. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.
- L. Features and Accessories:
 - 1. Standard frame sizes, trip ratings, and number of poles.

2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.

2.6 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
- B. Enclosure Finish: The enclosure shall be finished with gray baked enamel paint, electrodeposited on cleaned, phosphatized steel (NEMA 250 Type 1) gray baked enamel paint, electrodeposited on cleaned, phosphatized galvanized steel (NEMA 250 Types 3R, 12).
- C. Conduit Entry: NEMA 250 Types 4, 4X, and 12 enclosures shall contain no knockouts. NEMA 250 Types 7 and 9 enclosures shall be provided with threaded conduit openings in both endwalls.
- D. Operating Mechanism: The circuit-breaker operating handle shall be externally operable with the operating mechanism being an integral part of the box, not the cover. The cover interlock mechanism shall have an externally operated override. The override shall not permanently disable the interlock mechanism, which shall return to the locked position once the override is released. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.

PART 3 - EXECUTION

3.1 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

- A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.
 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 2. Outdoor Locations: NEMA 250, Type 3R.
 3. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

3.2 INSTALLATION

- A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Architect and Owner no fewer than seven days in advance of proposed interruption of electric service.
 2. Indicate method of providing temporary electric service.
 3. Do not proceed with interruption of electric service without Architect's and Owner's written permission.
 4. Comply with NFPA 70E.
- B. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- C. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- D. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- E. Install fuses in fusible devices.
- F. Comply with NFPA 70 and NECA 1.
- G. Set field-adjustable circuit-breaker trip ranges to values indicated on the Drawings.

3.3 IDENTIFICATION

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Perform tests and inspections.
- D. Tests and Inspections for Switches:
1. Visual and Mechanical Inspection:

- a. Inspect physical and mechanical condition.
 - b. Inspect anchorage, alignment, grounding, and clearances.
 - c. Verify that the unit is clean.
 - d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
 - e. Verify that fuse sizes and types match the Specifications and Drawings.
 - f. Verify that each fuse has adequate mechanical support and contact integrity.
 - g. Inspect bolted electrical connections for high resistance using one of the two following methods:
 - 1) Use a low-resistance ohmmeter.
 - a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
 - a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.
 - h. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.
 - i. Verify correct phase barrier installation.
 - j. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.
2. Electrical Tests:
- a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
 - b. Measure contact resistance across each switchblade fuseholder. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
 - c. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the

NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.

- d. Measure fuse resistance. Investigate fuse-resistance values that deviate from each other by more than 15 percent.
- e. Perform ground fault test according to NETA ATS 7.14 "Ground Fault Protection Systems, Low-Voltage."

E. Tests and Inspections for Molded Case Circuit Breakers:

1. Visual and Mechanical Inspection:

- a. Verify that equipment nameplate data are as described in the Specifications and shown on the Drawings.
- b. Inspect physical and mechanical condition.
- c. Inspect anchorage, alignment, grounding, and clearances.
- d. Verify that the unit is clean.
- e. Operate the circuit breaker to ensure smooth operation.
- f. Inspect bolted electrical connections for high resistance using one of the two following methods:
 - 1) Use a low-resistance ohmmeter.
 - a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
 - a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.
- g. Inspect operating mechanism, contacts, and chutes in unsealed units.
- h. Perform adjustments for final protective device settings in accordance with the coordination study.

2. Electrical Tests:

- a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- b. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with circuit breaker closed, and across each

- open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.
- c. Perform a contact/pole resistance test. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
 - d. Perform insulation resistance tests on all control wiring with respect to ground. Applied potential shall be 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable. Test duration shall be one minute. For units with solid state components, follow manufacturer's recommendation. Insulation resistance values shall be no less than two megohms.
 - e. Determine the following by primary current injection:
 - 1) Long-time pickup and delay. Pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
 - 2) Short-time pickup and delay. Short-time pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
 - 3) Ground-fault pickup and time delay. Ground-fault pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
 - 4) Instantaneous pickup. Instantaneous pickup values shall be as specified and within manufacturer's published tolerances.
 - f. Test functionality of the trip unit by means of primary current injection. Pickup values and trip characteristics shall be as specified and within manufacturer's published tolerances.
 - g. Perform minimum pickup voltage tests on shunt trip and close coils in accordance with manufacturer's published data. Minimum pickup voltage of the shunt trip and close coils shall be as indicated by manufacturer.
 - h. Verify correct operation of auxiliary features such as trip and pickup indicators; zone interlocking; electrical close and trip operation; trip-free, anti-pump function; and trip unit battery condition. Reset all trip logs and indicators. Investigate units that do not function as designed.
 - i. Verify operation of charging mechanism. Investigate units that do not function as designed.
3. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

- F. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- G. Prepare test and inspection reports.
 - 1. Test procedures used.
 - 2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
 - 3. List deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION 262816

ANNEX SERVER HVAC RETROFIT PROJECT

PLANS

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ANNEX SERVER HVAC RETROFIT PROJECT

ALTERNATE NO. 3, ADDENDUM #2

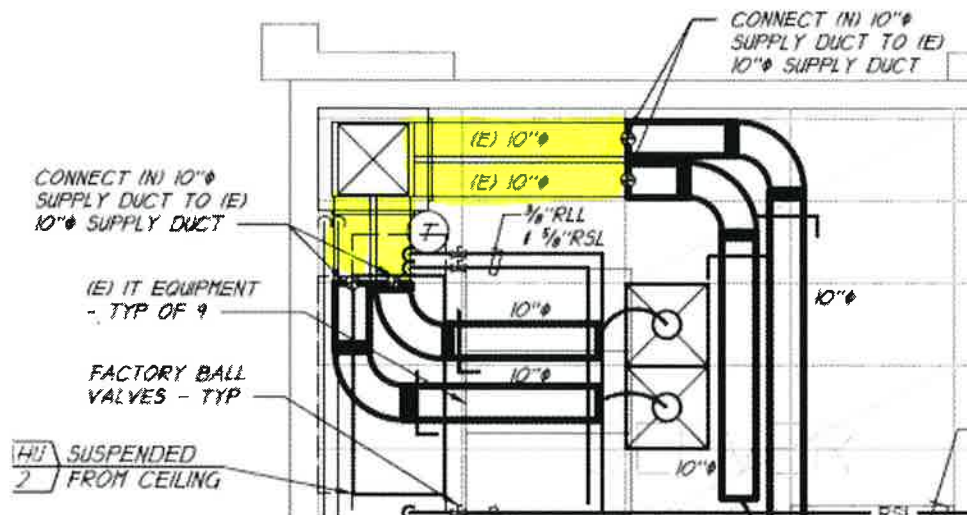
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ADDENDUM NO. 2, REVISION 1
TO THE PLANS AND SPECIFICATIONS FOR
Annex Server HVAC Retrofit Project

November 26, 2019

This addendum is being issued to notify bidders that the following changes have been made to the Project bid documents: Please see the listed changes below:

1. Remove the Panel EM, Manual Transfer Switch and all related conduit, wiring, and associated electrical equipment from the Base Bid. All new homerun circuits, conduit, wiring, and circuit breakers will be routed to existing Panel X.
2. The Panel EM, Manual Transfer Switch, and all related conduit, electrical equipment, and wiring will now be carried as Alternate #3 on the Bid Proposal
3. Remove the existing 10" flex ducting and extend the proposed 10" round galvanized ducting all the way to the supply plenum. Please see sketch below. This work is part of the Base Bid



Receipt of this addendum should be acknowledged by **inserting the number and the date of receipt of Addendum on page 4** of the Bid Proposal Form. Failure to acknowledge receipt of this addendum on the Bid Proposal Form may be considered grounds for rejection of the bid.

If a bid is submitted, it should be with the understanding that the revisions contained herein are incorporated into the plans and specifications for the project and form a part of the contract to be

executed for this work. It is requested that any contractors or subcontractors that may have been given plans or specifications for this project be advised of these contract revisions.

Inyo County
Department of Public Works



November 26th, 2019

Mike Errante
Public Works Director

Date

ANNEX HVAC RETROFIT PROJECT

SPECIFICATIONS MANUAL

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10597 Double R Blvd, Suite 1
Reno, Nevada 89521
(775) 853-1131 – Fax (775) 852-2352

Inyo **Annex HVAC Retrofit**

168 N Edwards St.
Independence, California
Project No. -

Cutsheets Manual
January 10, 2020

SECTION 01 73 29 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.

1.3 DEFINITIONS

- A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch the following operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 - 1. Primary operational systems and equipment.
 - 2. Air or smoke barriers.
 - 3. Fire-protection systems.
 - 4. Control systems.
 - 5. Communication systems.
 - 6. Conveying systems.
 - 7. Electrical wiring systems.
 - 8. Operating systems of special construction in Division 13 Sections.
- C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 - 1. Water, moisture, or vapor barriers.
 - 2. Membranes and flashings.
 - 3. Exterior curtain-wall construction.
 - 4. Equipment supports.
 - 5. Piping, ductwork, vessels, and equipment.
 - 6. Noise- and vibration-control elements and systems.

- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
 - 1. Retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm.
 - a. Roofing.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Proceed with patching after construction operations requiring cutting are complete.

- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 - 4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
 - 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION 01 73 29

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
- B. Related Requirements:
 - 1. Section 321313 "Concrete Paving" for concrete pavement and walks.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - 1. Location of construction joints is subject to approval of the Architect.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.6 QUALITY ASSURANCE

- 1. See Structural drawings for special inspection requirements.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1.9 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
 - 1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301.
 - 2. ACI 117.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

2.4 CONCRETE MATERIALS

- A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- B. Cementitious Materials:
 - 1. Portland Cement: ASTM C 150/C 150M, Type II
 - 2. Fly Ash: ASTM C 618,
- C. Normal-Weight Aggregates: ASTM C 33/C 33M, coarse aggregate or better, graded. Provide aggregates from a single source
 - 1. Maximum Coarse-Aggregate Size 3/4 inch nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Air-Entraining Admixture: ASTM C 260/C 260M.
- E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

F. Water: ASTM C 94/C 94M

2.5 VAPOR RETARDERS

- A. 15 Mil Stego Wrap, or approved equal. Seal all penetrations and lap sheets per manuf. recommendations.

2.6 CURING MATERIALS

- A. See Structural drawings for concrete curing.

2.7 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.8 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials
 - 1. Fly Ash: 20 percent.max.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture to achieve slump, max w/c ratio below 0.50 for interior concrete.
 - 4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.
- E. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.9 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. See Structural drawings.

2.10 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.11 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M[and ASTM C 1116/C 1116M], and furnish batch ticket information.
 - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
 1. Class A, 1/8 inch for smooth-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.

3.2 VAPOR-RETARDER INSTALLATION

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
 1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.3 STEEL REINFORCEMENT INSTALLATION

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

- E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.4 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 3. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 4. For additional information, see Structural drawings.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
 - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
 - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.5 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.6 FINISHING FORMED SURFACES

- A. Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete where indicated:
 - 1. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix 1 part portland cement to 1-1/2 parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.

3.7 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighen until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 - 2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
 - a. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.
 - 3. Finish and measure surface, so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.
- C. Broom Finish: Apply a broom finish to exterior concrete, steps, ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.8 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305.1 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

3.9 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.10 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare test reports.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
1. Steel reinforcement placement.
 2. Steel reinforcement welding.
 3. Headed bolts and studs.
 4. Post installed anchors, including mechanical and epoxy anchors.
 5. Verification of use of required design mixture.
 6. Concrete placement, including conveying and depositing.
 7. Curing procedures and maintenance of curing temperature.
 8. Verification of concrete strength before removal of shores and forms from beams and slabs.
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

- a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
6. Unit Weight: ASTM C 567/C 567M, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

15. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- E. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

END OF SECTION 03 30 00

SECTION 05 12 00 – STRUCTURAL STEEL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes structural steel.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of product specified.
- C. Shop Drawings detailing fabrication of structural steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
 - 3. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify high-strength bolted slip-critical, direct-tension, or tensioned shear/bearing connections.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed structural steel work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Fabricator Qualifications: Engage a firm experienced in fabricating structural steel similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the Work.
- C. Comply with applicable provisions of the following specifications and documents:
 - 1. ASTM A 6 "Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use."
- D. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel."
 - 1. Present evidence that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver structural steel to Project site in such quantities and at such times to ensure continuity of installation.

- B. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.
 - 1. Store fasteners in a protected place. Clean and re-lubricate bolts and nuts that become dry or rusty before use.
 - 2. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.6 SEQUENCING

- A. Supply anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Structural Steel Shapes, Plates, and Bars: As follows:
 - 1. Carbon Steel: ASTM A 36/A 572 Dual certification FY=50 ksi, or ASTM A 992 FY=50 ksi.
- B. Channel ledger/chords: ASTM A 572 FY=50 ksi Maximum tensile strength = 73 ksi.
- C. Cold-Formed Structural Steel Tubing: ASTM A 500, Grade B.
- D. Steel Pipe: ASTM A 53, Type E or S, Grade B.
- E. Anchor Rods, Bolts, Nuts, and Washers: As follows:
 - 1. Unheaded Rods: ASTM A 36.
 - 2. Headed Bolts: ASTM A 307, Grade A; carbon-steel, hex-head bolts; and carbon-steel nuts.
 - 3. Washers: ASTM A 36.
- F. Non-high-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A; carbon-steel, hex-head bolts; carbon-steel nuts; and flat, unhardened steel washers.
 - 1. Finish: Plain, uncoated.
- G. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers.
 - 1. Finish: Plain, uncoated.
- H. Welding Electrodes: Comply with AWS requirements.

2.2 PRIMER

- A. Primer: Fabricator's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer. Color shall be light grey.

2.3 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, non-staining grout containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, of consistency suitable for application, and a 30-minute working time.

2.4 FABRICATION

- A. Fabricate and assemble structural steel in shop to greatest extent possible. Fabricate structural steel according to AISC specifications referenced in this Section and in Shop Drawings.
 - 1. Camber structural steel members where indicated.
 - 2. Mark and match-mark materials for field assembly.
 - 3. Fabricate for delivery a sequence that will expedite erection and minimize field handling of structural steel.
 - 4. Complete structural steel assemblies, including welding of units, before starting shop-priming operations.
 - 5. Comply with fabrication tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 - 1. Plane thermally cut edges to be welded.
- C. Finishing: Accurately mill ends of columns and other members transmitting loads in bearing.
- D. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's printed instructions.
- E. Steel Wall Framing: Select true and straight members for fabricating steel wall framing to be attached to structural steel framing. Straighten as required to provide uniform, square, and true members in completed wall framing.
- F. Holes: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on Shop Drawings.
 - 1. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.
 - 2. Weld threaded nuts to framing and other specialty items as indicated to receive other work.

2.5 SHOP CONNECTIONS

- A. Shop install and tighten nonhigh-strength bolts, except where high-strength bolts are indicated.
- B. Shop install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - 1. Bolts: ASTM A 325 high-strength bolts, unless otherwise indicated.

2. Connection Type: tensioned shear/bearing connections.

C. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp.

2.6 SHOP PRIMING

A. Shop prime steel surfaces, except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed-on fireproofing.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust, loose mill scale, and spatter, slag, or flux deposits. Prepare surfaces according to SSPC specifications as follows:

1. SSPC-SP 2 "Hand Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Use light gray primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Before erection proceeds, and with the steel erector present, verify elevations of concrete and masonry bearing surfaces and locations of anchorages for compliance with requirements.

B. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section.

- B. Base and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
 - 1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
 - 3. Pack grout solidly between bearing surfaces and plates so no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
 - a. Comply with manufacturer's instructions for proprietary grout materials.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 2. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection.
- G. Do not enlarge unfair holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

- A. Install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - 1. Bolts: ASTM A 325 high-strength bolts, unless otherwise indicated.
 - 2. Connection Type: tensioned shear/bearing connections.
- B. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.
 - 1. Comply with AISC specifications referenced in this Section for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
 - 2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp.

3.5 FIELD QUALITY CONTROL

- A. Owner will engage an independent testing and inspecting agency to perform field inspections and tests and to prepare test reports.
 - 1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements.
- B. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.
- C. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.
- D. Field-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

3.6 CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.
 - 1. Apply by brush or spray to provide a minimum dry film thickness of 1.5 mils.

END OF SECTION 05 12 00

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Framing with dimension lumber.
 - 2. Framing with timber.
 - 3. Framing with engineered wood products.
 - 4. Shear wall panels.
 - 5. Rooftop equipment bases and support curbs.
 - 6. Wood blocking, cants, and nailers.
 - 7. Wood furring.
 - 8. Utility shelving.
 - 9. Plywood backing panels.

1.3 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.
- B. Dimension Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.
- C. Exposed Framing: Framing not concealed by other construction.
- D. OSB: Oriented strand board.
- E. Timber: Lumber of 5 inches nominal size or greater in least dimension.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include

- physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

- B. Fastener Patterns: Full-size templates for fasteners in exposed framing.

1.5 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- B. Evaluation Reports: For the following, from ICC-ES:
1. Power-driven fasteners.
 2. Post-installed anchors.
 3. Metal framing anchors.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
- B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less; 19 percent for more than 2-inch nominal thickness unless otherwise indicated.
- C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWWA U1; Use Category UC2[for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground].
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
 - 2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Application: Treat all rough carpentry unless otherwise indicated.
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, and similar concealed members in contact with masonry or concrete.
 - 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 - 4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
 - 5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Treatment shall not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
 - 4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664 and design value adjustment factors shall be calculated according to

ASTM D 6841.[For enclosed roof framing, framing in attic spaces, and where high temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.]

- C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent.[Kiln-dry plywood after treatment to maximum moisture content of 15 percent.]
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
 - 1. For exposed lumber indicated to receive a stained or natural finish, [mark end or back of each piece] [or] [omit marking and provide certificates of treatment compliance issued by testing agency].
- E. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.
- F. Application: Treat [all rough carpentry unless otherwise indicated.] [items indicated on Drawings, and the following:]
 - 1. Framing for raised platforms.
 - 2. Framing for stages.
 - 3. Concealed blocking.
 - 4. Framing for non-load-bearing partitions.
 - 5. Framing for non-load-bearing exterior walls.
 - 6. Roof construction.
 - 7. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

- A. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade.
 - 1. Application: Interior partitions not indicated as load bearing.
 - 2. Species:
 - a. Hem-fir (north); NLGA.
 - b. Southern pine or mixed southern pine; SPIB.
 - c. Spruce-pine-fir; NLGA.
 - d. Hem-fir; WCLIB, or WWPA.
 - e. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
 - f. Northern species; NLGA.
 - g. Eastern softwoods; NeLMA.
 - h. Western woods; WCLIB or WWPA.
- B. Load-Bearing Partitions: No. 1 grade.
 - 1. Application: Exterior walls and interior load-bearing partitions.
 - 2. Species:
 - a. Douglas fir-larch; WCLIB or WWPA.
 - b. Douglas fir-south; WWPA.
 - c. Douglas fir-larch (north); NLGA.

C. Joists, Rafters, and Other Framing Not Listed Above: No. 1 grade.

1. Species:
 - a. Douglas fir-larch; WCLIB or WWPA.
 - b. Douglas fir-south; WWPA.
 - c. Douglas fir-larch (north); NLGA.

2.5 SHEAR WALL PANELS

- A. Wood-Framed Shear Wall Panels: Prefabricated assembly consisting of wood perimeter framing, tie downs, and Exposure I, Structural I plywood or OSB sheathing.

2.6 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.
6. Grounds.
7. Utility shelving.

- B. Dimension Lumber Items: Construction or No. 2 grade lumber of the following species:

- C. Usually retain all species below that meet requirements except those unavailable in Project's location. Species groups are listed in order of decreasing strength (extreme fiber stress in bending). Some species groups below overlap others; delete subparagraphs as necessary to eliminate duplication.

1. Hem-fir (north); NLGA.
2. Mixed southern pine or southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
6. Western woods; WCLIB or WWPA.
7. Northern species; NLGA.
8. Eastern softwoods; NeLMA.

- D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.7 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: 3/4" fire treated Plywood, see Architectural plans.

2.8 FASTENERS

- A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.
 - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.9 METAL FRAMING ANCHORS

- A. Allowable design loads, as published by manufacturer, shall meet or exceed those of products of manufacturers listed. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors. **HARDWARE SHOWN IS MINIMUM, SEE STRUCTURAL PLANS FOR ADDITIONAL INFORMATION.**
- B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.
 - 1. Use for interior locations unless otherwise indicated.
- C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.
 - 1. Use for wood-preservative-treated lumber and where indicated.
- D. Joist Hangers: U-shaped joist hangers with 2-inch-long seat and 1-1/4-inch-wide nailing flanges at least 85 percent of joist depth minimum, see Structural plans for additional information
- E. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.
- F. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch above base and with 2-inch-minimum side cover, socket 0.062 inch thick, and standoff and adjustment plates 0.108 inch thick.
- G. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.

- H. Rafter Tie-Downs: Bent strap tie for fastening rafters or roof trusses to wall studs below, 1-1/2 inches wide by 0.050 inch thick.
- I. Rafter Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 2-1/4 inches wide by 0.062 inch thick. Tie fits over top of rafter or truss and fastens to both sides of rafter or truss, face of top plates, and side of stud below.
- J. Hold-Downs: Brackets for bolting to wall studs and securing to foundation walls with anchor bolts or to other hold-downs with threaded rods and designed with first of two bolts placed seven bolt diameters from reinforced base.
- K. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- E. Install shear wall panels to comply with manufacturer's written instructions.
- F. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- G. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.
- H. Do not splice structural members between supports unless otherwise indicated.
- I. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

- J. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.
 3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
 4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.
- K. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- L. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
1. Use inorganic boron for items that are continuously protected from liquid water.
 2. Use copper naphthenate for items not continuously protected from liquid water.
- M. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- N. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
 3. ICC-ES evaluation report for fastener.
- O. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WALL AND PARTITION FRAMING INSTALLATION

- A. General: Provide single bottom plate and double top plates using members of 2-inch nominal thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions and for load-bearing partitions where framing members bearing on partition are located directly over studs]. Fasten plates to supporting construction unless otherwise indicated.
 - 1. For exterior walls, provide 2-by-6-inch nominal-16 inches o.c. unless otherwise indicated.
 - 2. For interior partitions and walls, provide 2x6 at 24"oc u.n.o. per Structural drawings.
 - 3. Provide continuous horizontal blocking at midheight of partitions more than 96 inches high, using members of 2-inch nominal thickness and of same width as wall or partitions.
- B. Construct corners and intersections with three or more studs.
- C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.
 - 1. For non-load-bearing partitions, provide double-jamb studs and headers not less than 4-inch nominal depth for openings 48 inches and less in width, 6-inch nominal depth for openings 48 to 72 inches in width, 8-inch nominal depth for openings 72 to 120 inches in width, and not less than 10-inch nominal depth for openings 10 to 12 feet in width.
 - 2. For load-bearing walls, provide double-jamb studs for openings 60 inches and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated.

3.4 PROTECTION

- A. Protect all rough carpentry including studs, sheathing, framing, sill plates, curbs, etc. from weather during all phases of construction, so allowable moisture content is not exceeded.

END OF SECTION 06 10 00

SECTION 230500 - MECHANICAL GENERAL CONDITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Drawings and General provisions of the Contract including the "General Conditions", "Supplementary Conditions", and "General Requirements" of the Contract as written and referred to here are adopted and made part of Division 16.
- B. The Contract Agreement, Bidding documents, and all Addenda issued prior to Contract Agreement execution form a part of these specifications and apply to all Contracts or Subcontracts relating to the Mechanical systems.

1.2 SUMMARY

- A. The work under this Division shall consist of all labor, materials, equipment, services and related accessories, etc., necessary and required to complete all work as shown or inferred on the Drawings and in the Specifications (Contract Documents).
- B. Provide fixed Mechanical, except where specifically noted otherwise.
- C. Provide portable Mechanical equipment for the complete system(s).
- D. Provide equipment, ducting, piping etc. normally furnished or required for complete Mechanical systems but not specifically specified on the drawings and/or in specifications, as though specified by both.
- E. All equipment, ducting, piping etc. shall be new, except where specifically shown or specified otherwise.

1.3 WORK INCLUDED IN THIS DIVISION

- A. Mechanical work includes, but is not limited to
 - 1. Alterations and additions to existing Mechanical systems.
 - 2. Connection of all appliances and equipment including Owner furnished equipment.
- A. Install work under this Division per drawings, specifications, latest adopted edition of the Local adopted Building Codes, and any special codes having jurisdiction over specific portions of work within complete installation. In event of conflict, install work per most stringent code requirements determined by Engineer. This does not relieve the Contractor from furnishing and installing work shown or specified which may exceed the requirements of such ordinances, laws, regulations and codes.
- B. All materials, products, devices, fixtures, forms or types of construction included in this project shall meet or exceed the published requirements of American Society of Mechanical Engineers (ASME), American National Standards Institute (ANSI), and Institute of Mechanical and Electronics Engineers (IEEE). All equipment shall bear the Underwriter's Laboratories (UL) label or equivalent from approved independent testing laboratory.

- C. Arrange, pay fees for and complete work to pass required tests by agencies having authority over work. Deliver to Engineer copies of the Certificates of Inspection and approval issued by authorities and provide original copy of each certificate to Owner.
- D. When required by law or regulations, the governmental agency having jurisdiction for inspections shall be given reasonable notice and opportunity to inspect the work. Any work that is enclosed or covered up before such inspection and test shall be uncovered at the Contractor's expense; after it has been inspected, the Contractor shall restore the work to its original condition at his own expense.

1.8 INSURANCE

- A. The Contractor shall procure and maintain, at his expense, such insurance as required by law and/or specified in the General Conditions.

1.9 DRAWINGS AND SPECIFICATIONS

- A. Drawings and specifications are complementary. Work called for by one is binding as if called for by both. Any discrepancies between drawings and specifications shall be brought to the attention of the Engineer for clarification during the bidding period. No allowance shall subsequently be made to the Contractor by reason of his failure to have brought said discrepancies to the attention of the Consultant during the bidding period or by reason of any error on the Contractor's part.
- B. Drawings are schematic and diagrammatic in nature. Drawings show general run of distribution and approximate location of equipment. The contractor shall review drawings of all trades to assure coordination prior to placement of work. Right is reserved to change location of equipment and devices, and routing of pipes and ducts within 10 feet, without extra cost to Owner.
- C. Use dimensions in figures, shop drawings, etc. and actual site measurements in preference to scaled dimensions. Do not scale drawings for exact sizes or locations – use dimensioned details or actual field conditions. Verify item mounting heights as required by project conditions prior to rough-in.
- D. Discrepancies between different drawings or between drawings and specifications, or regulations and codes governing the installation shall be brought to the attention of the Engineer in writing for determination.
- E. Layout equipment as shown on drawings as close as possible. Verify access requirements for equipment actually furnished.
- F. Contractor is responsible to field measure and confirm the mounting heights and location of Mechanical equipment with respect to counters, doorways, and other architectural, electrical, fire or structural work. Do not scale distances off the Mechanical drawings: Use actual building dimensions.
- G. Execution of Contract is evidence that Contractor has examined all existing conditions, drawings and specifications related to work, and is informed to extent and character of work. Later claims for labor and materials required due to difficulties encountered, which could have been foreseen had examination been made, will not be recognized.
- H. All work called for in this Section of the plans and specifications shall be performed under this Section, regardless of whether such work may also have been called for in other Section(s). Discrepancies in or conflicts among the various parts of the contract drawings shall not relieve Contractor of his obligation to perform.

- I. No attempt has been made to establish the required sections or splits of equipment relative to the size of access into the space, building, etc. Contractor shall establish all said splits, sections, etc. necessary to install equipment complete without undue disassembly of equipment or demolition of building parts at site of work.
- J. Charges for extra work are not allowed unless work is authorized by written order from the Owner's Representative approving charges for work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All material shall be new, and have a UL label where available. If UL label is not available, material shall be manufactured in accordance with applicable ASME, ANSI, IEEE and Federal Standards. Use UL labeled components in assemblies that do not have overall UL label.
- B. Utilize one of the manufacturers listed to furnish all of the major equipment required for this project.

2.2 SUBSTITUTIONS

- A. All equipment and materials scheduled on the drawings or listed in the specifications are the "basis of design;" equipment and materials used on the project are subject to compliance with all listed requirements. In submitting a bid to complete services in this project, the contractor represents that its bid is based on materials and equipment described in the contract documents, including addenda. Contractors are encouraged to request a review of substitute materials and equipment. Substitutes will be considered only if they keep with the general intent of the contract documents, including quality of work and product, and are fully documented. All requests for review of alternates shall be submitted to the engineer 7 working days prior to the date of bid opening. Substitutes not properly submitted may be rejected without cause. In requesting a review of substitutes the contractor is to provide an item-by-item comparison of the alternate product to the basis of design. Comparisons shall include but are not limited to: size, weight, capacity, construction, warranty, finish, etc. Contractors will not be granted extended contract time or fees in connection with the rejection of a substitute product. Contractor shall fabricate, furnish, install and pay for any additional materials and/or services by any other trade required to facilitate the use of a substituted item.

2.3 SUBMITTALS

- A. Before ordering any equipment contractor is to provide 6 sets of submittals for all equipment, accessories, test and balance, startup, fixtures, etc. That bare importance on proper project completion. All certifications for welders, balance contractors and startup technicians are to be provided in their appropriate sections. Submittals expected for final review are to be submitted a minimum of 14 working days prior to the required review and return time. The contractor is included 2 reviews of said submittals; any time incurred by additional submittal reviews caused by rejected or unacceptable submittals will be charged to the contractor at the engineer's hourly billing rate. Submittals will not be accepted that have not been reviewed and approved by the general contractor and/or construction manager having authority on the project. Incomplete submittals will not be accepted; a single fully encompassing submittal is to be provided by each trade. Contractors will not be granted extended contract time or fees in connection with the rejection of submittals or delays caused by unhurried submittal delivery.
- B. Standard factory brochures will not suffice as product submittals; factory submittal packages indicating the products, performance, dimensions, clearances, colors, testing and listing certifications and all accessories to be used are to be provided. In the case of alternates comparison documentation is to be provided showing proof of equality.

- C. In the case that additional design services are required by a registered professional the contractor is to provide sealed and signed documentation of work to be completed depicting necessary designs, and performance in accordance with all adopted codes.

PART 3 - EXECUTION

3.1 VISIT TO SITE

- A. Visit site, and survey existing conditions affecting work prior to bid. Include necessary materials and labor to accomplish the Mechanical work, including relocation of existing services and utilities on building site in bid. No consideration shall be given to future claims due to existing conditions. Any discrepancies or interference's shall be reported immediately to the Engineer.

3.2 WORKMANSHIP

- A. All work performed shall be first class work in every aspect. The work shall be performed by mechanics skilled in their respective trades, who shall at all times be under the supervision of competent persons.
- B. Work under this Division shall be first class with emphasis on neatness and workmanship. All work shall be installed square and plumb and concealed where possible. Work that is deficient, defective, poorly laid out, not perfectly aligned, or that is not consistent with the requirements generally accepted in the trade for "first class work" will not be acceptable.
- C. In addition to the materials specified elsewhere, furnish and install all other miscellaneous items necessary for the completion of the work to the extent that all systems are complete and operative.
- D. All work under this Section shall be performed in cooperation with the work performed under all other Sections of the Specifications for the Project in order to avoid interference with other work and to secure the proper installation of all work. Refer the Drawings and Specifications covering the work to be performed under all Sections, so that the relation and extent of the work of this Section with respect to the work of all other Sections is understood. Give right of way to raceways and piping systems installed at a required slope.
- E. Install work using competent mechanics, under supervision of foreman, all duly certified by local authorities. The installation shall be subject to the Engineer's observation, and final acceptance. The Engineer may reject unsuitable work.

3.3 CHANGE ORDERS

- A. Additional work may be required on the project, which is outside the scope of the contract. Such additional work will be described in Supplemental Instructions and/or Clarifications, to be estimated and priced by the Contractor, and accepted by the Owner, prior to commencing work.
- B. Acceptable charges will be limited to the following:
 - a. Labor hours shall be calculated, and shall be priced based on actual paid cost, not to exceed local Prevailing Wage Rates.
 - b. Supervision and Support shall not exceed 15% of labor charges. This blanket percentage shall cover foreman, tools, vehicles, record drawings, etc.

- c. Charges for material shall be charged at actual unit prices quoted by suppliers, supported by a true copy of the written price quotation.
- d. Major equipment items shall be charged at actual unit prices quoted by suppliers, supported by a true copy of the written price quotation.
- e. Handling charges for material shall not exceed 5% of material and equipment charges. This blanket percentage shall cover freight, cartage, wastage, etc.
- f. Should the Owner or Engineer find reason to dispute or challenge the Contractor's pricing of additional work, one of the following solutions may be imposed
- g. Contractor shall be directed to proceed with the work, and submit his proposed charges for arbitration at the conclusion of the project.
- h. Contractor shall maintain a separate labor log and obtain daily signatures thereon, and shall be prepared to submit a certified, audited payroll report to support his claims.
- i. Owner shall purchase the disputed equipment and/or material, and provide same to Contractor at job site for installation, along with a copy of the invoice. Contractor may add a 10% charge to cover handling and warranty administration.
- j. Owner shall contract with a separate licensed Mechanical Contractor to perform the extra work. In this event, the originally-contracted work shall be completed by Contractor and accepted by the Owner, following inspection and recommendation by the Engineer. This Contractor shall cause no impediment to the work of the separate contractor, and shall maintain full warranty on his originally-installed equipment and workmanship.

3.4 GUARANTEE

- A. Furnish the Owner a written guarantee, stating that if the workmanship and/or material executed under this Division are proven defective within one (1) year after final acceptance by the Owner, such defects and other work damaged will be repaired and/or replaced. Submit with Operations and Maintenance Manuals.
- B. Obtain from the various manufacturers or vendors guarantees or warranties for their particular equipment or components, and deliver them to the Owner. All guarantees and warranties provided shall be referenced to this project.
- C. In event that systems are placed in operation in several phases at the Owner's request, guarantee will begin on date each system or item of equipment is accepted for service by the Owner. Provide O&M manuals for all equipment when equipment is accepted for service by the Owner.
- D. All guarantees and warranties shall include labor and material at the site of installation for the duration of the guarantee period.

3.5 COOPERATION

- A. Carefully coordinate work with other contractors and subcontractors. Refer conflicts between trades to Engineer. Provide necessary information to other trades for such coordination. Such information shall include Shop Drawings, Product Data and all other required data.
- B. Whenever such information is not provided in a timely manner or whenever such information is incorrect, this contractor shall bear all costs for providing or correcting affected work of related trades with no change to the Contract Price or Construction Schedule.

- C. Work to be installed as progress of project will allow. Schedule of work determined by General Contractor, Owner, and/or Architect/Engineer.

3.6 HVAC CONTROL WIRING

- A. Control Wiring including low voltage and line voltage interlock wiring will be furnished and installed under Division 16.

3.8 PROTECTING

- A. Provide warning lights, bracing, shoring, rails, guards and covers necessary to prevent damage or injury. All persons working around Mechanical equipment shall have Mechanical shock and flash protection per OSHA 1910.301-309 & 331-335.
- B. Do not leave exposed or unprotected, Mechanical items carrying current. Protect visitors and workers from exposure to contact with Mechanically energized surfaces, parts, etc. in accordance with OSHA standards.

3.10 DELIVERY, STORAGE AND HANDLING

- A. Deliver equipment and materials to job site in original, unopened, labeled container. Products shall be properly identified with names, model numbers, types, grades, compliance labels and other information needed for identification. Store to prevent damage and injury. Store materials to prevent corroding. Store finished materials and equipment to prevent staining and discoloring. Store materials affected by condensation in warm dry areas. Provide heaters. Contractor shall verify the availability of on site storage space, if no on site storage space is available then the contractor shall cover the cost for off site storage. Materials stored at the project site that becomes soiled with construction dirt, concrete, or moisture shall be removed from the site and replaced with new. Do not install soiled material.
- B. Protect work and materials from damage by weather, entrance of water or dirt. Cap and mark piping and ductwork during installation.
- C. Avoid damage to materials and equipment in place. Repair, or remove and replace damaged work and materials.
- D. Protection and safekeeping of products stored on premises is responsibility of Contractor supplying products.
- E. Schedule of deliveries and unloading to prevent traffic congestion blocking of access or interference with work. Arrange deliveries to avoid larger accumulations of materials than can be suitably stored at site.
- F. Install equipment per manufacturer's recommendations. Conflicts between contract documents and these recommendations shall be referred to Engineer for remedy.
- G. Mechanical or electronic equipment that has been damaged, exposed to weather or is, in the opinion of the Engineer or Architect, otherwise unsuitable because of improper fabrication, storage or installation shall be removed and replaced by this Contractor at his expense.

3.11 CLEANING AND PAINTING

- A. Clean equipment furnished in this Division after completion of work. Clean wipe the interior of all ducting, pipes, equipment soiled with dirt and debris prior to installation of wiring.

B. Touch-up or re-paint damaged painted finishes as determined by the Engineer.

C. Contractor is to paint out all diffuser, grille and internal ductwork portions visible behind terminations in space. All ductwork installed exposed within the space is to be painted per the architectural requirements. Coordinate exact requirements with architectural drawings.

D. Remove debris, packing cartons, scrap, etc., from site daily.

3.12 STARTUP

A. All mechanical and high efficiency plumbing equipment is to be started up by a factory trained and certified technician

3.13 TRAINING

A. Training for operation and maintenance of new systems or modifications to existing systems is specified in Technical sections. Contractor shall submit with record documents an itemized receipt signed by Owner's representative that all specified training has been received.

3.14 ACCESS PANELS

A. The contractor shall furnish all access panels for walls, partitions, etc., and shall give access panel to the General Contractor for installation at locations as directed by the Mechanical Contractor. It shall be the responsibility of the Mechanical Contractor that access panels are provided for access to all equipment and accessories, which may be concealed by building construction to provide adequate service space and comply with the manufacturers listed requirements. Access panels shall be installed so as not to interfere with building and other system arrangements.

END OF SECTION 230500

SECTION 23 05 13 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
 - 1. Motor controllers.
 - 2. Torque, speed, and horsepower requirements of the load.
 - 3. Ratings and characteristics of supply circuit and required control sequence.
 - 4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

- A. Comply with NEMA MG 1 unless otherwise indicated.
- B. Comply with IEEE 841 for severe-duty motors.

2.2 MOTOR CHARACTERISTICS

- A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.
- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Efficiency: Energy efficient, as defined in NEMA MG 1.
- C. Service Factor: 1.15.
- D. Multispeed Motors: Variable torque.

1. For motors with 2:1 speed ratio, consequent pole, single winding.
 2. For motors with other than 2:1 speed ratio, separate winding for each speed.
- E. Multispeed Motors: Separate winding for each speed.
- F. Rotor: Random-wound, squirrel cage.
- G. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- H. Temperature Rise: Match insulation rating.
- I. Insulation: Class F.
- J. Code Letter Designation:
1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
 2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.
- K. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

- A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
- B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.
1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
 2. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
 3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
 4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
- C. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.

2.5 SINGLE-PHASE MOTORS

- A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:
1. Permanent-split capacitor.
 2. Split phase.
 3. Capacitor start, inductor run.
 4. Capacitor start, capacitor run.
- B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
- C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.

- D. Motors 1/20 HP and Smaller: Shaded-pole type.
- E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

END OF SECTION 23 05 13

SECTION 23 05 17 - SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Sleeves.
 - 2. Stack-sleeve fittings.
 - 3. Sleeve-seal systems.
 - 4. Sleeve-seal fittings.
 - 5. Grout.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.
- C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.
- D. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- E. Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- F. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.
- G. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.

2.2 STACK-SLEEVE FITTINGS

- A. Description: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring, bolts, and nuts for membrane flashing.
 - 1. Underdeck Clamp: Clamping ring with setscrews.

2.3 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
 - 1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 2. Pressure Plates: Stainless steel.
 - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.4 SLEEVE-SEAL FITTINGS

- A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall. Unit has plastic or rubber waterstop collar with center opening to match piping OD.

2.5 GROUT

- A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
 - 1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
 - 2. Cut sleeves to length for mounting flush with both surfaces.

- a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.
 1. Cut sleeves to length for mounting flush with both surfaces.
 2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Section 07 92 00 "Joint Sealants."
- E. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 07 84 13 "Penetration Firestopping."

3.2 STACK-SLEEVE-FITTING INSTALLATION

- A. Install stack-sleeve fittings in new slabs as slabs are constructed.
 1. Install fittings that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 2. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing. Comply with requirements for flashing specified in Section 07 62 00 "Sheet Metal Flashing and Trim."
 3. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level.
 4. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 5. Using grout, seal the space around outside of stack-sleeve fittings.
- B. Fire-Barrier Penetrations: Maintain indicated fire rating of floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 07 84 13 "Penetration Firestopping."

3.3 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.4 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.

- D. Using grout, seal the space around outside of sleeve-seal fittings.

3.5 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:

- 1. Exterior Concrete Walls below Grade:

- a. Piping Smaller Than NPS 6: Galvanized-steel wall sleeves with sleeve-seal system, Galvanized-steel-pipe sleeves with sleeve-seal system or Sleeve-seal fittings.

- 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

- b. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves with sleeve-seal system or Sleeve-seal fittings.

- 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

- 2. Concrete Slabs-on-Grade:

- a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves with sleeve-seal system or Sleeve-seal fittings.

- 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

- b. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves with sleeve-seal system.

- 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

- c. Piping Smaller Than NPS 6 Galvanized-steel-pipe sleeves.

- d. Piping NPS 6 and Larger: Galvanized-steel-sheet sleeves.

END OF SECTION 23 05 17

SECTION 23 05 18 - ESCUTCHEONS FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Escutcheons.
 - 2. Floor plates.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

- A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

2.2 FLOOR PLATES

- A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.
- B. Split-Casting Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.
 - 1. Escutcheons for New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece.
 - b. Chrome-Plated Piping: One-piece, cast-brass type with polished, chrome-plated finish.

- c. Insulated Piping: One-piece, stamped-steel type.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
 - e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
 - f. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type.
 - g. Bare Piping in Equipment Rooms: One-piece, stamped-steel type.
- C. Install floor plates for piping penetrations of equipment-room floors.
- D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
- 1. New Piping: One-piece, floor-plate type.
 - 2. Existing Piping: Split-casting, floor-plate type.

3.2 FIELD QUALITY CONTROL

- A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION 23 05 18

SECTION 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Fiberglass pipe hangers.
4. Metal framing systems.
5. Thermal-hanger shield inserts.
6. Fastener systems.
7. Pipe stands.
8. Equipment supports.

- B. Related Sections:

1. Section 23 31 13 "Metal Ducts" and for duct hangers and supports.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for HVAC piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
 1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
 3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following; include Product Data for components:
 - 1. Trapeze pipe hangers.
 - 2. Metal framing systems.
 - 3. Pipe stands.
 - 4. Equipment supports.

- C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Detail fabrication and assembly of trapeze hangers.
 - 2. Design Calculations: Calculate requirements for designing trapeze hangers.

1.6 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.7 QUALITY ASSURANCE

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
 - 3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
 - 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 - 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of zinc plate carbon steel.

- B. Stainless-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 - 3. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.

- C. Copper Pipe Hangers:
 - 1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
 - 2. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.

2.2 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 METAL FRAMING SYSTEMS

- A. MFMA Manufacturer Metal Framing Systems:

1. Description: Shop- or field-fabricated pipe-support assembly for supporting multiple parallel pipes.
2. Standard: MFMA-4.
3. Channels: Continuous slotted steel channel with inturred lips.
4. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
6. Metallic Coating: Electroplated zinc, Hot-dipped galvanized or In-line, hot galvanized.

2.4 THERMAL-HANGER SHIELD INSERTS

- A. Insulation-Insert Material for Cold Piping: [ASTM C 552, Type II cellular glass with 100-psig or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.
- B. Insulation-Insert Material for Hot Piping: [Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig or ASTM C 552, Type II cellular glass with 100-psig, or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength.
- C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- E. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.5 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Mechanical-Expansion Anchors: Insert-wedge-type, stainless- steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.6 PIPE STANDS

- A. General Requirements for Pipe Stands: Shop- or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.
- B. Compact Pipe Stand: One-piece plastic unit with integral-rod roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.

- C. Low-Type, Single-Pipe Stand: One-piece stainless-steel base unit with plastic roller, for roof installation without membrane penetration.
- D. High-Type, Single-Pipe Stand:
 - 1. Description: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.
 - 2. Base: Stainless steel.
 - 3. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.
 - 4. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.
- E. High-Type, Multiple-Pipe Stand:
 - 1. Description: Assembly of bases, vertical and horizontal members, and pipe supports, for roof installation without membrane penetration.
 - 2. Bases: One or more; plastic.
 - 3. Vertical Members: Two or more protective-coated-steel channels.
 - 4. Horizontal Member: Protective-coated-steel channel.
 - 5. Pipe Supports: Galvanized-steel, clevis-type pipe hangers.
- F. Curb-Mounted-Type Pipe Stands: Shop- or field-fabricated pipe supports made from structural-steel shapes, continuous-thread rods, and rollers, for mounting on permanent stationary roof curb.

2.7 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.8 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
 - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.

2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.
- D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. Fastener System Installation:
 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- F. Pipe Stand Installation:
 1. Pipe Stand Types except Curb-Mounted Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
 2. Curb-Mounted-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. See Section 07 72 00 "Roof Accessories" for curbs.
- G. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- H. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- I. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- J. Install lateral bracing with pipe hangers and supports to prevent swaying.
- K. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- L. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- M. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- N. Insulated Piping:
 1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

- a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick.
 - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
 - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
 - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1 inch.

3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Section 09 91 23 "Interior Painting"
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports, metal trapeze pipe hangers and metal framing systems and attachments for general service applications.
- F. Use padded hangers for piping that is subject to scratching.
- G. Use thermal-hanger shield inserts for insulated piping and tubing.
- H. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
 - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
 - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
 - 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
 - 5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
 - 6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
 - 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 - 8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 - 9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.

10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
 11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
 12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
 13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 14. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
 15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
 16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
 17. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
 18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.
 19. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
 20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
 21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- I. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- J. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- K. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.

7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- L. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- M. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
 3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
 4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
 5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.
 6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
 7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from trapeze support.
 8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
 - a. Horizontal (MSS Type 54): Mounted horizontally.
 - b. Vertical (MSS Type 55): Mounted vertically.
 - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.
- N. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- O. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

- P. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION 23 05 29

SECTION 230548 - SEISMIC CONTROLS FOR HVAC

PART 1 - GENERAL

1.1 GENERAL

- A. Seismic bracing for mechanical systems (equipment, ductwork, piping, and conduit) shall comply with all applicable requirements of the 2018 California Building Code (CBC) including all applicable provisions of the American Society of Civil Engineers (ASCE) Minimum Design Loads for Buildings and Other Structures (ASCE Standard 7-10). Basic seismic design criteria for each project shall be as listed on the structural drawings for that project.
- B. Compliance with the applicable seismic bracing requirements shall be accomplished utilizing the most current version of one of the following design manuals (no exceptions):
 - International Seismic Application Technology (ISAT) Design Manual
 - Mason Industries Seismic Restraint Design Manual
 - Kinetics Noise Control Seismic Design Manual
- C. A complete bound copy of the applicable design manual shall be provided to the Owner at the beginning of the construction period for use/reference during the course of the project.
- D. Component Importance Factors (I_p) for all mechanical equipment, ductwork, piping, and conduit shall be determined and assigned in accordance with ASCE Standard 7-10 Section 13.1.3.

1.2 SUBMITTALS

- A. The Contractor shall provide the required number of seismic shop drawing submittal sets for review and approval by the Owner. Submittals shall include a comprehensive set of shop drawings clearly depicting the seismic bracing requirements for all mechanical equipment, ductwork, piping, and conduit. Any equipment that does not require seismic bracing shall be specifically identified in the submittal, and the reason for exemption shall be provided.
- B. Submittals shall be fully coordinated with the structural drawings and shall include all applicable structural attachment details. Seismic bracing shop drawings shall include all vertical support anchorage loads and all seismic bracing anchorage loads. Each specific load shall be indicated and the structural element that the support is attached to shall be clearly depicted/identified. Seismic bracing submittals shall be stamped and signed by a structural or civil engineer licensed in the State of Nevada.
- C. Seismic shop drawing submittals will be reviewed by both the mechanical engineer and the structural engineer.

1.3 SITE VISITS

- A. An authorized representative of the seismic bracing system manufacturer shall visit the job site during the construction period to confirm that the seismic bracing installation complies with the shop drawings, with all applicable code requirements, and with the seismic bracing system manufacturer's written installation requirements and associated details. A minimum of three site visits shall be provided, with the first visit scheduled just prior to installation of the first seismic braces, the second visit at the approximate midpoint of construction, and the third visit when the seismic bracing installation is complete (and prior to installation of ceilings).

- B. A written report shall be issued within one week of each site visit summarizing the observations made during the site visit and listing all required corrective actions and/or deficiencies.
- C. Site visits shall be coordinated with the Owner and shall be scheduled in writing a minimum of two weeks prior to the proposed site visit date.
- D. After all equipment installation is complete and all seismic bracing has been verified, the authorized representative that conducted the field verification shall issue a letter certifying that the installation is complete and that the installation complies with the specified requirements.

1.4 Special Inspection

- A. Special inspections will be arranged and paid for by the Owner when and if required by 2012 IBC Section 1704. When special inspection is required for a particular system or item of equipment the Contractor shall be available on site during each special inspection to facilitate the on-site review process.

END OF SECTION 230548

SECTION 23 05 48.13 - VIBRATION CONTROLS FOR HVAC

PART 1: GENERAL

1.1 WORK INCLUDED

- A. This section provides minimum acceptance requirements for vibration isolation for all heating, ventilating, and air-conditioning equipment, ductwork and piping.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Concrete work is provided in Division 03.
- B. Ductwork flexible connections are specified elsewhere in Division 23.

1.3 QUALITY ASSURANCE

- A. Unless otherwise directed by the local authority having jurisdiction, the following codes and standards will apply:
 - 1. 2018 California Building Code
 - 2. American Society of Civil Engineers 7-10
- B. Manufacturer's Qualifications: Firms regularly engaged in manufacture of vibration control products of type, size, and capacity required, whose products have been in satisfactory use in similar service for not less than 5 years.

1.4 SUBMITTALS

- A. All vibration isolation systems shall be by one manufacturer.
- B. Submit shop drawings for all devices specified herein and as indicated and scheduled on the drawings. Submittals shall indicate full compliance with the device specification in Part 2. Any deviation shall be specifically noted and subject to engineer approval. Submittals shall include device dimensions, placement, attachment and anchorage requirements.
- C. Provide calculations for selection of seismic/wind restraints, certified by a qualified professional engineer, licensed in the state of the project.
- D.

PART 2: PRODUCTS

2.1 VIBRATION ISOLATION:

- A. Springs: All springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. All springs except internal nested springs shall have an outside diameter not less than 0.8 of the compressed height of the spring. Ends of springs shall be square and ground for stability. Laterally stable springs shall have k_x/k_y ratios of at least 0.9. All springs shall be fully color-coded to indicate capacity – color striping is not considered adequate.
- B. Corrosion Protection: All springs shall be powder-coated enamel. Housings shall be hot dipped galvanized (located outdoors), powder-coated enamel, or painted with rust-resistant paint.
- C. Equipment requiring vibration isolation:
 - 1. Outdoor Heat Pumps
 - 2. Indoor Air Handlers
 - 3. Unit Heater
 - 4. Exhaust Fans
- D. Isolators:
 - 1. Vibration Isolation Pads: Type NSN – Sandwich neoprene pad type isolators, with 3/8" (10 mm) minimum thick ribbed neoprene pads bonded to each side of a 10 ga (3.5 mm) minimum galvanized metal plate. Isolator pads shall be selected to ensure that deflection does not exceed 20% of isolator free height.
 - 2. Grommet Washers: Type GW - Neoprene grommet washers of sufficient size to accommodate USS standard washers, long enough to sleeve through 1/4" (6 mm) plate material, and with at least 1/8" (3 mm) thick material around the bolt hole.
 - 3. Housed Spring Floor Mounted Isolators: Type HS – Housed, spring isolators with components for leveling and securing equipment. Springs shall be supported by a steel top and bottom frame separated by an elastomeric material.
 - 4. Spring Hangers: Vibration isolator hanger supports with steel springs and welded steel housings. Hangers shall be designed for a minimum of 15 degree angular misalignment from vertical before support rod contacts housing; hangers serving lightweight loads 0.90 kN (200 lbs) and less may be exempt from this requirement. Provide a vertical uplift stop-washer on spring hangers for seismically restrained equipment, duct or piping.
 - a. Type SHRB – Spring hanger with neoprene and bottom cup isolators complete with spring, compression cup, neoprene "double-deflection" element at top of hanger, and neoprene cup under the spring.

PART 3: EXECUTION

3.1 GENERAL:

- A. Coordinate size, doweling, and reinforcing of concrete equipment housekeeping pads and piers with vibration isolation device manufacturer to ensure adequate space and

prevent edge breakout failures. Pads and piers must be adequately doweled in to structural slab.

- B. Coordinate locations and sizes of structural supports with locations of vibration isolators (e.g., fans.).
- C. Isolated equipment, duct and piping located on roofs must be attached to the structure. Intermediate supports between the restraint and structure that are not attached to the structure must be approved by the restraint manufacturer.

3.2 VIBRATION ISOLATION:

- A. Block and shim all bases level so that all ductwork, piping and electrical connections can be made to a rigid system at the proper operating level, before isolators are adjusted. Ensure that there are no rigid connections or incidental physical contacts between isolated equipment and the building structure or nearby systems.
- B. Ensure housekeeping pads have adequate space to mount equipment and isolator housings and shall also be large enough to ensure adequate edge distance for isolator anchors.
- C. Select and locate vibration isolation equipment to give uniform loading and deflection, according to weight distribution of equipment.
 - 1. Deflection – 1”
- D. Mount fans, as indicated on the drawings, on structural steel vibration bases common to both fan and motor. There shall be a minimum operating clearance of 1” (25 mm) between steel bases and the structure.

END OF SECTION 230548.13

SECTION 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Equipment labels.
 - 2. Warning signs and labels.
 - 3. Duct labels.
 - 4. Stencils.
 - 5. Valve tags.
 - 6. Warning tags.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:
 - 1. Material and Thickness: Brass, 0.032-inch, stainless steel, 0.025-inch, aluminum, 0.032-inch or anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Letter Color: White.
 - 3. Background Color: Black.
 - 4. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 - 5. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.

6. Fasteners: Stainless-steel rivets.
7. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
2. Letter Color: White.
3. Background Color: Black.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
7. Fasteners: Stainless-steel rivets.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.

D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number, and identify Drawing numbers where equipment is indicated (plans, details, and schedules) and the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: White.
- C. Background Color: Red.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
- G. Fasteners: Stainless-steel rivets.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information plus emergency notification instructions.

2.3 DUCT LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.

- B. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- C. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- D. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
- E. Fasteners: Stainless-steel self-tapping screws.
- F. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- G. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings; also include duct size and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions or as separate unit on each duct label to indicate flow direction.

2.4 STENCILS

- A. Stencils for Piping:
 - 1. Lettering Size: Size letters according to ASME A13.1 for piping.
 - 2. Stencil Material: Aluminum or Brass.
 - 3. Stencil Paint: Exterior, gloss, alkyd enamel or acrylic enamel in colors complying with recommendations in ASME A13.1 unless otherwise indicated. Paint may be in pressurized spray-can form.
 - 4. Identification Paint: Exterior, alkyd enamel or acrylic enamel in colors according to ASME A13.1 unless otherwise indicated. Paint may be in pressurized spray-can form.
- B. Stencils for Ducts:
 - 1. Lettering Size: Minimum letter height of 1-1/4 inches for viewing distances up to 15 feet and proportionately larger lettering for greater viewing distances.
 - 2. Stencil Material: Aluminum or Brass.
 - 3. Stencil Paint: Exterior, gloss, alkyd enamel or acrylic enamel. Paint may be in pressurized spray-can form.
 - 4. Identification Paint: Exterior, alkyd enamel or acrylic enamel. Paint may be in pressurized spray-can form.
- C. Stencils for Access Panels and Door Labels, Equipment Labels, and Similar Operational Instructions:
 - 1. Lettering Size: Minimum letter height of 1/2 inch for viewing distances up to 72 inches and proportionately larger lettering for greater viewing distances.
 - 2. Stencil Material: Aluminum or Brass.
 - 3. Stencil Paint: Exterior, gloss, alkyd enamel or acrylic enamel. Paint may be in pressurized spray-can form.
 - 4. Identification Paint: Exterior, alkyd enamel or acrylic enamel. Paint may be in pressurized spray-can form.

2.5 VALVE TAGS

- A. Description: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

1. Tag Material: Brass, 0.032-inch anodized aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 2. Fasteners: Brass wire-link chain or beaded chain.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
1. Valve-tag schedule shall be included in operation and maintenance data.

2.6 WARNING TAGS

- A. Description: Preprinted or partially preprinted accident-prevention tags of plasticized card stock with matte finish suitable for writing.
1. Size: 3 by 5-1/4 inches minimum.
 2. Fasteners: Brass grommet and wire.
 3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
 4. Color: Safety-yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

3.3 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.4 PIPE LABEL INSTALLATION

- A. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels, complying with ASME A13.1, with painted, color-coded bands on each piping system.

1. Identification Paint: Use for contrasting background.
 2. Stencil Paint: Use for pipe marking.
- B. Pipe Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
1. Near each valve and control device.
 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 3. Near penetrations and on both sides of through walls, floors, ceilings, and inaccessible enclosures.
 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 5. Near major equipment items and other points of origination and termination.
 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- C. Directional Flow Arrows: Arrows shall be used to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.
- D. Pipe Label Color Schedule:
1. Chilled-Water Piping: White letters on a safety-green background.
 2. Condenser-Water Piping: White letters on a safety-green background.
 3. Heating Water Piping: White letters on a safety-green background.
 4. Refrigerant Piping: White letters on a safety-purple background.

3.5 DUCT LABEL INSTALLATION

- A. Install plastic-laminated duct labels with permanent adhesive on air ducts in the following color codes:
1. Blue background with white letters: For cold-air supply ducts.
 2. Yellow background with white letters: For hot-air supply ducts.
 3. Green background with white letters: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
- B. Stenciled Duct Label Option: Stenciled labels showing service and flow direction may be provided instead of plastic-laminated duct labels, at Installer's option.
- C. Locate labels near points where ducts enter into and exit from concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

3.6 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, shutoff valves, faucets, convenience and lawn-watering hose connections, and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
1. Valve-Tag Size and Shape:
 - a. Chilled Water: 1-1/2 inches.

- b. Condenser Water: 1-1/2 inches.
- c. Refrigerant: 1-1/2 inches.
- d. Hot Water: 1-1/2 inches.
- e. Gas: 1-1/2 inches.

2. Valve-Tag Colors:

- a. Toxic and Corrosive Fluids: Black letters on a safety-orange background.
- b. Flammable Fluids: Black letters on a safety-yellow background.
- c. Combustible Fluids: White letters on a safety-brown background.
- d. Potable and Other Water: White letters on a safety-green background.
- e. Compressed Air: White letters on a safety-blue background.
- f. Defined by User: White letters on a safety-purple background, black letters on a safety-white background, white letters on a safety-gray background, and white letters on a safety-black background

3.7 WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 23 05 53

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Balancing Air Systems:
 - a. Constant-volume air systems.
 - 2. Testing, adjusting, and balancing existing systems and equipment.
 - 3. Sound tests.
 - 4. Vibration tests.
 - 5. Duct leakage tests.
 - 6. Control system verification.

1.3 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. BAS: Building automation systems.
- C. NEBB: National Environmental Balancing Bureau.
- D. TAB: Testing, adjusting, and balancing.
- E. TABB: Testing, Adjusting, and Balancing Bureau.
- F. TAB Specialist: An independent entity meeting qualifications to perform TAB work.
- G. TDH: Total dynamic head.

1.4 PREINSTALLATION MEETINGS

- A. TAB Conference: If requested by the Owner, conduct a TAB conference at Project site after approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Provide a minimum of 14 days' advance notice of scheduled meeting time and location.
 - 1. Minimum Agenda Items:
 - a. The Contract Documents examination report.
 - b. The TAB plan.
 - c. Needs for coordination and cooperation of trades and subcontractors.
 - d. Proposed procedures for documentation and communication flow.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
- B. Contract Documents Examination Report: Within 30 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.
- C. Strategies and Procedures Plan: Within 30 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.
- D. System Readiness Checklists: Within 30 days of Contractor's Notice to Proceed, submit system readiness checklists as specified in "Preparation" Article.
- E. Examination Report: Submit a summary report of the examination review required in "Examination" Article.
- F. Certified TAB reports.
- G. Sample report forms.
- H. Instrument calibration reports, to include the following:
 - 1. Instrument type and make.
 - 2. Serial number.
 - 3. Application.
 - 4. Dates of use.
 - 5. Dates of calibration.

1.6 QUALITY ASSURANCE

- A. TAB Specialists Qualifications: Certified by AABC.
 - 1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC.
 - 2. TAB Technician: Employee of the TAB specialist and certified by AABC as a TAB technician.
- B. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."
- C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
- D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.7 FIELD CONDITIONS

- A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.
- B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.
- B. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.
- F. Examine equipment performance data including fan and pump curves.
 - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
 - 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- H. Examine test reports specified in individual system and equipment Sections.
- I. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.
- J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.
- K. Examine strainers. Verify that startup screens have been replaced by permanent screens with indicated perforations.
- L. Examine control valves for proper installation for their intended function of throttling, diverting, or mixing fluid flows.
- M. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

- N. Examine system pumps to ensure absence of entrained air in the suction piping.
- O. Examine operating safety interlocks and controls on HVAC equipment.
- P. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

- A. Prepare a TAB plan that includes the following:
 - 1. Equipment and systems to be tested.
 - 2. Strategies and step-by-step procedures for balancing the systems.
 - 3. Instrumentation to be used.
 - 4. Sample forms with specific identification for all equipment.
- B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:
 - 1. Airside:
 - a. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
 - b. Duct systems are complete with terminals installed.
 - c. Volume, smoke, and fire dampers are open and functional.
 - d. Clean filters are installed.
 - e. Fans are operating, free of vibration, and rotating in correct direction.
 - f. Variable-frequency controllers' startup is complete and safeties are verified.
 - g. Automatic temperature-control systems are operational.
 - h. Ceilings are installed.
 - i. Windows and doors are installed.
 - j. Suitable access to balancing devices and equipment is provided.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance", ASHRAE 111 and SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
 - 2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 23 33 00 "Air Duct Accessories."
 - 3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 23 07 13 "Duct Insulation," Section 23 07 16 "HVAC Equipment Insulation," and Section 23 07 19 "HVAC Piping Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Cross-check the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.
- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.
- J. Check condensate drains for proper connections and functioning.
- K. Check for proper sealing of air-handling-unit components.
- L. Verify that air duct system is sealed as specified in Section 23 31 13 "Metal Ducts."

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 - 1. Measure total airflow.
 - a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
 - b. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
 - c. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
 - d. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.
 - 2. Measure fan static pressures as follows:
 - a. Measure static pressure directly at the fan outlet or through the flexible connection.
 - b. Measure static pressure directly at the fan inlet or through the flexible connection.
 - c. Measure static pressure across each component that makes up the air-handling system.
 - d. Report artificial loading of filters at the time static pressures are measured.
 - 3. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.

4. Obtain approval from Architect and Owner for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
 5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.
1. Measure airflow of submain and branch ducts.
 2. Adjust submain and branch duct volume dampers for specified airflow.
 3. Re-measure each submain and branch duct after all have been adjusted.
- C. Adjust air inlets and outlets for each space to indicated airflows.
1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
 2. Measure inlets and outlets airflow.
 3. Adjust each inlet and outlet for specified airflow.
 4. Re-measure each inlet and outlet after they have been adjusted.
- D. Verify final system conditions.
1. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to design if necessary.
 2. Re-measure and confirm that total airflow is within design.
 3. Re-measure all final fan operating data, rpms, volts, amps, and static profile.
 4. Mark all final settings.
 5. Test system in economizer mode. Verify proper operation and adjust if necessary.
 6. Measure and record all operating data.
 7. Record final fan-performance data.

3.6 TOLERANCES

- A. Set HVAC system's airflow rates and water flow rates within the following tolerances:
1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
 2. Air Outlets and Inlets: Plus or minus 10 percent.
 3. Heating-Water Flow Rate: Plus or minus 5 percent.
 4. Cooling-Water Flow Rate: Plus or minus 5 percent.
- B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.7 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 2. Include a list of instruments used for procedures, along with proof of calibration.
 3. Certify validity and accuracy of field data.
- B. Final Report Contents: In addition to certified field-report data, include the following:

1. Pump curves.
 2. Fan curves.
 3. Manufacturers' test data.
 4. Field test reports prepared by system and equipment installers.
 5. Other information relative to equipment performance; do not include Shop Drawings and Product Data.
- C. General Report Data: In addition to form titles and entries, include the following data:
1. Title page.
 2. Name and address of the TAB specialist.
 3. Project name.
 4. Project location.
 5. Architect's name and address.
 6. Engineer's name and address.
 7. Contractor's name and address.
 8. Report date.
 9. Signature of TAB supervisor who certifies the report.
 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 11. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 12. Nomenclature sheets for each item of equipment.
 13. Data for terminal units, including manufacturer's name, type, size, and fittings.
 14. Notes to explain why certain final data in the body of reports vary from indicated values.
 15. Test conditions for fans and pump performance forms including the following:
 - a. Settings for outdoor-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Face and bypass damper settings at coils.
 - e. Fan drive settings including settings and percentage of maximum pitch diameter.
 - f. Inlet vane settings for variable-air-volume systems.
 - g. Settings for supply-air, static-pressure controller.
 - h. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
 2. Water and steam flow rates.
 3. Duct, outlet, and inlet sizes.
 4. Pipe and valve sizes and locations.
 5. Terminal units.
 6. Balancing stations.
 7. Position of balancing devices.
- E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:
1. Unit Data:
 - a. Unit identification.
 - b. Location.

- c. Make and type.
 - d. Model number and unit size.
 - e. Manufacturer's serial number.
 - f. Unit arrangement and class.
 - g. Discharge arrangement.
 - h. Sheave make, size in inches, and bore.
 - i. Center-to-center dimensions of sheave and amount of adjustments in inches.
 - j. Number, make, and size of belts.
 - k. Number, type, and size of filters.
2. Motor Data:
- a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave and amount of adjustments in inches.
3. Test Data (Indicated and Actual Values):
- a. Total airflow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Filter static-pressure differential in inches wg.
 - f. Preheat-coil static-pressure differential in inches wg.
 - g. Cooling-coil static-pressure differential in inches wg.
 - h. Heating-coil static-pressure differential in inches wg.
 - i. Outdoor airflow in cfm.
 - j. Return airflow in cfm.
 - k. Outdoor-air damper position.
 - l. Return-air damper position.
 - m. Vortex damper position.

F. Apparatus-Coil Test Reports:

1. Coil Data:
- a. System identification.
 - b. Location.
 - c. Coil type.
 - d. Number of rows.
 - e. Fin spacing in fins per inch o.c.
 - f. Make and model number.
 - g. Face area in sq. ft..
 - h. Tube size in NPS.
 - i. Tube and fin materials.
 - j. Circuiting arrangement.
2. Test Data (Indicated and Actual Values):
- a. Airflow rate in cfm.
 - b. Average face velocity in fpm.
 - c. Air pressure drop in inches wg.
 - d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
 - e. Return-air, wet- and dry-bulb temperatures in deg F.
 - f. Entering-air, wet- and dry-bulb temperatures in deg F.

- g. Leaving-air, wet- and dry-bulb temperatures in deg F.
 - h. Water flow rate in gpm.
 - i. Water pressure differential in feet of head or psig.
 - j. Entering-water temperature in deg F.
 - k. Leaving-water temperature in deg F.
 - l. Refrigerant expansion valve and refrigerant types.
 - m. Refrigerant suction pressure in psig.
 - n. Refrigerant suction temperature in deg F.
 - o. Inlet steam pressure in psig.
- G. Gas- and Oil-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:
- 1. Unit Data:
 - a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and unit size.
 - e. Manufacturer's serial number.
 - f. Fuel type in input data.
 - g. Output capacity in Btu/h.
 - h. Ignition type.
 - i. Burner-control types.
 - j. Motor horsepower and rpm.
 - k. Motor volts, phase, and hertz.
 - l. Motor full-load amperage and service factor.
 - m. Sheave make, size in inches, and bore.
 - n. Center-to-center dimensions of sheave and amount of adjustments in inches.
 - 2. Test Data (Indicated and Actual Values):
 - a. Total airflow rate in cfm.
 - b. Entering-air temperature in deg F.
 - c. Leaving-air temperature in deg F.
 - d. Air temperature differential in deg F.
 - e. Entering-air static pressure in inches wg.
 - f. Leaving-air static pressure in inches wg.
 - g. Air static-pressure differential in inches wg.
 - h. Low-fire fuel input in Btu/h.
 - i. High-fire fuel input in Btu/h.
 - j. Manifold pressure in psig.
 - k. High-temperature-limit setting in deg F.
 - l. Operating set point in Btu/h.
 - m. Motor voltage at each connection.
 - n. Motor amperage for each phase.
 - o. Heating value of fuel in Btu/h.
- H. Electric-Coil Test Reports: For electric furnaces, duct coils, and electric coils installed in central-station air-handling units, include the following:
- 1. Unit Data:
 - a. System identification.
 - b. Location.
 - c. Coil identification.
 - d. Capacity in Btu/h.
 - e. Number of stages.

- f. Connected volts, phase, and hertz.
 - g. Rated amperage.
 - h. Airflow rate in cfm.
 - i. Face area in sq. ft..
 - j. Minimum face velocity in fpm.
 2. Test Data (Indicated and Actual Values):
 - a. Heat output in Btu/h.
 - b. Airflow rate in cfm.
 - c. Air velocity in fpm.
 - d. Entering-air temperature in deg F.
 - e. Leaving-air temperature in deg F.
 - f. Voltage at each connection.
 - g. Amperage for each phase.
- I. Fan Test Reports: For supply, return, and exhaust fans, include the following:
 1. Fan Data:
 - a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and size.
 - e. Manufacturer's serial number.
 - f. Arrangement and class.
 - g. Sheave make, size in inches, and bore.
 - h. Center-to-center dimensions of sheave and amount of adjustments in inches.
 2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 - g. Number, make, and size of belts.
 3. Test Data (Indicated and Actual Values):
 - a. Total airflow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Suction static pressure in inches wg.
- J. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
 1. Report Data:
 - a. System and air-handling-unit number.
 - b. Location and zone.
 - c. Traverse air temperature in deg F.
 - d. Duct static pressure in inches wg.
 - e. Duct size in inches.
 - f. Duct area in sq. ft..

- g. Indicated airflow rate in cfm.
- h. Indicated velocity in fpm.
- i. Actual airflow rate in cfm.
- j. Actual average velocity in fpm.
- k. Barometric pressure in psig.

K. Air-Terminal-Device Reports:

1. Unit Data:

- a. System and air-handling unit identification.
- b. Location and zone.
- c. Apparatus used for test.
- d. Area served.
- e. Make.
- f. Number from system diagram.
- g. Type and model number.
- h. Size.
- i. Effective area in sq. ft..

2. Test Data (Indicated and Actual Values):

- a. Airflow rate in cfm.
- b. Air velocity in fpm.
- c. Preliminary airflow rate as needed in cfm.
- d. Preliminary velocity as needed in fpm.
- e. Final airflow rate in cfm.
- f. Final velocity in fpm.
- g. Space temperature in deg F.

L. System-Coil Reports: For reheat coils and water coils of terminal units, include the following:

1. Unit Data:

- a. System and air-handling-unit identification.
- b. Location and zone.
- c. Room or riser served.
- d. Coil make and size.
- e. Flowmeter type.

2. Test Data (Indicated and Actual Values):

- a. Airflow rate in cfm.
- b. Entering-water temperature in deg F.
- c. Leaving-water temperature in deg F.
- d. Water pressure drop in feet of head or psig.
- e. Entering-air temperature in deg F.
- f. Leaving-air temperature in deg F.

M. Instrument Calibration Reports:

1. Report Data:

- a. Instrument type and make.
- b. Serial number.
- c. Application.
- d. Dates of use.
- e. Dates of calibration.

3.8 VERIFICATION OF TAB REPORT

- A. The TAB specialist's test and balance engineer shall conduct the inspection in the presence of Owner and commissioning authority.
- B. Owner or Commissioning authority shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
- C. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
- D. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
- E. If TAB work fails, proceed as follows:
 - 1. TAB specialists shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
 - 2. If the second final inspection also fails, Owner may contract the services of another TAB specialist to complete TAB work according to the Contract Documents and deduct the cost of the services from the original TAB specialist's final payment.
 - 3. If the second verification also fails, Owner and/or design professional may contact AABC Headquarters regarding the AABC National Performance Guaranty.
- F. Prepare test and inspection reports.

3.9 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 23 05 93

SECTION 23 07 13 - DUCT INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes insulating the following duct services:
 - 1. Indoor, concealed supply, return and outdoor air.
 - 2. Indoor, exposed supply and outdoor air.
 - 3. Indoor, exposed return located in unconditioned space.
- B. Related Sections:
 - 1. Section 23 31 13 "Metal Ducts" for duct liners.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 - 2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
 - 3. Detail application of field-applied jackets.
 - 4. Detail application at linkages of control devices.
- C. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:
 - 1. Sheet Form Insulation Materials: 12 inches square.
 - 2. Sheet Jacket Materials: 12 inches square.
 - 3. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

- C. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 23 05 29 "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

1.8 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.

- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type II for sheet materials.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Aeroflex USA, Inc.
 - b. Armacell LLC.
 - c. K-Flex USA.
- G. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. Knauf Insulation.
 - c. Manson Insulation Inc.
 - d. Owens Corning.
- H. Polyolefin: Unicellular, polyethylene thermal plastic insulation. Comply with ASTM C 534 or ASTM C 1427, Type I, Grade 1 for tubular materials and Type II, Grade 1 for sheet materials.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Armacell LLC.
 - b. Nomaco Insulation.

2.2 FIRE-RATED INSULATION SYSTEMS

- A. Fire-Rated Blanket: High-temperature, flexible, blanket insulation with FSK jacket that is tested and certified to provide a 2-hour fire rating by an NRTL acceptable to authorities having jurisdiction.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. 3M.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Thermal Ceramics.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
 - 1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 - 1. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
 - 1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. PVC Jacket Adhesive: Compatible with PVC jacket.
 - 1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
 - 1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.
 - 1. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
 - 2. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 3. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
 - 4. Color: White.
- C. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
 - 1. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
 - 2. Service Temperature Range: Minus 20 to plus 180 deg F.
 - 3. Solids Content: 60 percent by volume and 66 percent by weight.
 - 4. Color: White.

2.5 SEALANTS

- A. FSK and Metal Jacket Flashing Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: Aluminum.
5. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. ASJ Flashing Sealants, and Vinyl and PVC Jacket Flashing Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: White.
5. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.6 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.
5. Vinyl Jacket: White vinyl with a permeance of 1.3 perms when tested according to ASTM E 96/E 96M, Procedure A, and complying with NFPA 90A and NFPA 90B.

2.7 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.
- C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Adhesive: As recommended by jacket material manufacturer.
2. Color: White.

2.8 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Width: 3 inches.
2. Thickness: 11.5 mils.
3. Adhesion: 90 ounces force/inch in width.
4. Elongation: 2 percent.

5. Tensile Strength: 40 lbf/inch in width.
 6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
1. Width: 3 inches.
 2. Thickness: 6.5 mils.
 3. Adhesion: 90 ounces force/inch in width.
 4. Elongation: 2 percent.
 5. Tensile Strength: 40 lbf/inch in width.
 6. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
1. Width: 2 inches.
 2. Thickness: 6 mils.
 3. Adhesion: 64 ounces force/inch in width.
 4. Elongation: 500 percent.
 5. Tensile Strength: 18 lbf/inch in width.
- D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
1. Width: 2 inches.
 2. Thickness: 3.7 mils.
 3. Adhesion: 100 ounces force/inch in width.
 4. Elongation: 5 percent.
 5. Tensile Strength: 34 lbf/inch in width.

2.9 SECUREMENTS

- A. Bands:
1. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316; 0.015 inch thick, 1/2 inchwide with wing seal.
 2. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inchwide with wing seal.
- B. Insulation Pins and Hangers:
1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, [0.135-inch-diameter shank, length to suit depth of insulation indicated.
 2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch-diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
 3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - b. Spindle: Copper- or zinc-coated, low-carbon steel, aluminum or stainless steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
 - c. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

4. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Baseplate: Perforated, nylon sheet, 0.030 inch thick by 1-1/2 inches in diameter.
 - b. Spindle: Nylon, 0.106-inch-diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.
 - c. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
 5. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
 - b. Spindle: Copper- or zinc-coated, low-carbon steel, aluminum or stainless steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
 - c. Adhesive-backed base with a peel-off protective cover.
 6. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, galvanized-steel, aluminum or stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
 - a. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
 7. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.
- D. Wire: 0.062-inch soft-annealed, stainless steel.

2.10 CORNER ANGLES

- A. PVC Corner Angles: 30 milsthick, minimum 1 by 1 inch, PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.
- B. Aluminum Corner Angles: 0.040 inchthick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14.
- C. Stainless-Steel Corner Angles: 0.024 inchthick, minimum 1 by 1 inch, stainless steel according to ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.

B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

K. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.

a. For below ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.
- L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 4. Seal jacket to wall flashing with flashing sealant.
- C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
1. Comply with requirements in Section 07 84 13 "Penetration Firestopping."
- E. Insulation Installation at Floor Penetrations:
1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 07 84 13 "Penetration Firestopping."

3.5 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 INSTALLATION OF MINERAL-FIBER INSULATION

- A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
 - 1. Apply adhesives according to manufacturer's recommended coverage rates.
 - 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
 - 3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not overcompress insulation during installation.
 - e. Impale insulation over pins and attach speed washers.
 - f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
 - 4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
 - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
 - 5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
 - 6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
 - 7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.
 - 8. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

- a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
9. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
 10. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.7 FIELD-APPLIED JACKET INSTALLATION

- A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.
 1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
 2. Embed glass cloth between two 0.062-inch-thick coats of lagging adhesive.
 3. Completely encapsulate insulation with coating, leaving no exposed insulation.
- B. Where FSK jackets are indicated, install as follows:
 1. Draw jacket material smooth and tight.
 2. Install lap or joint strips with same material as jacket.
 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.
 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.
- C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.
 1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.8 FIRE-RATED INSULATION SYSTEM INSTALLATION

- A. Where fire-rated insulation system is indicated, secure system to ducts and duct hangers and supports to maintain a continuous fire rating.
- B. Insulate duct access panels and doors to achieve same fire rating as duct.
- C. Install firestopping at penetrations through fire-rated assemblies. Fire-stop systems are specified in Section 07 84 13 "Penetration Firestopping."

3.9 FINISHES

- A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting."
 - 1. Flat Acrylic Finish: [Two] <Insert number> finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
 - 1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to [one] <Insert number> location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.
- D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.11 DUCT INSULATION SCHEDULE, GENERAL

- A. Plenums and Ducts Requiring Insulation:
 - 1. Indoor, concealed supply and return air.
- B. Items Not Insulated:
 - 1. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
 - 2. Factory-insulated flexible ducts.
 - 3. Factory-insulated plenums and casings.
 - 4. Flexible connectors.
 - 5. Vibration-control devices.
 - 6. Factory-insulated access panels and doors.

3.12 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

- A. Concealed, round and flat-oval, supply-air duct insulation shall be the following:
 - 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-6 minimum.
- B. Concealed, round and flat-oval, return-air duct insulation shall be the following:
 - 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-6 minimum.
- C. Concealed, round and flat-oval, outdoor-air duct insulation shall be the following:
 - 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-6 minimum.
- D. Concealed, round and flat-oval, exhaust-air duct insulation shall be[one of] the following:
 - 1. Not insulated
- E. Concealed, rectangular, supply-air duct insulation shall be one of the following:
 - 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-6 minimum.
 - a. Verify installation with space constraints.
 - 2. Polyolefin: 1 inch thick and an installed isolating value of R-6 minimum.
- F. Concealed, rectangular, return-air duct insulation shall be one of the following:
 - 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-6 minimum.
 - a. Verify installation with space constraints.
 - 2. Polyolefin: 1 inch thick and an installed isolating value of R-6 minimum.
- G. Concealed, rectangular, outdoor-air duct insulation shall be shall be one of the following:
 - 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-6 minimum.
 - a. Verify installation with space constraints.
 - 2. Polyolefin: 1 inch thick and an installed isolating value of R-6 minimum.
- H. Concealed, rectangular, exhaust-air duct insulation between isolation damper and penetration of building exterior shall be the following:
 - 1. Not insulated
- I. Concealed, supply-air plenum insulation shall be the following:
 - 1. Polyolefin: 1 inch thick and an installed isolating value of R-6 minimum.
- J. Concealed, return-air plenum insulation shall be the following:
 - 1. Polyolefin: 1 inch thick and an installed isolating value of R-6 minimum.

- K. Concealed, outdoor-air plenum insulation shall be the following:
 - 1. Polyolefin: 1 inch thick and an installed isolating value of R-6 minimum.
- L. Concealed, exhaust-air plenum insulation shall be the following:
 - 1. Not insulated
- M. Exposed, round and flat-oval, supply-air duct insulation shall be the following:
 - 1. Not insulated
- N. Exposed, round and flat-oval, return-air duct insulation shall be the following:
 - 1. Not insulated
- O. Exposed, round and flat-oval, outdoor-air duct insulation shall be the following:
 - 1. Not insulated
- P. Exposed, round and flat-oval, exhaust-air duct insulation shall be the following:
 - 1. Not insulated
- Q. Exposed, rectangular, supply-air duct insulation shall be the following:
 - 1. Not insulated
- R. Exposed, rectangular, return-air duct insulation shall be the following:
 - 1. Not insulated
- S. Exposed, rectangular, outdoor-air duct insulation shall be the following:
 - 1. Not insulated
- T. Exposed, rectangular, exhaust-air duct insulation shall be the following:
 - 1. Not insulated
- U. Exposed, supply-air plenum insulation shall be the following:
 - 1. Polyolefin: 1 inch thick and an installed isolating value of R-6 minimum.
- V. Exposed, return-air plenum insulation shall be the following:
 - 1. Polyolefin: 1 inch thick and an installed isolating value of R-6 minimum.
- W. Exposed, outdoor-air plenum insulation shall be the following:
 - 1. Polyolefin: 1 inch thick and an installed isolating value of R-6 minimum.
- X. Exposed, exhaust-air plenum insulation shall be the following:
 - 1. Not insulated

3.13 OUTDOOR (OUTSIDE OF INSULATED SPACE) DUCT AND PLENUM INSULATION SCHEDULE

- A. Concealed, round and flat-oval, supply-air duct insulation shall be the following:
 - 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-8 minimum.
- B. Concealed, round and flat-oval, return-air duct insulation shall be the following:
 - 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-8 minimum.
- C. Concealed, rectangular, supply-air duct insulation shall be one of the following:
 - 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-8 minimum.
 - a. Verify installation with space constraints.
 - 2. Polyolefin: 1 inch thick and an installed isolating value of R-8 minimum.
- D. Concealed, rectangular, return-air duct insulation shall be one of the following:
 - 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-8 minimum.
 - a. Verify installation with space constraints.
 - 2. Polyolefin: 1 inch thick and an installed isolating value of R-8 minimum.
- E. Exposed, round and flat-oval, supply-air duct insulation shall be the following:
 - 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-8 minimum.
 - a. Verify installation with space constraints.
 - 2. Polyolefin: 1 inch thick and an installed isolating value of R-8 minimum.
- F. Exposed, round and flat-oval, return-air duct insulation shall be the following:
 - 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-8 minimum.
 - a. Verify installation with space constraints.
 - 2. Polyolefin: 1 inch thick and an installed isolating value of R-8 minimum.
- G. Exposed, rectangular, supply-air duct insulation shall be the following:
 - 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-8 minimum.
 - a. Verify installation with space constraints.
 - 2. Polyolefin: 1 inch thick and an installed isolating value of R-8 minimum.
- H. Exposed, rectangular, return-air duct insulation shall be the following:
 - 1. Mineral-Fiber Blanket: 2 inches thick and an installed isolating value of R-8 minimum.
 - a. Verify installation with space constraints.

2. Polyolefin: 1 inch thick and an installed isolating value of R-8 minimum.

END OF SECTION 23 07 13

SECTION 23 08 00 – COMMISSIONING OF HVAC

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes commissioning process requirements for HVAC&R systems, assemblies, and equipment.
- B. Related Sections:
 - 1. Section 01 91 13 "General Commissioning Requirements" for general commissioning process requirements.

1.2 DEFINITIONS

- A. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
- B. CxA: Commissioning Authority.
- C. HVAC&R: Heating, Ventilating, Air Conditioning, and Refrigeration.
- D. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.3 INFORMATIONAL SUBMITTALS

- A. Certificates of readiness.
- B. Certificates of completion of installation, prestart, and startup activities.

1.4 ALLOWANCES

- A. Labor, instrumentation, tools, and equipment costs for technicians for the performance of commissioning testing are covered by the "Schedule of Allowances" Article in Section 01 21 00 "Allowances."

1.5 CONTRACTOR'S RESPONSIBILITIES

- A. Perform commissioning tests at the direction of the CxA.
- B. Attend construction phase controls coordination meeting.
- C. Attend testing, adjusting, and balancing review and coordination meeting.
- D. Participate in HVAC&R systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.
- E. Provide information requested by the CxA for final commissioning documentation.

- F. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

1.6 CxA'S RESPONSIBILITIES

- A. Provide Project-specific construction checklists and commissioning process test procedures for actual HVAC&R systems, assemblies, equipment, and components to be furnished and installed as part of the construction contract.
- B. Direct commissioning testing.
- C. Verify testing, adjusting, and balancing of Work are complete.
- D. Provide test data, inspection reports, and certificates in Systems Manual.

1.7 COMMISSIONING DOCUMENTATION

- A. Provide the following information to the CxA for inclusion in the commissioning plan:
 - 1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
 - 2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
 - 3. Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for HVAC&R systems, assemblies, equipment, and components to be verified and tested.
 - 4. Certificate of readiness, signed by the Contractor, certifying that HVAC&R systems, assemblies, equipment, components, and associated controls are ready for testing.
 - 5. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
 - 6. Certificate of readiness certifying that HVAC&R systems, subsystems, equipment, and associated controls are ready for testing.
 - 7. Test and inspection reports and certificates.
 - 8. Corrective action documents.
 - 9. Verification of testing, adjusting, and balancing reports.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TESTING PREPARATION

- A. Certify that HVAC&R systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
- B. Certify that HVAC&R instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.
- C. Certify that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.

- D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- E. Inspect and verify the position of each device and interlock identified on checklists.
- F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.
- G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.2 Testing AND BALANCING VERIFICATION

- A. Prior to performance of testing and balancing Work, provide copies of reports, sample forms, checklists, and certificates to the CxA.
- B. Notify the CxA at least 10 days in advance of testing and balancing Work, and provide access for the CxA to witness testing and balancing Work.
- C. Provide technicians, instrumentation, and tools to verify testing and balancing of HVAC&R systems at the direction of the CxA.
 - 1. The CxA will notify testing and balancing Subcontractor 10 days in advance of the date of field verification. Notice will not include data points to be verified.
 - 2. The testing and balancing Subcontractor shall use the same instruments (by model and serial number) that were used when original data were collected.
 - 3. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final testing, adjusting, and balancing report. For sound pressure readings, a deviation of 3 dB shall result in rejection of final testing. Variations in background noise must be considered.
 - 4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.3 GENERAL TESTING REQUIREMENTS

- A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.
- B. Scope of HVAC&R testing shall include entire HVAC&R installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. Testing shall include measuring capacities and effectiveness of operational and control functions.
- C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.
- D. The CxA along with the HVAC&R Contractor, testing and balancing Subcontractor, and HVAC&R Instrumentation and Control Subcontractor shall prepare detailed testing plans, procedures, and checklists for HVAC&R systems, subsystems, and equipment.
- E. Tests will be performed using design conditions whenever possible.
- F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

- G. The CxA may direct that set points be altered when simulating conditions is not practical.
- H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.
- I. If tests cannot be completed because of a deficiency outside the scope of the HVAC&R system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.
- J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.4 HVAC&R SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

- A. HVAC&R Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Section 23 09 00 "Instrumentation and Control for HVAC" and Section 23 09 93 "Sequence and Operations for HVAC Controls." Assist the CxA with preparation of testing plans.
- B. Energy Supply System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of gas and hot-water systems and equipment at the direction of the CxA. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.
- C. Refrigeration System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of refrigerant compressors and condensers, heat pumps, and other refrigeration systems. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.
- D. HVAC&R Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of air, steam, and hydronic distribution systems; special exhaust; and other distribution systems, including HVAC&R terminal equipment and unitary equipment.
- E. Evaporative System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of evaporative cooler systems. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

END OF SECTION 23 08 00

SECTION 23 11 23 - FACILITY NATURAL-GAS PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Pipes, tubes, and fittings.
 - 2. Piping specialties.
 - 3. Piping and tubing joining materials.
 - 4. Valves.
 - 5. Pressure regulators.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

1.4 PERFORMANCE REQUIREMENTS

- A. Minimum Operating-Pressure Ratings:
 - 1. Piping and Valves: 100 psig minimum unless otherwise indicated.
 - 2. Service Regulators: 100 psig minimum unless otherwise indicated.
 - 3. Minimum Operating Pressure of Service Meter: 5 psig.
- B. Natural-Gas System Pressure within Buildings: More than 2 psig but not more than 5 psig.
- C. Natural-Gas System Pressures within Buildings: Three pressure ranges. Primary pressure is more than 2 psig but not more than 5 psig, and is reduced to secondary pressures of more than 0.5 psig but not more than 2 psig, and is reduced again to pressures of 0.5 psig or less.
- D. Delegated Design: Design restraints and anchors for natural-gas piping and equipment, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of the following:
 - 1. Piping specialties.
 - 2. Corrugated, stainless-steel tubing with associated components.
 - 3. Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
 - 4. Pressure regulators. Indicate pressure ratings and capacities.
 - 5. Dielectric fittings.
- B. Delegated-Design Submittal: For natural-gas piping and equipment indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Detail fabrication and assembly of seismic restraints.
 - 2. Design Calculations: Calculate requirements for selecting seismic restraints.

1.6 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans and details, drawn to scale, on which natural-gas piping is shown and coordinated with other installations, using input from installers of the items involved.
- B. Site Survey: Plans, drawn to scale, on which natural-gas piping is shown and coordinated with other services and utilities.
- C. Qualification Data: For qualified professional engineer.
- D. Welding certificates.
- E. Field quality-control reports.

1.7 QUALITY ASSURANCE

- A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Handling Flammable Liquids: Remove and dispose of liquids from existing natural-gas piping according to requirements of authorities having jurisdiction.
- B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

- C. Store and handle pipes and tubes having factory-applied protective coatings to avoid damaging coating, and protect from direct sunlight.
- D. Protect stored PE pipes and valves from direct sunlight.

1.9 PROJECT CONDITIONS

- A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.

1.10 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.
- B. Coordinate requirements for access panels and doors for valves installed concealed behind finished surfaces. Comply with requirements in Section 08 31 13 "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
 - 1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
 - 2. Wrought-Steel Welding Fittings: ASTM A 234/A 234M for butt welding and socket welding.
 - 3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
 - 4. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
 - a. Material Group: 1.1.
 - b. End Connections: Threaded or butt welding to match pipe.
 - c. Lapped Face: Not permitted underground.
 - d. Gasket Materials: ASME B16.20, metallic, flat, asbestos free, aluminum o-rings, and spiral-wound metal gaskets.
 - e. Bolts and Nuts: ASME B18.2.1, carbon steel aboveground and stainless steel underground.
 - 5. Protective Coating for Underground and Outdoor Piping: Factory-applied, three-layer coating of epoxy, adhesive, and PE.
 - a. Joint Cover Kits: Epoxy paint, adhesive, and heat-shrink PE sleeves.
 - 6. Mechanical Couplings:
 - a. Stainless-steel flanges and tube with epoxy finish.
 - b. Buna-nitrile seals.
 - c. Stainless-steel bolts, washers, and nuts.
 - d. Coupling shall be capable of joining PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.
 - e. Steel body couplings installed underground on plastic pipe shall be factory equipped with anode.

B. PE Pipe: ASTM D 2513, SDR 11.

1. PE Fittings: ASTM D 2683, socket-fusion type or ASTM D 3261, butt-fusion type with dimensions matching PE pipe.
2. PE Transition Fittings: Factory-fabricated fittings with PE pipe complying with ASTM D 2513, SDR 11; and steel pipe complying with ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
3. Anodeless Service-Line Risers: Factory fabricated and leak tested.
 - a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet.
 - b. Casing: Steel pipe complying with ASTM A 53/A 53M, Schedule 40, black steel, Type E or S, Grade B, with corrosion-protective coating covering.
 - c. Aboveground Portion: PE transition fitting.
 - d. Outlet shall be threaded or flanged or suitable for welded connection.
 - e. Tracer wire connection.
 - f. Ultraviolet shield.
 - g. Stake supports with factory finish to match steel pipe casing or carrier pipe.
4. Transition Service-Line Risers: Factory fabricated and leak tested.
 - a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet connected to steel pipe complying with ASTM A 53/A 53M, Schedule 40, Type E or S, Grade B, with corrosion-protective coating for aboveground outlet.
 - b. Outlet shall be threaded or flanged or suitable for welded connection.
 - c. Bridging sleeve over mechanical coupling.
 - d. Factory-connected anode.
 - e. Tracer wire connection.
 - f. Ultraviolet shield.
 - g. Stake supports with factory finish to match steel pipe casing or carrier pipe.
5. Plastic Mechanical Couplings, NPS 1-1/2 and Smaller: Capable of joining PE pipe to PE pipe.
 - a. PE body with molded-in, stainless-steel support ring.
 - b. Buna-nitrile seals.
 - c. Acetal collets.
 - d. Electro-zinc-plated steel stiffener.
6. Plastic Mechanical Couplings, NPS 2 and Larger: Capable of joining PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.
 - a. Fiber-reinforced plastic body.
 - b. PE body tube.
 - c. Buna-nitrile seals.
 - d. Acetal collets.
 - e. Stainless-steel bolts, nuts, and washers.

2.2 PIPING SPECIALTIES

A. Appliance Flexible Connectors:

1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
4. Corrugated stainless-steel tubing with polymer coating.
5. Operating-Pressure Rating: 0.5 psig.
6. End Fittings: Zinc-coated steel.

7. Threaded Ends: Comply with ASME B1.20.1.
8. Maximum Length: 72 inches

B. Y-Pattern Strainers:

1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
3. Strainer Screen: [40] [60]-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig.

C. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

2.3 JOINING MATERIALS

A. Joint Compound and Tape: Suitable for natural gas.

B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F complying with AWS A5.8/A5.8M. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.

2.4 MANUAL GAS SHUTOFF VALVES

A. See "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles for where each valve type is applied in various services.

B. General Requirements for Metallic Valves, NPS 2 and Smaller: Comply with ASME B16.33.

1. CWP Rating: 125 psig.
2. Threaded Ends: Comply with ASME B1.20.1.
3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
4. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
6. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.

C. General Requirements for Metallic Valves, NPS 2-1/2 and Larger: Comply with ASME B16.38.

1. CWP Rating: 125 psig.
2. Flanged Ends: Comply with ASME B16.5 for steel flanges.
3. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
4. Service Mark: Initials "WOG" shall be permanently marked on valve body.

D. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.

1. Body: Bronze, complying with ASTM B 584.
2. Ball: Chrome-plated bronze.
3. Stem: Bronze; blowout proof.
4. Seats: Reinforced TFE; blowout proof.
5. Packing: Threaded-body packnut design with adjustable-stem packing.

6. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
7. CWP Rating: 600 psig.
8. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
9. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

E. PE Ball Valves: Comply with ASME B16.40.

1. Body: PE.
2. Ball: PE.
3. Stem: Acetal.
4. Seats and Seals: Nitrile.
5. Ends: Plain or fusible to match piping.
6. CWP Rating: 80 psig.
7. Operating Temperature: Minus 20 to plus 140 deg F.
8. Operator: Nut or flat head for key operation.
9. Include plastic valve extension.
10. Include tamperproof locking feature for valves where indicated on Drawings.

2.5 EARTHQUAKE VALVES

A. Earthquake Valves: Comply with ASCE 25.

1. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction.
2. Maximum Operating Pressure: 60 psig.
3. Cast-aluminum body with stainless-steel internal parts.
4. Nitrile-rubber, reset-stem o-ring seal.
5. Valve position, open or closed, indicator.
6. Composition valve seat with clapper held by spring or magnet locking mechanism.
7. Level indicator.
8. End Connections: Threaded for valves NPS 2 and smaller; flanged for valves NPS 2-1/2 and larger.

2.6 PRESSURE REGULATORS

A. General Requirements:

1. Single stage and suitable for natural gas.
2. Steel jacket and corrosion-resistant components.
3. Elevation compensator.
4. End Connections: Threaded for regulators NPS 2 and smaller; flanged for regulators NPS 2-1/2 and larger.

B. Line Pressure Regulators: Comply with ANSI Z21.80.

1. Body and Diaphragm Case: Cast iron or die-cast aluminum.
2. Springs: Zinc-plated steel; interchangeable.
3. Diaphragm Plate: Zinc-plated steel.
4. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
5. Orifice: Aluminum; interchangeable.
6. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
7. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
8. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.

9. Overpressure Protection Device: Factory mounted on pressure regulator.
10. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
11. Maximum Inlet Pressure: 5 psig.

C. Appliance Pressure Regulators: Comply with ANSI Z21.18.

1. Body and Diaphragm Case: Die-cast aluminum.
2. Springs: Zinc-plated steel; interchangeable.
3. Diaphragm Plate: Zinc-plated steel.
4. Seat Disc: Nitrile rubber.
5. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
6. Factory-Applied Finish: Minimum three-layer polyester and polyurethane paint finish.
7. Regulator may include vent limiting device, instead of vent connection, if approved by authorities having jurisdiction.
8. Maximum Inlet Pressure: 5 psig.

2.7 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Description:
 - a. Standard: ASSE 1079.
 - b. Pressure Rating: 150psig minimum at 180 deg F.
 - c. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. Description:
 - a. Standard: ASSE 1079.
 - b. Factory-fabricated, bolted, companion-flange assembly.
 - c. Pressure Rating: 150psig minimum at 180 deg F.
 - d. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Insulating Kits:

1. Description:
 - a. Nonconducting materials for field assembly of companion flanges.
 - b. Pressure Rating: 150 psig.
 - c. Gasket: Neoprene or phenolic.
 - d. Bolt Sleeves: Phenolic or polyethylene.
 - e. Washers: Phenolic with steel backing washers.

2.8 LABELING AND IDENTIFYING

- A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for natural-gas piping system to verify actual locations of piping connections before equipment installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Close equipment shutoff valves before turning off natural gas to premises or piping section.
- B. Inspect natural-gas piping according to NFPA 54 and International Fuel Gas Code to determine that natural-gas utilization devices are turned off in piping section affected.
- C. Comply with NFPA 54 and the International Fuel Gas Code requirements for prevention of accidental ignition.

3.3 OUTDOOR PIPING INSTALLATION

- A. Comply with NFPA 54 and the International Fuel Gas Code for installation and purging of natural-gas piping.
- B. Install underground, natural-gas piping buried at least 36 inches below finished grade. Comply with requirements in Section 31 20 00 "Earth Moving" for excavating, trenching, and backfilling.
 - 1. If natural-gas piping is installed less than 36 inches below finished grade, install it in containment conduit.
- C. Install underground, PE, natural-gas piping according to ASTM D 2774.
- D. Steel Piping with Protective Coating:
 - 1. Apply joint cover kits to pipe after joining to cover, seal, and protect joints.
 - 2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer.
 - 3. Replace pipe having damaged PE coating with new pipe.
- E. Install fittings for changes in direction and branch connections.
- F. Install pressure gage downstream from each service regulator. Pressure gages are specified in Section 23 05 19 "Meters and Gages for HVAC Piping."
- G. Install earthquake valves at building entrance
 - 1. Valve to be aboveground outside buildings according to listing.

3.4 INDOOR PIPING INSTALLATION

- A. Comply with NFPA 54 and the International Fuel Gas Code for installation and purging of natural-gas piping.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.
- D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- G. Locate valves for easy access.
- H. Install natural-gas piping at uniform grade of 2 percent down toward drip and sediment traps.
- I. Install piping free of sags and bends.
- J. Install fittings for changes in direction and branch connections.
- K. Verify final equipment locations for roughing-in.
- L. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements.
- M. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.
 - 1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.
- N. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.
- O. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels unless indicated to be exposed to view.
- P. Concealed Location Installations: Except as specified below, install concealed natural-gas piping and piping installed under the building in containment conduit constructed of steel pipe with welded joints as described in Part 2. Install a vent pipe from containment conduit to outdoors and terminate with weatherproof vent cap.
 - 1. Above Accessible Ceilings: Natural-gas piping, fittings, valves, and regulators may be installed in accessible spaces without containment conduit.

2. In Floors: Install natural-gas piping with welded or brazed joints and protective coating in cast-in-place concrete floors. Cover piping to be cast in concrete slabs with minimum of 1-1/2 inches of concrete. Piping may not be in physical contact with other metallic structures such as reinforcing rods or electrically neutral conductors. Do not embed piping in concrete slabs containing quick-set additives or cinder aggregate.
 3. In Floor Channels: Install natural-gas piping in floor channels. Channels must have cover and be open to space above cover for ventilation.
 4. In Walls or Partitions: Protect tubing installed inside partitions or hollow walls from physical damage using steel striker barriers at rigid supports.
 - a. Exception: Tubing passing through partitions or walls does not require striker barriers.
 5. Prohibited Locations:
 - a. Do not install natural-gas piping in or through circulating air ducts, clothes or trash chutes, chimneys or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.
 - b. Do not install natural-gas piping in solid walls or partitions.
- Q. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
- R. Connect branch piping from top or side of horizontal piping.
- S. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment. Unions are not required at flanged connections.
- T. Do not use natural-gas piping as grounding electrode.
- U. Install strainer on inlet of each line-pressure regulator and automatic or electrically operated valve.
- V. Install pressure gage downstream from each line regulator. Pressure gages are specified in Section 23 05 19 "Meters and Gages for HVAC Piping."
- W. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 23 05 17 "Sleeves and Sleeve Seals for HVAC Piping."
- X. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 23 05 17 "Sleeves and Sleeve Seals for HVAC Piping."
- Y. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 23 05 18 "Escutcheons for HVAC Piping."
- 3.5 VALVE INSTALLATION
- A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing, aluminum, or copper connector.
 - B. Install underground valves with valve boxes.
 - C. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.
 - D. Install earthquake valves at building entrance
 1. Valve to be aboveground outside buildings according to listing.
 - E. Install anode for metallic valves in underground PE piping.

3.6 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints:
 - 1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
 - 2. Cut threads full and clean using sharp dies.
 - 3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
 - 4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
 - 5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Welded Joints:
 - 1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
 - 2. Bevel plain ends of steel pipe.
 - 3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.
- E. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
 - 1. Plain-End Pipe and Fittings: Use butt fusion.
 - 2. Plain-End Pipe and Socket Fittings: Use socket fusion.

3.7 HANGER AND SUPPORT INSTALLATION

- A. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 23 05 48 "Vibration and Seismic Controls for HVAC."
- B. Comply with requirements for pipe hangers and supports specified in Section 23 05 29 "Hangers and Supports for HVAC Piping and Equipment."
- C. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:
 - 1. NPS 1 and Smaller: Maximum span, 96 inches; minimum rod size, 3/8 inch.
 - 2. NPS 1-1/4: Maximum span, 108 inches; minimum rod size, 3/8 inch.
 - 3. NPS 1-1/2 and NPS 2: Maximum span, 108 inches; minimum rod size, 3/8 inch.
 - 4. NPS 2-1/2 to NPS 3-1/2: Maximum span, 10 feet; minimum rod size, 1/2 inch.
 - 5. NPS 4 and Larger: Maximum span, 10 feet; minimum rod size, 5/8 inch.

3.8 CONNECTIONS

- A. Connect to utility's gas main according to utility's procedures and requirements.
- B. Install natural-gas piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.

- C. Install piping adjacent to appliances to allow service and maintenance of appliances.
- D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.
- E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.9 LABELING AND IDENTIFYING

- A. Comply with requirements in Section 23 05 53 "Identification for HVAC Piping and Equipment" for piping and valve identification.
- B. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.10 PAINTING

- A. Comply with requirements in Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting" for painting interior and exterior natural-gas piping.
- B. Paint exposed, exterior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components, with factory-applied paint or protective coating.
 - 1. Alkyd System: MPI INT 5.1E.
 - a. Prime Coat: Alkyd anticorrosive metal primer.
 - b. Intermediate Coat: Interior alkyd matching topcoat.
 - c. Topcoat: Interior alkyd flat.
 - d. Color: Gray.
- C. Damage and Touchup: Repair marred and damaged factory-applied finishes with materials and by procedures to match original factory finish.

3.11 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Test, inspect, and purge natural gas according to NFPA 54 and the International Fuel Gas Code and authorities having jurisdiction.
- C. Natural-gas piping will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.12 OUTDOOR PIPING SCHEDULE

- A. Underground natural-gas piping shall be the following:

1. PE pipe and fittings joined by heat fusion, or mechanical couplings; service-line risers with tracer wire terminated in an accessible location.
- B. Aboveground natural-gas piping shall be the following:
1. Steel pipe with malleable-iron fittings and threaded joints.
 - a. Provide with factory protective coating.
 2. Steel pipe with wrought-steel fittings and welded joints.
 - a. Provide with factory protective coating.
- C. Containment Conduit: Steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.
- 3.13 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES LESS THAN 0.5 PSIG
- A. Aboveground, distribution piping shall be one of the following:
1. Steel pipe with malleable-iron fittings and threaded joints.
 2. Steel pipe with wrought-steel fittings and welded joints.
 3. Drawn-temper copper tube with wrought-copper fittings and brazed joints.
- B. Underground, below building, piping shall be one of the following:
1. PE pipe and fittings joined by heat fusion, or mechanical couplings; service-line risers with tracer wire terminated in an accessible location.
 - a. No fittings allowed below grade
- C. Containment Conduit: Steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.
- D. Containment Conduit Vent Piping: Steel pipe with malleable-iron fittings and threaded or wrought-steel fittings with welded joints. Coat underground pipe and fittings with protective coating for steel piping.
- 3.14 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES MORE THAN 0.5 PSIG AND LESS THAN 5 PSIG
- A. Aboveground, branch piping NPS 2 and smaller shall be one of the following:
1. Steel pipe with malleable-iron fittings and threaded joints.
 2. Steel pipe with wrought-steel fittings and welded joints.
- B. Aboveground, distribution piping shall be one of the following:
1. Steel pipe with malleable-iron fittings and threaded joints.
 2. Steel pipe with steel welding fittings and welded joints.
- C. Underground, below building, piping shall be one of the following:
1. PE pipe and fittings joined by heat fusion, or mechanical couplings; service-line risers with tracer wire terminated in an accessible location.

a. No fittings allowed below grade

- D. Containment Conduit: Steel pipe with wrought-steel fittings and welded joints. Coat underground pipe and fittings with protective coating for steel piping.
- E. Containment Conduit Vent Piping: Steel pipe with malleable-iron fittings and threaded or wrought-steel fittings with welded joints. Coat underground pipe and fittings with protective coating for steel piping.

3.15 UNDERGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

- A. Connections to Existing Gas Piping: Use valve and fitting assemblies made for tapping utility's gas mains and listed by an NRTL.
- B. Underground:
 - 1. PE valves.

3.16 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

- A. Valves for pipe sizes NPS 2 and smaller at service meter shall be the following:
 - 1. Two-piece, full-port, bronze ball valves with bronze trim.
- B. Valves for pipe sizes NPS 2-1/2 and larger at service meter shall be the following:
 - 1. Two-piece, full-port, bronze ball valves with bronze trim.
- C. Distribution piping valves for pipe sizes NPS 2 and smaller shall be the following:
 - 1. Two-piece, full-port, bronze ball valves with bronze trim.
- D. Distribution piping valves for pipe sizes NPS 2-1/2 and larger shall be the following:
 - 1. Two-piece, full-port, bronze ball valves with bronze trim.
- E. Valves in branch piping for single appliance shall be the following:
 - 1. Two-piece, full-port, bronze ball valves with bronze trim.

END OF SECTION 23 11 23

SECTION 23 23 00

REFRIGERANT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Refrigerant pipes and fittings.
 - 2. Refrigerants.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of valve, refrigerant piping, and piping specialty.
 - 1. Include pressure drop, based on manufacturer's test data, for the following:
 - a. Thermostatic expansion valves.
 - b. Solenoid valves.
 - c. Hot-gas bypass valves.
 - d. Filter dryers.
 - e. Strainers.
 - f. Pressure-regulating valves.
- B. Sustainable Design Submittals:
 - 1. Product Data: For refrigerants, indicating compliance with refrigerant management practices.
- C. Shop Drawings:
 - 1. Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes; flow capacities; valve arrangements and locations; slopes of horizontal runs; oil traps; double risers; wall and floor penetrations; and equipment connection details.
 - 2. Show piping size and piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.
 - 3. Show interface and spatial relationships between piping and equipment.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to 2010 ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
- B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."
- C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.7 PRODUCT STORAGE AND HANDLING

- A. Store piping with end caps in place to ensure that piping interior and exterior are clean when installed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Line Test Pressure for Refrigerant R-410A:
 - 1. Suction Lines for Air-Conditioning Applications: 300 psig.
 - 2. Suction Lines for Heat-Pump Applications: 535 psig.
 - 3. Hot-Gas and Liquid Lines: 535 psig.

2.2 COPPER TUBE AND FITTINGS

- A. Copper Tube: ACR.
- B. Wrought-Copper Fittings: ASME B16.22.
- C. Wrought-Copper Unions: ASME B16.22.
- D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.
- E. Brazing Filler Metals: AWS A5.8/A5.8M.
- F. Flexible Connectors:
 - 1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
 - 2. End Connections: Socket ends.
 - 3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch-long assembly.
 - 4. Working Pressure Rating: Factory test at minimum 500 psig.
 - 5. Maximum Operating Temperature: 250 deg F.

2.3 VALVES AND SPECIALTIES

A. Service Valves:

1. Body: Forged brass with brass cap including key end to remove core.
2. Core: Removable ball-type check valve with stainless-steel spring.
3. Seat: Polytetrafluoroethylene.
4. End Connections: Copper spring.
5. Working Pressure Rating: 500 psig.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS FOR REFRIGERANT R-410A

- A. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type ACR, annealed-or drawn-temper tubing and wrought-copper fittings with brazed joints.

3.2 VALVE AND SPECIALTY APPLICATIONS

- A. Install service valves on all inlets to and outlets from distribution boxes.
- B. Install service valves for gage taps at inlet and outlet of hot-gas bypass valves and strainers if they are not an integral part of valves and strainers.
- C. Install receivers sized to accommodate pump-down charge.
- D. Install flexible connectors at compressors.

3.3 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
- B. Install refrigerant piping according to ASHRAE 15.
- C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping adjacent to machines to allow service and maintenance.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.

- I. Select system components with pressure rating equal to or greater than system operating pressure.
- J. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- K. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Section 08 31 13 "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.
- L. Install refrigerant piping in protective conduit where installed belowground.
- M. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.
- N. Slope refrigerant piping as follows:
 - 1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
 - 2. Install horizontal suction lines with a uniform slope downward to compressor.
 - 3. Install traps and double risers to entrain oil in vertical runs.
 - 4. Liquid lines may be installed level.
- O. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.
- P. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
- Q. Identify refrigerant piping and valves according to Section 23 05 53 "Identification for HVAC Piping and Equipment."
- R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 23 05 18 "Escutcheons for HVAC Piping."

3.4 PIPE JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.
- D. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
 - 1. Use Type BCuP (copper-phosphorus) alloy for joining copper socket fittings with copper pipe.
 - 2. Use Type BAg (cadmium-free silver) alloy for joining copper with bronze or steel.
- E. Threaded Joints: Thread steel pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and to restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry-seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

3.5 HANGERS AND SUPPORTS

- A. Comply with requirements for pipe hangers and supports specified in Section 23 05 29 "Hangers and Supports for HVAC Piping and Equipment."
- B. Install the following pipe attachments:
 - 1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet long.
 - 2. Roller hangers and spring hangers for individual horizontal runs 20 feet or longer.
 - 3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
 - 4. Spring hangers to support vertical runs.
 - 5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
- C. Install hangers for copper tubing with the following maximum spacing and minimum rod diameters:
 - 1. NPS 1/2: Maximum span, 60 inches; minimum rod, 1/4 inch.
 - 2. NPS 5/8: Maximum span, 60 inches; minimum rod, 1/4 inch.
 - 3. NPS 1: Maximum span, 72 inches; minimum rod, 1/4 inch.
 - 4. NPS 1-1/4: Maximum span, 96 inches; minimum rod, 3/8 inch.
- D. Support multifloor vertical runs at least at each floor.

3.6 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Comply with ASME B31.5, Chapter VI.
 - 2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
 - 3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in "Performance Requirements" Article.
 - a. Fill system with nitrogen to the required test pressure.
 - b. System shall maintain test pressure at the manifold gage throughout duration of test.
 - c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
 - d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.
- B. Prepare test and inspection reports.

3.7 SYSTEM CHARGING

- A. Charge system using the following procedures:
 - 1. Install core in filter dryers after leak test but before evacuation.
 - 2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
 - 3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
 - 4. Charge system with a new filter-dryer core in charging line.

3.8 ADJUSTING

- A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.
- B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
- C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.
- D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
 - 1. Open shutoff valves in condenser water circuit.
 - 2. Verify that compressor oil level is correct.
 - 3. Open compressor suction and discharge valves.
 - 4. Open refrigerant valves except bypass valves that are used for other purposes.
 - 5. Check open compressor-motor alignment and verify lubrication for motors and bearings.
- E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION

SECTION 23 31 13 - METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Double-wall rectangular ducts and fittings.
3. Single-wall round ducts and fittings.
4. Sheet metal materials.
5. Duct liner.
6. Sealant and gaskets.
7. Hangers and supports.
8. Seismic-restraint devices.

- B. Related Sections:

1. Section 23 05 93 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Section 23 33 00 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and ASCE/SEI 7.
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of the following products:
 1. Liners and adhesives.
 2. Sealants and gaskets.
 3. Seismic-restraint devices.

B. Delegated-Design Submittal:

1. Sheet metal thicknesses.
2. Joint and seam construction and sealing.
3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.
5. Design Calculations: Calculations including analysis data signed and sealed by the qualified professional engineer responsible for their preparation for selecting hangers and supports and seismic restraints.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
2. Suspended ceiling components.
3. Structural members to which duct will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Penetrations of smoke barriers and fire-rated construction.
6. Items penetrating finished ceiling including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Perimeter moldings.

B. Welding certificates.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to [AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.] [AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.] [AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.]

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up."

D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 DOUBLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. Rectangular Ducts: Fabricate ducts with indicated dimensions for the inner duct.
- B. Outer Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- C. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- E. Interstitial Insulation: Fibrous-glass liner complying with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."
 - 1. Maximum Thermal Conductivity: 0.125 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.
 - 2. Install spacers that position the inner duct at uniform distance from outer duct without compressing insulation.
 - 3. Coat insulation with antimicrobial coating.
 - 4. Cover insulation with polyester film complying with UL 181, Class 1.
- F. Inner Duct: Minimum 0.028-inch-perforated galvanized sheet steel having 3/32-inch-diameter perforations, with overall open area of 23 percent.
- G. Formed-on Transverse Joints (Flanges): Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse

Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

- H. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SINGLE-WALL ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
- B. Flat-Oval Ducts: Indicated dimensions are the duct width (major dimension) and diameter of the round sides connecting the flat portions of the duct (minor dimension).
- C. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. Transverse Joints in Ducts Larger Than 32 Inches in Diameter: Flanged.
- D. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
 - 2. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.
- E. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.4 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G90.
 - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
 - 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

- D. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.5 DUCT LINER

- A. Flexible Elastomeric Duct Liner: Preformed, cellular, closed-cell, sheet materials complying with ASTM C 534, Type II, Grade 1; and with NFPA 90A or NFPA 90B.
 - 1. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
 - 2. Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.
 - a. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - b. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 - 3. Minimum installed R-Value of R-6 for installation inside of the insulated envelope and R-8 for installations outside of the insulated envelope.
- B. Insulation Pins and Washers:
 - 1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch-diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
 - 2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized steel or stainless steel; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
- C. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 7-11, "Flexible Duct Liner Installation."
 - 1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
 - 2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
 - 3. Butt transverse joints without gaps, and coat joint with adhesive.
 - 4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
 - 5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
 - 6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm.
 - 7. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
 - 8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
 - a. Fan discharges.
 - b. Intervals of lined duct preceding unlined duct.
 - c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.

9. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.
 - a. Sheet Metal Inner Duct Perforations: 3/32-inch diameter, with an overall open area of 23 percent.
10. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.6 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:
 1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
 2. Tape Width: 4 inches.
 3. Sealant: Modified styrene acrylic.
 4. Water resistant.
 5. Mold and mildew resistant.
 6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
 7. Service: Indoor and outdoor.
 8. Service Temperature: Minus 40 to plus 200 deg F.
 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
 10. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 11. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Water-Based Joint and Seam Sealant:
 1. Application Method: Brush on.
 2. Solids Content: Minimum 65 percent.
 3. Shore A Hardness: Minimum 20.
 4. Water resistant.
 5. Mold and mildew resistant.
 6. VOC: Maximum 75 g/L (less water).
 7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
 8. Service: Indoor or outdoor.
 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- D. Flanged Joint Sealant: Comply with ASTM C 920.
 1. General: Single-component, acid-curing, silicone, elastomeric.
 2. Type: S.
 3. Grade: NS.
 4. Class: 25.
 5. Use: O.

6. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 7. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.
- F. Round Duct Joint O-Ring Seals:
1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
 2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
 3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.7 HANGERS AND SUPPORTS

- A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
- B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
- C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- D. Trapeze and Riser Supports:
1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
 2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
 3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Section 23 33 00 "Air Duct Accessories" for fire and smoke dampers.
- L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

3.2 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.
- F. Tape is not to be used on exposed duct.

3.3 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
 - 1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 2. Outdoor, Supply-Air Ducts: Seal Class A.
 - 3. Outdoor, Exhaust Ducts: Seal Class C.
 - 4. Outdoor, Return-Air Ducts: Seal Class C.
 - 5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
 - 6. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.
 - 7. Unconditioned Space, Exhaust Ducts: Seal Class C.
 - 8. Unconditioned Space, Return-Air Ducts: Seal Class B.
 - 9. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.

10. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.
11. Conditioned Space, Exhaust Ducts: Seal Class B.
12. Conditioned Space, Return-Air Ducts: Seal Class C.

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 1. Where practical, install concrete inserts before placing concrete.
 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
 5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 SEISMIC-RESTRAINT-DEVICE INSTALLATION

- A. Install ducts with hangers and braces designed to support the duct and to restrain against seismic forces required by applicable building codes. Comply with ASCE/SEI 7.
 1. Space lateral supports per the delegated design requirements.
 2. Brace a change of direction longer per the delegated design requirements.
- B. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.
- C. Install cables so they do not bend across edges of adjacent equipment or building structure.
- D. Install cable restraints on ducts that are suspended with vibration isolators.
- E. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction.
- F. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, to upper truss chords of bar joists, or to concrete members.

3.6 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Section 23 33 00 "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.7 PAINTING

- A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting."

3.8 FIELD QUALITY CONTROL

- A. Independent 3rd party commissioning agent to perform tests and inspections including, but not limited to, that listed below.
- B. Leakage Tests:
 - 1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
- C. Duct System Cleanliness Tests:
 - 1. Visually inspect duct system to ensure that no visible contaminants are present.
 - 2. Test sections of metal duct system, chosen randomly by Owner, for cleanliness according to "Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems."
 - a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.
- D. Duct system will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

3.9 DUCT CLEANING

- A. Clean new and existing duct system(s) before testing, adjusting, and balancing.
- B. Use service openings for entry and inspection.
 - 1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Section 23 33 00 "Air Duct Accessories" for access panels and doors.
 - 2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
 - 3. Remove and reinstall ceiling to gain access during the cleaning process.

- C. If duct system is considered defective due to cleanliness the entire duct system shall be mechanically, and surface, cleaned per the specifications below.
- D. Particulate Collection and Odor Control:
 - 1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
 - 2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.
- E. Clean the following components by removing surface contaminants and deposits:
 - 1. Air outlets and inlets (registers, grilles, and diffusers).
 - 2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
 - 3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
 - 4. Coils and related components.
 - 5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
 - 6. Supply-air ducts, dampers, actuators, and turning vanes.
 - 7. Dedicated exhaust and ventilation components and makeup air systems.
- F. Mechanical Cleaning Methodology:
 - 1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
 - 2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
 - 3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
 - 4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
 - 5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
 - 6. Provide drainage and cleanup for wash-down procedures.
 - 7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.10 START UP

- A. Air Balance: Comply with requirements in Section 23 05 93 "Testing, Adjusting, and Balancing for HVAC."

3.11 DUCT SCHEDULE

- A. Supply Ducts:
 - 1. Ducts:
 - a. Pressure Class: Positive at pressures indicated in the project schedules.

- b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 12.
 - d. SMACNA Leakage Class for Round and Flat Oval: 6.
 - 2. All ductwork installed outside of the building to be double wall.
- B. Return Ducts:
 - 1. Ducts Connected to Air-Handling Units:
 - a. Pressure Class: Negative at pressures indicated in the project schedules.
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 6.
 - d. SMACNA Leakage Class for Round and Flat Oval: 3.
 - 2. All ductwork installed outside of the building to be double wall.
- C. Ducts Connected to Equipment Not Listed Above:
 - a. Pressure Class: Positive or negative at pressures indicated in the project schedules.
 - b. Minimum SMACNA Seal Class: A.
 - c. SMACNA Leakage Class for Rectangular: 6.
 - d. SMACNA Leakage Class for Round and Flat Oval: 3.
- 2. All ductwork installed outside of the building to be double wall.
- D. Exhaust Ducts:
 - 1. Ducts Connected to Air-Handling Units:
 - a. Pressure Class: Positive or negative at pressures indicated in the project schedules.
 - b. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.
 - c. SMACNA Leakage Class for Rectangular: 6.
 - d. SMACNA Leakage Class for Round and Flat Oval: 3.
 - 2. Ducts Connected to Equipment Not Listed Above:
 - a. Pressure Class: Positive or negative at pressures indicated in the project schedules.
 - b. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.
 - c. SMACNA Leakage Class for Rectangular: 6.
 - d. SMACNA Leakage Class for Round and Flat Oval: 3.
- E. Outdoor-Air (Not Filtered, Heated, or Cooled) Ducts:
 - 1. Ducts Connected to Air-Handling Units:
 - a. Pressure Class: Positive or negative at pressures indicated in the project schedules.
 - b. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.
 - c. SMACNA Leakage Class for Rectangular: 6.
 - d. SMACNA Leakage Class for Round and Flat Oval: 3.
 - 2. Ducts Connected to Equipment Not Listed Above:
 - a. Pressure Class: Positive or negative at pressures indicated in the project schedules.
 - b. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.
 - c. SMACNA Leakage Class for Rectangular: 6.
 - d. SMACNA Leakage Class for Round and Flat Oval: 3.

F. Duct liner

1. All plenum drops from air-handling units and fans to be lined.
2. All ductwork specifically called out to be lined on the drawings.

G. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel.

H. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
 - a. Velocity 1000 fpm or Lower:
 - 1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
 - 2) Mitered Type RE 4 without vanes.
 - b. Velocity 1000 to 1500 fpm:
 - 1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
 - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
 - c. Velocity 1500 fpm or Higher:
 - 1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
 - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."
 - a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
 - 1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
 - 2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
 - 3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.

- 4) Radius-to Diameter Ratio: 1.5.
 - b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
 - c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam.
- I. Branch Configuration:
 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."
 - a. Rectangular Main to Rectangular Branch: 45-degree entry.
 2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.
 - a. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION 23 31 13

SECTION 23 33 00 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Manual volume dampers.
2. Control dampers.
3. Fire dampers.
4. Flange connectors.
5. Turning vanes.
6. Remote damper operators.
7. Flexible connectors.
8. Flexible ducts.

- B. Related Requirements:

1. Section 23 37 23 "HVAC Gravity Ventilators" for roof-mounted ventilator caps.
2. Section 28 31 11 "Digital, Addressable Fire-Alarm System" for duct-mounted fire and smoke detectors.
3. Section 28 31 12 "Zoned (DC-Loop) Fire-Alarm System" for duct-mounted fire and smoke detectors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.

1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:
 - a. Special fittings.
 - b. Manual volume damper installations.
 - c. Control-damper installations.
 - d. Fire-damper, smoke-damper, combination fire- and smoke-damper, ceiling, and corridor damper installations, including sleeves; and duct-mounted access doors and remote damper operators.
 - e. Duct security bars.
 - f. Wiring Diagrams: For power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from Installers of the items involved.
- B. Source quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fusible Links: Furnish quantity equal to 10 percent of amount installed.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 MATERIALS

- A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: [G60] [G90].
 - 2. Exposed-Surface Finish: Mill phosphatized.
- B. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304, and having a No. 2 finish for concealed ducts and finish for exposed ducts.
- C. Aluminum Sheets: Comply with ASTM B 209, Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.
- D. Extruded Aluminum: Comply with ASTM B 221, Alloy 6063, Temper T6.
- E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

- F. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 MANUAL VOLUME DAMPERS

A. Low-Leakage, Steel, Manual Volume Dampers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Nailor Industries Inc.
 - b. Pottorff.
 - c. Ruskin Company.
 - d. Vent Products Co., Inc.
2. Comply with AMCA 500-D testing for damper rating.
3. Low-leakage rating, with linkage outside airstream, and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.
4. Suitable for horizontal or vertical applications.
5. Frames:
 - a. Raised Hat shape.
 - b. 0.094-inch-thick, galvanized sheet steel.
 - c. Mitered and welded corners.
 - d. Flanges for attaching to walls and flangeless frames for installing in ducts.
6. Blades:
 - a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Galvanized, roll-formed steel, 0.064 inch thick.
7. Blade Axles: Stainless steel.
8. Blade Seals: Vinyl or Neoprene.
9. Jamb Seals: Cambered stainless steel or aluminum.
10. Tie Bars and Brackets: Galvanized steel.
11. Accessories:
 - a. Include locking device to hold single-blade dampers in a fixed position without vibration.

B. Jackshaft:

1. Size: 0.5-inch diameter.
2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.

C. Damper Hardware:

1. Zinc-plated, die-cast core with dial and handle made of 3/32-inch-thick zinc-plated steel, and a 3/4-inch hexagon locking nut.
2. Include center hole to suit damper operating-rod size.
3. Include elevated platform for insulated duct mounting.

2.4 CONTROL DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cesco Products; a division of MESTEK, Inc.
 2. McGill AirFlow LLC.
 3. Nailor Industries Inc.
 4. Pottorff.
 5. Ruskin Company.
 6. Vent Products Co., Inc.
 7. Young Regulator Company.
- B. Low-leakage rating, with linkage outside airstream, and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.
- C. Frames:
1. Raised Hat shaped.
 2. 0.094-inch-thick, galvanized sheet steel.
 3. Mitered and welded corners.
- D. Blades:
1. Multiple blade with maximum blade width of 6 inches.
 2. Parallel -blade design.
 3. Stainless steel or Aluminum.
 4. 0.064 inch thick single skin or 0.0747-inch-thick dual skin.
 5. Blade Edging: Closed-cell neoprene or PVC.
 6. Blade Edging: Inflatable seal blade edging, or replaceable rubber seals.
- E. Blade Axles: 1/2-inch-diameter; stainless steel; blade-linkage hardware of zinc-plated steel and brass; ends sealed against blade bearings.
1. Operating Temperature Range: From minus 40 to plus 200 deg F.
 2. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
 3. Thrust bearings at each end of every blade.

2.5 FIRE DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cesco Products; a division of MESTEK, Inc.
 2. Nailor Industries Inc.
 3. Pottorff.
 4. Ruskin Company.
 5. Vent Products Co., Inc.
- B. Type: Rated and labeled according to UL 555 by an NRTL.
- C. Closing rating in ducts up to 4-inch wg static pressure class and minimum 2000-fpm velocity.
- D. Fire Rating: 1-1/2 hours.

- E. Frame: Curtain type with blades outside airstream; fabricated with roll-formed, 0.034-inch-thick galvanized steel; with mitered and interlocking corners.
- F. Mounting Sleeve: Factory- or field-installed, galvanized sheet steel.
 - 1. Minimum Thickness: 0.138 inch thick, as indicated, and of length to suit application.
 - 2. Exception: Omit sleeve where damper-frame width permits direct attachment of perimeter mounting angles on each side of wall or floor; thickness of damper frame must comply with sleeve requirements.
- G. Mounting Orientation: Vertical or horizontal as indicated.
- H. Blades: Roll-formed, interlocking, 0.024-inch-thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch-thick, galvanized-steel blade connectors.
- I. Horizontal Dampers: Include blade lock and stainless-steel closure spring.
- J. Heat-Responsive Device: Replaceable, 165 deg Frated, fusible links.

2.6 FLANGE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CL WARD & Family Inc.
 - 2. Ductmate Industries, Inc.
 - 3. Hardcast, Inc.
 - 4. Nexus PDQ.
 - 5. Ward Industries; a brand of Hart & Cooley, Inc.
- B. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
- C. Material: Galvanized steel.
- D. Gage and Shape: Match connecting ductwork.

2.7 TURNING VANES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CL WARD & Family Inc.
 - 2. Ductmate Industries, Inc.
 - 3. Duro Dyne Inc.
 - 4. METALAIRE, Inc.
 - 5. SEMCO LLC.
- B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
 - 1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

- C. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
- D. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows."
- E. Vane Construction: Single and Double wall.
- F. Vane Construction: Single wall for ducts up to 48 inches wide and double wall for larger dimensions.

2.8 REMOTE DAMPER OPERATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Pottorff.
 - 2. Young Regulator Company.
- B. Description: Cable system designed for remote manual damper adjustment.
- C. Cable: Stainless steel.
- D. Wall-Box Mounting: Recessed.
- E. Wall-Box Cover-Plate Material: Stainless steel.

2.9 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CL WARD & Family Inc.
 - 2. Ductmate Industries, Inc.
 - 3. Duro Dyne Inc.
- B. Materials: Flame-retardant or noncombustible fabrics.
- C. Coatings and Adhesives: Comply with UL 181, Class 1.
- D. Metal-Edged Connectors: Factory fabricated with a fabric strip 5-3/4 inches wide attached to two strips of 2-3/4-inch-wide, 0.028-inch-thick, galvanized sheet steel or 0.032-inch-thick aluminum sheets. Provide metal compatible with connected ducts.
- E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
 - 1. Minimum Weight: 26 oz./sq. yd..
 - 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
 - 3. Service Temperature: Minus 40 to plus 200 deg F.
- F. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.
 - 1. Minimum Weight: 24 oz./sq. yd..
 - 2. Tensile Strength: 530 lbf/inch in the warp and 440 lbf/inch in the filling.
 - 3. Service Temperature: Minus 50 to plus 250 deg F.

- G. High-Corrosive-Environment System, Flexible Connectors: Glass fabric with chemical-resistant coating.
 - 1. Minimum Weight: 14 oz./sq. yd..
 - 2. Tensile Strength: 450 lbf/inch in the warp and 340 lbf/inch in the filling.
 - 3. Service Temperature: Minus 67 to plus 500 deg F.
- H. Thrust Limits: Combination coil spring and elastomeric insert with spring and insert in compression, and with a load stop. Include rod and angle-iron brackets for attaching to fan discharge and duct.
 - 1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.
 - 2. Outdoor Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 - 3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 - 4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
 - 5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
 - 6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
 - 7. Coil Spring: Factory set and field adjustable for a maximum of 1/4-inch movement at start and stop.

2.10 FLEXIBLE DUCTS

- A. Insulated, Flexible Duct: UL 181, Class 1, 2-ply vinyl film supported by helically wound, spring-steel wire; fibrous-glass insulation; polyethylene vapor-barrier film.
 - 1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
 - 2. Maximum Air Velocity: 4000 fpm.
 - 3. Temperature Range: Minus 10 to plus 160 deg F.
 - 4. Insulation R-value: R-8
- B. Flexible Duct Connectors:
 - 1. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action in sizes 3 through 18 inches, to suit duct size.
 - 2. Non-Clamp Connectors: Liquid adhesive plus tape.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Compliance with ASHRAE/IESNA 90.1-2004 includes Section 6.4.3.3.3 - "Shutoff Damper Controls," restricts the use of backdraft dampers, and requires control dampers for certain applications. Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.

- D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
 - 1. Install steel volume dampers in steel ducts.
 - 2. Install aluminum volume dampers in aluminum ducts.
- E. Set dampers to fully open position before testing, adjusting, and balancing.
- F. Install fire dampers according to UL listing.
- G. Install flexible connectors to connect ducts to equipment.
- H. For fans developing static pressures of 5-inch wg and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
- I. Connect terminal units to supply ducts directly.
- J. Connect diffusers to ducts directly or with maximum 60-inch lengths of flexible duct clamped or strapped in place.
- K. Connect flexible ducts to metal ducts with liquid adhesive plus tape or draw bands as listed above.
- L. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop of fans.

3.2 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Operate dampers to verify full range of movement.
 - 2. Inspect locations of access doors and verify that purpose of access door can be performed.
 - 3. Operate fire, smoke, and combination fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.
 - 4. Inspect turning vanes for proper and secure installation.
 - 5. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION 23 33 00

SECTION 23 37 13.13 - AIR DIFFUSERS

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Modular Core Supply Grille Diffusers

- B. Related Requirements:

- 1. Section 23 33 00 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers.
 - 2. Section 23 37 13.23 "Air Registers and Grilles" for adjustable-bar register and grilles, fixed-face registers and grilles, and linear bar grilles.
 - 3. Section 23 37 13.43 "Security Registers and Grilles" for security registers and security grilles.
 - 4. Section 23 37 16 "Fabric Air-Diffusion Devices" for continuous tubular diffusers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
 - 2. Diffuser Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

- B. Samples: For each exposed product and for each color and texture specified. Actual size of smallest diffuser indicated.

- C. Samples for Initial Selection: For diffusers with factory-applied color finishes. Actual size of smallest diffuser indicated.

- D. Samples for Verification: For diffusers, in manufacturer's standard sizes to verify color selected. Actual size of smallest diffuser indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

- 1. Ceiling suspension assembly members.
 - 2. Method of attaching hangers to building structure.
 - 3. Size and location of initial access modules for acoustical tile.
 - 4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 - 5. Duct access panels.

- B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 MODULAR-CORE SUPPLY GRILLE DIFFUSERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Krueger.
 - 2. Nailor Industries Inc.
 - 3. Price Industries.
 - 4. Titus.
 - 5. Tuttle & Bailey.
- B. Material: Steel.
- C. Grilles per Unit: Four.
- D. Finish: White baked acrylic.
- E. Border: 1-1/2-inch width with countersunk screw holes.
- F. Blades:
 - 1. Airfoil, individually adjustable horizontally.
 - 2. Double deflection.
 - 3. Set in modules.
- G. Modules: Removable; rotatable.
- H. Mounting: Surface.
- I. Accessory: Opposed-blade steel damper.

2.2 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate diffusers according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where diffusers are installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install diffusers level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install diffusers with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

- A. After installation, adjust diffusers to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 23 37 13.13

SECTION 23 37 13.23 - AIR REGISTERS AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Fixed face egg crate grilles.
- 2. Louvered face grilles.

- B. Related Requirements:

- 1. Section 23 33 00 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to registers and grilles.
- 2. Section 23 37 13.13 "Air Diffusers" for various types of air diffusers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
- 2. Register and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

- B. Samples: For each exposed product and for each color and texture specified. Smallest size register and grille indicated.

- C. Samples for Initial Selection: For registers and grilles with factory-applied color finishes. Smallest size register and grille indicated.

- D. Samples for Verification: For registers and grilles, in manufacturer's standard sizes to verify color selected. Smallest size register and grille indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

- 1. Ceiling suspension assembly members.
- 2. Method of attaching hangers to building structure.
- 3. Size and location of initial access modules for acoustical tile.
- 4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
- 5. Duct access panels.

- B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 GRILLES

A. Fixed Face Egg Crate Grille:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Krueger.
 - b. Nailor Industries Inc.
 - c. Price Industries.
 - d. Titus.
 - e. Tuttle & Bailey.
2. Finish: Baked enamel, white.
3. Face Arrangement: [1/2-by-1/2-by-1/2-inchgrid core.
4. Core Construction: Removable.
5. Frame: 1-1/4wide.
6. Mounting: Lay in.

B. Louvered Face Grille:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Krueger.
 - b. Nailor Industries Inc.
 - c. Price Industries.
 - d. Titus.
 - e. Tuttle & Bailey.
2. Material: Steel.
3. Finish: Mill.
4. Face Blade Arrangement: Horizontal; spaced 3/4inchapart.
5. Core Construction: Integral.
6. Frame: 3/4 incheswide.
7. Mounting: Countersunk screw.

2.2 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate registers and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas where registers and grilles are installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install registers and grilles level and plumb.
- B. Outlets and Inlets Locations: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install registers and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

- A. After installation, adjust registers and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 23 37 13.23

SECTION 23 73 13.13 - INDOOR, BASIC AIR-HANDLING UNITS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes factory-assembled, indoor air-handling units with limited features, including the following components and accessories:
 - 1. Casings.
 - 2. Fans, drives, and motors.
 - 3. Coils.
 - 4. Air filtration.
 - 5. Dampers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each air-handling unit.
- B. Shop Drawings: For each type and configuration of indoor, basic, air-handling unit.
 - 1. Include plans, elevations, sections, and mounting and attachment details.
 - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Detail fabrication and assembly of indoor, basic air-handling units, as well as procedures and diagrams.
 - 4. Include diagrams for power, signal, and control wiring.
- C. Delegated-Design Submittal: For vibration isolation and seismic restraints indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Include design calculations for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Floor plans and other details, or BIM model, drawn to scale, showing the items described in this Section, and coordinated with all building trades.
- B. Seismic Qualification Data: Certificates for indoor, basic air-handling units, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
 - 4. Restraint of internal components.

- C. Source quality-control reports.
- D. Startup service reports.
- E. Field quality-control reports.
- F. Sample Warranty: For manufacturer's warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For air-handling units to include in emergency, operation, and maintenance manuals.

1.5 WARRANTY

- A. Warranty: Manufacturer agrees to repair or replace components of indoor, basic, air-handling units that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Manufacturer's standard, but not less than one year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. NFPA Compliance: Comply with NFPA 90A for design, fabrication, and installation of air-handling units and components.
- C. ASHRAE 62.1 Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."
- D. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."
- E. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design vibration isolation and seismic restraints, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- F. Seismic Performance: Air-handling units shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
 - 2. Component Importance Factor: 1.0.

2.2 CAPACITIES AND CHARACTERISTICS

- A. Per project drawings.

2.3 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. AAON.
 2. Carrier Corporation; a unit of United Technologies Corp.
 3. Daikin Applied.
 4. Dunham-Bush, Inc.
 5. ENVIRO-TEC; by Johnson Controls, Inc.
 6. Trane.
 7. YORK; a Johnson Controls company.

2.4 UNIT CASINGS

- A. General Fabrication Requirements for Casings;
 1. Forming: Form walls, roofs, and floors with at least two breaks at each joint.
 2. Joints: Sheet metal screws or pop rivets.
 3. Sealing: Seal all joints with water-resistant sealant. Hermetically seal at each corner and around entire perimeter.
- B. Single-Wall Construction
 1. Material: Galvanized steel with manufacturer's standard finish.
 2. Floor Plate: Galvanized steel.
 3. Insulation and Adhesive:
 - a. Materials: ASTM C1071, Type I or Type II glass-fiber blanket or board insulation, neoprene coated or foil faced.
 - b. Insulation Thickness: 1 inch.
 - c. Thermal Break: Provide continuity of insulation with no through-casing metal in casing walls, floors, or roofs of air-handling unit.
 - d. Location and Application: Factory applied with adhesive and mechanical fasteners to the internal surface of all complete unit.
 - 1) Liner Adhesive: Comply with ASTM C916, Type I.
 - 2) Mechanical Fasteners: Galvanized steel, suitable for adhesive attachment, or mechanical attachment, to duct without damaging liner when applied as recommended by manufacturer and without causing leakage in cabinet.
- C. Airstream Surfaces: Surfaces in contact with airstream shall comply with requirements in ASHRAE 62.1.
- D. Static-Pressure Classifications:
 1. For Unit Sections Upstream of Fans: Minus 2-inch wg.
 2. For Unit Sections Downstream and Including Fans: 2-inch wg.
- E. Panels and Doors:

1. Panels:
 - a. Fabrication: Formed and reinforced with same materials and insulation thickness as casing.
 - b. Fasteners: Two or more camlock type for panel lift-out operation. Arrangement shall allow panels to be opened against airflow.
 - c. Gasket: Neoprene, applied around entire perimeters of panel frames.
 - d. Size: Large enough to allow unobstructed access for inspection and maintenance of air-handling unit's internal components..

F. Condensate Drain Pans:

1. Location: Each type of cooling coil.
2. Construction:
 - a. Single-wall, galvanized-steel or noncorrosive polymer sheet.
3. Drain Connection:
 - a. Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on one end of pan.
 - b. Minimum Connection Size: NPS 3/4.
4. Slope: Minimum to comply with ASHRAE 62.1, in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and from humidifiers, and to direct water toward drain connection.
5. Length: Extend drain pan downstream from leaving face[for distance to comply with ASHRAE 62.1.
6. Width: Entire width of water producing device.

2.5 FAN, DRIVE, AND MOTOR SECTION

- A. Fan and Drive Assemblies: Statically and dynamically balanced and designed for continuous operation at maximum-rated fan speed and motor horsepower.
- B. Fans: Centrifugal, rated according to AMCA 210; galvanized steel; mounted on solid-steel shaft.
 1. Shafts: With field-adjustable alignment.
 - a. Turned, ground, and polished hot-rolled steel with keyway.
 2. Shaft Bearings:
 - a. Heavy-duty, self-aligning, permanently lubricating bearings.
 3. Housings: Formed- and reinforced-steel panels to form curved scroll housings with shaped cutoff and spun-metal inlet bell.
 - a. Bracing: Steel angle or channel supports for mounting and supporting fan scroll, wheel, motor, and accessories.
 4. Forward-Curved, Centrifugal Fan Wheels: Inlet flange, backplate, and shallow blades with inlet and tip curved forward in direction of airflow and mechanically fastened to flange and backplate; hub swaged to backplate and fastened to shaft with setscrews.

5. Mounting: For internal vibration isolation. Factory-mount fans with manufacturer's standard restrained vibration isolation mounting devices having a minimum static deflection of 1 inch.
 6. Shaft Lubrication Lines: Extended to a location outside the casing.
 7. Flexible Connector: Factory fabricated with a fabric and galvanized-steel sheet.
 - a. Flexible Connector Fabric: Glass fabric, double coated with neoprene. Fabrics, coatings, and adhesives shall comply with UL 181, Class 1.
- C. Drive, Belt: Factory-mounted, V-belt drive, with adjustable alignment and belt tensioning, and with 1.5 service factor based on fan motor.
1. Pulleys: Cast iron or cast steel with split, tapered bushing, dynamically balanced at the factory.
 2. Belts: Oil resistant, non-sparking and nonstatic; in matched sets for multiple-belt drives.
 3. Belt Guards: Comply with requirements specified by OSHA and fabricate according to SMACNA's "HVAC Duct Construction Standards".
- D. Motors:
1. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 23 05 13 "Common Motor Requirements for HVAC Equipment."
 2. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
 3. Efficiency: Premium efficient as defined in NEMA MG 1.
 4. Motor Pulleys: Adjustable pitch for use with 5-hp motors and smaller; fixed pitch for use with motors larger than 5 hp. Select pulley size so pitch adjustment is at the middle of adjustment range at fan design conditions.
 5. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
- E. Motors:
- F. Variable-Frequency Motor Controller: Comply with Section 26 29 23 "Variable-Frequency Motor Controllers."

2.6 COIL SECTION

A. General Requirements for Coil Section:

1. Comply with AHRI 410.
2. Fabricate coil section to allow removal and replacement of coil for maintenance and to allow in-place access for service and maintenance of coil(s).
3. Coils shall not act as structural component of unit.

B. Heating Coils:

1. Electrical Coils: Comply with UL 1995.
 - a. Casing Assembly: Slip-in or Flanged type with galvanized-steel frame.
 - b. Open Heating Elements: Resistance wire of 80 percent nickel and 20 percent chromium supported and insulated by floating ceramic bushings recessed into casing openings, fastened to supporting brackets, and mounted in galvanized-steel frame.
 - c. Overtemperature Protection: Disk-type, automatically resetting, thermal-cutout, safety device; serviceable through terminal box without removing heater from coil section.
 - d. Secondary Protection: Load-carrying, manually resetting or manually replaceable, thermal cutouts; factory wired in series with each heater stage.
 - e. Control Panel: Unit mounted with disconnecting means and overcurrent protection.

- 1) Contactor.
- 2) Toggle switches, one per step.
- 3) Step controller.
- 4) Time-delay relay.
- 5) Pilot lights, one per step.
- 6) Airflow proving switch.

C. Cooling Coils:

1. Refrigerant Coil:

- a. Tubes: Copper.
- b. Fins:
 - 1) Material: Aluminum.
- c. Fin and Tube Joints: Mechanical bond.
- d. Headers: Seamless-copper headers with brazed connections.
- e. Ratings: Designed, tested, and rated according to ASHRAE 33 and AHRI 410.
 - 1) Working Pressure: Minimum 300 psig

2.7 AIR FILTRATION SECTION

A. Particulate air filtration is specified in Section 23 41 00 "Particulate Air Filtration."

B. Panel Filters:

1. Description: Pleated factory-fabricated, self-supported disposable air filters with holding frames.
2. Filter Unit Class: UL 900.
3. Media: Interlaced glass, synthetic, or cotton fibers coated with nonflammable adhesive and antimicrobial coating.
4. Filter-Media Frame: High wet-strength beverage board with perforated metal retainer, or metal grid, on outlet side.

C. Adhesive, Sustainability Projects: As recommended by air-filter manufacturer and with a VOC content of 80 g/L or less.

D. Side-Access Filter Mounting Frames:

1. Particulate Air Filter Frames: Match inner casing and outer casing material, and insulation thickness. Galvanized steel track.
 - a. Sealing: Incorporate positive-sealing device to ensure seal between gasketed material on channels to seal top and bottom of filter cartridge frames to prevent bypass of unfiltered air.

2.8 CONTROLS

A. DDC Controller:

1. Controller shall have volatile-memory backup.
2. Safety Control Operation:

- a. Smoke Detectors: Stop fan and close outdoor-air damper if smoke is detected. Provide additional contacts for alarm interface to fire-alarm control panel.
 - b. Firestats: Stop fan and close outdoor-air damper if air greater than 130 deg enters unit. Provide additional contacts for alarm interface to fire-alarm control panel.
 - c. Fire-Alarm Control Panel Interface: Provide control interface to coordinate with operating sequence.
 - d. Low-Discharge Temperature: Stop fan and close outdoor-air damper if supply-air temperature is less than 40 deg F.
 - e. Defrost Control for Condenser Coil: Pressure differential switch to initiate defrost sequence.
3. Scheduled Operation: Occupied and unoccupied periods on seven-day clock with a minimum of four programmable periods per day.
 4. Unoccupied Period:
 - a. Heating Setback: Per Owner.
 - b. Cooling Setback: Per Owner.
 - c. Override Operation: Two hours.
 5. Supply Fan Operation:
 - a. Occupied Periods: Run fan continuously.
 - b. Unoccupied Periods: Cycle fan to maintain setback temperature.
 6. Refrigerant Circuit Operation:
 - a. Occupied Periods: Cycle or stage compressors to match compressor output to cooling load to maintain room temperature. Cycle condenser fans to maintain maximum hot-gas pressure.
 - b. Unoccupied Periods: Cycle compressors and condenser fans for heating to maintain setback temperature.
 - c. Switch reversing valve for heating or cooling mode on air-to-air heat pump.
 7. Electric Heat Operation:
 - a. Occupied Periods: Modulate coil as backup heat to maintain room temperature.
 - b. Unoccupied Periods: Modulate coil as backup heat to maintain setback temperature.
 8. Economizer Outdoor-Air Damper Operation:
 - a. Morning warm-up and cool-down cycles.
 - b. Occupied Periods: Open to minimum intake, and maximum 100 percent of the fan capacity. Controller shall permit air-side economizer operation when outdoor air is less than 70 deg F. Use mixed-air and outdoor-air to adjust mixing dampers. During economizer cycle operation, lock out cooling.
 - c. Unoccupied Periods: Close outdoor-air damper and open return-air damper.
- B. Interface Requirements for HVAC Instrumentation and Control System:
1. Interface relay for scheduled operation.
 2. Interface relay to provide indication of fault at the central workstation and diagnostic code storage.
 3. Provide BACnet compatible interface for central HVAC control workstation for the following:
 - a. Adjusting set points.
 - b. Monitoring supply fan start, stop, and operation.
 - c. Inquiring data to include outdoor-air damper position, supply- and room-air temperature.

- d. Monitoring occupied and unoccupied operations.
- e. Monitoring constant and variable motor loads.
- f. Monitoring variable-frequency drive operation.
- g. Monitoring cooling load.
- h. Monitoring economizer cycles.
- i. Monitoring air-distribution static pressure and ventilation air volume.

2.9 MATERIALS

A. Steel:

- 1. ASTM A36/A36M for carbon structural steel.
- 2. ASTM A568/A568M for steel sheet.

B. Stainless Steel:

- 1. Manufacturer's standard grade for casing.
- 2. Manufacturer's standard type, ASTM A240/A240M for bare steel exposed to airstream or moisture.

C. Galvanized Steel: ASTM A653/A653M.

D. Aluminum: ASTM B209.

2.10 SOURCE QUALITY CONTROL

- A. AHRI 430 Certification: Air-handling units and their components shall be factory tested according to AHRI 430 and shall be listed and labeled by AHRI.
- B. AMCA 300 and AMCA 301, or AHRI 260 Certification: Air-handling unit fan sound ratings shall comply with AMCA 300, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data" and AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data," or with AHRI 260, "Sound Rating of Ducted Air Moving and Conditioning Equipment."
- C. Water Coils: Factory tested to 300 psig according to AHRI 410 and ASHRAE 33.
- D. Refrigerant Coils: Factory tested to minimum 450-psig internal pressure, and to minimum 300-psig internal pressure while underwater, according to AHRI 410 and ASHRAE 33.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine roughing-in for steam, hydronic, and condensate drainage piping systems and electrical services to verify actual locations of connections before installation.
- B. Equipment Mounting:
 - 1. Install air-handling units on cast-in-place concrete equipment bases. Coordinate sizes and locations of concrete bases with actual equipment provided. Comply with requirements for equipment bases and foundations specified in Section 03 30 00 "Cast-in-Place Concrete."
 - 2. Comply with requirements for vibration isolation and seismic-control devices specified in Section 23 05 48 "Vibration and Seismic Controls for HVAC."

3. Comply with requirements for vibration isolation devices specified in Section 23 05 48.13 "Vibration Controls for HVAC."
- C. Arrange installation of units to provide access space around air-handling units for service and maintenance.
- D. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction and testing with new, clean filters.
- E. Connect duct to air-handling units with flexible connections. Comply with requirements in Section 23 33 00 "Air Duct Accessories."

3.2 PIPING CONNECTIONS

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to air-handling unit, allow for service and maintenance.
- C. Connect piping to air-handling units mounted on vibration isolators with flexible connectors.
- D. Connect condensate drain pans using NPS $\frac{3}{4}$ ASTM B88, Type M copper tubing. Extend to nearest equipment or floor drain. Construct deep trap at connection to drain pan and install cleanouts at changes in direction.
- E. connection. Install balancing valve and union or flange at each coil return connection.
- F. Refrigerant Piping: Comply with applicable requirements in Section 23 23 00 "Refrigerant Piping." Install shutoff valve and union or flange at each supply and return connection.

3.3 ELECTRICAL CONNECTIONS

- A. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.
- D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
 1. Nameplate shall be laminated acrylic or melamine plastic signs, as specified in Section 26 05 53 "Identification for Electrical Systems."
 2. Nameplate shall be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.

3.4 CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.
- B. Connect control wiring according to Section 26 05 23 "Control-Voltage Electrical Power Cables."

3.5 FIELD QUALITY CONTROL

- A. Engage a factory-authorized service representative to to perform tests and inspections.
- B. Air-handling unit and components will be considered defective if unit or components do not pass tests and inspections.
- C. Prepare test and inspection reports.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain air-handling units.

END OF SECTION 23 73 13.13

SECTION 23 74 16.11 - PACKAGED, ROOFTOP AIR-CONDITIONING UNITS RTU 1-6 & 12

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes packaged, small-capacity, rooftop air-conditioning units (RTUs) with the following components and accessories:

1. Casings.
2. Fans.
3. Motors.
4. Rotary heat exchangers.
5. Coils.
6. Refrigerant circuit components.
7. Air filtration.
8. Gas furnaces.
9. Dampers.
10. Electrical power connections.
11. Controls.
12. Accessories.
13. Roof curbs.

1.3 DEFINITIONS

- A. DDC: Direct digital controls.
- B. ECM: Electronically commutated motor.
- C. MERV: Minimum efficiency reporting value.
- D. Outdoor-Air Refrigerant Coil: Refrigerant coil in the outdoor-air stream to reject heat during cooling operations and to absorb heat during heating operations. "Outdoor air" is defined as the air outside the building or taken from outdoors and not previously circulated through the system.
- E. RTU: Rooftop unit. As used in this Section, this abbreviation means packaged, small-capacity, rooftop air-conditioning units. This abbreviation is used regardless of whether the unit is mounted on the roof or on a concrete base on ground.
- F. Supply-Air Fan: The fan providing supply air to conditioned space. "Supply air" is defined as the air entering a space from air-conditioning, heating, or ventilating apparatus.
- G. Supply-Air Refrigerant Coil: Refrigerant coil in the supply-air stream to absorb heat (provide cooling) during cooling operations and to reject heat (provide heating) during heating operations. "Supply air" is defined as the air entering a space from air-conditioning, heating, or ventilating apparatus.

1.4 ACTION SUBMITTALS

- A. Product Data: For each RTU.
 - 1. Include manufacturer's technical data.
 - 2. Include rated capacities, dimensions, required clearances, characteristics, and furnished specialties and accessories.
- B. Shop Drawings:
 - 1. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Include diagrams for power, signal, and control wiring.
- C. Delegated-Design Submittal: For RTU supports indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Include design calculations for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
 - 2. Detail mounting, securing, and flashing of roof curb to roof structure. Indicate coordinating requirements with roof membrane system.
 - 3. Wind- and Seismic-Restraint Details: Detail fabrication and attachment of wind and seismic restraints and snubbers. Show anchorage details and indicate quantity, diameter, and depth of penetration of anchors.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Structural members to which RTUs will be attached.
 - 2. Roof openings.
 - 3. Roof curbs and flashing.
- B. Seismic Qualification Certificates: For RTUs, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
 - 4. Restraint of internal components, including fans, coils, and refrigeration components.
- C. Product Certificates: Submit certification that specified equipment will withstand wind forces identified in "Performance Requirements" Article and in Section 23 05 48 "Vibration and Seismic Controls for HVAC."
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculations.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of wind force and locate and describe mounting and anchorage provisions.

3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Field quality-control reports.

E. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For RTUs to include in emergency, operation, and maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fan Belts: One set(s) for each belt-driven fan.
2. Filters: One set(s) of filters for each unit.

1.8 SERVICE AGREEMENT

- A. Contractor to provide 12 month equipment service contract beyond required service visits.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of RTUs that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Compressors: Manufacturer's standard, but not less than five years from date of Substantial Completion.
2. Warranty Period for Solid-State Ignition Modules: Manufacturer's standard, but not less than three years from date of Substantial Completion.
3. Warranty Period for Control Boards: Manufacturer's standard, but not less than three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 DESCRIPTION

- A. AHRI Compliance:

1. Comply with AHRI 210/240 for testing and rating energy efficiencies for RTUs.
2. Comply with AHRI 340/360 for testing and rating energy efficiencies for RTUs.
3. Comply with AHRI 270 for testing and rating sound performance for RTUs.
4. Comply with AHRI 1060 for testing and rating performance for air-to-air exchanger.

- B. AMCA Compliance:

1. Comply with AMCA 11 and bear the AMCA-Certified Ratings Seal for air and sound performance according to AMCA 211 and AMCA 311.

2. Damper leakage tested according to AMCA 500-D.
3. Operating Limits: Classify according to AMCA 99.

C. ASHRAE Compliance:

1. Comply with ASHRAE 15 for refrigeration system safety.
2. Comply with ASHRAE 33 for methods of testing cooling and heating coils.
3. Comply with applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

D. ASHRAE/IES Compliance: Comply with applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

E. NFPA Compliance: Comply with NFPA 90A or NFPA 90B.

F. UL Compliance: Comply with UL 1995.

G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AAON.
2. Allied Commercial.
3. Daikin Applied.
4. Trane
5. YORK; a Johnson Controls company.

2.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design mounting and restraints for RTUs, including comprehensive engineering analysis.

1. Design RTU supports to comply with wind and seismic performance requirements.

B. Wind-Restraint Performance:

1. Basic Wind Speed: Per information on the architectural and structural drawings.
2. Building Classification Category Per information on the architectural and structural drawings.
3. Minimum 10 lb/sq. ft. multiplied by the maximum area of the mechanical component projected on a vertical plane that is normal to the wind direction, and 45 degrees either side of normal.

C. Seismic Performance: RTUs, accessories, and components shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.4 The term "withstand" means "the unit will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will be fully operational after the seismic event.".

2.5 CAPACITIES AND CHARACTERISTICS

A. Dampers:

1. Outdoor-Air Damper: Linked damper blades, for zero to 100 percent outdoor air, with motorized damper filter.
2. Outdoor- and Return-Air Mixing Dampers: Opposed blade galvanized-steel dampers mechanically fastened to cadmium plated for galvanized-steel operating rod in reinforced cabinet. Connect operating rods with common linkage or gears and interconnect so dampers operate simultaneously.
3. Relief-Air Damper: Gravity actuated or motorized, as required by ASHRAE/IES 90.1.
4. Barometric relief dampers.

2.6 CASINGS

- A. General Fabrication Requirements for Casings: Formed and reinforced double-wall insulated panels, fabricated to allow removal for access to internal parts and components, with joints between sections sealed.
- B. Exterior Casing Material: Galvanized steel with factory-painted finish, with pitched roof panels and knockouts with grommet seals for electrical and piping connections and lifting lugs.
1. Corrosion Protection: 2500 hours' salt spray test according to ASTM B 117.
- C. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Cabinet leakage shall not exceed 1% of total airflow when tested at 3 times the minimum external static pressure provided in AHRI Standard 340/360. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, at a maximum 8 inches of positive or negative static pressure, to reduce air leakage. Deflection shall be measured at the midpoint of the panel height and width. Continuous sealing shall be included between panels and between access doors and openings to reduce air leakage. Piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage.
- D. Condensate Drain Pans: Fabricated stainless-steel sheet, a minimum of 2 inches deep, and complying with ASHRAE 62.1 for design and construction of drain pans.
1. Double-Wall Construction: Fill space between walls with foam insulation and seal moisture tight.
 2. Drain Connections: Threaded nipple.
- E. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

2.7 FANS

- A. Supply-Air Fans: Aluminum or painted-steel wheels, and galvanized- or painted-steel fan scrolls.
1. Direct-Driven Supply-Air Fans: Motor shall be resiliently mounted in the fan inlet.
 2. Blowers and motors shall be dynamically balance and mounted on rubber isolators.
 3. Motors shall be premium efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.

- B. Condenser-Coil Fan: Axial flow, mounted on shaft of permanently lubricated motors.
- C. Relief-Air Fan [RTU-1, 2, 3, 5, 12]: Backward inclined plenum fan, shaft mounted on permanently lubricated motor.
- D. Relief-Air Fan [RTU-4]: Housed forward curved fan, shaft mounted on permanently lubricated motor.

2.8 MOTORS

- A. Comply with NEMA MG 1, Design B, medium induction motor, unless otherwise indicated.
- B. Comply with IEEE 841 for severe-duty motors.
- C. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
- D. Duty: Continuous duty at ambient temperature of 104 deg F and at altitude of 5000 feet above sea level.
- E. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
- F. Efficiency: Energy efficient, as defined in NEMA MG 1.
- G. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements.
- H. Controls:
 - 1. Starting relay, factory mounted and wired, and manual motor starter for field wiring.
 - 2. Control energy recovery to permit air economizer operation.
 - a. Bypass dampers to assist energy recovery control.
 - 3. Speed Settings: Adjustable settings for maximum and minimum rotor speed limits.
 - 4. Defrost cycle.

2.9 COILS

- A. Supply-Air Refrigerant Coil:
 - 1. Aluminum-plate fin and seamless copper tube in steel casing with equalizing-type vertical distributor.
 - 2. Polymer strip shall prevent all copper coils from contacting steel coil frame or condensate pan.
 - 3. Coil Split: Interlaced.
 - 4. Coated.

2.10 REFRIGERANT CIRCUIT COMPONENTS

- A. Compressor [Lead]: Hermetic, variable-speed scroll, mounted on vibration isolators; with internal overcurrent and high-temperature protection, internal pressure relief, and crankcase heater.
- B. Compressors [Lag]: Hermetic, scroll, mounted on vibration isolators; with internal overcurrent and high-temperature protection, internal pressure relief.

C. Refrigeration Specialties:

1. Refrigerant: R-410A.
2. Expansion valve with replaceable thermostatic element.
3. Refrigerant filter/dryer.
4. Manual-reset high-pressure safety switch.
5. Automatic-reset low-pressure safety switch.
6. Minimum off-time relay.
7. Automatic-reset compressor motor thermal overload.
8. Brass service valves installed in compressor suction and liquid lines.
9. Four-way reversing valve with a replaceable magnetic coil, thermostatic expansion valves with bypass check valves, and a suction line accumulator.

2.11 AIR FILTRATION

- A. Minimum 2" thick and minimum MERV 8.

2.12 GAS FURNACE

- A. Description: Factory assembled, piped, and wired; complying with ANSI Z21.47/CSA 2.3 and NFPA 54.
1. CSA Approval: Designed and certified by and bearing label of CSA.
- B. Burners: Stainless steel.
1. Fuel: Natural gas.
 2. Ignition: Electronically controlled electric spark or hot-surface igniter with flame sensor.
 3. High-Altitude Kit: For Project elevations more than 2000 feet above sea level.
- C. Heat-Exchanger and Drain Pan: Stainless steel.
- D. Power Vent: Integral, motorized centrifugal fan interlocked with gas valve.
- E. Gas Valve Train: Single-body, regulated, redundant, 24-V ac gas valve assembly containing pilot solenoid valve, pilot filter, pressure regulator, pilot shutoff, and manual shutoff.
- F. Burner shall be fully modulating.

2.13 DAMPERS

- A. Leakage Rate: Comply with ASHRAE/IES 90.1.
- B. Damper Motor: Modulating with adjustable minimum position.

2.14 ELECTRICAL POWER CONNECTIONS

- A. RTU shall have a single connection of power to unit with unit-mounted disconnect switch accessible from outside unit and control-circuit transformer with built-in overcurrent protection.

2.15 CONTROLS

A. DDC Controller:

1. Controller shall have volatile-memory backup.
2. Safety Control Operation:
 - a. Smoke Detectors: Stop fan and close outdoor-air damper if smoke is detected. Provide additional contacts for alarm interface to fire-alarm control panel.
 - b. Firestats: Stop fan and close outdoor-air damper if air greater than 130 deg enters unit. Provide additional contacts for alarm interface to fire-alarm control panel.
 - c. Fire-Alarm Control Panel Interface: Provide control interface to coordinate with operating sequence.
 - d. Low-Discharge Temperature: Stop fan and close outdoor-air damper if supply-air temperature is less than 40 deg F.
 - e. Defrost Control for Condenser Coil: Pressure differential switch to initiate defrost sequence.
3. Scheduled Operation: Occupied and unoccupied periods on seven-day clock with a minimum of four programmable periods per day.
4. Unoccupied Period:
 - a. Heating Setback: Per Owner.
 - b. Cooling Setback: Per Owner.
 - c. Override Operation: Two hours.
5. Supply Fan Operation:
 - a. Occupied Periods: Run fan continuously.
 - b. Unoccupied Periods: Cycle fan to maintain setback temperature.
6. Refrigerant Circuit Operation:
 - a. Occupied Periods: Cycle or stage compressors to match compressor output to cooling load to maintain room temperature. Cycle condenser fans to maintain maximum hot-gas pressure.
 - b. Unoccupied Periods: Cycle compressors and condenser fans for heating to maintain setback temperature.
 - c. Switch reversing valve for heating or cooling mode on air-to-air heat pump.
7. Gas Furnace Operation:
 - a. Occupied Periods: Modulate burner to maintain room temperature.
 - b. Unoccupied Periods: Cycle burner to maintain setback temperature.
8. Economizer Outdoor-Air Damper Operation:
 - a. Morning warm-up and cool-down cycles.
 - b. Occupied Periods: Open to minimum intake, and maximum 100 percent of the fan capacity. Controller shall permit air-side economizer operation when outdoor air is less than 70 deg F. Use mixed-air and outdoor-air to adjust mixing dampers. During economizer cycle operation, lock out cooling.
 - c. Unoccupied Periods: Close outdoor-air damper and open return-air damper.

B. Interface Requirements for HVAC Instrumentation and Control System:

1. Interface relay for scheduled operation.
2. Interface relay to provide indication of fault at the central workstation and diagnostic code storage.
3. Provide BACnet compatible interface for central HVAC control workstation for the following:
 - a. Adjusting set points.
 - b. Monitoring supply fan start, stop, and operation.
 - c. Inquiring data to include outdoor-air damper position, supply- and room-air temperature.
 - d. Monitoring occupied and unoccupied operations.
 - e. Monitoring constant and variable motor loads.
 - f. Monitoring variable-frequency drive operation.
 - g. Monitoring cooling load.
 - h. Monitoring economizer cycles.
 - i. Monitoring air-distribution static pressure and ventilation air volume.

2.16 ACCESSORIES

- A. Duplex, 115-V, ground-fault-interrupter outlet with 15-A overcurrent protection. Include transformer if required. Outlet shall be energized even if the unit main disconnect is open.
- B. Factory wired disconnect
- C. Factory- or field-installed, demand-controlled ventilation as required in unit schedules.
- D. Safeties:
 1. Smoke detector as required in unit schedules.
 2. Phase-loss protection.
 3. High and low pressure control.
 4. Gas furnace airflow-proving switch.
- E. Outdoor-air intake weather hood.

2.17 ROOF CURBS

- A. Roof curbs with vibration isolators and wind or seismic restraints are specified in Section 23 05 48 "Vibration and Seismic Controls for HVAC."
- B. Materials: Galvanized steel with corrosion-protection coating, watertight gaskets, and factory-installed wood nailer; complying with NRCA standards.
 1. Curb Insulation and Adhesive: Comply with NFPA 90A or NFPA 90B.
 - a. Materials: ASTM C 1071, Type I or II.
 - b. Thickness: 2 inches.
 2. Application: Factory applied with adhesive and mechanical fasteners to the internal surface of curb.
 - a. Liner Adhesive: Comply with ASTM C 916, Type I.
 - b. Mechanical Fasteners: Galvanized steel, suitable for adhesive attachment, mechanical attachment, or welding attachment to duct without damaging liner when applied as recommended by manufacturer and without causing leakage in cabinet.

- c. Liner materials applied in this location shall have airstream surface coated with a temperature-resistant coating or faced with a plain or coated fibrous mat or fabric depending on service air velocity.
 - d. Liner Adhesive: Comply with ASTM C 916, Type I.
- C. Curb Dimensions: Height of 14 inches.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of RTUs.
- B. Examine roughing-in for RTUs to verify actual locations of piping and duct connections before equipment installation.
- C. Examine roofs for suitable conditions where RTUs will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Roof Curb: Install on roof structure or concrete base, level and secure, according AHRI Guideline B. Install RTUs on curbs and coordinate roof penetrations and flashing with roof construction specified in Section 07 72 00 "Roof Accessories." Secure RTUs to upper curb rail, and secure curb base to roof framing or concrete base with anchor bolts.
- B. Unit Support: Install unit level on structural curbs. Coordinate wall penetrations and flashing with wall construction. Secure RTUs to structural support with anchor bolts.
- C. Equipment Mounting:
 - 1. When units are installs cast-in-place concrete. Comply with requirements for equipment bases and foundations specified in Section 03 30 00 "Cast-in-Place Concrete."
 - 2. Comply with requirements for vibration isolation and seismic-control devices specified in Section 23 05 48 "Vibration and Seismic Controls for HVAC."
 - 3. Comply with requirements for vibration isolation devices specified in Section 23 05 48.13 "Vibration Controls for HVAC."

3.3 CONNECTIONS

- A. Comply with duct installation requirements specified in other HVAC Sections. Drawings indicate general arrangement of ducts. The following are specific connection requirements:
 - 1. Install ducts to termination at top of roof curb.
 - 2. Remove roof decking only as required for passage of ducts. Do not cut out decking under entire roof curb.
 - 3. Connect supply ducts to RTUs with flexible duct connectors specified in Section 23 33 00 "Air Duct Accessories."
 - 4. Install return-air duct continuously through roof structure.

- B. Install condensate drain, minimum connection size, with trap and indirect connection to nearest roof drain or area drain.
- C. Where installing piping adjacent to RTUs, allow space for service and maintenance.
 - 1. Gas Piping: Comply with applicable requirements in Section 23 11 23 "Facility Natural-Gas Piping. Connect gas piping to burner, full size of gas train inlet, and connect with union and shutoff valve with sufficient clearance for burner removal and service.

3.4 FIELD QUALITY CONTROL

- A. Independent 3rd party commissioning agent to perform tests and inspections including, but not limited to, that listed below.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections with the assistance of a factory-authorized service representative.
- D. Tests and Inspections:
 - 1. After installing RTUs and after electrical circuitry has been energized, test units for compliance with requirements.
 - 2. Inspect for and remove shipping bolts, blocks, and tie-down straps.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. RTU will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

3.5 STARTUP SERVICE

- A. Engage a factory service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Inspect for visible damage to unit casing.
 - 3. Inspect for visible damage to furnace combustion chamber.
 - 4. Inspect for visible damage to compressor, coils, and fans.
 - 5. Inspect internal insulation.
 - 6. Verify that labels are clearly visible.
 - 7. Verify that clearances have been provided for servicing.
 - 8. Verify that controls are connected and operable.
 - 9. Verify that filters are installed.
 - 10. Clean condenser coil and inspect for construction debris.
 - 11. Clean furnace flue and inspect for construction debris.
 - 12. Connect and purge gas line.
 - 13. Remove packing from vibration isolators.
 - 14. Inspect operation of barometric relief dampers.
 - 15. Verify lubrication on fan and motor bearings.
 - 16. Inspect fan-wheel rotation for movement in correct direction without vibration and binding.
 - 17. Adjust fan belts to proper alignment and tension.
 - 18. Start unit according to manufacturer's written instructions.

- a. Start refrigeration system.
 - b. Do not operate below recommended low-ambient temperature.
 - c. Complete startup sheets and attach copy with Contractor's startup report.
19. Inspect and record performance of interlocks and protective devices; verify sequences.
 20. Operate unit for an initial period as recommended or required by manufacturer.
 21. Perform the following operations for both minimum and maximum firing. Adjust burner for peak efficiency:
 - a. Measure gas pressure on manifold.
 - b. Inspect operation of power vents.
 - c. Measure combustion-air temperature at inlet to combustion chamber.
 - d. Measure flue-gas temperature at furnace discharge.
 - e. Perform flue-gas analysis. Measure and record flue-gas carbon dioxide and oxygen concentration.
 - f. Measure supply-air temperature and volume when burner is at maximum firing rate and when burner is off. Calculate useful heat to supply air.
 22. Calibrate thermostats.
 23. Adjust and inspect high-temperature limits.
 24. Inspect outdoor-air dampers for proper stroke and interlock with return-air dampers.
 25. Start refrigeration system and measure and record the following when ambient is a minimum of 15 deg F above return-air temperature:
 - a. Coil leaving-air, dry- and wet-bulb temperatures.
 - b. Coil entering-air, dry- and wet-bulb temperatures.
 - c. Outdoor-air, dry-bulb temperature.
 - d. Outdoor-air-coil, discharge-air, dry-bulb temperature.
 26. Inspect controls for correct sequencing of heating, mixing dampers, refrigeration, and normal and emergency shutdown.
 27. Measure and record the following minimum and maximum airflows. Plot fan volumes on fan curve.
 - a. Supply-air volume.
 - b. Return-air volume.
 - c. Relief-air volume.
 - d. Outdoor-air intake volume.
 28. Simulate maximum cooling demand and inspect the following:
 - a. Compressor refrigerant suction and hot-gas pressures.
 - b. Short circuiting of air through condenser coil or from condenser fans to outdoor-air intake.
 29. Verify operation of remote panel including operation and failure modes. Inspect the following:
 - a. High-temperature limit on gas-fired heat exchanger.
 - b. Low-temperature safety operation.
 - c. Filter high-pressure differential alarm.
 - d. Economizer to minimum outdoor-air changeover.
 - e. Relief-air fan operation.
 - f. Smoke and firestat alarms.
 30. After startup and performance testing and prior to Substantial Completion, replace existing filters with new filters.

3.6 CLEANING AND ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to four visits to Project during other-than-normal occupancy hours for this purpose.
- B. After completing system installation and testing, adjusting, and balancing RTU and air-distribution systems, clean filter housings and install new filters.

3.7 DEMONSTRATION

- A. Engage a factory service representative to train Owner's maintenance personnel to adjust, operate, and maintain RTUs.

END OF SECTION 23 74 16.11

SECTION 23 81 26 - SPLIT-SYSTEM AIR-CONDITIONERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes split-system air-conditioning and heat-pump units consisting of separate evaporator-fan and compressor-condenser components.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1.3 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ASHRAE Compliance:
 - 1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
 - 2. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - "Procedures," and Section 7 - "Construction and System Start-up."
- C. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period:

- a. For Compressor: Five year(s) from date of Substantial Completion.
- b. For Parts: One year(s) from date of Substantial Completion.
- c. For Labor: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AAON.
2. Carrier Corporation; a unit of United Technologies Corp.
3. Daikin Applied.
4. Dunham-Bush, Inc.
5. ENVIRO-TEC; by Johnson Controls, Inc.
6. Trane.
7. YORK; a Johnson Controls company.

2.2 OUTDOOR UNITS 10TONS OR LESS)

A. Air-Cooled, Compressor-Condenser Components:

1. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
2. Two separate and independent refrigerant circuits Each refrigeration circuit equipped with integral subcooling circuit Front or rear refrigerant line connections.
3. Compressor: Two (2) direct drive hermetic scroll compressor Suction gas-cooled motors w/ \pm 10% voltage utilization range of unit nameplate voltage Crankcase Heaters
 - a. Compressor Type: Scroll.
 - b. Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
 - c. Refrigerant R-410A.
 - d. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and liquid subcooler. Comply with ARI 206/110.
4. Heat-Pump Components: Reversing valve and low-temperature-air cutoff thermostat.
5. Fan: Aluminum-propeller type, directly connected to motor.
6. Motor: Permanently lubricated, with integral thermal-overload protection.
7. Low Ambient Kit: Permits operation down to 45 deg F
8. Mounting Base: Polyethylene.

2.3 ACCESSORIES

- A. Control equipment and sequence of operation are specified in "Section 23 73 13.13 - Indoor, Basic Air-Handling Units."
- B. Automatic-reset timer to prevent rapid cycling of compressor.
- C. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.

- D. Drain Hose: For condensate.
- E. Monitoring:
 - 1. Monitor constant and variable motor loads.
 - 2. Monitor variable-frequency-drive operation.
 - 3. Monitor economizer cycle.
 - 4. Monitor cooling load.
 - 5. Monitor air distribution static pressure and ventilation air volumes.

2.4 CAPACITIES AND CHARACTERISTICS

- A. Per project drawings:

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install units level and plumb.
- B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.
- C. Install roof-mounted, compressor-condenser components on equipment supports specified in Section 07 72 00 "Roof Accessories." Anchor units to supports with removable, cadmium-plated fasteners.
- D. Equipment Mounting:
 - 1. Install ground-mounted, compressor-condenser components on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 03 30 00 "Cast-in-Place Concrete."
 - 2. Install ground-mounted, compressor-condenser components on polyethylene mounting base.
 - 3. Comply with requirements for vibration isolation and seismic control devices specified in Section 23 05 48 "Vibration and Seismic Controls for HVAC."
 - 4. Comply with requirements for vibration isolation devices specified in Section 23 05 48.13 "Vibration Controls for HVAC."
- E. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
 - 1. Water Coil Connections: Comply with requirements specified in Section 23 21 13 "Hydronic Piping" and Section 23 21 16 "Hydronic Piping Specialties." Connect hydronic piping to supply and return coil connections with shutoff-duty valve and union or flange on the supply connection and with throttling-duty valve and union or flange on the return connection.
 - 2. Remote, Water-Cooled Condenser Connections: Comply with requirements specified in Section 23 21 13 "Hydronic Piping" and Section 23 21 16 "Hydronic Piping Specialties." Connect

hydronic piping to supply and return connections with shutoff-duty valve and union or flange on the supply connection and with throttling-duty valve and union or flange on the return connection.

- B. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.
- C. Duct Connections: Duct installation requirements are specified in Section 23 31 13 "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply[and return] ducts to split-system air-conditioning units with flexible duct connectors. Flexible duct connectors are specified in Section 23 33 00 "Air Duct Accessories."

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Remove and replace malfunctioning units and retest as specified above.
- D. Prepare test and inspection reports.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units.

END OF SECTION 23 81 26

SECTION 260000 - ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The Drawings and General provisions of the Contract including the "General Conditions", "Supplementary Conditions", and "General Requirements" of the Contract as written and referred to here are adopted and made part of Division 16.
- B. The Contract Agreement, Bidding documents, and all Addenda issued prior to Contract Agreement execution form a part of these specifications and apply to all Contracts or Subcontracts relating to the electrical systems.

1.02 SUMMARY

- A. The work under this Division shall consist of all labor, materials, equipment, services and related accessories, etc., necessary and required to complete all work as shown or inferred on the Drawings and in the Specifications (Contract Documents).
- B. Provide fixed electrical, telecomm, security, and fire alarm equipment, except where specifically noted otherwise.
- C. Provide portable electrical equipment for the complete system(s).
- D. Provide equipment and/or wiring normally furnished or required for complete electrical and fire alarm systems but not specifically specified on the drawings and/or in specifications, as though specified by both.
- E. All equipment and wiring shall be new, except where specifically shown or specified otherwise.

1.03 WORK INCLUDED IN THIS DIVISION

- A. Electrical, telecomm, security, and fire alarm work includes, but is not limited to
 - 1. Removal or relocation of electrical, telecomm, security, and fire alarm services along with electrical work located on or crossing through project property, above or below grade, obstructing construction of project or conflicting with completed project or any applicable code.
 - 2. Alterations and additions to existing electrical and fire alarm systems.
 - 4. Provide fire alarm control panels, booster panels, circuit breakers, power outlets, convenience outlets, switches, fire alarm initiation and annunciation devices and/or other equipment forming part of a system.
 - 5. Connection of all appliances and equipment including Owner furnished equipment.
 - 6. Complete temporary facilities for construction power and fire alarm systems.
 - 7. Complete alterations and additions to existing fire alarm system.

1.04 WORK NOT INCLUDED IN THIS DIVISION (REFER TO OTHER DIVISIONS OF THESE SPECIFICATIONS)

- A. Installation of motors.
- B. Control wiring for mechanical systems, except where specifically indicated to be provided by Electrical Contractor.

1.05 REFERENCES

NEC:	National Electrical Code (latest edition adopted by local authorities unless otherwise noted).
NFPA:	National Fire Protection Association.
OSHA:	Occupational Safety and Health Administration.
UL:	Underwriters Laboratories, Inc.
NEMA:	National Electrical Manufacturer's Association.
IEEE:	Institute of Electrical and Electronic Engineers.
ACI:	American Concrete Institute.
ADA:	American Disabilities Act.
ASTM:	American Society for Testing Materials.
AWS:	American Welding Society.
FM:	Factory Mutual Insurance Association.
IES:	Illumination Engineering Society.
ISA:	Instrument Society of America.
LPI	Lightning Protection Institute.
NACE:	National Association of Corrosion Engineers.
NETA:	International Electrical Testing Association.
UL:	Underwriters Laboratories.
NECA:	National Electrical Contractors Association.
NETA:	National Electrical Testing Association.

1.06 DEFINITIONS

Provide:	Furnish, install, connect and test until complete.
Wire:	Furnish all necessary wiring, connect and test until complete.
Install:	Furnish, set in place, wire and test until complete.
Work:	Materials completely installed, connected, and tested until complete.
AWG:	American Wire Gage.
Equal:	Acceptable equal as determined by the Engineer.

1.07 REQUIREMENTS OF REGULATORY AGENCIES

- A. Obtain and pay for all permits and inspections required for the work prior to the start of work. Where permits are not obtained prior to the commencement of work, all additional equipment required by the permitting process shall be the responsibility of the contractor and shall not be an extra cost to the owner. Comply with all ordinances pertaining to work described herein. Pay all expenses arising from the procurement of these certificates and include in the base Contract Price.

- B. Install work under this Division per drawings, specifications, latest adopted edition of the National Electrical Code, (NFPA-70) including local amendments and interpretations, Local adopted Building Codes, and any special codes having jurisdiction over specific portions of work within complete installation. In event of conflict, install work per most stringent code requirements determined by Engineer. This does not relieve the Contractor from furnishing and installing work shown or specified which may exceed the requirements of such ordinances, laws, regulations and codes.
- C. All materials, products, devices, fixtures, forms or types of construction included in this project shall meet or exceed the published requirements of National Electrical Code (NEC), American National Standards Institute (ANSI), Institute of Electrical and Electronics Engineers (IEEE) and National Electrical Manufacturers Associations (NEMA). All equipment shall bear the Underwriter's Laboratories (UL) label or equivalent from approved independent testing laboratory.
- D. Arrange, pay fees for and complete work to pass required tests by agencies having authority over work. Deliver to Engineer copies of the Certificates of Inspection and approval issued by authorities and provide original copy of each certificate to Owner.
- E. When required by law or regulations, the governmental agency having jurisdiction for inspections shall be given reasonable notice and opportunity to inspect the work. Any work that is enclosed or covered up before such inspection and test shall be uncovered at the Contractor's expense; after it has been inspected, the Contractor shall restore the work to its original condition at his own expense.

1.08 INSURANCE

- A. The Contractor shall procure and maintain, at his expense, such insurance as required by law and/or specified in the General Conditions.

1.09 DRAWINGS AND SPECIFICATIONS

- A. Drawings and specifications are complementary. Work called for by one is binding as if called for by both. Any discrepancies between drawings and specifications shall be brought to the attention of the Engineer for clarification during the bidding period. No allowance shall subsequently be made to the Contractor by reason of his failure to have brought said discrepancies to the attention of the Consultant during the bidding period or by reason of any error on the Contractor's part.
- B. Drawings are schematic and diagrammatic in nature. Drawings show general run of circuits and approximate location of equipment. The contractor shall review drawings of all trades to assure coordination prior to placement of work. Right is reserved to change location of equipment and devices, and routing of conduits within 10 feet, without extra cost to Owner.
- C. Use dimensions in figures, shop drawings, etc. and actual site measurements in preference to scaled dimensions. Do not scale drawings for exact sizes or locations – use dimensioned details or actual field conditions. Verify item mounting heights as required by project conditions prior to rough-in.
- D. Discrepancies between different drawings or between drawings and specifications, or regulations and codes governing the installation shall be brought to the attention of the Engineer in writing for determination.

- E. Layout equipment as shown on drawings as close as possible. Verify access requirements for equipment actually furnished, and adjust layout to comply with NEC 110. Right is reserved to change layout within 10 feet without additional cost.
- F. Contractor is responsible to field measure and confirm the mounting heights and location of electrical equipment with respect to counters, doorways, and other architectural, mechanical or structural work. Do not scale distances off the electrical drawings: Use actual building dimensions.
- G. Execution of Contract is evidence that Contractor has examined all existing conditions, drawings and specifications related to work, and is informed to extent and character of work. Later claims for labor and materials required due to difficulties encountered, which could have been foreseen had examination been made, will not be recognized.
- H. All work called for in this Section of the plans and specifications shall be performed under this Section, regardless of whether such work may also have been called for in other Section(s). Discrepancies in or conflicts among the various parts of the contract drawings shall not relieve Contractor of his obligation to perform.
- I. No attempt has been made to establish the required sections or splits of equipment relative to the size of access into the space, building, etc. Contractor shall establish all said splits, sections, etc. necessary to install equipment complete without undue disassembly of equipment or demolition of building parts at site of work.
- J. Charges for extra work are not allowed unless work is authorized by written order from the Owner's Representative approving charges for work.
- K. Check all door swings so devices are not located behind doors. Relocate devices as required with the Consultant's review.
- L. Elevators: Coordination of the fire alarm equipment intertie with the elevator equipment and all work involved in the elevator shaft area shall be completed by an approved elevator contractor. The elevator contractor shall be included as a subcontractor to the fire alarm contractor.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All material shall be new, and have a UL label where available. If UL label is not available, material shall be manufactured in accordance with applicable NEMA, IEEE and Federal Standards. Use UL labeled components in assemblies that do not have overall UL label. All equipment shall comply with the terms "listed and labeled" as defined in the NEC 70, Article 100. Submit letter stating compliance with these requirements.
- B. Utilize one of the manufacturers listed to furnish all of the major equipment (i.e., transformers, bus duct, switchgear, circuit breakers, fire alarm panels, booster panels, detection equipment, annunciation equipment, etc.) required for this project.

PART 3 - EXECUTION

3.01 VISIT TO SITE

- A. Visit site, and survey existing conditions affecting work prior to bid. Include necessary materials and labor to accomplish the electrical work, including relocation of existing services and utilities on building site in bid. No consideration shall be given to future claims due to existing conditions. Any discrepancies or interference's shall be reported immediately to the Engineer.

3.02 WORKMANSHIP

- A. All work performed shall be first class work in every aspect. The work shall be performed by mechanics skilled in their respective trades, who shall at all times be under the supervision of competent persons. All work shall be installed to comply with NECA's "Standard of Installation."
- B. Work under this Division shall be first class with emphasis on neatness and workmanship. All work shall be installed square and plumb and concealed where possible. Work that is deficient, defective, poorly laid out, not perfectly aligned, or that is not consistent with the requirements generally accepted in the trade for "first class work" will not be acceptable.
- C. In addition to the materials specified elsewhere, furnish and install all other miscellaneous items necessary for the completion of the work to the extent that all systems are complete and operative.
- D. All work under this Section shall be performed in cooperation with the work performed under all other Sections of the Specifications for the Project in order to avoid interference with other work and to secure the proper installation of all work. Refer the Drawings and Specifications covering the work to be performed under all Sections, so that the relation and extent of the work of this Section with respect to the work of all other Sections is understood. Give right of way to raceways and piping systems installed at a required slope.
- E. Install work using competent mechanics, under supervision of foreman, all duly certified by local authorities. The installation shall be subject to the Engineer's observation, and final acceptance. The Engineer may reject unsuitable work.
- F. Conduit or Wire Mold systems must be complete prior to installation of wiring.

3.03 CHANGE ORDERS

- A. Additional work may be required on the project, which is outside the scope of the contract. Such additional work will be described in Supplemental Instructions and/or Clarifications, to be estimated and priced by the Contractor, and accepted by the Owner, prior to commencing work.
- B. Acceptable charges will be limited to the following
 1. Labor hours shall be calculated per National Electrical Contractors Association (NECA) tables, and shall be priced based on actual paid cost, not to exceed local Prevailing Wage Rates.
 2. Supervision and Support shall not exceed 15% of labor charges. This blanket percentage shall cover foreman, tools, vehicles, record drawings, etc.

3. Charges for material shall be limited to wholesale customer end-column Electrical Trade Pricing Publication (ETP, also known as "Biddle Book").
 4. Major equipment items (switchgear, lighting fixtures, custom equipment, etc. - known in the trade as "quote" items) shall be charged at actual unit prices quoted by suppliers, supported by a true copy of the written price quotation.
 5. Handling charges for material shall not exceed 5% of material and equipment charges. This blanket percentage shall cover freight, cartage, wastage, etc.
- C. Should the Owner or Engineer find reason to dispute or challenge the Contractor's pricing of additional work, one of the following solutions may be imposed
1. Contractor shall be directed to proceed with the work, and submit his proposed charges for arbitration at the conclusion of the project.
 2. Contractor shall maintain a separate labor log and obtain daily signatures thereon, and shall be prepared to submit a certified, audited payroll report to support his claims.
 3. Owner shall purchase the disputed equipment and/or material, and provide same to Contractor at job site for installation, along with a copy of the invoice. Contractor may add a 10% charge to cover handling and warranty administration.
 4. Owner shall contract with a separate licensed Electrical Contractor to perform the extra work. In this event, the originally-contracted work shall be completed by Contractor and accepted by the Owner, following inspection and recommendation by the Engineer. This Contractor shall cause no impediment to the work of the separate contractor, and shall maintain full warranty on his originally-installed equipment and workmanship.

3.04 GUARANTEE

- A. Furnish the Owner a written guarantee, stating that if the workmanship and/or material executed under this Division are proven defective within one (1) year after final acceptance by the Owner, such defects and other work damaged will be repaired and/or replaced. Submit with Operations and Maintenance Manuals.
- B. Obtain from the various manufacturers or vendors guarantees or warranties for their particular equipment or components, and deliver them to the Owner. All guarantees and warranties provided shall be referenced to this project.
- C. In event that systems are placed in operation in several phases at the Owner's request, guarantee will begin on date each system or item of equipment is accepted for service by the Owner. Provide O&M manuals for all equipment when equipment is accepted for service by the Owner.
- D. All guarantees and warranties shall include labor and material at the site of installation for the duration of the guarantee period.

3.05 OBSERVATIONS OF WORK AND DEMONSTRATION OF OPERATION (ACCEPTANCE)

- A. At all observations of work, open panel covers, junction box covers, pull box covers, device covers, and other equipment with removable plates for observation. Provide sufficient personnel to expedite cover removal and replacement.

- B. Contractor to demonstrate operation of new equipment and/or systems to satisfaction of Owner/Engineer, and to have manufacturer available for demonstration of equipment and/or systems where requested by Owner/Engineer. Furnish affidavit signed by Owner's representative indicating that demonstration of operation has been performed.

3.06 TESTING OF ELECTRICAL SYSTEMS

A. Test Completed work as follows

1. Perform tests required as defined in this document to indicate compliance with specifications, drawings, standards and applicable codes. Provide sufficient instruments, labor, technical support and materials for performing these tests. Tests shall be performed to the satisfaction of the Owner/Engineer. One-week prior notice of testing required.
2. Insulation - use 1000 VDC insulation tester (0-2000 megohm full-scale), equivalent to "Megger" as manufactured by Biddle Company. Test conductors and busses of all systems, including feeders, main service busway, motors, devices, equipment, etc. Test feeders, bus ducts, busses, etc., for fifteen (15) minutes with readings at one minute intervals.

- B. Additional Testing and Commissioning of electrical equipment is specified in elsewhere.

3.07 COOPERATION

- A. Carefully coordinate work with other contractors and subcontractors. Refer conflicts between trades to Engineer. Provide necessary information to other trades for such coordination. Such information shall include Shop Drawings, Product Data and all other required data.
- B. Whenever such information is not provided in a timely manner or whenever such information is incorrect, this contractor shall bear all costs for providing or correcting affected work of related trades with no change to the Contract Price or Construction Schedule.
- C. Work to be installed as progress of project will allow. Schedule of work determined by General Contractor, Owner, and/or Architect/Engineer.

3.08 COORDINATION OF UTILITY SERVICES

- A. The contractor shall be responsible for the coordination with all utility connections. This includes, but is not limited to; Power, Telephone and Cable Television.

3.09 PROTECTING

- A. Provide warning lights, bracing, shoring, rails, guards and covers necessary to prevent damage or injury. All persons working around electrical equipment shall have electrical shock and flash protection per OSHA 1910.301-309 & 331-335.
- B. Do not leave exposed or unprotected, electrical items carrying current. Protect visitors and workers from exposure to contact with electrically energized surfaces, parts, etc. in accordance with OSHA standards.

3.10 DELIVERY, STORAGE AND HANDLING

- A. Deliver equipment and materials to job site in original, unopened, labeled container. Products shall be properly identified with names, model numbers, types, grades, compliance labels and other information needed for identification. Store to prevent damage and injury. Store materials to prevent corroding. Store finished materials and equipment to prevent staining and discoloring. Store materials affected by condensation in warm dry areas. Provide heaters. Contractor shall verify the availability of on site storage space, if no on site storage space is available then the contractor shall cover the cost for off site storage. Materials stored at the project site that becomes soiled with construction dirt, concrete, or moisture shall be removed from the site and replaced with new. Do not install soiled material.
- B. Protect work and materials from damage by weather, entrance of water or dirt. Cap and mark conduit during installation.
- C. Avoid damage to materials and equipment in place. Repair, or remove and replace damaged work and materials.
- D. Protection and safekeeping of products stored on premises is responsibility of Contractor supplying products.
- E. Schedule of deliveries and unloading to prevent traffic congestion blocking of access or interference with work. Arrange deliveries to avoid larger accumulations of materials than can be suitably stored at site.
- F. Install equipment per manufacturer's recommendations. Conflicts between contract documents and these recommendations shall be referred to Engineer for remedy.
- G. Electrical or electronic equipment that has been damaged, exposed to weather or is, in the opinion of the Engineer or Architect, otherwise unsuitable because of improper fabrication, storage or installation shall be removed and replaced by this Contractor at his expense.

3.11 ANCHORS

- A. Provide anchors for all equipment, raceways, hangers, etc. to safely support weight of item involved plus 100% for dead loads. Live loads shall be considered in addition to dead loads.
- B. Anchors to consist of expansion type devices similar to "Redhead" or lead expansion anchors. Plastic anchors are not acceptable.
- C. Use preset anchor steel inserts in concrete slabs. Provide preset anchor size and type for anticipated or specified rod/bolt size and live/dead load.
- D. Anchor all wire mold surface raceway, a minimum of 5'-0" on center, and all components to permanent structure when possible. If wire mold and all components cannot be supported by a permanent structure, the contractor shall utilize Steel Hollow Wall Anchors or equal, provide size as required by application.

3.12 CLEANING AND PAINTING

- A. Clean equipment furnished in this Division after completion of work. Clean wipe the interior of all conduit, pull boxes, junction boxes, outlet boxes, and panel board backbones, soiled with dirt and debris prior to installation of wiring.
- B. Touch-up or re-paint damaged painted finishes as determined by the Engineer.
- C. All new conduits, existing wall surfaces (where existing devices have been removed), and other areas damaged by the contractor shall be painted to match the existing wall surface. Colors shall match existing.
- D. Remove debris, packing cartons, scrap, etc., from site daily.

3.13 HOUSEKEEPING PADS

- A. Furnish 2500 # concrete pads, 4" high, unless otherwise noted, for all freestanding equipment, i.e.: switchboards, panels, control panels, motor control centers, transformers, etc. Pads shall have 1" x 45° chamfered edges, and shall extend 2" to 4" beyond equipment mountings. Equipment pads that attach to existing equipment for a continuous line-up shall match existing pad elevations.

3.14 TRAINING

- A. Training for operation and maintenance of new systems or modifications to existing systems is specified in Technical sections. Contractor shall submit with record documents an itemized receipt signed by Owner's representative that all specified training has been received.

3.15 ACCESS PANELS

- A. The contractor shall furnish all access panels for walls, partitions, etc., and shall give access panel to the General Contractor for installation at locations as directed by the Electrical Contractor. It shall be the responsibility of the Electrical Contractor that access panels are provided for access to all boxes, bus joints, equipment, etc., which may be concealed by building construction to comply with the NEC and NFPA. Access panels shall be installed so as not to interfere with lighting arrangements.

END OF SECTION 260000

SECTION 26 05 19 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper building wire rated 600 V or less.
2. Connectors, splices, and terminations rated 600 V and less.

B. Related Requirements:

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: Indicate type, use, location, and termination locations.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

B. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. RoHS compliant.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

C. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.

D. Conductor Insulation:

1. Type THHN and Type THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

2.2 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. All splices of branch circuit conductors shall be done with twist-on wire nuts or insulated mechanical terminations. Push-in terminations are not allowed.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper; solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.
- C. Power-Limited Fire Alarm and Control: Solid for No. 12 AWG and smaller.
- D. No wire smaller than #12 AWG shall be used for light and power circuits.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN/THWN-2, single conductors in raceway.
- B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway.
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.
- E. Exposed Branch Circuits, Including in Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.
- G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. All building power, telephone, signal and other wiring (whether plenum rated or not) shall be installed in raceways. Exception: 50V or less cables in a remodeled area where other methods are currently being utilized and approved by a UNR Representative.

- B. MC Cable shall not be used. Exception: For a fixture whip (6' maximum length) from a junction box to (1) a recessed fixture above an accessible (lift-out tile) ceiling, or (2) a recessed fixture with at least 4 square feet of surface area in a non-accessible type of ceiling.
- C. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- D. Complete raceway installation between conductor and cable termination points according to Section 26 05 33 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- E. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- F. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- G. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- H. Support cables according to Section 26 05 29 "Hangers and Supports for Electrical Systems."
- I. Instrument cable shall consist of twisted shielded pair or triads.

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - 1. Use oxide inhibitor in each splice, termination, and tap for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 26 05 53 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.
- C. Provide full size separate color coded neutral conductors with a stripe that corresponds with phase color for each branch circuit. No shared neutral conductors on 120 volt and 277 volt circuits.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 26 05 44 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 07 84 13 "Penetration Firestopping."

END OF SECTION

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes grounding and bonding systems and equipment.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency and testing agency's field supervisor.
- B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.
 - 1. Plans showing as-built, dimensioned locations of grounding features specified in "Field Quality Control" Article, including the following:
 - a. UFER Grounds.
 - b. Grounding arrangements and connections for separately derived systems.
 - 2. Instructions for periodic testing and inspection of grounding features at test wells grounding connections for separately derived systems based on NFPA 70B.
 - a. Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
 - b. Include recommended testing intervals.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Certified by NETA.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Burndy; Part of Hubbell Electrical Systems.
 2. Thomas & Betts Corporation; A Member of the ABB Group.

2.3 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
1. Solid Conductors: ASTM B 3.
 2. Stranded Conductors: ASTM B 8.
 3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
 4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 5. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
- C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches in cross section, with 9/32-inch holes spaced 1-1/8 inches apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- C. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless exothermic-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.
- D. Beam Clamps: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- E. Cable-to-Cable Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- F. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.
- G. Conduit Hubs: Mechanical type, terminal with threaded hub.
- H. Ground Rod Clamps: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- I. Straps: Solid copper, copper lugs. Rated for 600 A.

J. Water Pipe Clamps:

1. U-bolt type with malleable-iron clamp and copper ground connector rated for direct burial.

2.5 GROUNDING ELECTRODES

A. Building grounding electrode shall be concrete encased Ufer type.

1. Where building is existing and new service is provided, which requires a new grounding conductor due to increase of grounding conductor size, the ufer ground shall be installed as follows:
 - a. Place ufer in footing for new service entrance exterior pad. Pad shall have a footing which extends 30-inches below finished grade. Install 30-feet of copper conductor per NEC 250 requirements and 260526-3.1(B).
 - b. Place in 30-foot long trench adjacent to the existing stemwall, footing of building. Trench shall be 30-inches in depth and grounding conductor shall be placed in concrete at the bottom of the trench, per NEC 250 requirements and 260526-3.1(B).

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.
 1. Bury at least 24 inches below grade.
- C. Underground Medium Voltage Duct Banks: Install bare copper conductor, No. 2/0 AWG minimum.
- D. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 1. Install bus horizontally, on insulated spacers 2 inches minimum from wall, 6 inches above finished floor unless otherwise indicated.
- E. Conductor Terminations and Connections:
 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 2. Underground Connections: Welded connectors.
 3. Connections to Ground Rods at Test Wells: Welded connectors.
 4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING AT THE SERVICE

- A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 GROUNDING SEPARATELY DERIVED SYSTEMS

- A. Generator: Install grounding electrode(s) at the generator location. The electrode shall be connected to the equipment grounding conductor and to the frame of the generator.
- B. Generator grounding shall be considered as a separately derived system and shall meet the requirements of the NEC 250.

3.4 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- B. Pad-Mounted Transformers and Switches: Install two ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than No. 2/0 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inches from the foundation.

3.5 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.
 - 3. Receptacle circuits.
 - 4. Single-phase motor and appliance branch circuits.
 - 5. Three-phase motor and appliance branch circuits.
 - 6. Flexible raceway runs.
 - 7. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
- C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- E. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.6 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

- B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.
- C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- D. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
 - 3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
 - 4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

- C. Grounding system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 1 ohm or less.
 - 2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 1 ohm or less.
 - 3. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm or less.
 - 4. Substations and Pad-Mounted Equipment: 1 ohm or less.
- F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Project Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION

PART 1 - SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 2 - GENERAL

2.1 SUMMARY

- A. Section Includes:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.
- B. Related Requirements:

2.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For fabrication and installation details for electrical hangers and support systems.
- C. Delegated-Design Submittal: For hangers and supports for electrical systems.
 - 1. Include design calculations and details of trapeze hangers.

2.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, and coordinated with each other, using input from installers of the items involved:
- B. Seismic Qualification Certificates: For hangers and supports for electrical equipment and systems, accessories, and components, from manufacturer.
- C. Welding certificates.

PART 3 - PRODUCTS

3.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design hanger and support system.
- B. Seismic Performance: Hangers and supports shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the supported equipment and systems will remain in place without separation of any parts when subjected to the seismic forces specified."
 - 2. Component Importance Factor: 1.0.

3.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4 factory-fabricated components for field assembly.
 - 1. Material: Pre-galvanized steel.
 - 2. Channel Width: 1-5/8 inches.
 - 3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 - 5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 6. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
 - 7. Channel Dimensions: Selected for applicable load criteria.
- B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.
- D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.
- E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
 - 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 - 6. Toggle Bolts: All-steel springhead type.
 - 7. Hanger Rods: Threaded steel.

3.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 4 - EXECUTION

4.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems unless requirements in this Section are stricter.

- B. Comply with requirements for raceways and boxes specified in Section 26 05 33 "Raceways and Boxes for Electrical Systems."
- C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMTs, IMCs, and RMCs as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.
- E. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

4.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

4.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- B. Field Welding: Comply with AWS D1.1/D1.1M.

4.4 PAINTING

- A. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 05 29

SECTION 26 05 33 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal conduits, tubing, and fittings.
2. Nonmetal conduits, tubing, and fittings.
3. Metal wireways and auxiliary gutters.
4. Boxes, enclosures, and cabinets.
5. Handholes and boxes for exterior underground cabling.

B. Related Requirements:

1. Section 26 05 43 "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.
2. Section 27 05 28 "Pathways for Communications Systems" for conduits, wireways, surface pathways, innerduct, boxes, faceplate adapters, enclosures, cabinets, and handholes serving communications systems.
3. Section 28 05 28 "Pathways for Electronic Safety and Security" for conduits, surface pathways, innerduct, boxes, and faceplate adapters serving electronic safety and security.

1.2 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Sustainable Design Submittals:
- C. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
1. Structural members in paths of conduit groups with common supports.
 2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.
- B. Seismic Qualification Certificates: For enclosures, cabinets, and conduit racks and their mounting provisions, including those for internal components, from manufacturer.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Fittings for electrical metallic tubing shall be steel, watertight, gland-ring types or steel setscrew types.
- C. GRC: Comply with ANSI C80.1 and UL 6.
- D. ARC: Comply with ANSI C80.5 and UL 6A.
- E. IMC: Comply with ANSI C80.6 and UL 1242.
- F. All metal conduit, couplings, elbows, and fittings buried below grade shall be coated with PVC or ½ -lap wrapped with an approved tape (coating or wrapping shall be a 20 mil total thickness). In lieu of rigid galvanized conduit for horizontal secondary service raceways and branch circuit wiring in or under a floor slab, Schedule 40 PVC may be used with rigid steel conduit termination stub-ups out of the ground or slab and into the building.
- G. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
 - 1. Comply with NEMA RN 1.
 - 2. Coating Thickness: 0.040 inch, minimum.
- H. EMT: Comply with ANSI C80.3 and UL 797.
- I. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- J. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
 - 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
 - 2. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: Setscrew, if in a wet location compression shall be used.
 - 3. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
 - 4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.
- K. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 Type 3R unless otherwise indicated, and sized according to NFPA 70.

1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

2.3 BOXES, ENCLOSURES, AND CABINETS

A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

D. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

E. Metal Floor Boxes:

1. Material: Cast metal or sheet metal.

2. Type: Semi-adjustable.

3. Shape: Rectangular.

4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

F. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.

G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

H. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.

I. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

J. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.

K. Gangable boxes are allowed.

L. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

2. Nonmetallic Enclosures: Plastic.

3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

M. Cabinets:

1. NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.

2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.
6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.4 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. General Requirements for Handholes and Boxes:

1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.

1. Standard: Comply with SCTE 77.
2. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
5. Cover Legend: Molded lettering, "ELECTRIC".
6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.

C. Fiberglass Handholes and Boxes: Molded of fiberglass-reinforced polyester resin, with frame and covers of polymer concrete or hot-dip galvanized-steel diamond plate.

1. Standard: Comply with SCTE 77.
2. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
5. Cover Legend: Molded lettering, "ELECTRIC".
6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed Conduit: GRC.
2. Concealed Conduit, Aboveground: GRC.
3. Underground Conduit: RNC, Type EPC-40-PVC,.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

- B. Indoors: Apply raceway products as specified below unless otherwise indicated.
 - 1. Exposed, Not Subject to Physical Damage: EMT.
 - 2. Exposed, Not Subject to Severe Physical Damage: EMT.
 - 3. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 - d. Gymnasiums.
 - 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 6. Damp or Wet Locations: GRC.
 - 7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 nonmetallic in institutional and commercial kitchens and damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 - 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 - 3. EMT: Use setscrew, steel fittings. Comply with NEMA FB 2.10.
 - 4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. All fire alarm system conduit shall be manufactured red.
- F. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- G. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for hangers and supports.
- D. Arrange stub-ups so curved portions of bends are not visible above finished slab.

- E. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- F. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines. Conduit shall be routed to minimize penetrations through floor building structural components.
- G. Support conduit within 12 inches of enclosures to which attached.
- H. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of 1 inch of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
 - 5. Conduits shall stub up through concrete slabs with RGC elbows and risers.
 - 6. Conduits located in concrete slabs shall not exceed $\frac{3}{4}$ " and shall be spaced no closer than eight inches on center except at panel and junction boxes where they shall be spread as widely as possible. Provide for special framing when required where conduits enter a panel board. In cases where conduits are larger than $\frac{3}{4}$ " are to be placed in a concrete slab, the structural engineering shall be notified/consulted.
- I. Stub-ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or RMC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- J. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- K. At damp and wet locations or where exposed to weather, flexible steel conduit, where allowed, shall be liquid tight type.
- L. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- M. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- N. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- O. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use and label.

- P. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces.
- Q. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service raceway enters a building or structure.
 - 3. Where otherwise required by NFPA 70.
- R. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 36 inches of flexible conduit for motor connections, connection between fan plenum and structure, expansion joints with an accessible junction box on each side, recessed and semi-recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC in damp or wet locations not subject to severe physical damage.
- S. For recessed lighting fixtures in an accessible (lift-out tile) ceiling flexible steel conduit shall not exceed 6'.
- T. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to top of box unless otherwise indicated.
- U. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between the box and cover plate or the supported equipment and box.
- V. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- W. Locate boxes so that cover or plate will not span different building finishes.
- X. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- Y. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- Z. Set metal floor boxes level and flush with finished floor surface.
- AA. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
 - 1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom for pipe less than 6 inches in nominal diameter.
 - 2. Install backfill.

3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as.
4. Install manufactured duct elbows for stub-up at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
 - b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
6. Underground Warning Tape: Comply with requirements in Section 26 05 53 "Identification for Electrical Systems."

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.
- D. Install handholes with bottom below frost line.
- E. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 26 05 44 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.6 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 07 84 13 "Penetration Firestopping."

3.7 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Color and legend requirements for raceways, conductors, and warning labels and signs.
 - 2. Labels.
 - 3. Bands and tubes.
 - 4. Tapes and stencils.
 - 5. Tags.
 - 6. Signs.
 - 7. Cable ties.
 - 8. Paint for identification.
 - 9. Fasteners for labels and signs.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of label and sign to illustrate composition, size, colors, lettering style, mounting provisions, and graphic features of identification products.
- C. Delegated-Design Submittal: For arc-flash hazard study.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1.
- B. Comply with UNR Design and Construction Standards.
- C. Comply with NFPA 70.
- D. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- E. Comply with ANSI Z535.4 for safety signs and labels.
- F. Comply with NFPA 70E requirements for arc-flash warning labels.

- G. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- H. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 600 V or Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage.
- B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.
 - 1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
 - 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - 3. Colors for 480/277-V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
 - 4. Color for Neutral: White.
 - 5. Color for Equipment Grounds: Green.
 - 6. Colors for Isolated Grounds: Green with white stripe.
- C. Warning Label Colors:
 - 1. Identify system voltage with black letters on an orange background.
- D. Warning labels and signs shall include, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

2.3 LABELS

- A. All labeling shall be done by machine – NO hand written labels.
- B. Provide label on the covers of outlets, switches, and junction boxes. Labels shall indicate panel and circuit numbers.

- C. All Equipment/System/Panel Identification Labels shall include room number, voltage, destination, or origin. Labels shall be engraved type with white letters on black for normal power, white letters on red for emergency power, and white letters on orange for UPS power.
1. Examples: PNL 5L 208-120V 3P 4W
Fed from DPL1
Located in Rm. E100
At Feeder Circuit Breaker in Distribution Panel DPL1:
Feeds PNL 5L
Located in Rm. E500
- D. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.
- E. Snap-around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameter and that stay in place by gripping action.
- F. Self-Adhesive Wraparound Labels: Preprinted, 3-mil-thick, polyester flexible label with acrylic pressure-sensitive adhesive.
1. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
 2. Marker for Labels: Permanent, waterproof, black ink marker recommended by tag manufacturer.
 3. Marker for Labels: Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.
- G. Self-Adhesive Labels: Polyester, thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
1. Minimum Nominal Size:
 - a. 1-1/2 by 6 inches for raceway and conductors.
 - b. 3-1/2 by 5 inches for equipment.
 - c. As required by authorities having jurisdiction.

2.4 BANDS AND TUBES

- A. Snap-around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches long, with diameters sized to suit diameter and that stay in place by gripping action.

2.5 TAPES AND STENCILS

- A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils thick by 1 to 2 inches wide; compounded for outdoor use.
- C. Tape and Stencil: 4-inch-wide black stripes on 10-inch centers placed diagonally over orange background and is 12 inches wide. Stop stripes at legends.

- D. Floor Marking Tape: 2-inch-wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.
- E. Underground-Line Warning Tape:
 - 1. Tape:
 - a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
 - b. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
 - 2. Color and Printing:
 - a. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, ANSI Z535.4, and ANSI Z535.5.
 - b. Inscriptions for Red-Colored Tapes: "ELECTRIC LINE, HIGH VOLTAGE".
 - c. Inscriptions for Orange-Colored Tapes: "TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE".
- F. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.6 TAGS

- A. Machine Written Tags:
 - 1. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.7 SIGNS

- A. Baked-Enamel Signs:
 - 1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
 - 2. 1/4-inch grommets in corners for mounting.
 - 3. Nominal Size: 7 by 10 inches.
- B. Metal-Backed Butyrate Signs:
 - 1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs, with 0.0396-inch galvanized-steel backing, punched and drilled for fasteners, and with colors, legend, and size required for application.
 - 2. 1/4-inch grommets in corners for mounting.
 - 3. Nominal Size: 10 by 14 inches.
- C. Laminated Acrylic or Melamine Plastic Signs:
 - 1. Engraved legend.

2. Thickness:
 - a. For signs up to 20 sq. in., minimum 1/16 inch.
 - b. For signs larger than 20 sq. in., 1/8 inch thick.
 - c. Engraved legend with white letters on a dark gray background.
 - d. Punched or drilled for mechanical fasteners with 1/4-inch grommets in corners for mounting.
 - e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.8 CABLE TIES

- A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
 1. Minimum Width: 3/16 inch.
 2. Tensile Strength at 73 Deg F according to ASTM D 638: 12,000 psi.
 3. Temperature Range: Minus 40 to plus 185 deg F.
 4. Color: Black, except where used for color-coding.
- B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
 1. Minimum Width: 3/16 inch.
 2. Tensile Strength at 73 Deg F according to ASTM D 638: 12,000 psi.
 3. Temperature Range: Minus 40 to plus 185 deg F.
 4. Color: Black.
- C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.
 1. Minimum Width: 3/16 inch.
 2. Tensile Strength at 73 Deg F according to ASTM D 638: 7000 psi.
 3. UL 94 Flame Rating: 94V-0.
 4. Temperature Range: Minus 50 to plus 284 deg F.
 5. Color: Black.

2.9 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.

- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- G. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.
- H. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- I. System Identification for Raceways and Cables over 600 V: Identification shall completely encircle cable or conduit. Place adjacent identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- J. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- K. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.
- L. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
- M. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage. System legends shall be as follows:
 - 1. "EMERGENCY POWER."
 - 2. "POWER."
 - 3. "UPS."
- N. Vinyl Wraparound Labels:
 - 1. Secure tight to surface at a location with high visibility and accessibility.
 - 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
- O. Snap-around Labels: Secure tight to surface at a location with high visibility and accessibility.
- P. Self-Adhesive Wraparound Labels: Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
- Q. Snap-around Color-Coding Bands: Secure tight to surface at a location with high visibility and accessibility.

- R. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.
- S. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.
 - 1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.
- T. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.
- U. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's written instructions.
- V. Underground Line Warning Tape:
 - 1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches overall.
 - 2. Limit use of underground-line warning tape to direct-buried cables.
 - 3. Install underground-line warning tape for direct-buried cables and cables in raceways.
- W. Machine Written Tags:
 - 1. Place in a location with high visibility and accessibility.
 - 2. Secure using plenum-rated cable ties.
- X. Baked-Enamel Signs:
 - 1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
 - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.
- Y. Metal-Backed Butyrate Signs:
 - 1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
 - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.
- Z. Laminated Acrylic or Melamine Plastic Signs:
 - 1. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
 - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.
- AA. Cable Ties: General purpose, for attaching tags, except as listed below:
 - 1. Outdoors: UV-stabilized nylon.
 - 2. In Spaces Handling Environmental Air: Plenum rated.

3.2 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels.
 - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- D. Accessible Fittings for Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive labels containing the wiring system legend and system voltage. System legends shall be as follows:
 - 1. "EMERGENCY POWER."
 - 2. "POWER."
 - 3. "UPS."
- E. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use snap-around labels to identify the phase.
 - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- F. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use write-on tags with the conductor or cable designation, origin, and destination.
- G. Control-Circuit Conductor Termination Identification: For identification at terminations, provide self-adhesive wraparound labels with the conductor designation.
- H. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.
- I. Auxiliary Electrical Systems Conductor Identification: Marker tape that is uniform and consistent with system used by manufacturer for factory-installed connections.
 - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
- J. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.
- K. Workspace Indication: Apply floor marking tape or tape and stencil to finished surfaces. Show working clearances in the direction of access to live parts. Workspace shall comply with NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

- L. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.
- M. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive equipment labels.
 - 1. Apply to exterior of door, cover, or other access.
 - 2. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:
 - a. Power-transfer switches.
 - b. Controls with external control power connections.
- N. Arc Flash Warning Labeling: Self-adhesive labels.
- O. Operating Instruction Signs: Self-adhesive labels.
- P. Emergency Operating Instruction Signs: Self-adhesive labels with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.
- Q. Equipment Identification Labels:
 - 1. Indoor Equipment: Baked-enamel signs.
 - 2. Outdoor Equipment: Laminated acrylic or melamine sign.

END OF SECTION 26 05 53

SECTION 26 24 16 - PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Distribution panelboards.
2. Lighting and appliance branch-circuit panelboards.

1.2 DEFINITIONS

- A. MCCB: Molded-case circuit breaker.
- B. SPD: Surge protective device.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of panelboard.
- B. Shop Drawings: For each panelboard and related equipment.
1. Include dimensioned plans, elevations, sections, and details.
 2. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
 3. Detail bus configuration, current, and voltage ratings.
 4. Short-circuit current rating of panelboards and overcurrent protective devices.
 5. Include evidence of NRTL listing for series rating of installed devices.
 6. Include evidence of NRTL listing for SPD as installed in panelboard.
 7. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 8. Include wiring diagrams for power, signal, and control wiring.
 9. Key interlock scheme drawing and sequence of operations.
 10. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards.

1.4 INFORMATIONAL SUBMITTALS

- A. Panelboard schedules for installation in panelboards.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.6 FIELD CONDITIONS

- A. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet.

1.7 WARRANTY

- A. **Manufacturer's Warranty:** Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.
1. Panelboard Warranty Period: 18 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANELBOARDS COMMON REQUIREMENTS

- A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces defined in Section 26 05 48.16 "Seismic Controls for Electrical Systems."
- B. **Electrical Components, Devices, and Accessories:** Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NEMA PB 1.
- D. Comply with NFPA 70.
- E. **Enclosures:** Flush and Surface-mounted, dead-front cabinets.
1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
 - b. Outdoor Locations: NEMA 250, Type 3R.
 - c. Other Wet or Damp Indoor Locations: NEMA 250, Type 3R.
 2. Height: 84 inches maximum.
 3. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims shall cover all live parts and shall have no exposed hardware.
 4. Front Cover: Shall be door-in-door type.
- F. **Incoming Mains Location:** Convertible between top and bottom.
- G. **Phase, Neutral, and Ground Buses:** Hard-drawn copper, 98 percent conductivity.
- H. **Conductor Connectors:** Suitable for use with conductor material and sizes.
1. Material: Hard-drawn copper, 98 percent conductivity.
 2. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.
 3. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.
 4. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
 5. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.

- I. NRTL Label: Panelboards shall be labeled by an NRTL acceptable to authority having jurisdiction for use as service equipment with one or more main service disconnecting and overcurrent protective devices. Panelboards shall have meter enclosures, wiring, connections, and other provisions for utility metering. Coordinate with utility company for exact requirements.
- J. Future Devices: Panelboards shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
- K. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

2.3 POWER PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton.
 - 2. General Electric Company; GE Energy Management - Electrical Distribution.
 - 3. Siemens Energy.
 - 4. Square D; by Schneider Electric.
- B. Panelboards: NEMA PB 1, distribution type.
- C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
 - 1. For doors more than 36 inches high, provide two latches, keyed alike.
- D. Mains: Lugs only.
- E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
- F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers.
- G. Branch Overcurrent Protective Devices: Fused switches.
- H. Contactors in Main Bus: NEMA ICS 2, Class A, electrically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.
 - 1. External Control-Power Source: 120-V branch circuit.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton.
 2. General Electric Company; GE Energy Management - Electrical Distribution.
 3. Siemens Energy.
 4. Square D; by Schneider Electric.
- B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
- C. Mains: Circuit breaker or lugs only.
- D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- E. Contactors in Main Bus: NEMA ICS 2, Class A, electrically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.
1. External Control-Power Source: 120-V branch circuit.
- F. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.
- G. Column-Type Panelboards: Single row of overcurrent devices with narrow gutter extension and overhead junction box equipped with ground and neutral terminal buses.

2.5 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eaton.
 2. General Electric Company; GE Energy Management - Electrical Distribution.
 3. Siemens Energy.
 4. Square D; by Schneider Electric.
- B. Molded-case circuit breaker: Comply with UL 489, with interrupting capacity to meet available fault currents.
1. Thermal-Magnetic Circuit Breakers:
 - a. Inverse time-current element for low-level overloads.
 - b. Instantaneous magnetic trip element for short circuits.
 - c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
 3. Electronic Trip Circuit Breakers:
 - a. RMS sensing.
 - b. Field-replaceable rating plug or electronic trip.
 - c. Digital display of settings, trip targets, and indicated metering displays.
 - d. Multi-button keypad to access programmable functions and monitored data.
 - e. Ten-event, trip-history log. Each trip event shall be recorded with type, phase, and magnitude of fault that caused the trip.
 - f. Integral test jack for connection to portable test set or laptop computer.
 - g. Field-Adjustable Settings:
 - 1) Instantaneous trip.
 - 2) Long- and short-time pickup levels.
 - 3) Long and short time adjustments.

- 4) Ground-fault pickup level, time delay, and I squared T response.
4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6-mA trip).
6. GFEP Circuit Breakers: Class B ground-fault protection (30-mA trip).
7. Arc-Fault Circuit Interrupter Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
8. Subfeed Circuit Breakers: Vertically mounted.
9. MCCB Features and Accessories:
 - a. Standard frame sizes, trip ratings, and number of poles.
 - b. Breaker handle indicates tripped status.
 - c. UL listed for reverse connection without restrictive line or load ratings.
 - d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
 - e. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and HID lighting circuits.
 - f. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
 - g. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.
 - h. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in off position.
 - i. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

2.6 IDENTIFICATION

- A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.
- B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.
- C. Circuit Directory: Directory card inside panelboard door, mounted in transparent card holder. Directory card shall be typewritten giving circuit numbers and a complete description of all outlets controlled by each panel circuit breaker including room numbers.

2.7 ACCESSORY COMPONENTS AND FEATURES

- A. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.
- B. Install panelboards and accessories according to NECA 407.
- C. Comply with mounting and anchoring requirements specified in Section 26 05 48.16 "Seismic Controls for Electrical Systems."
- D. Mount top of trim 70" above finished floor unless otherwise indicated.

- E. Mount panelboard cabinet plumb and rigid without distortion of box.
- F. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- G. Install overcurrent protective devices and controllers not already factory installed.
 - 1. Set field-adjustable, circuit-breaker trip ranges.
- H. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.
- I. Install filler plates in unused spaces.
- J. Where panels are installed flush with the walls, empty conduits shall be extended from the panel to an accessible space above and below. A minimum of one $\frac{3}{4}$ inch conduit shall be installed for every single pole spare circuit breakers or spaces, or fraction thereof, but not less than two empty conduits.
- K. Where underfloor space is accessible, spare conduits shall be extended there in addition to the ceiling space.
- L. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

3.2 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 26 05 53 "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.
- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."
- D. Device Nameplates: Label each branch circuit device in power panelboards with a nameplate complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."
- E. Install warning signs complying with requirements in Section 26 05 53 "Identification for Electrical Systems" identifying source of remote circuit.
- F. Ensure all items required by Inyo County Design and Construction Standards are included on labels

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.

- C. Tests and Inspections: (All tests and inspections shall be in accordance with Nevada State Public Works Division Adopted Standards latest edition)
 - 1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- D. Panelboards will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results, with comparisons of the two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION 26 24 16

PART 1 - SECTION 26 28 13 - FUSES

PART 2 - GENERAL

2.1 SUMMARY

A. Section Includes:

1. Cartridge fuses rated 600 V ac and less for use in the following:
 - a. Control circuits.
 - b. Motor-control centers.
 - c. Panelboards.
 - d. Switchboards.
 - e. Enclosed controllers.
 - f. Enclosed switches.

2.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

2.3 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

PART 3 - PRODUCTS

3.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Bussmann, an Eaton business.
2. Littelfuse, Inc.

3.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

1. Type RK-1: 600-V, zero- to 600-A rating, 200 kAIC, time delay.
2. Type RK-5: 600-V, zero- to 600-A rating, 200 kAIC, time delay.
3. Type CC: 600-V, zero- to 30-A rating, 200 kAIC, fast acting.
4. Type CD: 600-V, 31- to 60-A rating, 200 kAIC, fast acting.
5. Type J: 600-V, zero- to 600-A rating, 200 kAIC, time delay.
6. Type L: 600-V, 601- to 6000-A rating, 200 kAIC, time delay.

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- C. Comply with NEMA FU 1 for cartridge fuses.
- D. Comply with NFPA 70.
- E. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

PART 4 - EXECUTION

4.1 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.
- B. Install spare-fuse cabinet(s) in location shown on the Drawings or as indicated in the field by Owner.

4.2 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 26 28 13

SECTION 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Fusible switches.
 2. Nonfusible switches.
 3. Molded-case circuit breakers (MCCBs).
 4. Enclosures.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
1. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF electronic format.
- B. Shop Drawings: For enclosed switches and circuit breakers.
1. Include plans, elevations, sections, details, and attachments to other work.
 2. Include wiring diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.
- C. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Accredited by NETA.
1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

1.6 WARRANTY

- A. **Manufacturer's Warranty:** Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.
 - 1. **Warranty Period:** 5 year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. **Seismic Performance:** Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

2.2 GENERAL REQUIREMENTS

- A. **Source Limitations:** Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
- B. **Product Selection for Restricted Space:** Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. **Electrical Components, Devices, and Accessories:** Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with NFPA 70.

2.3 FUSIBLE SWITCHES

- A. **Manufacturers:** Subject to compliance with requirements, provide products by the following:
 - 1. ABB Inc.
 - 2. Eaton.
 - 3. Siemens Industry, Inc.
 - 4. Square D; by Schneider Electric.
- B. **Type HD, Heavy Duty:**
 - 1. Single throw.
 - 2. Three pole.
 - 3. 600-V ac.
 - 4. 200 A and smaller.
 - 5. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses.
 - 6. Lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Isolated Ground Kit: Internally mounted; insulated, labeled for copper and aluminum neutral conductors.
4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
5. Service-Rated Switches: Labeled for use as service equipment.

2.4 NONFUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Eaton.
2. Siemens Industry, Inc.
3. Square D; by Schneider Electric.

B. Type GD, General Duty, Three Pole, Single Throw, 240-V ac, 600 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.

C. Type HD, Heavy Duty, Three Pole, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

D. Type HD, Heavy Duty, Six Pole, Single Throw, 600-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

E. Type HD, Heavy Duty, Three Pole, Double Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

F. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Isolated Ground Kit: Internally mounted; insulated, labeled for copper and aluminum neutral conductors.
4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
5. Service-Rated Switches: Labeled for use as service equipment.

2.5 MOLDED-CASE CIRCUIT BREAKERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Eaton.
2. General Electric Company.
3. Siemens Industry, Inc.
4. Square D; by Schneider Electric.

- B. Circuit breakers shall be constructed using glass-reinforced insulating material. Current carrying components shall be completely isolated from the handle and the accessory mounting area.
- C. Circuit breakers shall have a toggle operating mechanism with common tripping of all poles, which provides quick-make, quick-break contact action. The circuit-breaker handle shall be over center, be trip free, and reside in a tripped position between on and off to provide local trip indication. Circuit-breaker escutcheon shall be clearly marked on and off in addition to providing international I/O markings. Equip circuit breaker with a push-to-trip button, located on the face of the circuit breaker to mechanically operate the circuit-breaker tripping mechanism for maintenance and testing purposes.
- D. The maximum ampere rating and UL, IEC, or other certification standards with applicable voltage systems and corresponding interrupting ratings shall be clearly marked on face of circuit breaker. Circuit breakers shall be 100 percent rated.
- E. MCCBs shall be equipped with a device for locking in the isolated position.
- F. Lugs shall be suitable for 140 deg F rated wire on 125-A circuit breakers and below.
- G. Standards: Comply with UL 489 and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- H. Thermal-Magnetic Circuit Breakers: Inverse time-current thermal element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
- I. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
- J. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:
 - 1. Long- and short-time pickup levels.
 - 2. Long- and short-time time adjustments.
 - 3. Ground-fault pickup level, time delay, and I-squared t response.
- K. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.
- L. Features and Accessories:
 - 1. Standard frame sizes, trip ratings, and number of poles.
 - 2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.

2.6 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
- B. Enclosure Finish: The enclosure shall be finished with gray baked enamel paint, electrodeposited on cleaned, phosphatized steel (NEMA 250 Type 1) gray baked enamel paint, electrodeposited on cleaned, phosphatized galvanized steel (NEMA 250 Types 3R, 12).
- C. Conduit Entry: NEMA 250 Types 4, 4X, and 12 enclosures shall contain no knockouts. NEMA 250 Types 7 and 9 enclosures shall be provided with threaded conduit openings in both endwalls.

- D. Operating Mechanism: The circuit-breaker operating handle shall be externally operable with the operating mechanism being an integral part of the box, not the cover. The cover interlock mechanism shall have an externally operated override. The override shall not permanently disable the interlock mechanism, which shall return to the locked position once the override is released. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.

PART 3 - EXECUTION

3.1 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

- A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.
 - 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 - 2. Outdoor Locations: NEMA 250, Type 3R.
 - 3. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

3.2 INSTALLATION

- A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 - 1. Notify Architect and Owner no fewer than seven days in advance of proposed interruption of electric service.
 - 2. Indicate method of providing temporary electric service.
 - 3. Do not proceed with interruption of electric service without Architect's and Owner's written permission.
 - 4. Comply with NFPA 70E.
- B. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- C. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- D. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- E. Install fuses in fusible devices.
- F. Comply with NFPA 70 and NECA 1.
- G. Set field-adjustable circuit-breaker trip ranges to values indicated on the Drawings.

3.3 IDENTIFICATION

- A. Comply with requirements in Section 26 05 53 "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Perform tests and inspections.

D. Tests and Inspections for Switches:

1. Visual and Mechanical Inspection:

- a. Inspect physical and mechanical condition.
- b. Inspect anchorage, alignment, grounding, and clearances.
- c. Verify that the unit is clean.
- d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
- e. Verify that fuse sizes and types match the Specifications and Drawings.
- f. Verify that each fuse has adequate mechanical support and contact integrity.
- g. Inspect bolted electrical connections for high resistance using one of the two following methods:

1) Use a low-resistance ohmmeter.

- a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.

2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.

- a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.

- h. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.
- i. Verify correct phase barrier installation.
- j. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.

2. Electrical Tests:

- a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- b. Measure contact resistance across each switchblade fuseholder. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- c. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's

published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.

- d. Measure fuse resistance. Investigate fuse-resistance values that deviate from each other by more than 15 percent.
- e. Perform ground fault test according to NETA ATS 7.14 "Ground Fault Protection Systems, Low-Voltage."

E. Tests and Inspections for Molded Case Circuit Breakers:

1. Visual and Mechanical Inspection:

- a. Verify that equipment nameplate data are as described in the Specifications and shown on the Drawings.
- b. Inspect physical and mechanical condition.
- c. Inspect anchorage, alignment, grounding, and clearances.
- d. Verify that the unit is clean.
- e. Operate the circuit breaker to ensure smooth operation.
- f. Inspect bolted electrical connections for high resistance using one of the two following methods:
 - 1) Use a low-resistance ohmmeter.
 - a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
 - a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.
- g. Inspect operating mechanism, contacts, and chutes in unsealed units.
- h. Perform adjustments for final protective device settings in accordance with the coordination study.

2. Electrical Tests:

- a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- b. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with circuit breaker closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.
- c. Perform a contact/pole resistance test. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- d. Perform insulation resistance tests on all control wiring with respect to ground. Applied potential shall be 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable. Test

duration shall be one minute. For units with solid state components, follow manufacturer's recommendation. Insulation resistance values shall be no less than two megohms.

- e. Determine the following by primary current injection:
 - 1) Long-time pickup and delay. Pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
 - 2) Short-time pickup and delay. Short-time pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
 - 3) Ground-fault pickup and time delay. Ground-fault pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
 - 4) Instantaneous pickup. Instantaneous pickup values shall be as specified and within manufacturer's published tolerances.
 - f. Test functionality of the trip unit by means of primary current injection. Pickup values and trip characteristics shall be as specified and within manufacturer's published tolerances.
 - g. Perform minimum pickup voltage tests on shunt trip and close coils in accordance with manufacturer's published data. Minimum pickup voltage of the shunt trip and close coils shall be as indicated by manufacturer.
 - h. Verify correct operation of auxiliary features such as trip and pickup indicators; zone interlocking; electrical close and trip operation; trip-free, anti-pump function; and trip unit battery condition. Reset all trip logs and indicators. Investigate units that do not function as designed.
 - i. Verify operation of charging mechanism. Investigate units that do not function as designed.
- 3. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- F. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- G. Prepare test and inspection reports.
- 1. Test procedures used.
 - 2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
 - 3. List deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION 26 28 16

ANNEX HVAC RETROFIT PROJECT

PLANS

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SERVER ROOM HVAC RETROFIT INYO ANNEX BUILDING

168 N EDWARDS ST,
INDEPENDENCE, CA

MECHANICAL ENGINEER
BRANDON ETCEMENDY PE
ETCEMENDY ENGINEERING INC.
10597 DOUBLE R BOULEVARD
RENO, NV 89521
775-853-1131 EXT. 221
betchemendy@eei-nv.com

ELECTRICAL ENGINEER
JAMES SOLARO PE
JP ENGINEERING
10597 DOUBLE R BLVD, STE. 1
RENO, NV 89521
775-852-2337
JAMES@JPENGNV.COM



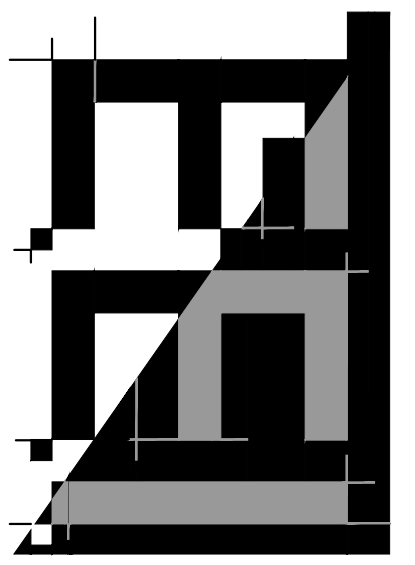
APPROVED BY:

Michael J. Errante

2-19-2020

MICHAEL J. ERRANTE, DIRECTOR
INYO COUNTY PUBLIC WORKS

DATE



ETCEMENDY
ENGINEERING
INC.
10597 DOUBLE R BLVD, STE. 1
RENO, NV 89521
775-853-1131
betchemendy@eei-nv.com



APPLICABLE CODES: CALIFORNIA MECHANICAL CODE 2016
CALIFORNIA PLUMBING CODE 2016
CALIFORNIA BUILDING CODE 2016
CALIFORNIA ELECTRICAL CODE 2016

SCOPE OF WORK

WORK UNDER THIS CONTRACT; includes but is not limited to, all material, labor, tools, expendable equipment, utility and transportation service, and all incidental items necessary to perform and complete the required Scope of Work in a workmanlike manner, complete and on schedule.

A. The Work shall be performed in areas as shown on the attached drawings at Inyo Annex Server IT located at 168 N Edwards St. Independence, CA.

B. The Scope of Work includes the following:

1. Demolition of diffusers and grilles in the Server Room.
2. Demolition of existing condenser and refrigerant piping located in outdoor mechanical patio.
3. Salvage of existing AC units located in Server Room.
4. Demolition of an existing air handler (AC-2).
5. Add alternate #1:
 - a. Replacement of existing condenser in landscape area near mechanical patio.
 - b. Provide complete electrical demolition of existing equipment to be removed.
7. Maintain circuit continuity of any branch circuit that is connected to equipment being removed.
8. Installation of new heat pumps, new air handlers and the install and routing of the refrigerant piping system.
9. Installation of new ductwork, supply air diffusers and return air grilles for existing air handler.
10. Provide new Panel and feed from existing Panel.
11. Provide new feeds for existing Panel.
12. Provide new electrical connections for new HVAC equipment
13. Provide new manual transfer switch
14. Provide new temporary generator landing lugs.

DRAWING INDEX

TO.IIT	TITLE PAGE
MO.IIT	MECHANICAL NOTES & SCHEDULES
ML.IIT	DEMOLITION MECHANICAL PLAN
M2.IIT	MECHANICAL PLAN
M3.IIT	MECHANICAL DETAILS
PO.IIT	PLUMBING NOTES & DETAILS
PL.IIT	DEMOLITION PLUMBING PLAN
P2.IIT	PLUMBING PLAN
EO.IIT	SYMBOL LIST AND SPECIFICATIONS
EO.2IT	SINGLE LINE DIAGRAM
E1.IIT	ELECTRICAL DEMOLITION PLAN
E2.IIT	ELECTRICAL PLAN

SERVER ROOM HVAC RETROFIT
INYO ANNEX BUILDING
168 N EDWARDS ST,
INDEPENDENCE, CALIFORNIA

REVISIONS

DRAWING TITLE

TITLE PAGE

date: 01/10/20
job number: 19030
drawn: SME
checked: BAE

TO.IIT

GENERAL NOTES:

STANDARDS AND CODES: LATEST EDITION OF THE CALIFORNIA MECHANICAL CODE (CMC), AS WELL AS ALL APPLICABLE STATE AND LOCAL CODES AND ORDINANCES. THIS DOES NOT RELIEVE THE CONTRACTOR FROM FURNISHING AND INSTALLING WORK SHOWN OR SPECIFIED WHICH MAY EXCEED THE REQUIREMENTS OF SUCH ORDINANCES, LAWS, REGULATIONS AND CODES.

COMPLETE INSTALLATION: PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, TOOLS, ACCESSORIES, ETC., NECESSARY TO ACCOMPLISH A COMPLETE MECHANICAL SYSTEM IN ACCORDANCE WITH THE PLANS TOGETHER WITH THE SPECIFICATIONS.

PERMITS: OBTAIN AND PAY FOR ALL BUILDING AND WORKING PERMITS AND INSPECTION FEES REQUIRED FOR THIS PROJECT.

DRAWINGS: DATA PRESENTED ON THESE DRAWINGS SHALL BE FIELD VERIFIED SINCE ALL DIMENSIONS, LOCATIONS, AND LEVELS ARE GOVERNED BY ACTUAL FIELD CONDITIONS. REVIEW ALL ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL AND SPECIALTY SYSTEMS DRAWINGS AND ADJUST ALL WORK TO MEET THE REQUIREMENTS ON CONDITIONS SHOWN THEREON. DO NOT SCALE MECHANICAL PLANS FOR EQUIPMENT, DUCTING, PIPING, APPLIANCE, ETC. LOCATIONS USE CONFIGURED DIMENSIONS IF GIVEN OR CHECK ARCHITECTURAL DRAWINGS.

COPYRIGHT: THESE PLANS, SPECIFICATIONS AND ALL RELATED ADDENDA AND DOCUMENTS CONSTITUTE COPYRIGHT MATERIALS OF ETCHENENDY ENGINEERING INC. ALL RIGHTS CONFERRED BY THE COPYRIGHT AND SIMILAR LAWS ARE RESERVED TO ETCHENENDY ENGINEERING INC. THESE MATERIALS SHALL REMAIN THE SOLE PROPERTY OF ETCHENENDY ENGINEERING INC. AND MAY NOT BE REPRODUCED, DISTRIBUTED TO OTHERS OR USED FOR ANY PURPOSE WHATSOEVER WITHOUT THE PRIOR WRITTEN CONSENT OF ETCHENENDY ENGINEERING INC.

LOCATIONS: INDICATED LOCATIONS OF ALL EQUIPMENT, DUCTING, PIPING, ETC. ARE SUBJECT TO CHANGE. SHIFT/RELOCATE/RECONFIGURE ANY OR CONNECTION POINT UP TO 10' AS DIRECTED BY ENGINEER, AT NO ADDED COST.

RECORD DRAWINGS: CONTRACTOR SHALL PROVIDE, PRIOR TO FINAL ACCEPTANCE AND OBSERVATION, ONE SET OF REVISED RECORD MECHANICAL CONSTRUCTION DOCUMENTS ON REPRODUCIBLE MEDIUM, INDICATING THE FOLLOWING ADDITIONAL INFORMATION:

RECORD NOTATIONS SHALL BE CLEARLY DRAWN AT A DRAFTING APPEARANCE EQUAL TO THE ORIGINAL DRAWINGS. CONTRACTOR SHALL ALSO PROVIDE ALL OPERATING AND MAINTENANCE MANUALS PRIOR TO FINAL PAYMENT.

EXAMINATION OF SITE AND EXISTING CONDITIONS: BEFORE SUBMITTING A PROPOSAL, CONTRACTOR SHALL EXAMINE THE SITE AND FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS AND LIMITATIONS. NO EXTRAS WILL BE ALLOWED BECAUSE OF THE CONTRACTOR'S MISUNDERSTANDING OF THE AMOUNT OF WORK INVOLVED OR HIS LACK OF KNOWLEDGE OF ANY SITE CONDITIONS WHICH MAY AFFECT HIS WORK. ANY APPARENT VARIANCE OF ANY SITE CONDITIONS FROM THE EXISTING CONDITIONS AT THE SITE SHALL BE CALLED TO THE ATTENTION OF THE ENGINEER BEFORE SUBMITTING A PROPOSAL.

SEISMIC RESTRAINT: ALL BUILDING HVAC SYSTEMS, INCLUDING DUCTWORK, IS TO BE SEISMICALLY RESTRAINED PER THE UNIFORM MECHANICAL CODES, INTERNATIONAL BUILDING CODE, AMERICAN SOCIETY OF CIVIL ENGINEERS AND STRUCTURAL ENGINEERING INSTITUTE. RESTRAINT SYSTEMS ARE TO BE COMPLETED IN A "DESIGN BUILD" FASHION BY THE AWARDED CONTRACTOR AND ARE TO BE INCLUDED IN THE PROJECT BID. THE CONTRACTOR IS TO ENLIST A QUALIFIED LICENSED PROFESSIONAL TO PROVIDE COMPREHENSIVE DESIGN CALCULATIONS AND SHOP DRAWINGS FOR SAID SYSTEMS. ALL DESIGN DATA AND DETAILED DRAWINGS ARE TO BE PROVIDED TO THE ENGINEER AND AUTHORITY HAVING JURISDICTION FOR REVIEW AND APPROVAL DURING THE SUBMITTAL PROCESS.

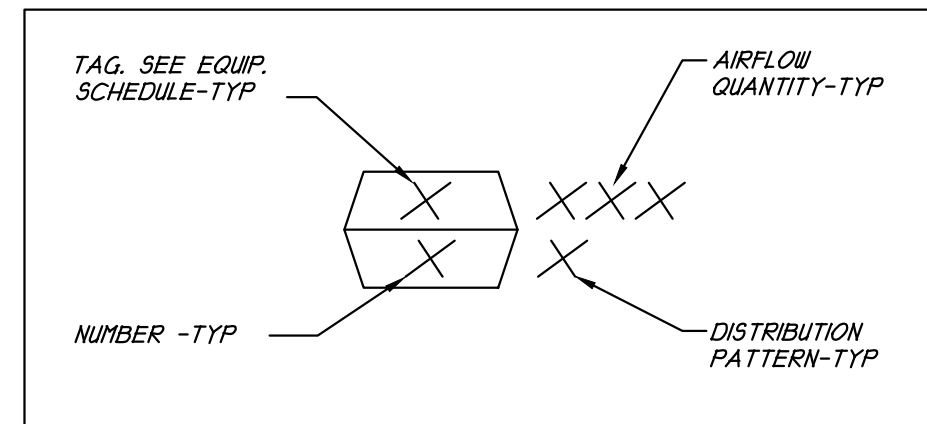
EXISTING CONDITIONS: ALL (E) SIZES AND LOCATIONS ARE APPROXIMATIONS AND ARE TO BE FIELD VERIFIED BY THE CONTRACTOR PRIOR COMMENCEMENT OF ANY WORK. NO ADDITIONAL FEES WILL BE ALLOWED DUE TO LACK OF FIELD VERIFICATION.

EQUIPMENT: ALL HVAC AND REFRIGERATION EQUIPMENT SHALL NOT CONTAIN CFC OR HALONS.

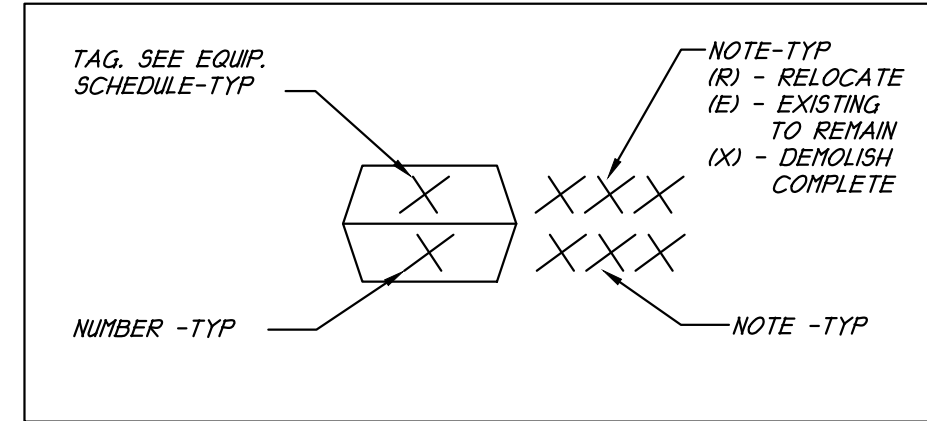
DUCT LEAKAGE VERIFICATION: ALL DUCT CONSTRUCTION SHALL COMPLY WITH TITLE 24 SECTION 120.4.1 (M)0120 FOR ALTERED SYSTEMS. DUCT LEAKAGE FOR ENTIRELY NEW OR REPLACEMENT DUCT SYSTEMS SHALL BE EQUAL TO OR LESS THAN 4 PERCENT OF THE SYSTEM AIR HANDLER AIRFLOW. THIS IS TO BE CONFIRMED BY FIELD VERIFICATION AND DIAGNOSTIC TESTING BY THE AIR BALANCE CONTRACTOR. TESTING SHALL BE PER THE PROJECT SPECIFICATIONS (AABC CONTRACTOR) AND THE TITLE 24 NONRESIDENTIAL APPENDIX SECTION 142.1.1.21

LISTINGS: ALL MECHANICAL EQUIPMENT AND DUCTWORK SHALL BE LISTED AND LABELED BY AN APPROVED AGENCY. INSTALLATION SHALL BE IN ACCORDANCE WITH APPROVED LISTING

DIFFUSER/GRILLE SYMBOL LEGEND



EQUIPMENT SYMBOL LEGEND



MECHANICAL LEGEND

SYMBOL	ABBREVIATION	INTENT
		RIGID DUCT
		INTERNALLY LINED DUCTWORK
		RIGID EXHAUST DUCT
		DUCT DOWN
		DUCT UP
		TURNING VANES
	D	SUPPLY AIR
	G	RETURN AIR
	EXH	EXHAUST AIR
	D	SUPPLY AIR
	G	RETURN AIR
	MVD	MANUAL VOLUME DAMPER
	AD	AUTOMATIC DAMPER (MOTORIZED)
	FLEX	FLEXIBLE DUCTWORK
		VERTICAL BRANCH WITH DAMPER
	DOWN	PIPE DOWN
	UP	PIPE UP
	Ø	DIAMETER ROUND
	(N)	NEW
	(E)	EXISTING
	⊕	POINT OF CONNECTION
	⊖	POINT OF DISCONNECT
	AFF	ABOVE FINISHED FLOOR
	BFF	BELOW FINISHED FLOOR
	AFG	ABOVE FINISHED GRADE
	TYP	TYPICAL
	MIN	MINIMUM
	CFM	CUBIC FEET PER MINUTE
	OSA	OUTSIDE AIR
	ESP	EXTERNAL STATIC PRESSURE
	BTU, BTUH	BRITISH THERMAL UNIT PER HOUR
	MBH	THOUSAND BTU
	CLG	COOLING
	HTG	HEATING
	CAP	CAPACITY
	SENS	SENSIBLE
	LTNT	LATENT
	C	CONDENSATE DRAIN
	RLL	REFRIGERATION LIQUID LINE
	RSL	REFRIGERATION SUCTION LINE
		BALL VALVE
		BALANCING VALVE
		BUTTERFLY VALVE
		AUTOMATIC CONTROL VALVE (2-WAY)
		AUTOMATIC CONTROL VALVE (3-WAY)
		MOTORIZED VALVE
		PRESSURE REDUCING VALVE

SPLIT SYSTEM OUTDOOR VRF HEAT PUMP WITH HEAT RECOVERY SCHEDULE

SYMBOL	DESCRIPTION	MODEL	CAPACITY	SEER	SUCTION	LIQUID	WEIGHT	ELECTRICAL	REMARKS
	AIR COOLED VRF HEAT PUMP FOR AHU 1-2	mitsubishi model PUMY-P40NRM2	CLG: 10.5 MBH HTG: 38.2 MBH	20	3/4"	3/8"	370	208V, 1Ø 3Ø MCA, 45 MOCP	L 3
	AIR COOLED VRF HEAT PUMP FOR AHU 3-4	mitsubishi model PUMY-P40NRM2	CLG: 28.4 MBH HTG: 38.2 MBH	20	3/4"	3/8"	370	208V, 1Ø 3Ø MCA, 45 MOCP	L 2

REMARKS:
1. LOW AMBIENT WITH WIND BAFFLE
2. 1-PIPE HEADER, CMY-Y10C-G
3. JOINT PIPE, CMY-Y12-G-E

SPLIT SYSTEM INDOOR HEAT PUMP SCHEDULE

SYMBOL	DESCRIPTION	MODEL	CAPACITY	AIRFLOW	MIN OSA	ELECTRICAL	WT (LBS)	REMARKS
	MULTI-ZONE CEILING SUSPENDED HEAT PUMP AIR HANDLER	mitsubishi model PCFY-P30NRMU-ERLTH	CLG: 20.3 MBH HTG: 21.4 MBH	880 CFM	-	208V, 1Ø, 122 MCA, 15 MOCP	100	L 2, 3
	MULTI-ZONE WALL MOUNT HEAT PUMP AIR HANDLER	mitsubishi model PKFY-P20NRMU-E2	CLG: 8.1 MBH HTG: 10.8 MBH	370 CFM	-	208V, 1Ø, 0.38 MCA, 15 MOCP	40	L 2, 3

REMARKS:
1. INTEGRAL CONDENSATE PUMP WITH OVERFLOW AND ALARM
2. WIRED THERMOSTAT
3. BY-BB BALL VALVES

NOTES:
1. MECHANICAL CONTRACTOR TO COORDINATE WITH SYSTEM PIPING TREES AND SYSTEM WIRING DIAGRAMS, SEE DETAIL 6115J
2. WHEN CONDENSATE PUMP ALARM IS ENERGIZED ASSOCIATED AIR HANDLER IS TO DE-ENERGIZE.

AIR DISTRIBUTION SCHEDULE

SYMBOL	DESCRIPTION	MODEL	SIZE	FRAME	PANEL	FINISH	ACCESSORIES
	STEEL MODULAR CORE SUPPLY AIR DIFFUSER	KRUEGER MODEL 5580P	20"x20"	F23	24"x24"	BRITISH WHITE	-

THERMOSTAT SCHEDULE

TAG	DESCRIPTION	MODEL	ELECTRICAL	MOUNT HEIGHT	REMARKS
	PROGRAMMABLE COMMERCIAL THERMOSTAT	MITSUBISHI	24V	48"	1

REMARKS:
1. ALL MOUNTING HARDWARE

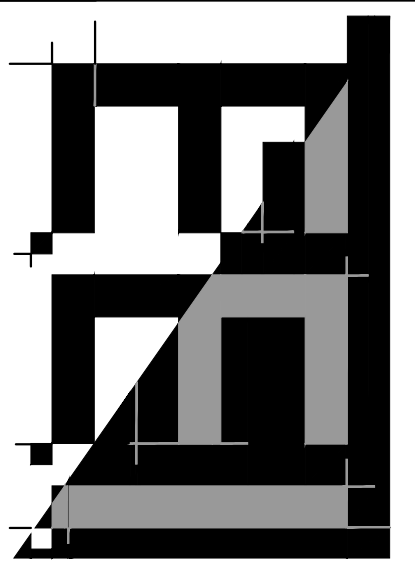
NOTES:
1.

ADD ALTERNATE #1

CONDENSING UNIT SCHEDULE

SYMBOL	DESCRIPTION	MODEL	CAPACITY	SEER	SUCTION	LIQUID	WEIGHT	ELECTRICAL	REMARKS
	AIR COOLED CONDENSING UNIT	RHEEM MODEL RA1660AJNA	54.0 MBH TOTAL CAP 42.2 MBH SENS CAP	15.1	1/2"	3/8"	310	208V, 1Ø 3Ø MCA, 40 MOCP	L 2, 3, 4, 5

REMARKS:
1. LOW AMBIENT
2. SUCTION LINE TRAP
3. SOLENOID LIQUID LINE VALVE
4. SIGHT GLASS
5. COMPRESSOR ISOLATION VALVES



ETCHEMENDY ENGINEERING INC.
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1049712018 ETCHEMENDY INC. 01/10/20
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ETCHEMENDY@ETCHEMENDY.COM



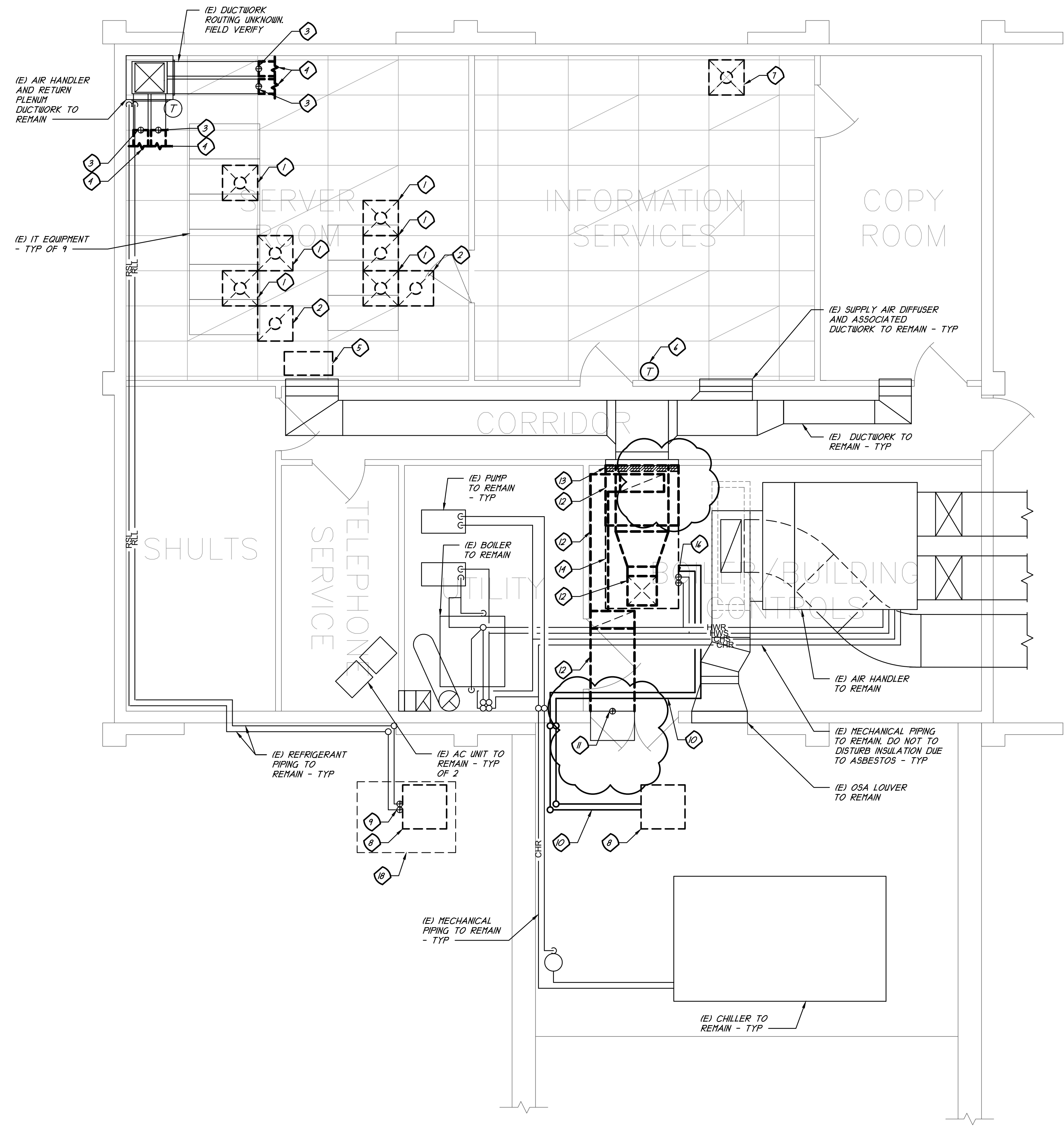
SERVER ROOM HVAC RETROFIT
INYO ANNEX BUILDING
 168 N EDWARDS ST.
 INDEPENDENCE, CALIFORNIA

REVISIONS

DRAWING TITLE
MECHANICAL NOTES & SCHEDULES

date: 01/10/20
 job number: 19090
 drawn: SME
 checked: BAE

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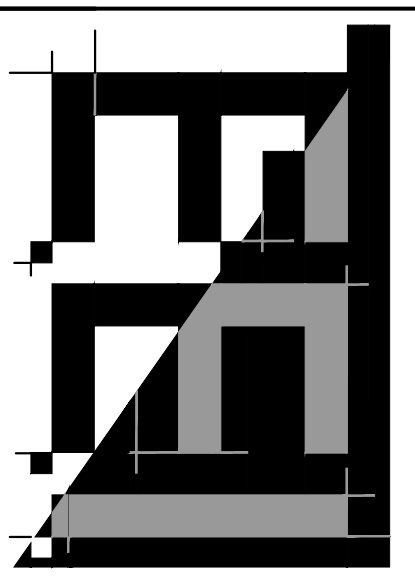


GENERAL NOTES:

1 ASBESTOS HAS BEEN FOUND TO BE PRESENT IN THE MECHANICAL ROOM VIA TESTING. COORDINATE ALL ASBESTOS CONTAINING MATERIALS WITH THE COUNTY AND COUNTY'S TESTING REPORT. ALL ABATEMENT REQUIRED TO PERFORM WORK IN QUESTION TO BE LISTED AS A SEPARATE LINE ITEM.

DEMOLITION KEYED NOTES:

- 1 (IE) SUPPLY AIR DIFFUSER TO BE REMOVED COMPLETE
- 2 (IE) RETURN AIR GRILLE TO BE REMOVED COMPLETE
- 3 (IE) DUCTWORK TO BE DISCONNECT AND REMAIN FOR RECONNECTION
- 4 (IE) DUCTWORK TO BE REMOVED COMPLETE. EXACT ROUTING UNKNOWN, FIELD VERIFY
- 5 (IE) AC UNIT TO BE REMOVED AND SALVAGED BACK TO THE OWNER
- 6 (IE) THERMOSTAT TO BE REMOVED COMPLETE
- 7 (IE) SUPPLY AIR DIFFUSER TO BE REMOVED COMPLETE. REMOVE ANY FLEX DUCT AND PERMANENTLY CAP THE (IE) DUCT ABOVE THE CEILING
- 8 ADD ALTERNATE #1 (IE) CONDENSING UNIT TO BE REMOVED COMPLETE
- 9 ADD ALTERNATE #1 DISCONNECT (IE) REFRIGERANT PIPING AND REMAIN FOR RECONNECTION.
- 10 (IE) REFRIGERANT PIPING TO BE REMOVED COMPLETE
- 11 (IE) OSA HOOD TO REMAIN. DISCONNECT AND REMOVE DUCTWORK
- 12 (IE) DUCTWORK TO BE REMOVED COMPLETE
- 13 (IE) FIRE DAMPERS, HIGH AND/OR LOW TO BE LOCKED CLOSED
- 14 (IE) AC TO BE REMOVED COMPLETE
- 15 IF ADD ALTERNATE #1 IS NOT TAKEN, (IE) CONDENSING UNIT TO REMAIN



LICENSED PROFESSIONAL ENGINEER
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SERVER ROOM HVAC RETROFIT
INYO ANNEX BUILDING
 168 N EDWARDS ST.
 INDEPENDENCE, CALIFORNIA

REVISIONS

DRAWING TITLE
DEMOLITION MECHANICAL PLAN

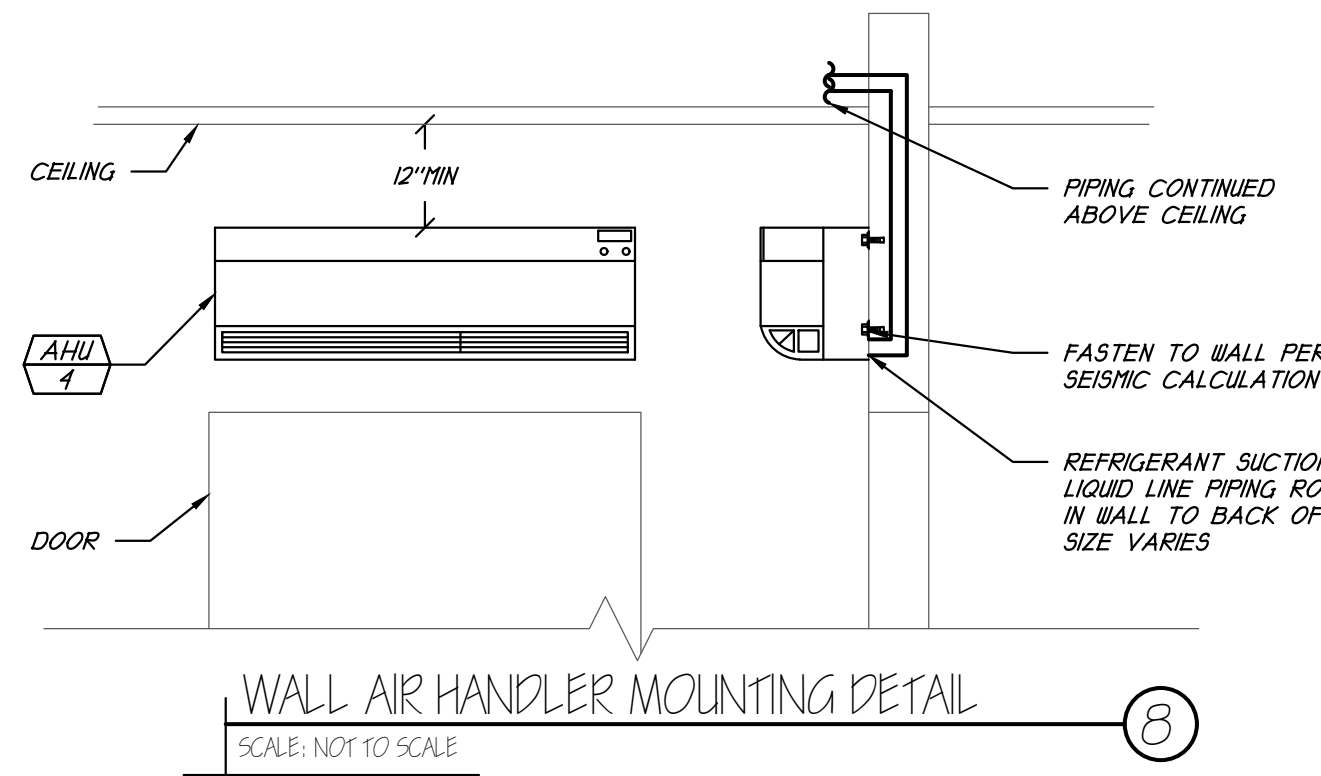
date: 01/10/20
 job number: 19030
 drawn: SME
 checked: BAE

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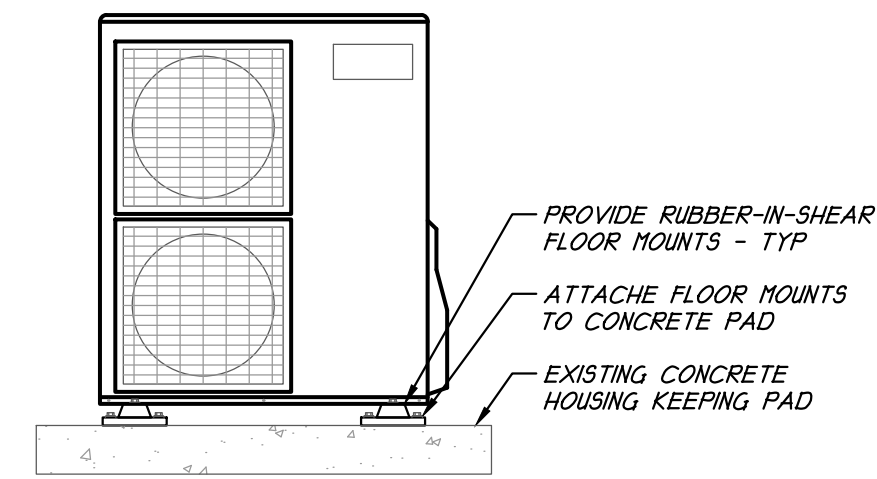
DEMOLITION MECHANICAL PLAN
 SCALE: 1/4" = 1'-0"

NOTE:

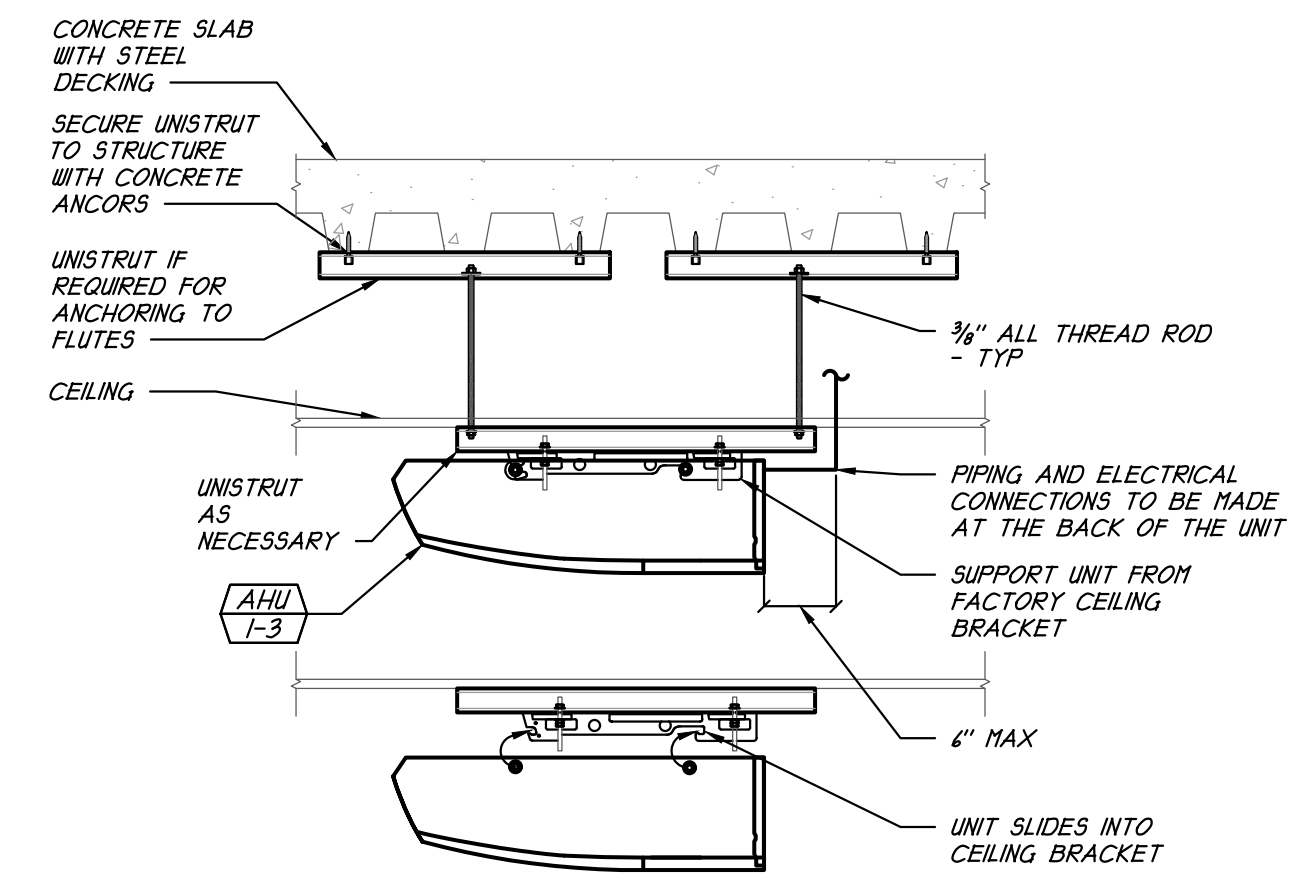
1. THIS DETAIL IS FOR REFERENCE ONLY. SEE MANUFACTURES INSTRUCTION FOR EXACT INSTALLATION
2. ALL UNIT CONNECTIONS ARE TO BE IN WALL AND NOT VISIBLE (I.E. ELECTRICAL, REFRIGERANT, CONDENSATE ETC.)
3. REFRIGERANT PIPING TO BE INSULATED PER MANUFACTURES SPECIFICATIONS



WALL AIR HANDLER MOUNTING DETAIL ⑧
SCALE: NOT TO SCALE



HEAT PUMP MOUNTING DETAIL ⑤
SCALE: NOT TO SCALE



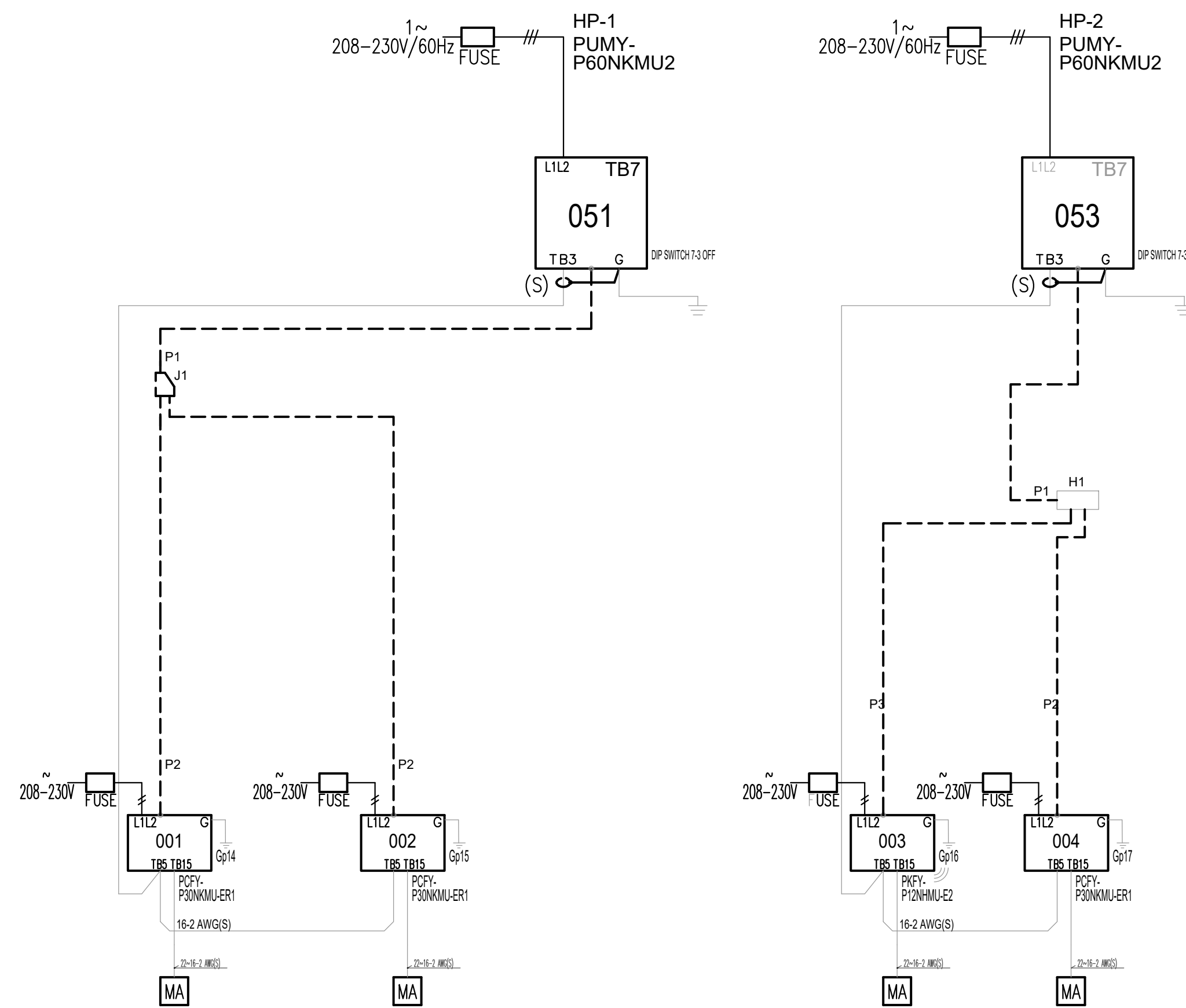
UNIT MOUNTING CEILING SUSPENDED DETAIL ①
SCALE: NOT TO SCALE

DIAGRAM	SYMBOL	LEGEND	CONT.No	PAGE
---	---	POWER WIRE		
---	---	CONTROL WIRE		
---	---	REF. PIPE		

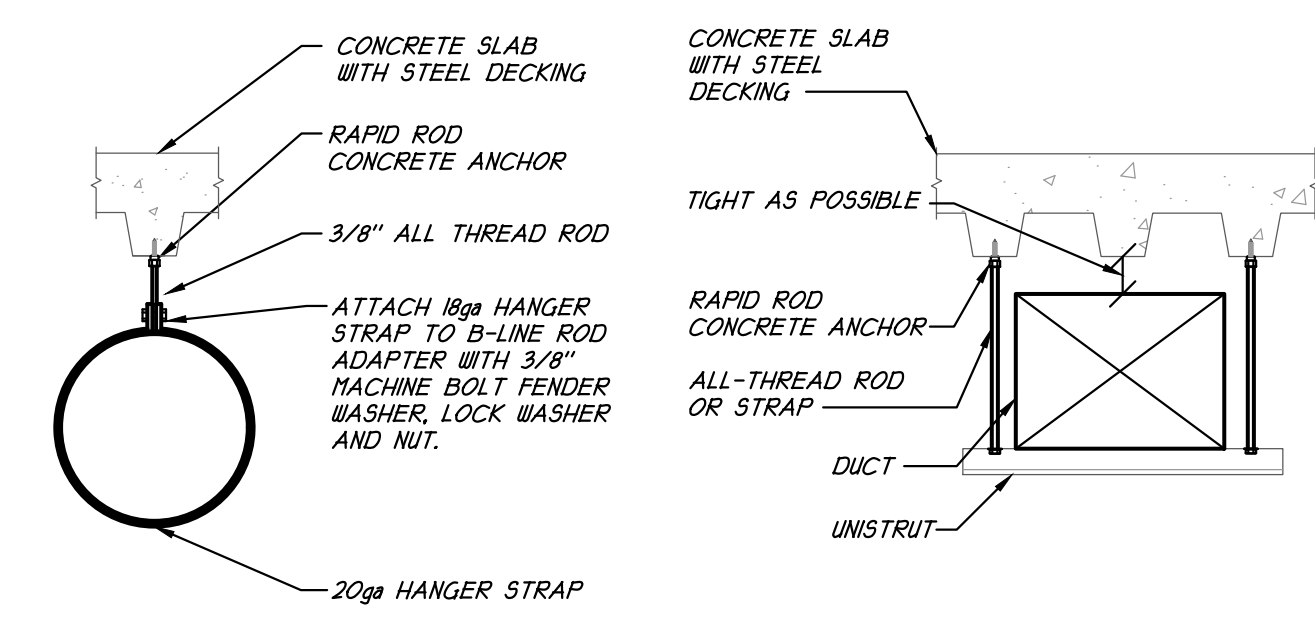
CITY MULTI SYSTEM SCHEMATIC DWG.

Additional refrigerant charge is needed depending on the size and length of extended piping. Please refer the amount of pre-charge and the formula of calculation which is mentioned on the data book.
1.25mm(16 AWG) : 1.25mm(16 AWG) or more. 0.75mm(20 AWG) : between 0.5mm(24 AWG) and 0.75mm(20 AWG).

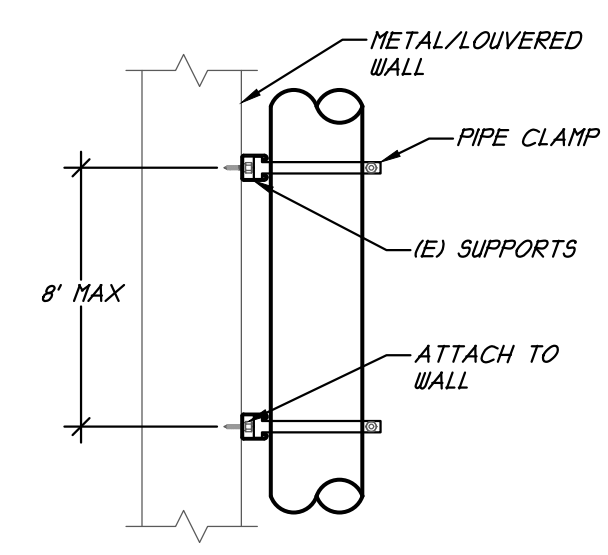
PIPING AND CONTROLS	
SYMBOL	BRANCH PIPE MODEL NAME
J1	CMY-Y62-C-E
H1	CMY-Y64-C-E
SYMBOL LIQUID PIPE/GAS PIPE SIZE	
P1	3/8 / 3/4
P2	3/8 / 5/8
P3	1/4 / 1/2
SYMBOL MODEL NUMBER	
MA	PAR-30AAA-J



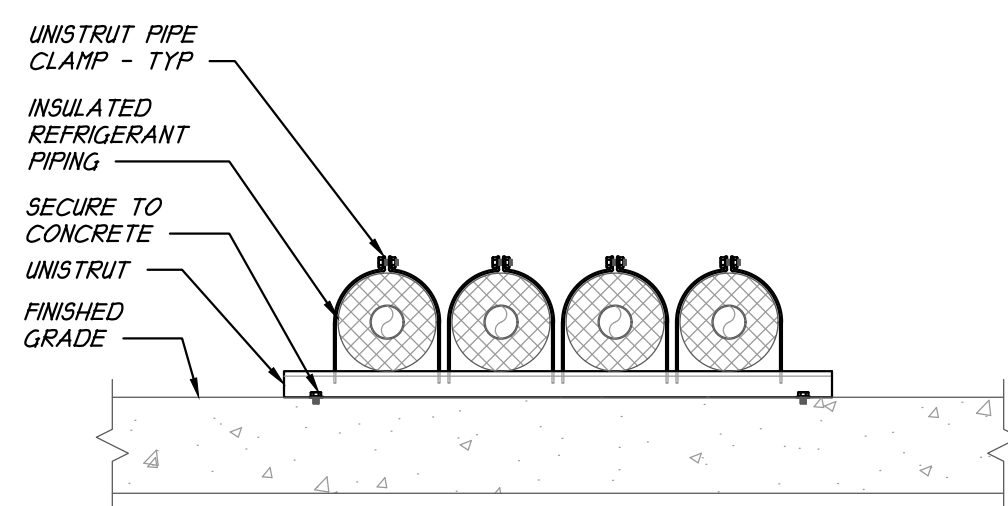
HEAT PUMP WIRING/PIPING DETAIL ⑥
SCALE: NOT TO SCALE



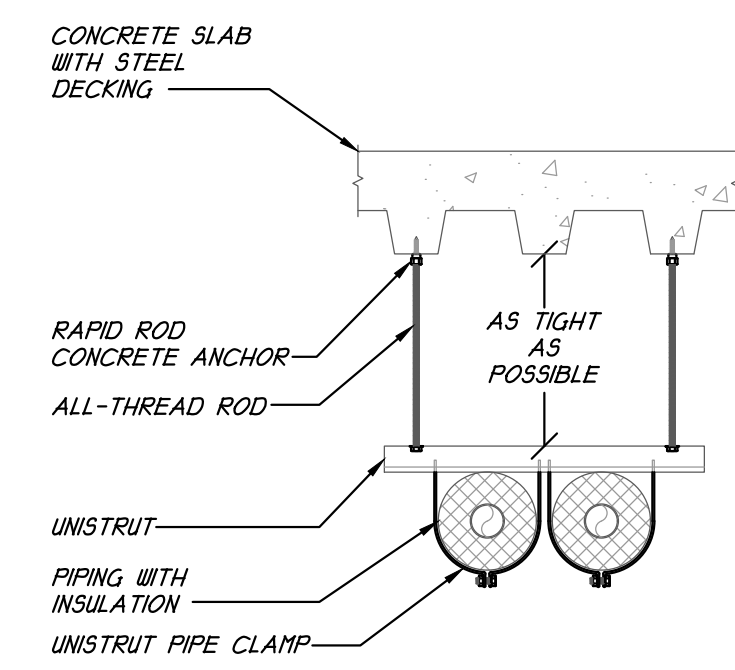
DUCT SUPPORT DETAIL ②
SCALE: NOT TO SCALE



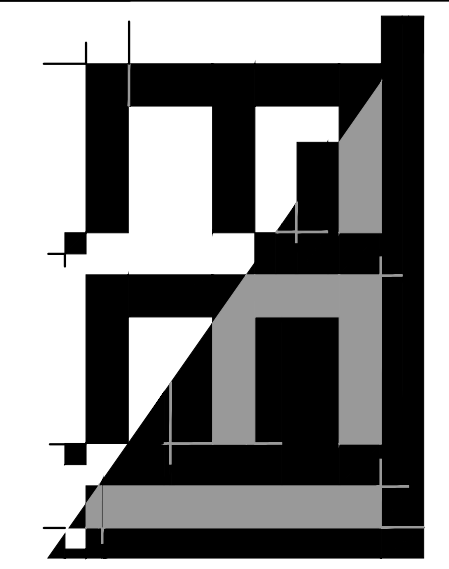
PIPING WALL SUPPORT DETAIL ③
SCALE: NOT TO SCALE



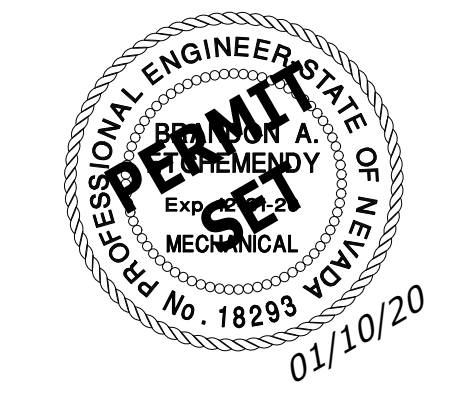
PIPING GROUND SUPPORT DETAIL ⑦
SCALE: NOT TO SCALE



PIPING SUPPORT DETAIL ④
SCALE: NOT TO SCALE



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GREGORY S. REMONDY
P. 775-853-0511 F. 775-852-2912
REGISTRATION NO. 18293



SERVER ROOM HVAC RETROFIT
INYO ANNEX BUILDING
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INDEPENDENCE, CALIFORNIA

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DRAWING TITLE	
MECHANICAL DETAILS	
date:	01/10/20
job number:	19030
drawn:	SME
checked:	BAE

M3.11T

GENERAL NOTES:

STANDARDS AND CODES, LATEST EDITION OF THE CALIFORNIA PLUMBING CODE (CPC), AS WELL AS ALL APPLICABLE STATE AND LOCAL CODES AND ORDINANCES, THIS DOES NOT RELIEVE THE CONTRACTOR FROM FURNISHING AND INSTALLING WORK SHOWN OR SPECIFIED WHICH MAY EXCEED THE REQUIREMENTS OF SUCH ORDINANCES, LAWS, REGULATIONS AND CODES.

COMPLETE INSTALLATION, PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, TOOLS, ACCESSORIES, ETC., NECESSARY TO ACCOMPLISH A COMPLETE PLUMBING SYSTEM IN ACCORDANCE WITH THE PLANS TOGETHER WITH THE SPECIFICATIONS.

PERMITS: OBTAIN AND PAY FOR ALL BUILDING AND WORKING PERMITS AND INSPECTION FEES REQUIRED FOR THIS PROJECT.

DRAWINGS: DATA PRESENTED ON THESE DRAWINGS SHALL BE FIELD VERIFIED SINCE ALL DIMENSIONS, LOCATIONS, AND LEVELS ARE GOVERNED BY ACTUAL FIELD CONDITIONS. REVIEW ALL ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL AND SPECIALTY SYSTEMS DRAWINGS AND ADJUST ALL WORK TO MEET THE REQUIREMENTS ON CONDITIONS SHOWN THEREON. DO NOT SCALE PLUMBING PLANS FOR FIXTURE, PIPING, APPLIANCE ETC. LOCATIONS. USE CONFIGURED DIMENSIONS IF GIVEN OR CHECK ARCHITECTURAL DRAWINGS.

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LOCATIONS: INDICATED LOCATIONS OF ALL FIXTURES, PIPING, EQUIPMENT ETC. ARE SUBJECT TO CHANGE. SHIFT/RELOCATE/RECONFIGURE ANY FIXTURE, PIPE, EQUIPMENT OR CONNECTION POINT UP TO 10' AS DIRECTED BY ENGINEER, AT NO ADDED COST.

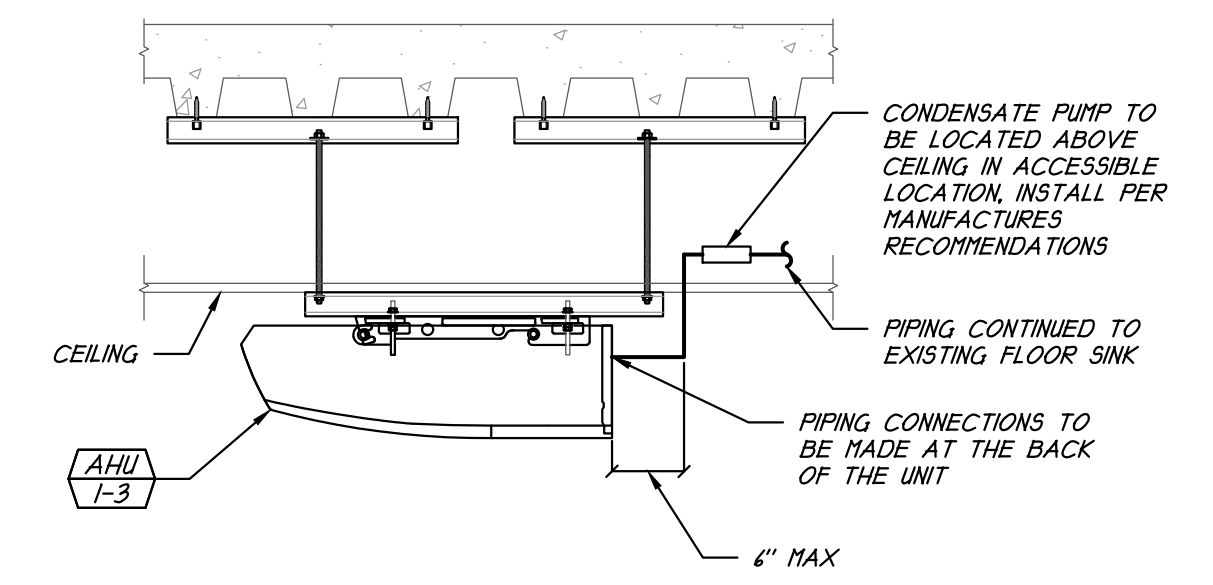
RECORD DRAWINGS: CONTRACTOR SHALL PROVIDE, PRIOR TO FINAL ACCEPTANCE AND OBSERVATION, ONE SET OF REVISED RECORD PLUMBING CONSTRUCTION DOCUMENTS ON REPRODUCIBLE MEDIUM, INDICATING THE FOLLOWING ADDITIONAL INFORMATION:

RECORD NOTATIONS SHALL BE CLEARLY DRAWN AT A DRAFTING APPEARANCE EQUAL TO THE ORIGINAL DRAWINGS. CONTRACTOR SHALL ALSO PROVIDE ALL OPERATING AND MAINTENANCE MANUALS PRIOR TO FINAL PAYMENT.

EXAMINATION OF SITE AND EXISTING CONDITIONS: BEFORE SUBMITTING A PROPOSAL, CONTRACTOR SHALL EXAMINE THE SITE AND FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS AND LIMITATIONS. NO EXTRAS WILL BE ALLOWED BECAUSE OF THE CONTRACTOR'S MISUNDERSTANDING OF THE AMOUNT OF WORK INVOLVED OR HIS LACK OF KNOWLEDGE OF ANY SITE CONDITIONS WHICH MAY AFFECT HIS WORK. ANY APPARENT VARIANCE OF THE DRAWINGS OR SPECIFICATIONS FROM THE EXISTING CONDITIONS AT THE SITE SHALL BE CALLED TO THE ATTENTION OF THE ENGINEER BEFORE SUBMITTING A PROPOSAL.

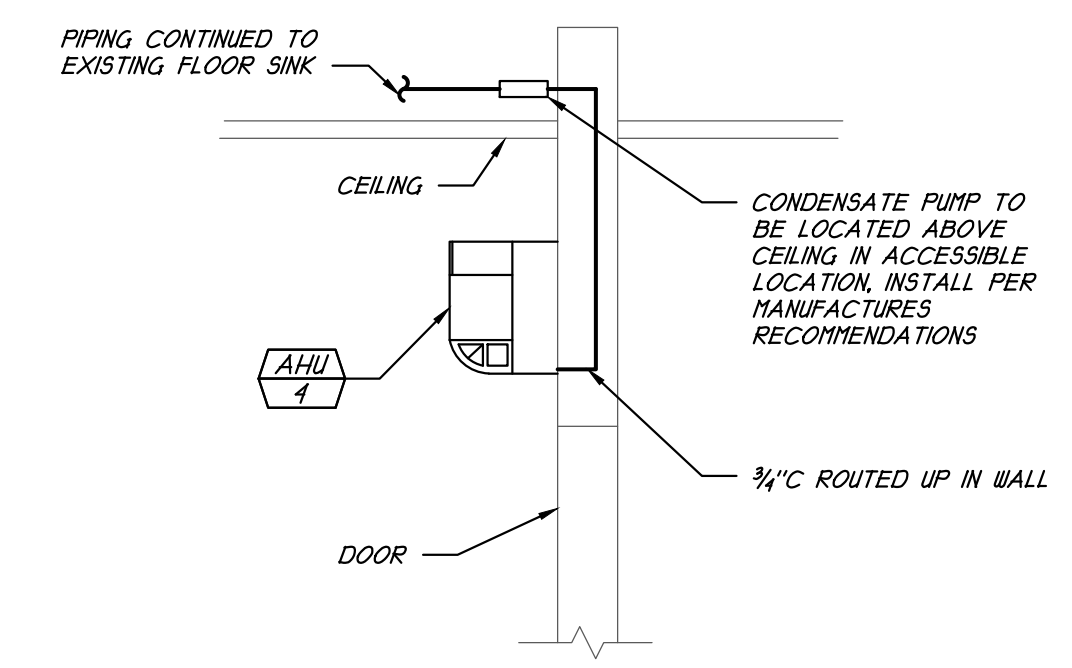
EXISTING CONDITIONS: ALL (E) SIZES AND LOCATIONS ARE APPROXIMATIONS AND ARE TO BE FIELD VERIFIED BY THE CONTRACTOR PRIOR COMMENCEMENT OF ANY WORK. NO ADDITIONAL FEES WILL BE ALLOWED DUE TO LACK OF FIELD VERIFICATION.

WATER HEATING TESTING: THE WATER HEATING SYSTEM SHALL BE TESTED AND ADJUSTED TO MAINTAIN A DELIVERY WATER TEMPERATURE AS INDICATED ON THE WATER HEATER PIPING DIAGRAM FOR ALL OPERATING CONDITIONS.



CEILING SUSPENDED UNIT PIPING DETAIL ①
SCALE: NOT TO SCALE

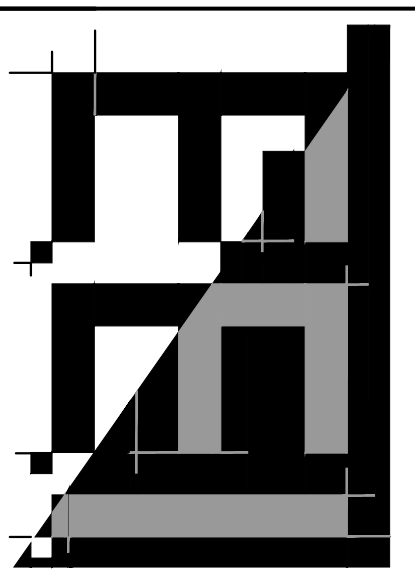
NOTE:
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2. ALL UNIT CONNECTIONS ARE TO BE IN WALL AND NOT VISIBLE (I.E. ELECTRICAL, REFRIGERANT, CONDENSATE ETC.)



WALL MOUNTED UNIT PIPING DETAIL ②
SCALE: NOT TO SCALE

PLUMBING LEGEND

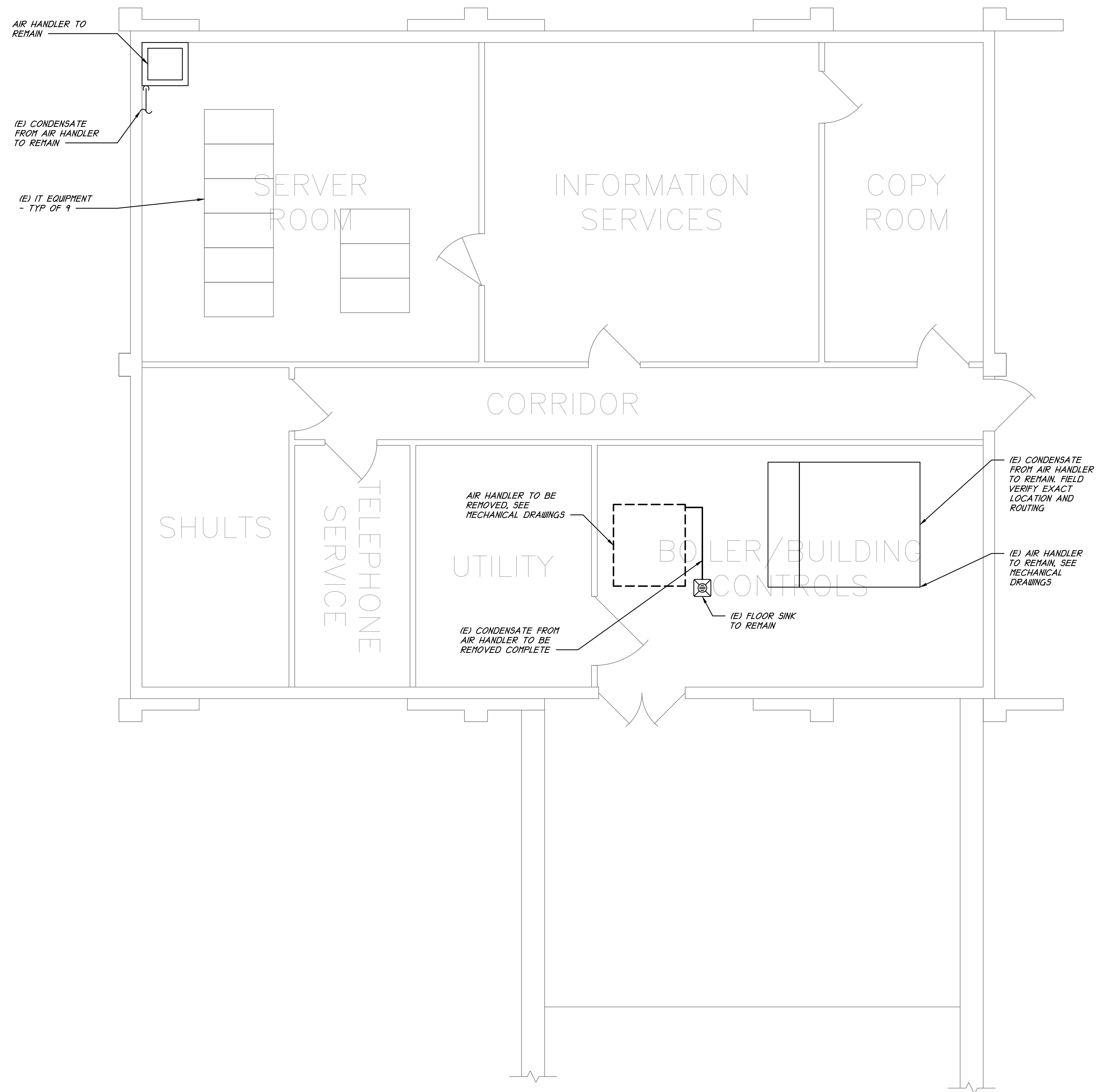
LINETYPE	ABBREVIATION	INTENT
	C	CONDENSATE PIPING
	UP	PIPE UP
	DOWN	PIPE DOWN
	POC	POINT OF CONNECTION
	POD	POINT OF DISCONNECT
	VTR	VENT THRU ROOF
		BALANCING VALVE
		BALL VALVE
	(N)	NEW
	(E)	EXISTING
	AFF	ABOVE FINISHED FLOOR
	AFG	ABOVE FINISHED GRADE
	BFF	BELOW FINISHED FLOOR
	BFG	BELOW FINISHED GRADE
	MIN	MINIMUM
	TYP	TYPICAL
	GPF	GALLONS PER FLUSH
	GPH	GALLONS PER HOUR
	GPM	GALLON PER MINUTE
	FCO	FLOOR CLEANOUT
	COTG	CLEANOUT TO GRADE
	WCO	WALL CLEAN OUT
	TDL	TOTAL DEVELOPED LENGTH



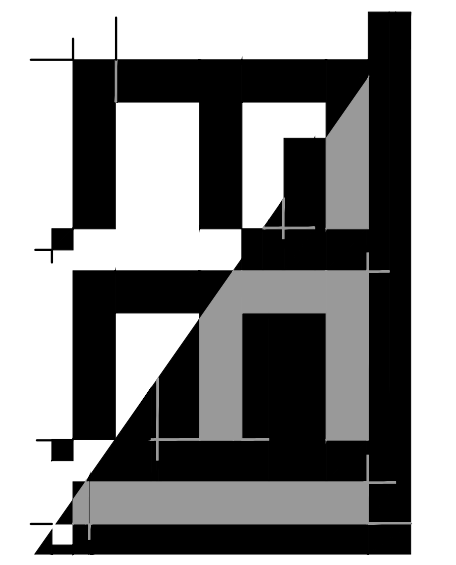
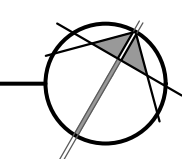
SERVER ROOM HVAC RETROFIT
INYO ANNEX BUILDING
168 N EDWARDS ST.
INDEPENDENCE, CALIFORNIA

REVISIONS	
DRAWING TITLE	
PLUMBING NOTES & DETAILS	
date:	01/10/20
job number:	19030
drawn:	SME
checked:	BAE

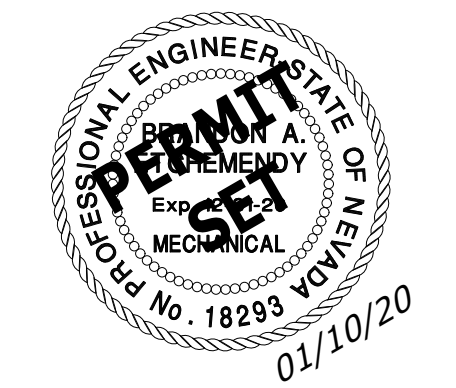
PO.IIT



DEMOLITION PLUMBING PLAN
SCALE: 1/4" = 1'-0"



GREGORY J. KENNEDY
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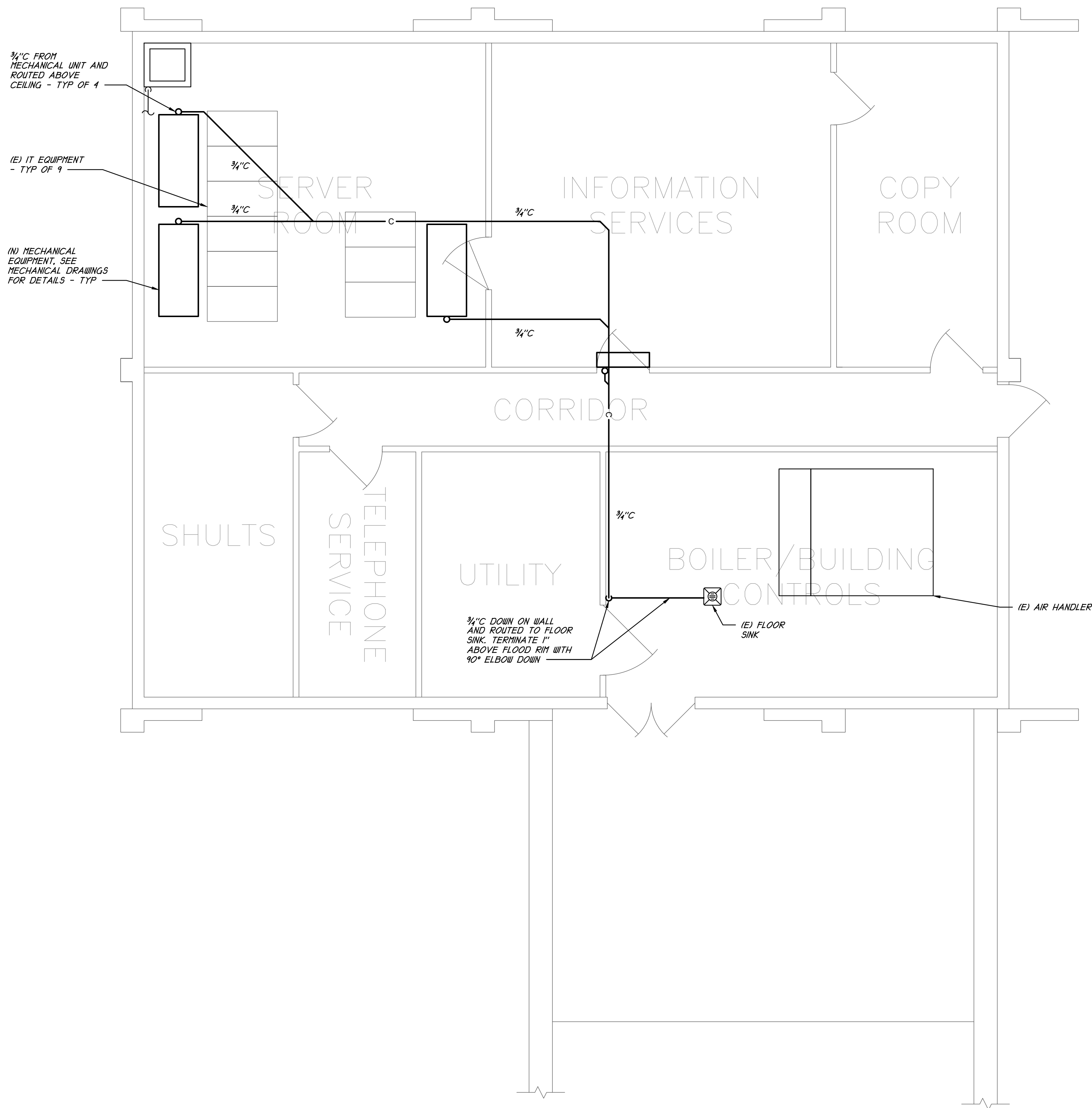
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DEMOLITION PLUMBING PLAN

date: 01/10/20
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checked: BAE

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3/4" FROM MECHANICAL UNIT AND ROUTED ABOVE CEILING - TYP OF 1

(E) IT EQUIPMENT - TYP OF 1

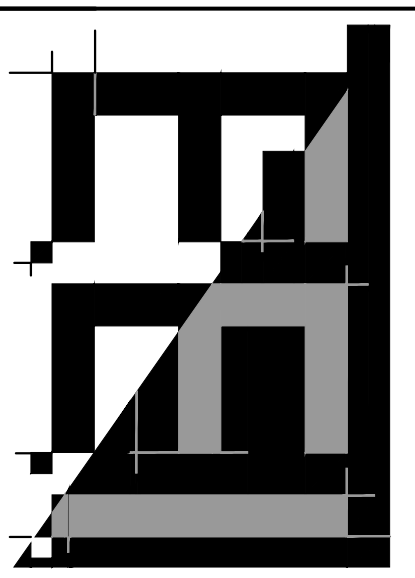
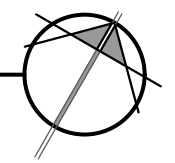
(N) MECHANICAL EQUIPMENT, SEE MECHANICAL DRAWINGS FOR DETAILS - TYP

3/4" DOWN ON WALL AND ROUTED TO FLOOR SINK. TERMINATE 1" ABOVE FLOOD RIM WITH 90° ELBOW DOWN

(E) FLOOR SINK

(E) AIR HANDLER

PLUMBING PLAN
SCALE: 1/4" = 1'-0"



GREGORY J. TREMENDY
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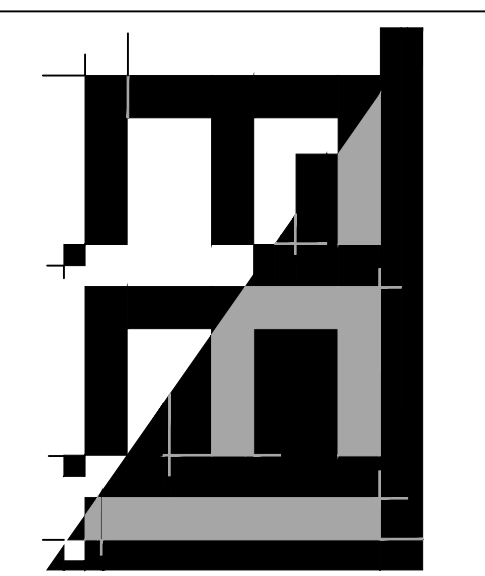
DRAWING TITLE
PLUMBING PLAN

date: 01/10/20
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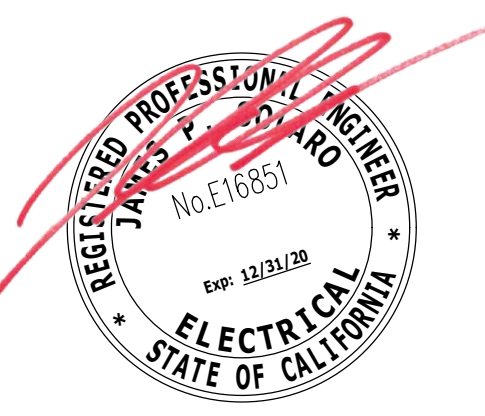
P2.II

SPECIFICATIONS	
ITEM	DESCRIPTION
16.1	STANDARDS AND CODES: ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC), AS WELL AS ALL APPLICABLE STATE AND LOCAL CODES AND ORDINANCES. THIS DOES NOT RELIEVE THE CONTRACTOR FROM FURNISHING AND INSTALLING WORK SHOWN OR SPECIFIED WHICH MAY EXCEED THE REQUIREMENTS OF SUCH ORDINANCES, LAWS, REGULATIONS AND CODES.
16.2	COMPLETE INSTALLATION: PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, TOOLS, ACCESSORIES, ETC., NECESSARY TO ACCOMPLISH A COMPLETE ELECTRICAL SYSTEM IN ACCORDANCE WITH THE PLANS TOGETHER WITH THE SPECIFICATIONS.
16.3	PERMITS: OBTAIN AND PAY FOR ALL BUILDING AND WORKING PERMITS AND INSPECTION FEES REQUIRED FOR THIS PROJECT.
16.4	DRAWINGS: DATA PRESENTED ON THESE DRAWINGS SHALL BE FIELD VERIFIED SINCE ALL DIMENSIONS, LOCATIONS, AND LEVELS ARE GOVERNED BY ACTUAL FIELD CONDITIONS. REVIEW ALL ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL AND SPECIALTY SYSTEMS DRAWINGS AND ADJUST ALL WORK TO MEET THE REQUIREMENTS ON CONDITIONS SHOWN THEREON. DO NOT SCALE ELECTRICAL PLANS FOR FIXTURE, DEVICE OR APPLIANCE LOCATIONS. USE CONFIGURED DIMENSIONS IF GIVEN OR CHECK ARCHITECTURAL OR MECHANICAL DRAWINGS.
16.5	COPYRIGHT: THESE PLANS, SPECIFICATIONS AND ALL RELATED ADDENDA AND DOCUMENTS CONSTITUTE COPYRIGHT MATERIALS OF JP ENGINEERING. ALL RIGHTS CONFERRED BY THE COPYRIGHT AND SIMILAR LAWS ARE RESERVED TO JP ENGINEERING. THESE MATERIALS SHALL REMAIN THE SOLE PROPERTY OF JP ENGINEERING AND MAY NOT BE REPRODUCED, DISTRIBUTED TO OTHERS OR USED FOR ANY PURPOSE WHATSOEVER WITHOUT THE PRIOR WRITTEN CONSENT OF JP ENGINEERING.
16.6	LOCATIONS: INDICATED LOCATIONS OF ALL OUTLETS AND EQUIPMENT ARE SUBJECT TO CHANGE. SHIFT/RELOCATE/RECONFIGURE ANY OUTLET, EQUIPMENT OR CONNECTION POINT UP TO 10' AS DIRECTED BY ENGINEER, AT NO ADDED COST.
16.7	RECORD DRAWINGS: CONTRACTOR SHALL PROVIDE, PRIOR TO FINAL ACCEPTANCE AND OBSERVATION, ONE SET OF REVISED RECORD ELECTRICAL CONSTRUCTION DOCUMENTS ON REPRODUCIBLE MEDIUM INDICATING THE FOLLOWING ADDITIONAL INFORMATION: EXACT ROUTING OF ALL CONDUITS LARGER THAN 1" EXACT LOCATION OF ALL SERVICE GROUNDING/BONDING CONNECTIONS CONTRACTORS NAME, ADDRESS AND TELEPHONE NUMBER RECORD NOTATIONS SHALL BE CLEARLY DRAWN AT A DRAFTING APPEARANCE EQUAL TO THE ORIGINAL DRAWINGS. CONTRACTOR SHALL ALSO PROVIDE ALL OPERATING AND MAINTENANCE MANUALS PRIOR TO FINAL PAYMENT.
16.8	EXAMINATION OF SITE AND EXISTING CONDITIONS: BEFORE SUBMITTING A PROPOSAL, CONTRACTOR SHALL EXAMINE THE SITE AND FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS AND LIMITATIONS. NO EXTRAS WILL BE ALLOWED BECAUSE OF THE CONTRACTOR'S MISUNDERSTANDING OF THE AMOUNT OF WORK INVOLVED OR HIS LACK OF KNOWLEDGE OF ANY SITE CONDITIONS WHICH MAY AFFECT HIS WORK. ANY APPARENT VARIANCE OF THE DRAWINGS OR SPECIFICATIONS FROM THE EXISTING CONDITIONS AT THE SITE SHALL BE CALLED TO THE ATTENTION OF THE ENGINEER BEFORE SUBMITTING A PROPOSAL.
16.9	EXISTING OUTLETS: EXISTING OUTLETS AND CIRCUITING NOT IN CONFLICT WITH NEW CONDITIONS SHALL REMAIN. EXTEND OUTLETS TO NEW SURFACES, CAULK AND PROVIDE JUMBO PLATES AS REQUIRED TO PRESENT A SERVICEABLE AND FINISHED APPEARANCE.
16.10	EXISTING SWITCHGEAR: REUSE EXISTING SWITCHGEAR AND PANELS IN PLACE WHERE SO INDICATED. MODIFY AS REQUIRED TO ACCOMMODATE NEW WORK. PROVIDE NEW CIRCUIT BREAKERS AND/OR FUSES AS REQUIRED. REARRANGE EXISTING CIRCUITS WITHIN PANELS TO AGREE WITH NEW PANEL SCHEDULES. TRACE AND IDENTIFY ALL EXISTING CIRCUITS ON NEW RECORD PANEL SCHEDULES.
16.11	DEMOLITION: PROVIDE COMPLETE ELECTRICAL DEMOLITION: REMOVE EXISTING OUTLETS AND EQUIPMENT IN CONFLICT WITH NEW CONDITIONS. EXISTING CONDUITS REMOVED FROM SERVICE MAY BE ABANDONED IN PLACE IF IN A CONCEALED LOCATION. REMOVE ALL WIRE FROM ABANDONED RACEWAYS. CONTRACTOR SHALL INSURE CONTINUITY OF EXISTING CIRCUITING PASSING THROUGH DEMOLITION AREAS. EXTEND AND/OR RELOCATED AS NECESSARY. SHIFT/RELOCATE EXISTING EQUIPMENT AND CIRCUITING AS REQUIRED TO ACCOMMODATE NEW WORK.
16.12	SALVAGE: ALL EXISTING EQUIPMENT REMOVED DURING THE COURSE OF THIS PROJECT SHALL BE OFFERED TO OWNER FOR SALVAGE. ANY EQUIPMENT SELECTED BY OWNER SHALL BE DELIVERED TO OWNER ON SITE. ALL REMAINING EQUIPMENT BECOMES THE PROPERTY OF THIS CONTRACTOR AND SHALL BE REMOVED FROM THE SITE.
16.13	TESTING: PRIOR TO PLACING IN SERVICE, ALL ELECTRICAL SYSTEMS SHALL BE TESTED FOR OPENS, GROUNDS, AND PHASE ROTATION. THE MAIN SERVICE GROUND AND ALL LOCAL TRANSFORMER MADE GROUNDS SHALL BE MEGGER-TESTED.
16.14	GROUNDING: TEST EXISTING SERVICE NEUTRAL FOR ADEQUACY AND FOR GROUND CONTINUITY. GROUND ALL EQUIPMENT AND SYSTEM NEUTRAL IN ACCORDANCE WITH ARTICLE 250 OF THE NEC. EQUIPMENT GROUNDS HAVE NOT BEEN SHOWN ON DRAWINGS - WHERE GROUND WIRES HAVE BEEN SHOWN THEY INDICATE AN INSULATED GROUND.
16.15	EQUIPMENT STANDARDS: ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND OF THE HIGHEST QUALITY AVAILABLE ("SPECIFICATION GRADE"). SERVICE EQUIPMENT SHALL BE FACTORY-ASSEMBLED COMMERCIAL-GRADE, CONFIGURED PER SERVING UTILITY STANDARDS. WIRING DEVICES SHALL BE SPECIFICATION GRADE WITH NYLON PLATES, WHITE UNLESS OTHERWISE NOTED, RAISED STEEL BOX COVERS MAY BE USED IN UTILITY AREAS.
16.16	MATCH EXISTING: EXISTING EQUIPMENT AND SYSTEMS SHALL BE CONSIDERED A MINIMUM STANDARD TO BE MET, IF NOT OTHERWISE EXCEEDED BY THESE PLANS AND SPECIFICATIONS. NEW MATERIALS AND EQUIPMENT SHALL MATCH EXISTING IN APPEARANCE AND FUNCTION.
16.17	TAMPER-PROOF: ALL EQUIPMENT AND CIRCUITING ACCESSIBLE BY THE PUBLIC SHALL BE TAMPER-PROOF AND VANDAL RESISTANT. OPENABLE DEVICES AND EQUIPMENT SHALL BE PADLOCKABLE.
16.18	DISTRIBUTION EQUIPMENT: DISTRIBUTION EQUIPMENT SHALL BE DEAD-FRONT, PANELBOARD OR SWITCHBOARD TYPE AS INDICATED. UL-LABELED AND ENCLOSED IN A NEMA HOUSING APPROPRIATE TO ITS LOCATION AND APPLICATION WITH HINGED WIREWAY COVERS. BUSSING, DEVICE FINGERS AND LUGS SHALL BE COPPER UNLESS INDICATED ON DRAWINGS. AIC RATINGS SHOWN ON PLANS ARE MINIMUM RATINGS. CIRCUIT BREAKERS SHALL BE IN EXCESS OF THE AVAILABLE FAULT CURRENT. SERIES-RATING OF UPSTREAM AND DOWNSTREAM CIRCUIT BREAKERS TO ACHIEVE REQUIRED FAULT CURRENT RATINGS IS PROHIBITED UNLESS APPROVED BY ENGINEER IN WRITING.
16.19	PANELBOARDS: PANELS SHALL HAVE FLUSH MONO-FLAT TRIM, LOCKING DOOR-IN-DOOR HINGED COVERS AND BOLT-ON CIRCUIT BREAKERS. FLUSH-MOUNTED PANELS SHALL HAVE EMPTY CONDUITS STUBBED TO ACCESSIBLE ATTIC SPACE: ONE 1" CONDUIT FOR EACH FOUR SPARE/SPACE CIRCUITS. PROVIDE ONE TYPED AND ONE SPARE PANEL SCHEDULE FOR OWNER'S USE. SCHEDULES SHALL BE TWO COLUMN TYPE WITH ODD CIRCUIT NUMBERS ON THE LEFT AND EVEN NUMBERS ON THE RIGHT.
16.20	CODE COMPLIANCE: A. WORKING CLEARANCE: • THE CONTRACTOR SHALL VERIFY THAT ALL ELECTRICAL EQUIPMENT MEETS THE CLEARANCE REQUIREMENTS OF NEC 110.26. DRAWINGS REPRESENT CLEARANCES ARE MET AS DESIGNED, ANY DEVIATION SHALL ALSO MEET THIS REQUIREMENT. • ELECTRICAL SWITCHBOARDS RATED 1200 AMPS OR GREATER, IN EXCESS OF 6 FEET IN LENGTH, SHALL REQUIRE TWO (2) EXITS FROM THE ELECTRICAL ROOM UNLESS NEC 110.26(C)(2)(a) OR 110.26(C)(2)(e) ARE MET. B. TRANSFORMERS: • TRANSFORMERS RATED GREATER THAN 112.5 KVA SHALL BE PLACED IN ELECTRICAL ROOMS WITH A 1-HOUR FIRE RATING PER NEC 450.21(B) WHERE THEY DO NOT MEET THE TRANSFORMER SECTION. TRANSFORMERS AS SPECIFIED IN THIS SECTION MEET NEC 450.21(B) EXCEPTION #2 AND ARE NOT REQUIRED TO BE PLACED IN A 1-HOUR RATED ROOM.
16.21	CIRCUITING: ALL WIRING SHALL BE IN CONDUIT, MINIMUM 3/4" O.D. CONCEALED EXCEPT WHERE NOTED. EMT WITH STEEL SET SCREWS INSULATED-THROUGH FITTINGS MAY BE USED IN DRY, PROTECTED INTERIOR LOCATIONS. PVC SCHEDULE 40 SHALL BE USED BELOW GRADE AT MINIMUM -24". WRAPPED RIGID ELBOWS AND RISERS SHALL BE USED FOR ALL THROUGH-GRADE TRANSITIONS AND STUB-UPS. RGS OR IMC CONDUIT WITH THREADED FITTINGS SHALL BE USED IN ALL LOCATIONS WHERE EXPOSED TO THE ELEMENTS OR SUBJECT TO PHYSICAL DAMAGE. METAL-CLAD CABLE (TYPE MC) WILL BE ACCEPTABLE FOR SINGLE CIRCUIT BRANCH CIRCUITING, FLEXIBLE WHIPS FROM JUNCTION BOXES TO LIGHTING FIXTURES (MAXIMUM OF 6'-0"), WITHIN CASEWORK AND ACCESSIBLE AREAS ONLY. TYPE MC CABLE MAY NOT BE USED FOR HOMERUNS. ENT IS NOT ALLOWED. CONNECT RECESSED AND SUSPENDED LIGHTING FIXTURES, MOTORIZED AND VIBRATING EQUIPMENT WITH STEEL FLEX. ALL CONDUIT SHALL HAVE PULL CORD IF OTHERWISE EMPTY.
16.22	WIRING: WIRE SHALL BE COPPER UNLESS OTHERWISE INDICATED. MINIMUM WIRE SIZE SHALL BE #12 AWG. INSULATION SHALL BE THW, THWN OR THHN.
16.23	FUSES: FUSES SHALL BE SIZED PER ACTUAL NAMEPLATE OF EQUIPMENT SERVED. FUSES SHALL BE DUAL-ELEMENT, CURRENT-LIMITING, AND SHALL BE INTERCHANGEABLE BETWEEN FRAME SIZES WITH STANDARD FACTORY FUSE REDUCERS. FUSES SHALL BE AS FOLLOWS UNLESS OTHERWISE INDICATED: a. CIRCUITS 601 TO 6000 AMPERES SHALL BE PROTECTED BY CURRENT LIMITING BUSSMANN LOW-PEAK TIME-DELAY FUSES KRP-C - UL CLASS L b. CIRCUITS 0 TO 600 AMPERES SHALL BE PROTECTED BY CURRENT LIMITING BUSSMANN LOW-PEAK DUAL-ELEMENT FUSES LPN-RK (250 VOLTS) OR LPS-RK (600 VOLTS) - UL CLASS RK1 c. ALL INDIVIDUAL MOTOR CIRCUITS RATED 480 AMPERES OR LESS SHALL BE PROTECTED BY BUSSMANN LOW-PEAK DUAL-ELEMENT FUSES LPN-RK (250 VOLTS) OR LPS-RK (600 VOLTS) - UL CLASS RK1 OR L d. CIRCUIT BREAKER PANELS SHALL BE PROTECTED BY BUSSMANN LOW-PEAK DUAL-ELEMENT FUSES LPN-RK (250 VOLTS), LPS-RK (600 VOLTS) OR BUSSMANN LOW-PEAK KRP-C TIME-DELAY FUSES - UL CLASS RK1 OR L e. ALL DUAL-ELEMENT FUSES SHALL HAVE SEPARATE OVERLOAD AND SHORT-CIRCUIT ELEMENTS. f. PROVIDE SPARE FUSE CABINET AFTER THE COMPLETION OF THE PROJECT WITH ONE SET OF SPARE FUSES FOR EVERY SIZE USED.
16.24	UTILITY SERVICES: PROVIDE POWER AND COMMUNICATIONS SYSTEM SERVICES IN ACCORDANCE WITH THE REQUIREMENTS OF THE SERVING UTILITIES. PROVIDE EXCAVATION, RACEWAY, STRUCTURES, GROUNDING, ETC. AS REQUIRED. CONTACT SERVING UTILITIES AND OBTAIN THEIR PROJECT SPECIFIC REQUIREMENTS PRIOR TO BID. UTILITY WORK INDICATED HEREIN IS FOR BIDDING ASSISTANCE ONLY. THESE PLANS DO NOT PURPORT TO INDICATE ALL WORK REQUIRED. (UTILITY SERVICE CHARGES PAID BY OTHERS)
16.25	TEMPORARY CONSTRUCTION POWER: PROVIDE TEMPORARY ELECTRICAL POWER AND LIGHTING FOR ALL TRADES THAT REQUIRE SERVICE DURING THE COURSE OF THIS PROJECT. PROVIDE TEMPORARY SERVICE AND DISTRIBUTION AS REQUIRED. COMPLY WITH THE NEC AND OSHA REQUIREMENTS. (ENERGY COSTS BY OTHERS)
16.26	SUBMITTALS: BEFORE ORDERING ANY EQUIPMENT, CONTRACTOR SHALL SUBMIT SIX COPIES OF FACTORY SHOP DRAWINGS FOR ALL LIGHTING FIXTURES, SWITCHGEAR, PANELS, MOTOR CONTROLLERS, WIRING DEVICES, ETC. PROPOSED FOR THIS PROJECT.
16.27	SUBSTITUTIONS: PROPOSED SUBSTITUTIONS SHALL BE EQUAL OR SUPERIOR TO SPECIFIED ITEMS IN ALL RESPECTS. EQUALITY RESTS SOLELY WITH ENGINEER. SUBSTITUTIONS MUST BE SUBMITTED A MINIMUM OF 10 WORKING DAYS PRIOR TO BID FOR CONSIDERATION. PROPOSED SUBSTITUTIONS PROVIDED LATER WILL NOT BE REVIEWED OR ALLOWED. BID SUBSTITUTED MATERIAL WILL ONLY BE ALLOWED IF ACCEPTED IN WRITING BY ENGINEER.
16.28	IDENTIFICATION: PROVIDE ENGRAVED NAMEPLATES FOR ALL SWITCHBOARDS, PANELS, TRANSFORMERS, DISCONNECTS, MOTOR STARTERS, CONTACTORS, TIME SWITCHES AND CABINETS. NAMEPLATES SHALL INCLUDE THE FOLLOWING INFORMATION AS APPLICABLE: DESIGNATION (i.e. PANEL A) FUNCTION (i.e. AIR HANDLER AH-1) VOLTAGE, PHASE, WIRE (i.e. 480 VOLT, 3Ø, 4W) FEEDER SIZE (i.e. 4-#4/0 THWN CU IN 2" C.) SOURCE (i.e. SWITCHBOARD MSB) NAMEPLATES SHALL BE WHITE LETTERS ON BLACK FOR NORMAL EQUIPMENT AND WHITE LETTERS ON RED FOR EMERGENCY EQUIPMENT.
16.29	GUARANTEE: THE COMPLETE ELECTRICAL SYSTEM, AND ALL PORTIONS THEREOF, SHALL BE GUARANTEED TO BE FREE FROM DEFECTS IN WORKMANSHIP AND MATERIALS FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE. PROMPTLY REMEDY SUCH DEFECTS AND ANY SUBSEQUENT DAMAGE CAUSED BY THE DEFECTS OR REPAIR THEREOF AT NO EXPENSE TO THE OWNER. LAMPS ARE EXEMPT FROM THIS GUARANTEE, BUT SHALL BE NEW AT TIME OF FINAL ACCEPTANCE.
16.30	SUSPENDED CEILING SYSTEMS: ALL LAY-IN FIXTURES SHALL BE INDEPENDENTLY SUPPORTED BY TWO #12 SLACK WIRES ATTACHED TO TWO OPPOSITE CORNERS OF THE FIXTURE PER UBC & NEC REQUIREMENTS. THESE WIRES SHALL BE SECURED TO THE STRUCTURAL FRAMING SUCH THAT FAILURE OF THE SUSPENDED CEILING SHALL NOT ALLOW THE FIXTURE TO DROP.
16.31	COORDINATION: THE CIVIL, ARCHITECTURAL, MECHANICAL, KITCHEN AND INTERIOR DRAWINGS CONTAIN DETAIL DESCRIPTIONS, CIRCUITING AND CONNECTION REQUIREMENTS WHICH ARE PART OF DIVISION 16 RESPONSIBILITIES. ELECTRICAL CONTRACTOR SHOULD NOT SUBMIT BIDS ON THIS PROJECT BEFORE REVIEWING ALL PROJECT DRAWINGS, SPECIFICATIONS AND ADDENDA.
16.32	FIRE ALARM: EXISTING FIRE ALARM SYSTEM TO REMAIN. MAINTAIN IN CONSTANT OPERATION DURING THIS PROJECT. NEW COMPONENTS AND CIRCUITING SHALL BE FACTORY-CERTIFIED AS BEING PROJECT-SPECIFIC COMPATIBLE WITH EXISTING SYSTEM. ALL CONNECTIONS TO EXISTING SYSTEM SHALL BE PERFORMED BY FACTORY-CERTIFIED TECHNICIAN AND SHALL BE ACCEPTED BY OWNER'S SYSTEM-MONITORING AGENCY. PLANS DO NOT INDICATE ALL DEVICES, CONNECTIONS OR CIRCUITING REQUIRED FOR A COMPLETE SYSTEM. SUBMIT PROPOSED DESIGN TO THE FIRE MARSHAL AND RECEIVE APPROVAL PRIOR TO ROUGH-IN.
16.33	ONGOING OPERATION: CONDUCT WORK TO MINIMIZE DISRUPTION OF OWNER'S ONGOING OPERATIONS. PROVIDE BARRICADES, NOISE ABATEMENT AND DUST CONTAINMENT MEASURES TO ENSURE THE SAFETY AND COMFORT OF PATRONS, STAFF AND WORKERS. INTERRUPTIONS OF EXISTING POWER, COMMUNICATIONS OR FIRE ALARM SYSTEMS SHALL BE PERFORMED ONLY AT SUCH TIMES AS DIRECTED BY RESIDENT ENGINEER. OUTAGES SHALL BE MOMENTARY IN NATURE. EACH SUCH OUTAGE (OR OPERATION WHICH MAY POSE RISK OF AN ACCIDENTAL OUTAGE) SHALL BE SCHEDULED 48 HOURS IN ADVANCE.

MASTER SYMBOL LIST	
SIGNAL OUTLETS	
▽	TELEPHONE: 4S BOX WITH SINGLE GANG MUD RING UON, +18" AFF UON
▽	TELEPHONE: 4S BOX WITH SINGLE GANG MUD RING UON, WALL MOUNT +54" AFF UON
▽	DATA: 4S BOX WITH SINGLE GANG MUD RING UON, +18" AFF UON
▽	VOICE/DATA: 4S BOX WITH SINGLE GANG MUD RING UON, +18" AFF UON
◇	TELEVISION: 4S BOX WITH SINGLE GANG MUD RING UON, +18" AFF UON
⊕	CAMERA: 4S BOX WITH SINGLE GANG MUD RING UON, CEILING MOUNTED UON
⊕	MICROPHONE: 4S BOX WITH SINGLE GANG MUD RING UON, +18" AFF UON
⊕	VOLUME CONTROL: 4S BOX WITH SINGLE GANG MUD RING UON, +48" TO TOP UON
⊕	SPEAKER: 8" COAXIAL WITH BACK BOX AND GRILLE, CEILING MOUNTED UON
→	3/4" (UON) STUB INTO ACCESSIBLE CEILING SPACE
SWITCHES	
S	SINGLE POLE: 20A, 120/277V, +48" TO TOP UON
S ₂	TWO POLE: 20A, 120/277V, +48" TO TOP UON
S ₃	THREE WAY: 20A, 120/277V, +48" TO TOP UON
S ₄	FOUR WAY: 20A, 120/277V, +48" TO TOP UON
S _x	X INDICATES EMERGENCY CIRCUIT
S _p	P INDICATES PILOT LIGHT (LIGHTED WHEN ON)
S _l	L INDICATES PILOT LOCATOR (LIGHTED WHEN OFF)
S _k	K INDICATES KEY OPERATED SWITCH
S _m	MANUAL MOTOR STARTER: 20A, 120/277V, POLES AND HEATERS AS REQUIRED
S _{mc}	MOMENTARY CONTACT: 20A, 120/277V, SPDT CENTER NORMALLY OFF UON, +48" TO TOP UON
D	DIMMER: 600 WATT UON, ELECTRONIC SLIDER, WITH ON/OFF TOGGLE, +48" TO TOP UON (PLANS SHALL INDICATE TYPE: FLUOR, INCAND OR LOW-VOLTAGE)
⬆	MOTION/OCCUPANCY SENSOR SWITCH WITH OFF-AUTO SELECTOR - WALL MOUNTED AT +48" TO TOP UON
⊕	ULTRASONIC MOTION/OCCUPANCY SENSOR SWITCH CEILING MOUNTED
⊕	ARROWS INDICATE DIRECTION AND COVERAGE PROVIDE WITH POWER PACK PER MANUFACTURERS REQUIREMENTS
⊕	PHOTO ELECTRIC SWITCH: 1600VIA UON
METHODS	
⊕	SHADING INDICATES: FIXTURE, OUTLET, EQUIPMENT, ETC. ON EMERGENCY 'X' OR NIGHT LIGHT 'NL' CIRCUIT
⊕	DEVICE MOUNTED IN MULTIPLE UNDER COMMON COVER. MAXIMUM HEIGHT ON WALL SHALL BE +48" TO TOP UON
⊕	DEVICES MOUNTED IN OR ABOVE COUNTER/BACKSPLASH: MAXIMUM HEIGHT ON WALLS SHALL BE +48" TO TOP UON
⊕	FLUSH FLOOR MOUNTED WIRING DEVICES
⊕	FLUSH FLOOR MOUNTED WIRING DEVICES IN SINGLE MULTI-COMPARTMENT BOX
⊕	RECEPTACLE MOUNTED IN CEILING OR CASEWORK
⊕	FINE DASHING INDICATES EXISTING EQUIPMENT AND DEVICES TO BE REMOVED
DESIGNATIONS	
⊕	LIGHT FIXTURE: F1 = TYPE (SEE FIXTURE SCHEDULE)
⊕	SHEET NOTE
⊕	REVISION DELTA: NUMBER REPRESENTS REVISION
⊕	MECHANICAL AND PLUMBING EQUIPMENT
⊕	MISCELLANEOUS: THESE AND OTHER SYMBOLS AS INDICATED IN TABLES AND SCHEDULES ON THE PLANS.
NOTE: THIS IS A MASTER SYMBOL LIST, ALL SYMBOLS SHOWN MAY NOT BE USED WITHIN THIS SET OF PLANS	
RECEPTACLES	
⊕	DUPLEX: 20A, 125V, NEMA 5-20, +18" AFF
⊕	DOUBLE DUPLEX: 20A, 125V, NEMA 5-20, +18" AFF
⊕	HALF SWITCHED DUPLEX: 20A, 125V, NEMA 5-20, +18" AFF (TOP HALF SWITCHED)
⊕	DUPLEX GFCI: 20A, 125V, GFCI, NEMA 5-20 GFR, +18" AFF
⊕	DUPLEX I.G.: 20A, 125V, ISO. GND., NEMA 5-20 IG +18" AFF (WHITE WITH ORANGE TRIANGLE, UON)
⊕	DOUBLE DUPLEX I.G.: 20A, 125V, ISO. GND., NEMA 5-20 IG +18" AFF (WHITE WITH ORANGE TRIANGLE, UON)
⊕	SPECIAL RECEPTACLE - AS INDICATED ON PLANS, +18" AFF
NOTE: DIAMOND SYMBOLS INDICATES DEDICATED CIRCUIT.	
EQUIPMENT	
⊕	SWITCHBOARD
⊕	PANELBOARD: SURFACE MOUNTED
⊕	PANELBOARD: FLUSH MOUNTED
⊕	TRANSFORMER
⊕	RELAY (120V COIL, STEP DN XFMR IF REQUIRED, UON)
⊕	RELAY (120V COIL, STEP DN XFMR IF REQUIRED, UON)
⊕	COMBINATION MAGNETIC STARTER/FUSED DISCONNECT
⊕	NON-FUSIBLE DISCONNECT SWITCH
⊕	FUSIBLE DISCONNECT SWITCH
⊕	PULLBOX: SIZE AS REQUIRED BY NEC
⊕	JUNCTION BOX: SIZE AS REQUIRED BY NEC
⊕	SURFACE RACEWAY WITH OR WITHOUT DEVICES
⊕	TELEPOWER POLE
CIRCUITING	
---	CONDUIT IN WALL OR ABOVE CEILING
---	CONDUIT IN FLOOR OR BELOW GRADE
	METAL CLAD CABLE (MC)
—OH—	OVERHEAD SERVICE
—P—	PRIMARY
—S—	SECONDARY
—T—	TELEPHONE
—TV—	TELEVISION
---	LOW VOLTAGE AND/OR CONTROL CIRCUITING
---	EMERGENCY CIRCUIT
→	STUB OUT: MARK AND CAP (SITE)
→	CIRCUITING UP OR DOWN
<p>TICS = NO. OF #12 WIRES (UON) IF MORE THAN TWO WITHIN CONDUIT OR MC</p> <p>— ISOLATED GROUNDING CONDUCTOR</p> <p>— GROUNDING CONDUCTOR</p> <p>— NEUTRAL CONDUCTOR (ONE PER PHASE CONDUCTOR)</p> <p>— PHASE CONDUCTOR(S)</p> <p>HOMERUN DESIGNATION</p> <p>— PHASE CONDUCTOR(S)</p> <p>— GROUNDING CONDUCTOR</p> <p>PNL — ISOLATED GROUNDING CONDUCTOR</p> <p>— NEUTRAL CONDUCTOR (ONE PER PHASE CONDUCTOR)</p> <p>— PANEL DESIGNATION</p>	
MISCELLANEOUS	
⊕	THERMOSTAT: AT +48" TO TOP UON (OR PER MECH PLANS)
⊕	EXHAUST FAN: FRACTIONAL HORSEPOWER
⊕	MOTOR: NUMBER = HORSEPOWER
⊕	SIGNAL CONNECTION
⊕	SHUNT TRIP STATION: +7'-6" AFF, 12" RED TRIANGLE, UON
⊕	CONTROL STATION: AT +48" TO TOP UON
⊕	DUAL LEVEL LIGHTING CONTROL SWITCH 'a' = CENTER (1) LAMP SWITCH 'b' = OUTER (2) LAMPS
ABBREVIATIONS	
℄	CENTERLINE
AFF	ABOVE FINISHED FLOOR
AIC	AMPERES INTERRUPTING CAPACITY
AFC	ABOVE FINISH CEILING
BMS	BUILDING MANAGEMENT SYSTEM
C	CONDUIT
CB	CIRCUIT BREAKER
CLG	CEILING
CIR	CIRCUIT
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
(E)	EXISTING TO REMAIN
ELEV	ELEVATOR
EMT	ELECTRICAL METALLIC TUBING
EPO	EMERGENCY POWER OFF SYSTEM
FBO	FURNISHED BY OTHERS
FPEN	FUSE PER EQUIPMENT NAMEPLATE
FLUOR	FLUORESCENT
FU	FUSE: DUAL-ELEMENT, TIME DELAY
GFI/GFCI	GROUND FAULT INTERRUPTER
GND	GROUND
HOA	HAND-OFF-AUTOMATIC
HID	HIGH INTENSITY DISCHARGE
IG	ISOLATED GROUND
INCAND	INCANDESCENT
K	kcmil (300K = 300 kcmil)
LTG	LIGHTING
LV	LOW VOLTAGE
MCP	MOTOR CIRCUIT PROTECTOR
MC	MULTI-CONDUCTOR CABLE
(N)	NEW
NC	NORMALLY CLOSED
NEUT	NEUTRAL
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
PNL	PANEL
PVC	POLYVINYL CHLORIDE CONDUIT
(R)	EXISTING TO BE RELOCATED
RAC	RIGID ALUMINUM CONDUIT
RSC	RIGID STEEL CONDUIT
SLD	SINGLE LINE DIAGRAM
SO	SEAL OFF
SPDT	SINGLE POLE DOUBLE THROW
SPEN	SIZE PER EQUIPMENT NAMEPLATE
SPST	SINGLE POLE SINGLE THROW
TEL	TELECOM
Typ	TYPICAL
UNSW	UNSWITCHED
UON	UNLESS OTHERWISE NOTED
WP	WEATHERPROOF (NEMA 3R)
WT	WATERTIGHT
(X)	EXISTING TO BE REMOVED
XFMR	TRANSFORMER
XP	EXPLOSION PROOF



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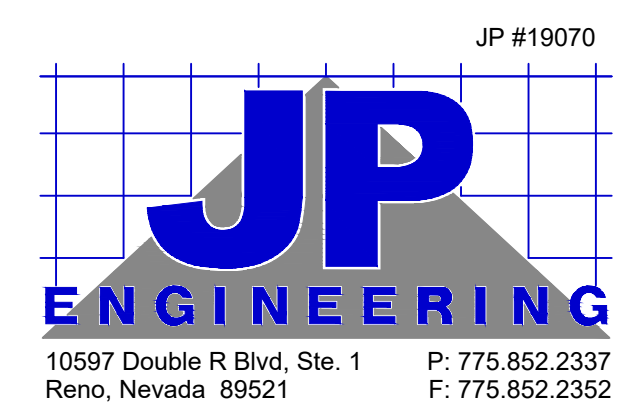
SERVER ROOM HVAC RETROFIT
 INYO ANNEX BUILDING
 168 EDWARDS ST.
 INDEPENDENCE, CALIFORNIA

REVISIONS	

DRAWING TITLE
 SYMBOL LIST AND SPECIFICATIONS

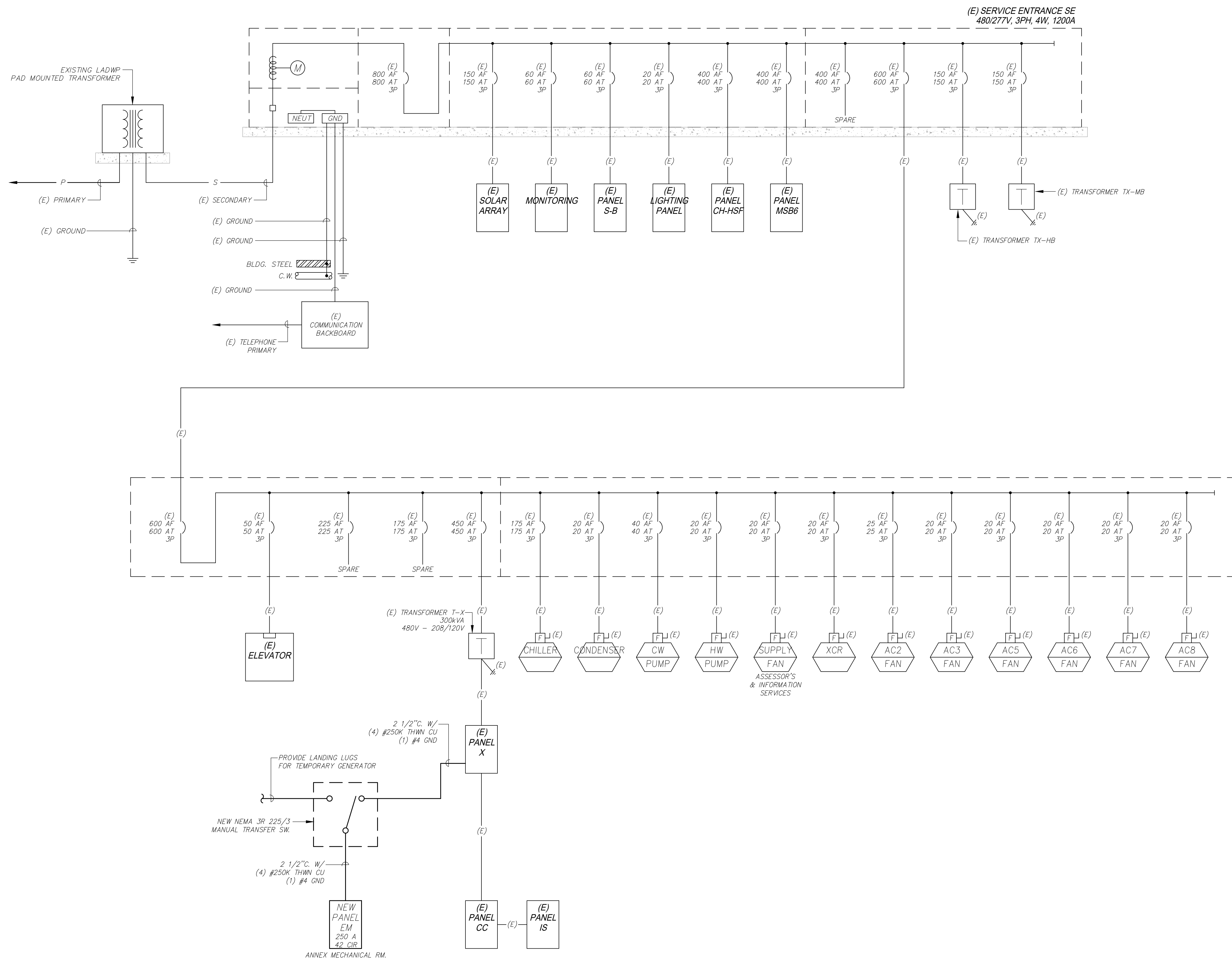
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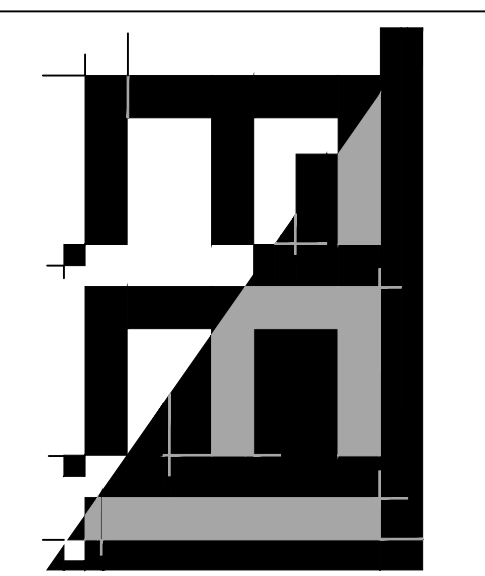


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A	SINGLE LINE DIAGRAM
E0.2IT	SCALE: NOT TO SCALE



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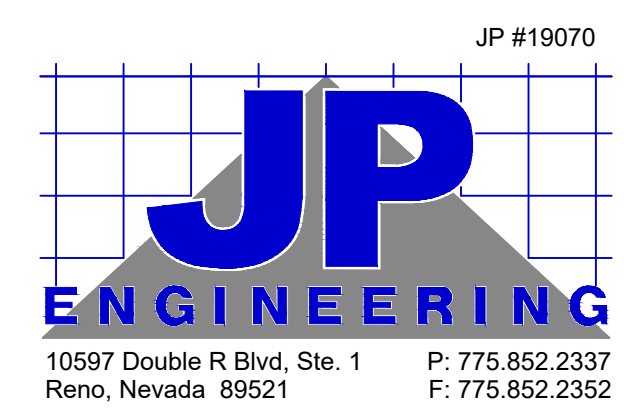


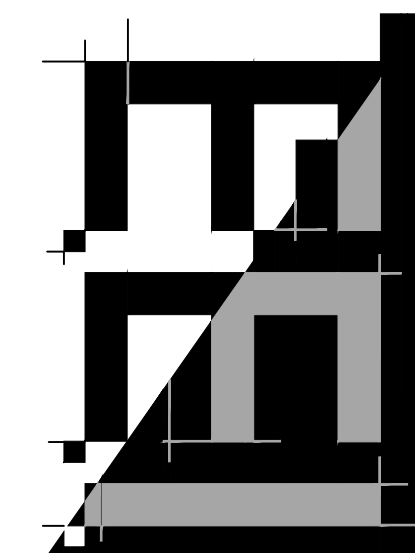
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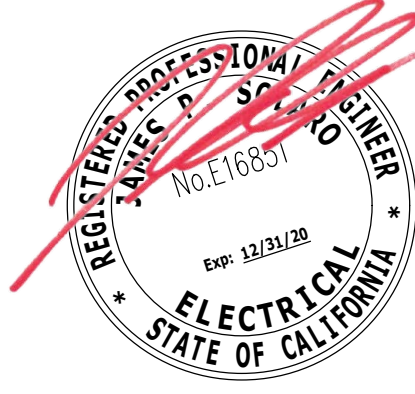
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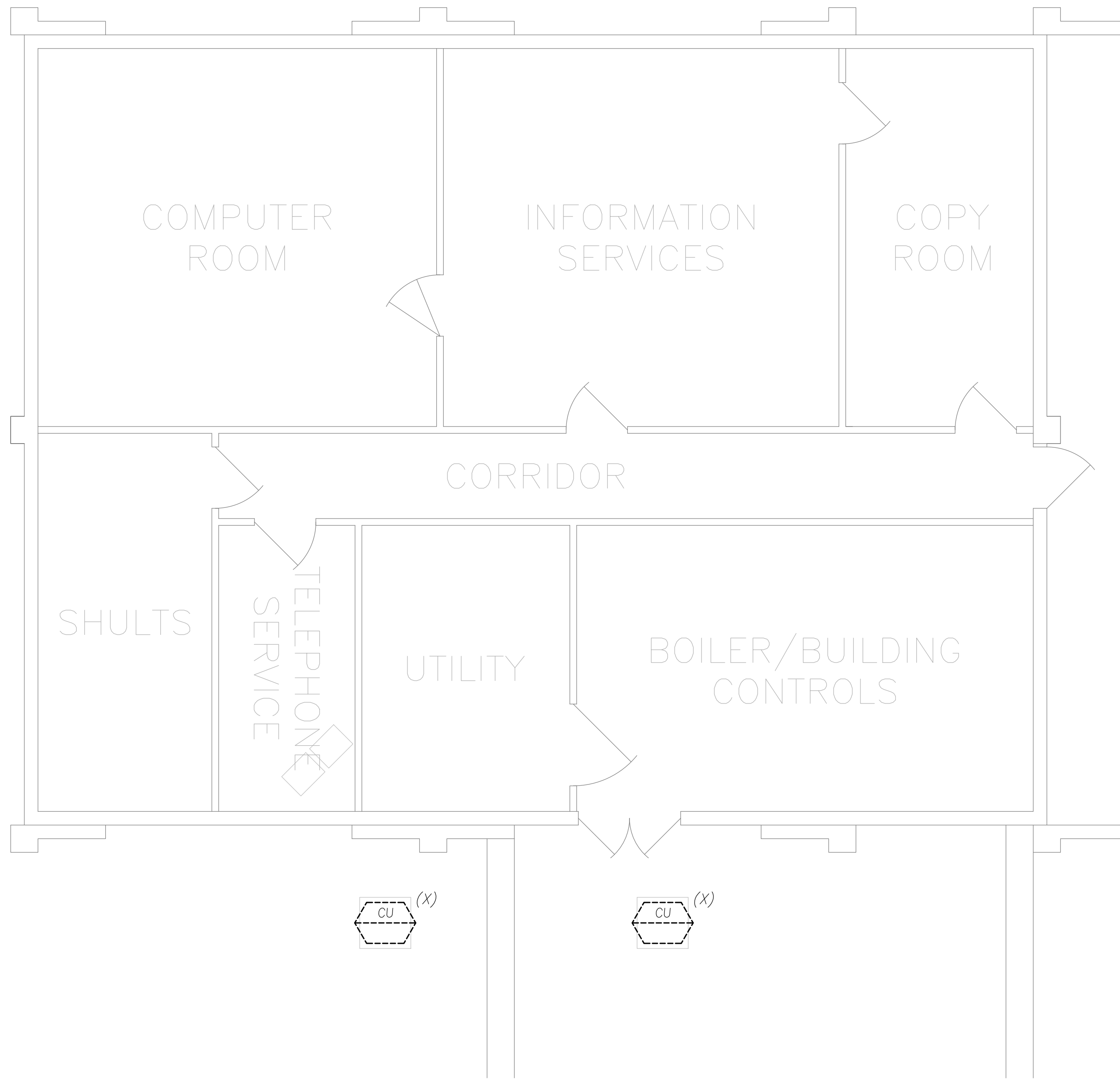




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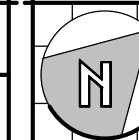
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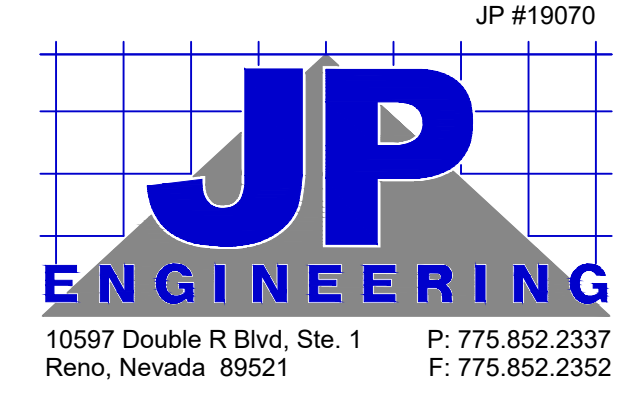
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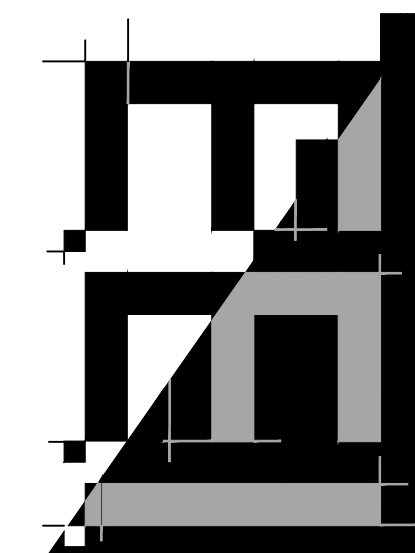
DRAWING TITLE
**ELECTRICAL
DEMOLITION
PLAN**

date 1/10/2020
job number EEI #19030
drawn JPS
checked JPS

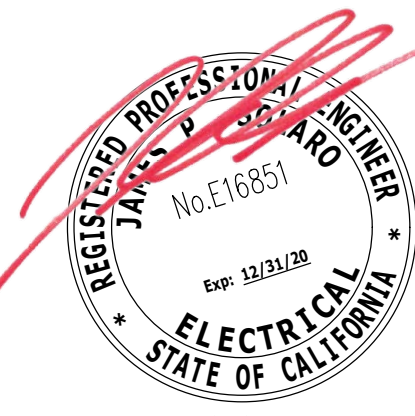
E1.11T

A | **ELECTRICAL DEMOLITION PLAN** | 
E1.11T | SCALE: 1/4" = 1'-0"





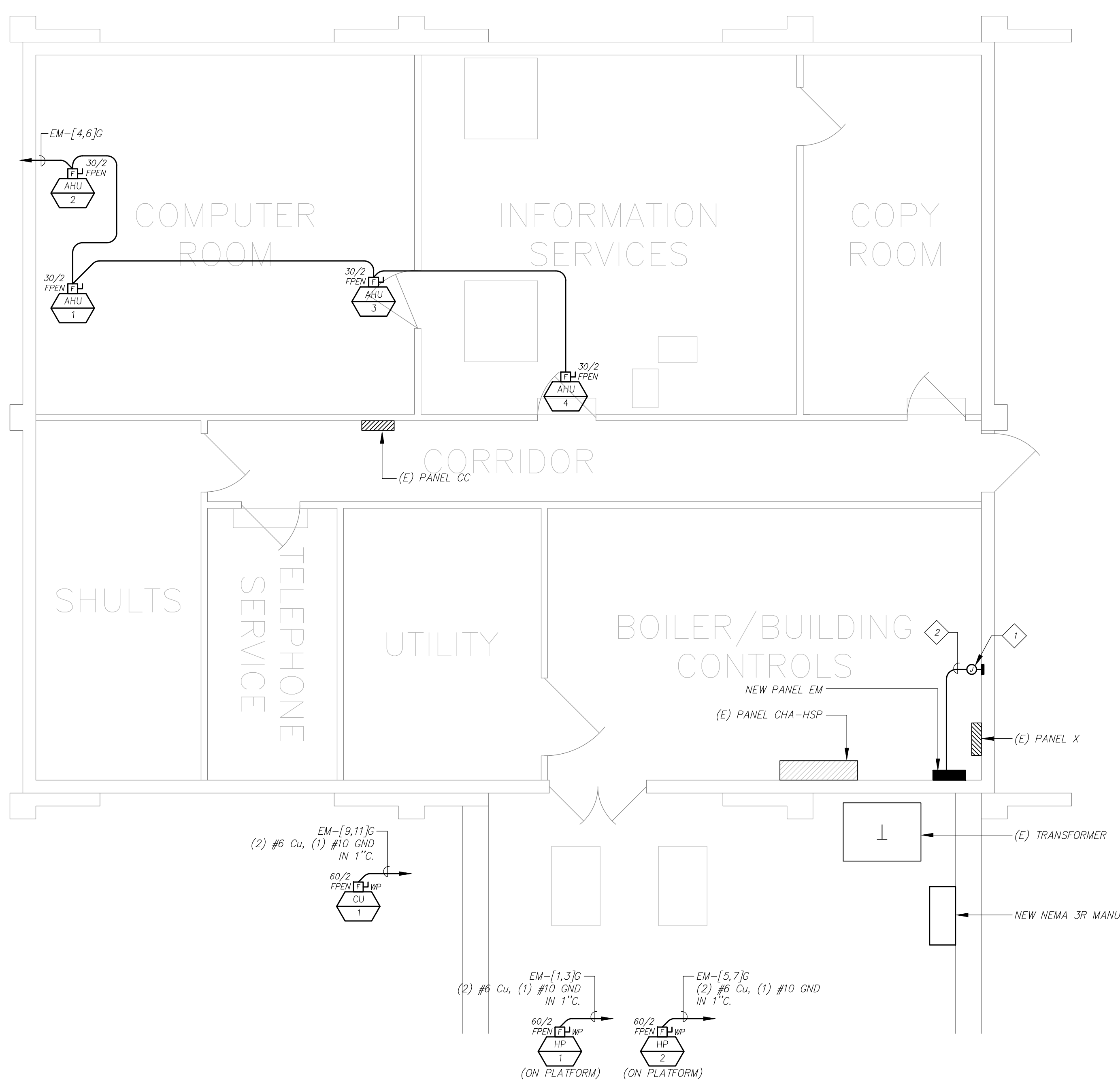
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SHEET NOTES	
1	WITH THE ACCEPTANCE OF ALTERNATE #2, INTERCEPT THE EXISTING FEEDERS TO PANEL CC AT THIS LOCATION.
2	WITH THE ACCEPTANCE OF ALTERNATE #2, PROVIDE A NEW FEEDER PER THE SINGLE LINE DIAGRAM.



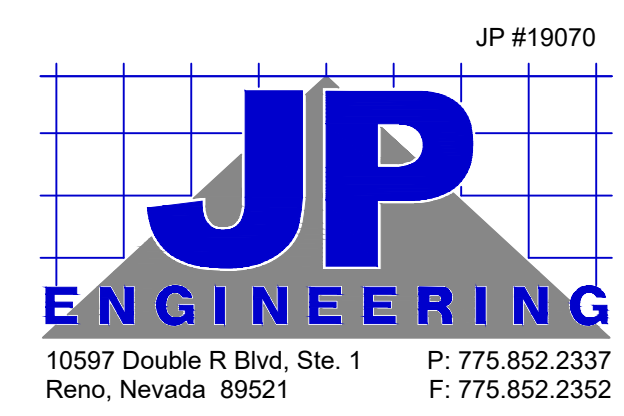
ANNEX MECHANICAL RM												
DF	DESCRIPTION	LOAD	BKR	CIR	A	B	C	CIR	BKR	LOAD	DESCRIPTION	DF
L	MECHANICAL ROOM LTS	1600	20/1	1	1780			2	20/1	180	RECEPT NEXT TO PANEL X	R
L	HALL & OFFICE LIGHTS	1200	20/1	3		1300		4	20/1	100	RELAY CAB. AC-CONTROLS	E
L	TELE & STORAGE LIGHTS	240	20/1	5			960	6	20/1	720	DATA/PHONE RM RECEPTS	R
R	S. EAST OFF. COPY MACH	1200	20/1	7	1920			8	20/1	720	DATA/PHONE RM RECEPTS	R
E	BOILER CONTROLS	100	20/1	9		820		10	20/1	720	DATA/PHONE RM RECEPTS	R
E	BOILER CONTROLS	100	20/1	11			820	12	20/1	720	DATA/PHONE RM RECEPTS	R
E	BOILER CONTROLS/TCLK	100	20/1	13	1000			14	20/1	900	DATA/PHONE	R
	SPARE COVER LG&G			30	15	3328		16	50	3328	AC UNITS S. WALL	M
				2	17			18	2	3328		M
				30	19	7680		20	100	7680		E
	SPARE			-	21		7680	22	-	7680	PANEL E - JAN. CLOSET	E
				3	23			24	3	7680		E
E	PANEL B - ANNEX 1ST FLR	15360	200	25	15360			26	40			
E		15360	-	27		15360		28	-		SPARE	
E		15360	3	29			15360	30	3			
E		17280	225	31	34560			32	225	17280		E
E	PNL CC - INFO SVCS HALL	17280	-	33		34560		34	-	17280	PANEL D - ENV. HEALTH	E
E		17280	3	35			34560	36	3	17280		E
E		5990	250	37	5990			38				
E	NEW PANEL EM	6161	-	39		6161		40				
E		6161	3	41			6161	42				
					68290	69209	68869					

AMPS:	800	NEUTRAL BUS:	100%	CON. KVA:	206.4
VOLTAGE:	208	GROUND BUS:	STANDARD	CON. AMPS:	572.8
PHASE/WIRE:	3-PH, 4W	AIC RATING:	22,000	NET KVA:	207.1
MAIN:	(E) 500/3 MCB	NEMA RATING:	1	NET AMPS:	574.9
LUGS:	MLO	EXISTING PANEL		Notes:	BOLD TEXT = NEW LOAD
MOUNTING:	SURFACE				
BUS:	COPPER	X			
DOOR:	STANDARD				

ANNEX MECHANICAL RM												
DF	DESCRIPTION	LOAD	BKR	CIR	A	B	C	CIR	BKR	LOAD	DESCRIPTION	DF
M	HP-1	2995	50	1	2995			2	20/1		SPARE	
M		2995	2	3		3332		4	20	337	AHU-1 THRU AHU-4	M
M	HP-2	2995	50	5			3332	6	2	337		M
M		2995	2	7	2995			8	20/1		SPARE	
M1	CU-1	2829	60	9		2829		10	20/1		SPARE	
M1		2829	2	11			2829	12	20/1		SPARE	
				13	0			14				
				15	0			16				
				17	0			18				
				19	0			20				
				21	0			22				
				23	0			24				
				25	0			26				
				27	0			28				
				29	0			30				
				31	0			32				
				33	0			34				
				35	0			36				
				37	0			38				
				39	0			40				
				41	0			42				
					5990	6161	6161					

AMPS:	250	NEUTRAL BUS:	100%	CON. KVA:	18.3
VOLTAGE:	208	GROUND BUS:	STANDARD	CON. AMPS:	50.8
PHASE/WIRE:	3-PH, 4W	AIC RATING:	22,000	NET KVA:	19.7
MAIN:	(E) 500/3 MCB	NEMA RATING:	1	NET AMPS:	54.8
LUGS:	MLO	NEW PANEL		Notes:	NEW PANEL
MOUNTING:	SURFACE				
BUS:	COPPER	EM			
DOOR:	STANDARD				

A **ELECTRICAL PLAN**
 E2.11T SCALE: 1/4" = 1'-0"



REVISIONS	
DRAWING TITLE	ELECTRICAL PLAN
date	1/10/2020
job number	EEL #19030
drawn	JPS
checked	JPS
	E2.11T

HVAC RETROFIT INYO ANNEX BUILDING

168 N EDWARDS ST,
INDEPENDENCE, CA

MECHANICAL ENGINEER

BRANDON ETCHEMENDY PE
ETCHEMENDY ENGINEERING INC.
10597 DOUBLE R BOULEVARD
RENO, NV 89521
775-853-1131 EXT. 221
betchemendy@eei-nv.com

ELECTRICAL ENGINEER

JAMES SOLARO PE
JP ENGINEERING
10597 DOUBLE R BLVD, STE. 1
RENO, NV 89521
775-852-2337
JAMES@JPENGNV.COM

STRUCTURAL ENGINEER

BARRETT DONOVAN PE
TECTONICS DESIGN GROUP
730 SANDHILL ROAD SUITE 250
RENO, NV 89521
775-824-9988
barrett@tdg-inc.com



APPROVED BY:

Michael J. Errante
MICHAEL J. ERRANTE, DIRECTOR
INYO COUNTY PUBLIC WORKS

2-19-2020

DATE

APPLICABLE CODES: CALIFORNIA MECHANICAL CODE 2016
CALIFORNIA PLUMBING CODE 2016
CALIFORNIA BUILDING CODE 2016
CALIFORNIA ELECTRICAL CODE 2016

SCOPE OF WORK

WORK UNDER THIS CONTRACT; includes but is not limited to, all material, labor, tools, expendable equipment, utility and transportation service, and all incidental items necessary to perform and complete the required Scope of Work in a workmanlike manner, complete and on schedule.

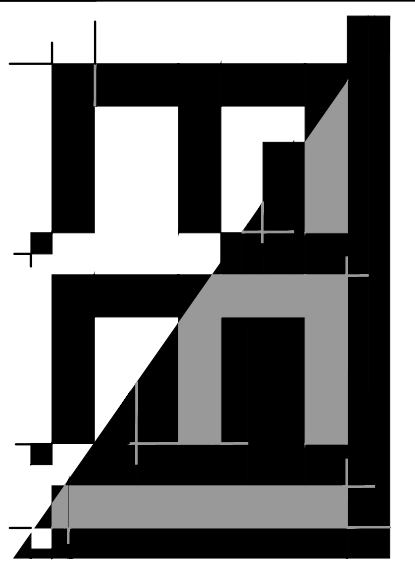
A. The Work shall be performed in areas as shown on the attached drawings at Inyo Annex Server IT located at 168 N Edwards St. Independence, CA.

B. The Scope of Work includes the following:

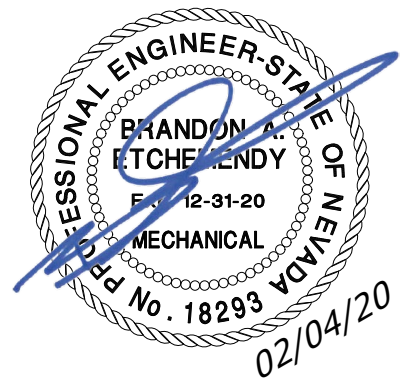
1. Demolition of existing air handler in the Boiler/Building Controls Room.
2. Salvation of existing chiller and demolition of existing mechanical piping located in outdoor mechanical patio.
3. Demolition of existing ductwork and mechanical piping in the Boiler/Controls room.
4. Decommissioning of the equipment in the Utility room.
5. Demolition of existing thermostats and wall patch/repair to match existing.
6. Demolition of various supply diffusers, return grilles and ductwork.
7. Cutting and filling of wall studs.
8. Removal and installation of existing T-bar ceiling.
9. Removal and installation of hard lid ceiling at 1st floor Men's bathroom.
10. Demolition of 5 existing air handlers.
11. Demolition of 2 roof mounted exhaust fans.
12. Installation of 2 heat pump split systems.
13. Installation of new ductwork, supply diffusers and return grilles
14. Installation of 6 new roof mounted packed unit with roof mounted ductwork.
15. Installation of new thermostats.
16. Installation of roof mounted LP piping on roof.
17. Demolition of electrical to mechanical equipment and the MCC. Includes removal of surface raceway not being utilized and feeders to the source of power.
18. Provide new electrical panel for new mechanical equipment.
19. Provide feeders and connections to the new mechanical equipment.
20. Check structural integrity of existing roof for installation of new roof mounted mechanical equipment.

DRAWING INDEX

TO.IR	TITLE PAGE
S2.2R	ROOF FRAMING PLAN
S3.IR	MISC. DETAILS
T1.IR	T24 COMPLIANCE
T1.2R	T24 COMPLIANCE
T1.3R	T24 COMPLIANCE
T1.4R	T24 COMPLIANCE
T1.5R	T24 COMPLIANCE
MO.IR	MECHANICAL NOTES & SCHEDULES
MO.2R	MECHANICAL CALCULATIONS
MO.3R	1ST FLOOR ZONING PLAN
MO.4R	2ND FLOOR ZONING PLAN
M1.IR	1ST FLOOR DEMOLITION MECHANICAL PLAN
M1.2R	2ND FLOOR DEMOLITION MECHANICAL PLAN
M1.3R	DEMOLITION MECHANICAL ROOF PLAN
M2.IR	1ST FLOOR MECHANICAL PLAN
M2.2R	2ND FLOOR MECHANICAL PLAN
M2.3R	MECHANICAL ROOF PLAN
M3.IR	MECHANICAL DETAILS
PO.IR	PLUMBING NOTES & DETAILS
P1.IR	1ST FLOOR DEMOLITION PLUMBING PLAN
P2.IR	1ST FLOOR PLUMBING PLAN
P2.2R	2ND FLOOR PLUMBING PLAN
P2.3R	PLUMBING ROOF PLAN
EO.IR	SYMBOL LIST AND SPECIFICATIONS
EO.2R	SINGLE LINE DIAGRAM
E1.IR	ELECTRICAL DEMOLITION PLAN
E1.2R	2ND FLOOR ELECTRICAL DEMO PLAN
E1.3R	ROOF ELECTRICAL DEMO PLAN
E2.IR	FIRST FLOOR ELECTRICAL PLAN
E2.2R	ROOF ELECTRICAL PLAN



BRANDON ETCHEMENDY
REGISTERED PROFESSIONAL ENGINEER
MECHANICAL
No. 18293
Exp. 02/04/20



HVAC RETROFIT
INYO ANNEX BUILDING
168 N EDWARDS ST,
INDEPENDENCE, CALIFORNIA 93526

REVISIONS

DRAWING TITLE

TITLE PAGE

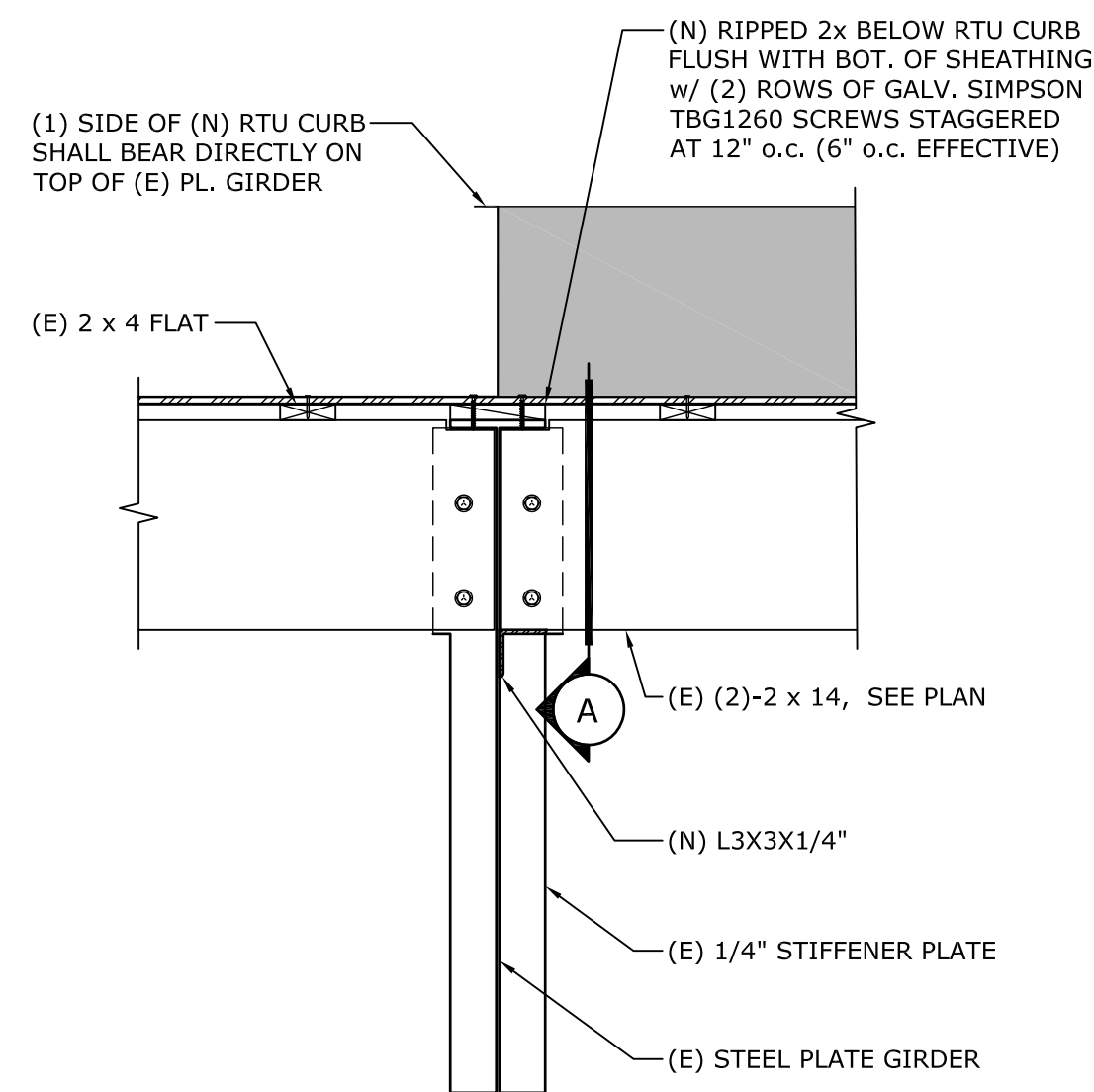
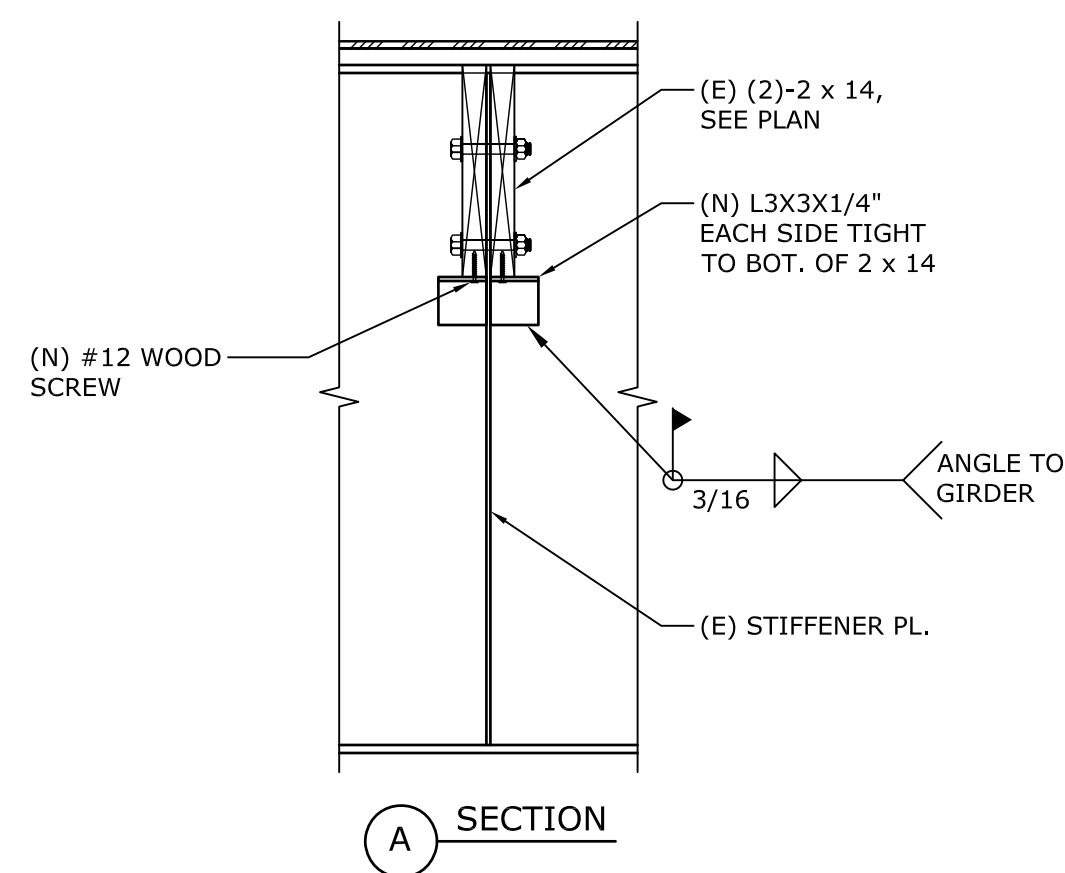
date: 02/04/20

job number: 19030

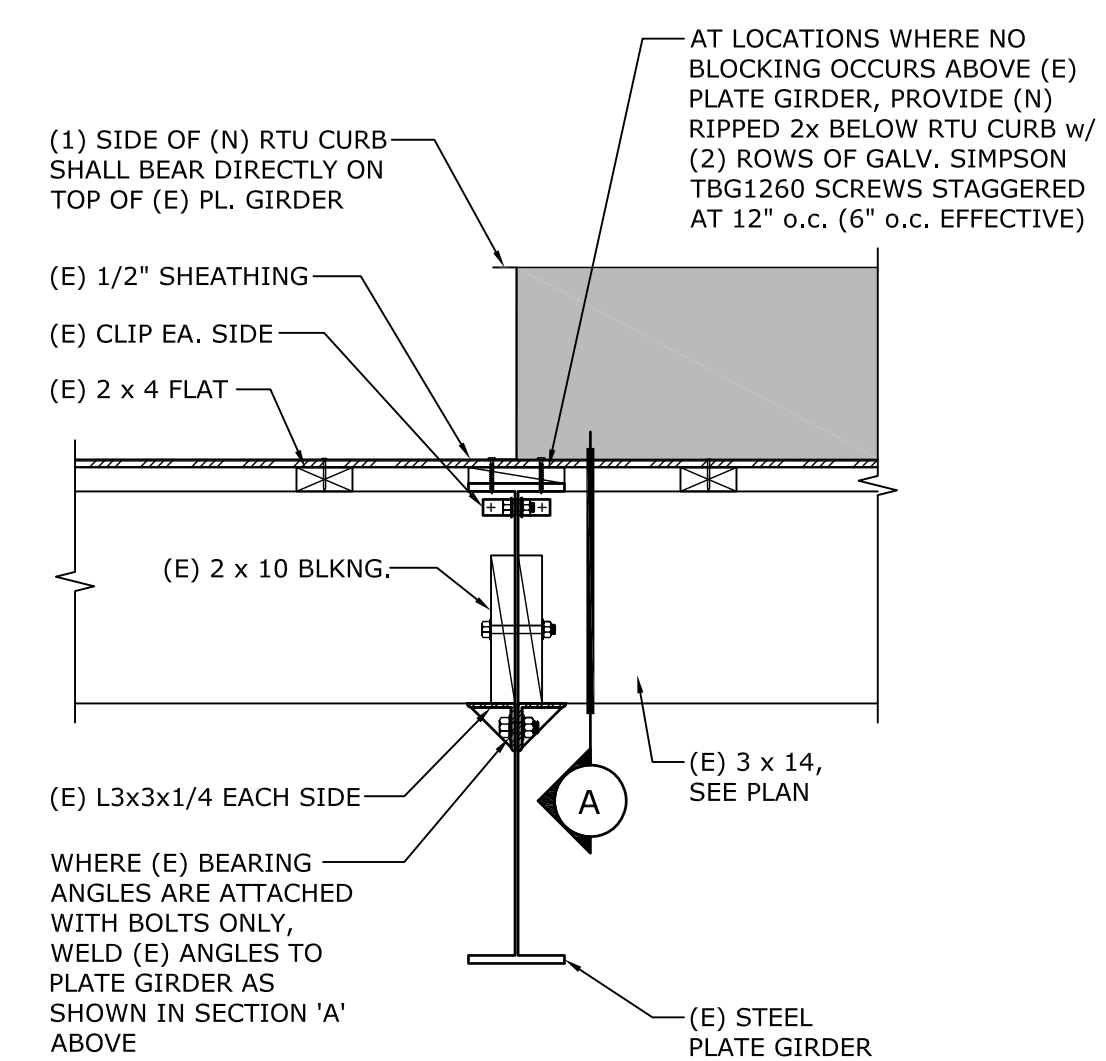
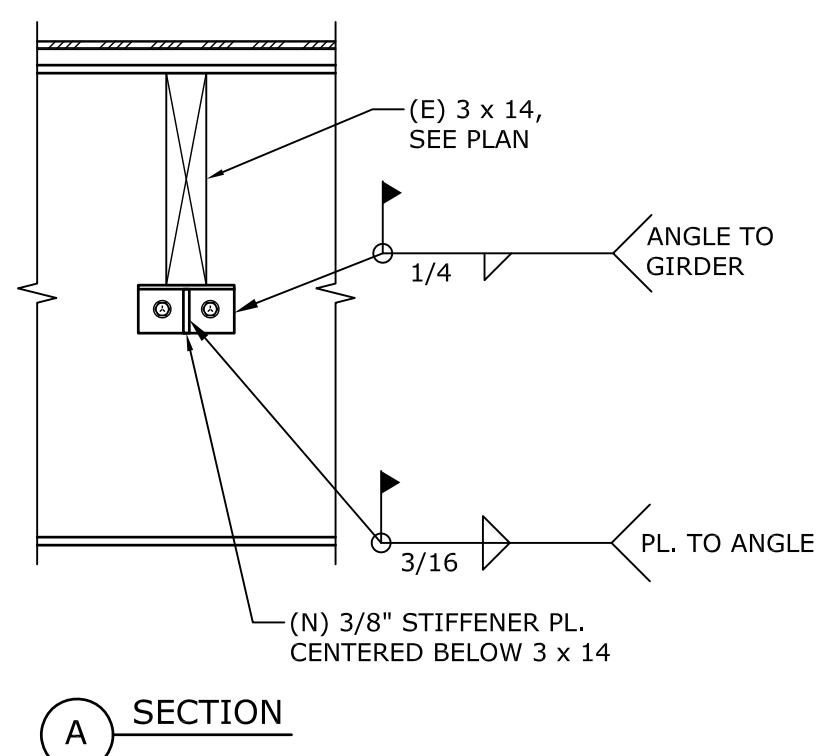
drawn: SME

checked: BAE

TO.IR



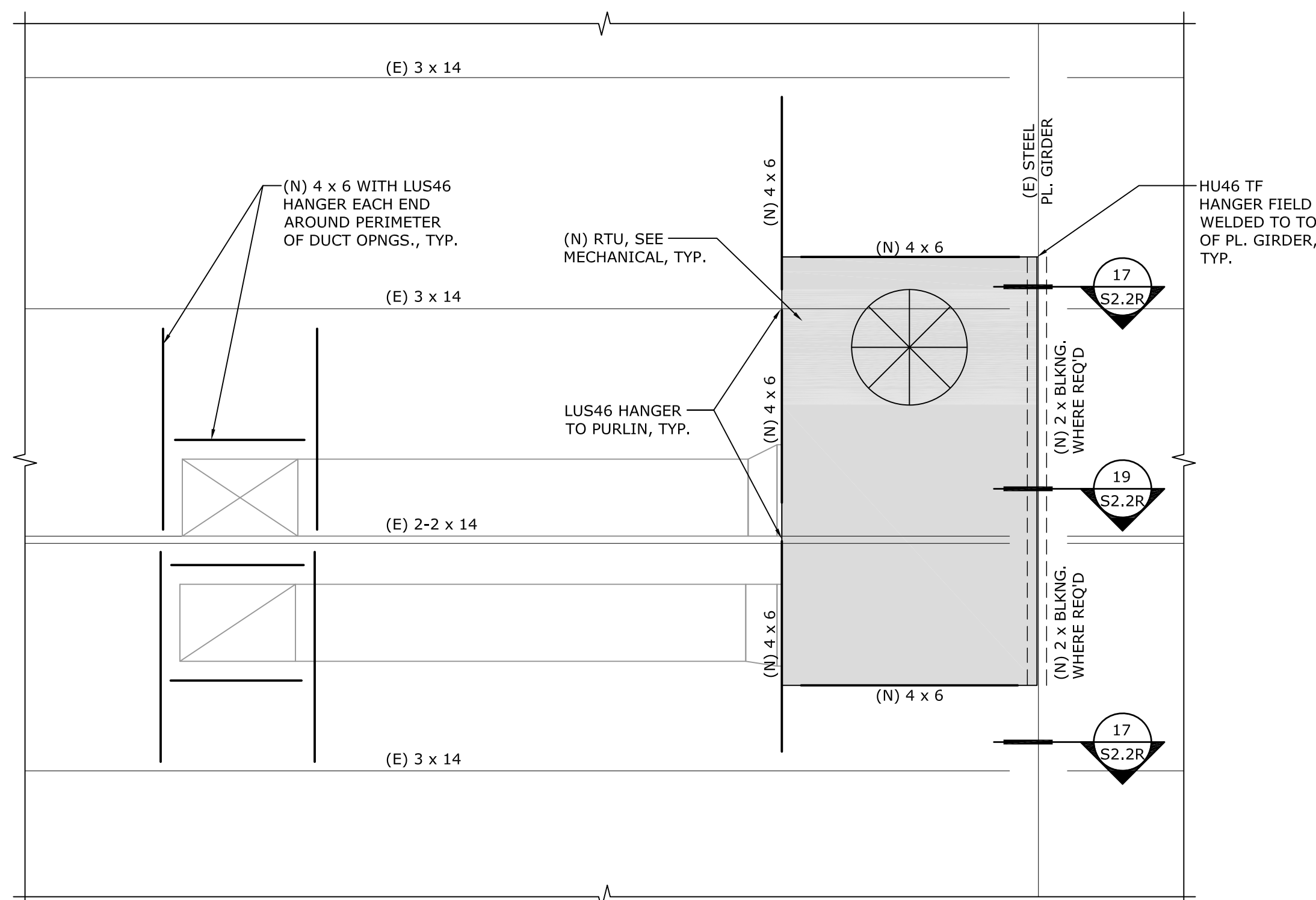
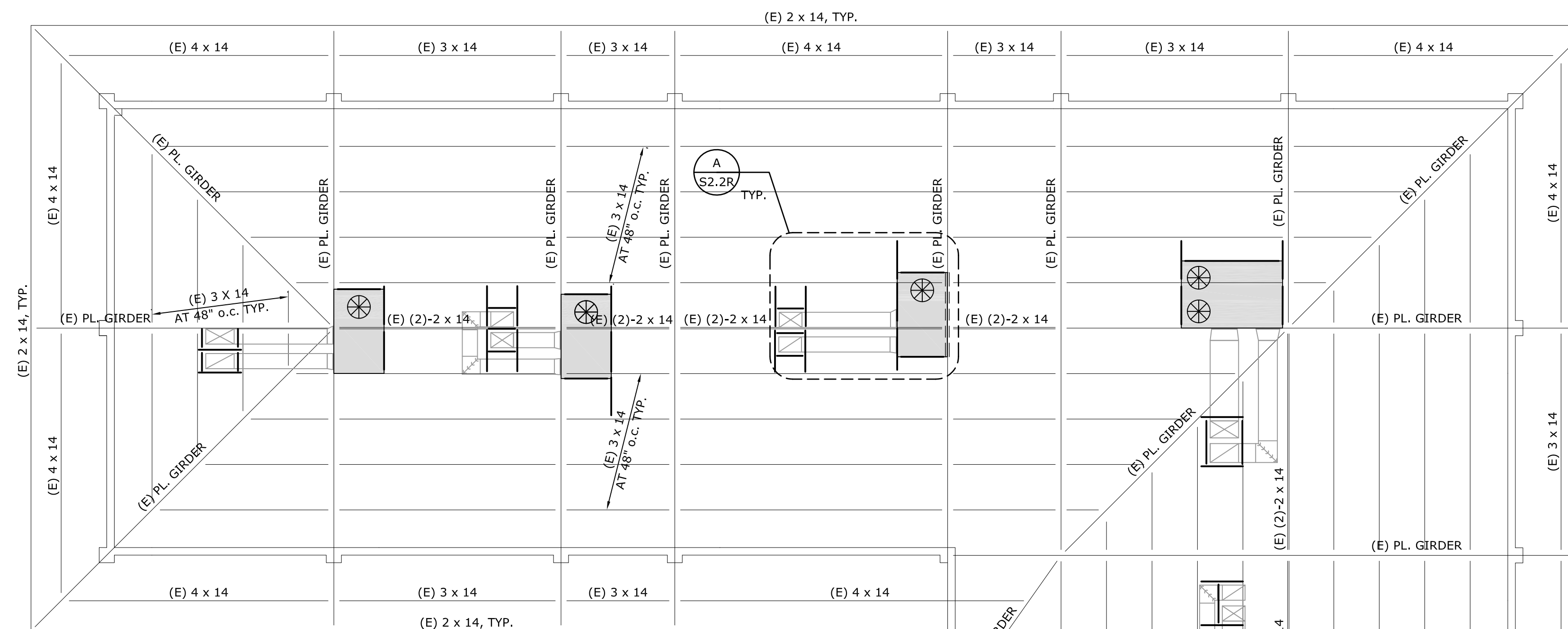
19 2-2x14 PURLIN SEAT AT RETROFIT
SCALE: 1" = 1'-0" S002



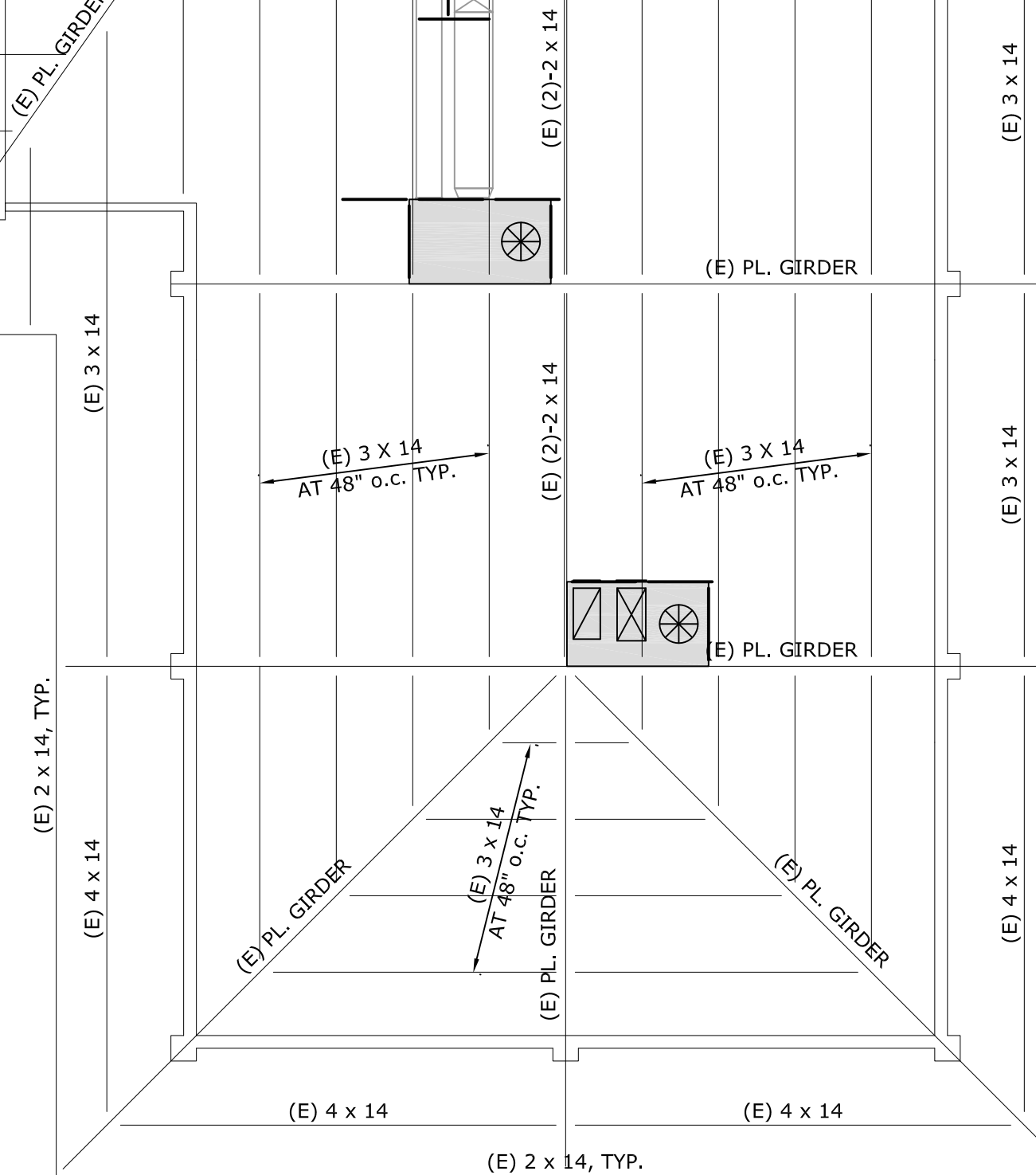
17 3x14 PURLIN SEAT RETROFIT
SCALE: 1" = 1'-0" S001

ROOF FRAMING NOTES

- ALL RETROFITS SHOWN SHALL BE DONE PRIOR TO INSTALLATION OF (N) RTU'S.
- SNOW SHALL NOT BE PRESENT ON THE ROOF DURING CONSTRUCTION.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE BUILDING, WORKERS AND PEDESTRIANS DURING CONSTRUCTION. ANY LOADS PLACED ON ROOF, OTHER THAN THOSE SHOWN HEREIN, SHALL BE REVIEWED BY A PROFESSIONAL ENGINEER (RETAINED BY THE CONTRACTOR) TO ENSURE THE ADEQUACY OF THE EXISTING STRUCTURE. PROVIDE SHORING, TEMPORARY BRACING, ETC., AS NECESSARY TO PREVENT OVERSTRESSING THE EXISTING FRAMING MEMBERS DURING PLACEMENT/MOVEMENT OF THE NEW ROOF TOP UNITS.
- CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS WHEN WELDING ADJACENT TO THE (E) WOOD ROOF TO ENSURE NO SMOKE OR FIRES OCCUR.
- ALL (E) SURFACES TO BE WELDED SHALL BE PREPPED PER AWS STANDARDS PRIOR TO WELDING.
- RE-PAINT (E) PLATE PL. GIRDERS TO MATCH EXISTING AFTER RETROFITS ARE COMPLETE.
- SEISMIC DUCT BRACING, RTU CURBS AND ANCHORAGE TO STRUCTURE TO BE DESIGNED BY OTHERS. CURB DRAWINGS AND CALCULATIONS SHALL BE SUBMITTED TO THE E.O.R. FOR REVIEW AND APPROVAL AND SHALL BE STAMPED BY A LICENSED CALIFORNIA PROFESSIONAL ENGINEER.
- THERE SHALL BE NO (E) MECHANICAL UNITS HUNG FROM THE SAME 3x14 AND DBL. 2x14 PURLINS WHERE (N) RTU'S OCCUR TO AVOID OVERLOADING (E) PURLIN. IF THESE CONDITIONS EXIST, (E) MECHANICAL UNITS SHALL BE REMOVED PRIOR TO INSTALLATION OF (N) RTU.



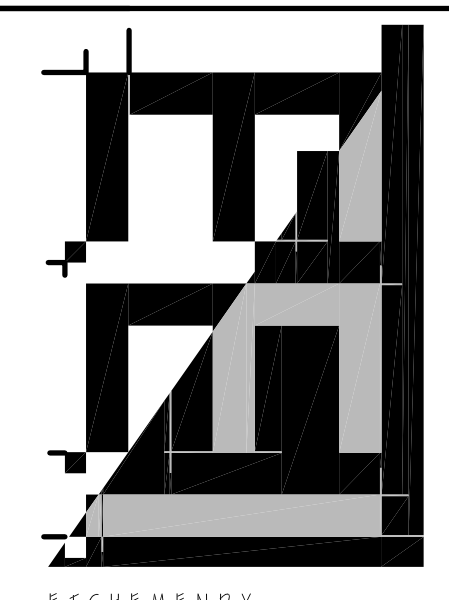
A ENLARGED ROOF FRAMING PLAN
SCALE: 1/2" = 1'-0"



ROOF FRAMING PLAN
SCALE: 1/8" = 1'-0"



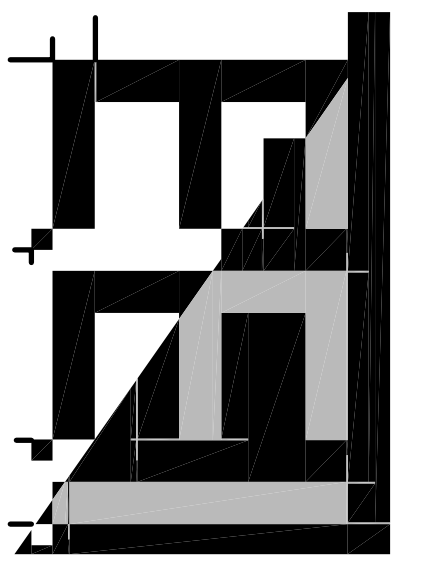
TECTONICS DESIGN GROUP
730 Sandhill Rd., #250, Reno, Nevada 89521
www.tectonicsdesigngroup.com
tel 775-824-9988
fax 775-824-9986



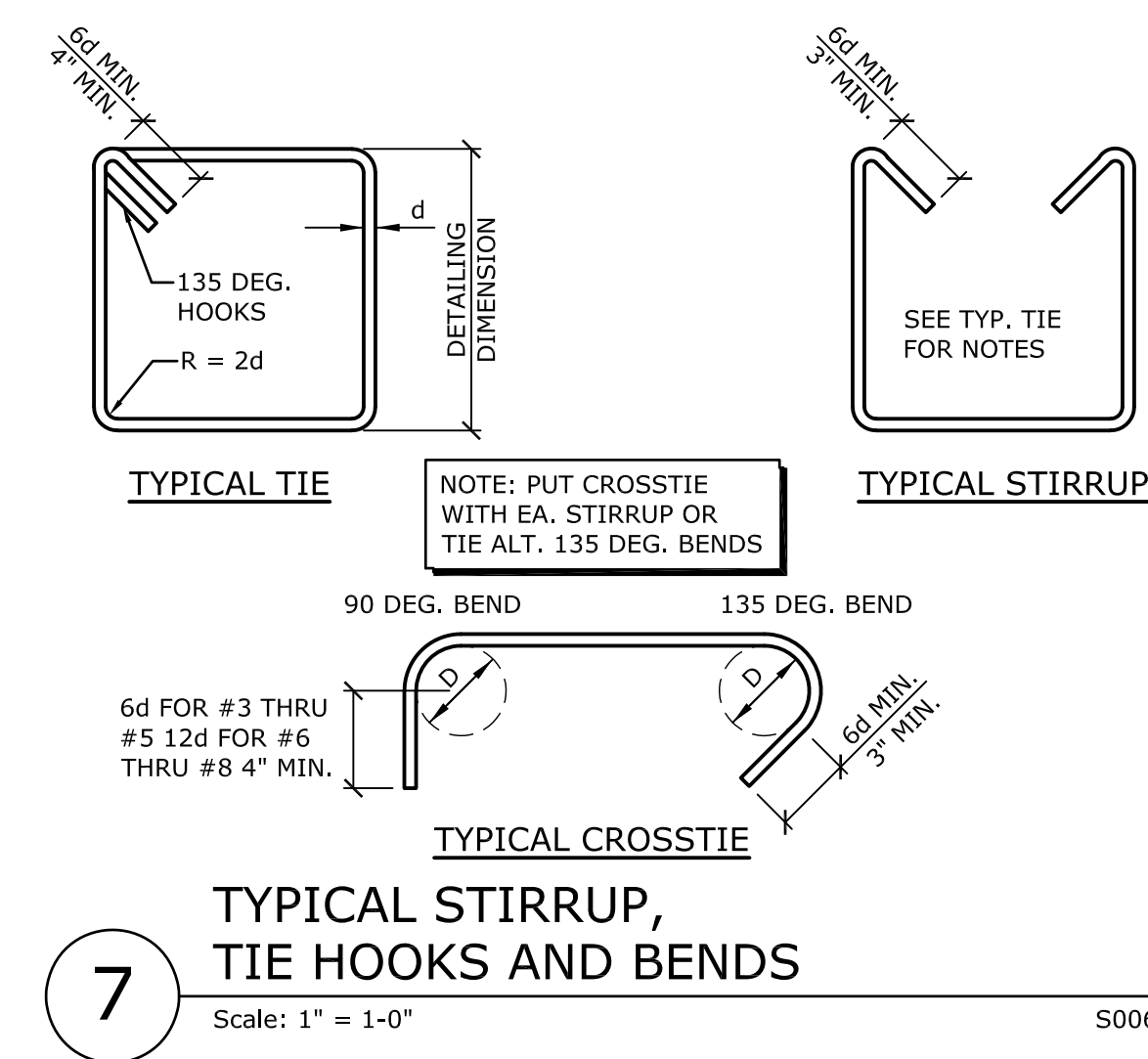
HVAC RETROFIT
INYO ANNEX BUILDING
168 N EDWARDS ST.
INDEPENDENCE, CALIFORNIA

REVISIONS	
DRAWING TITLE	
ROOF FRAMING PLAN AND DETAILS	
date	02/04/20
job number	19153
drawn	SG
checked	EG

S2.2R

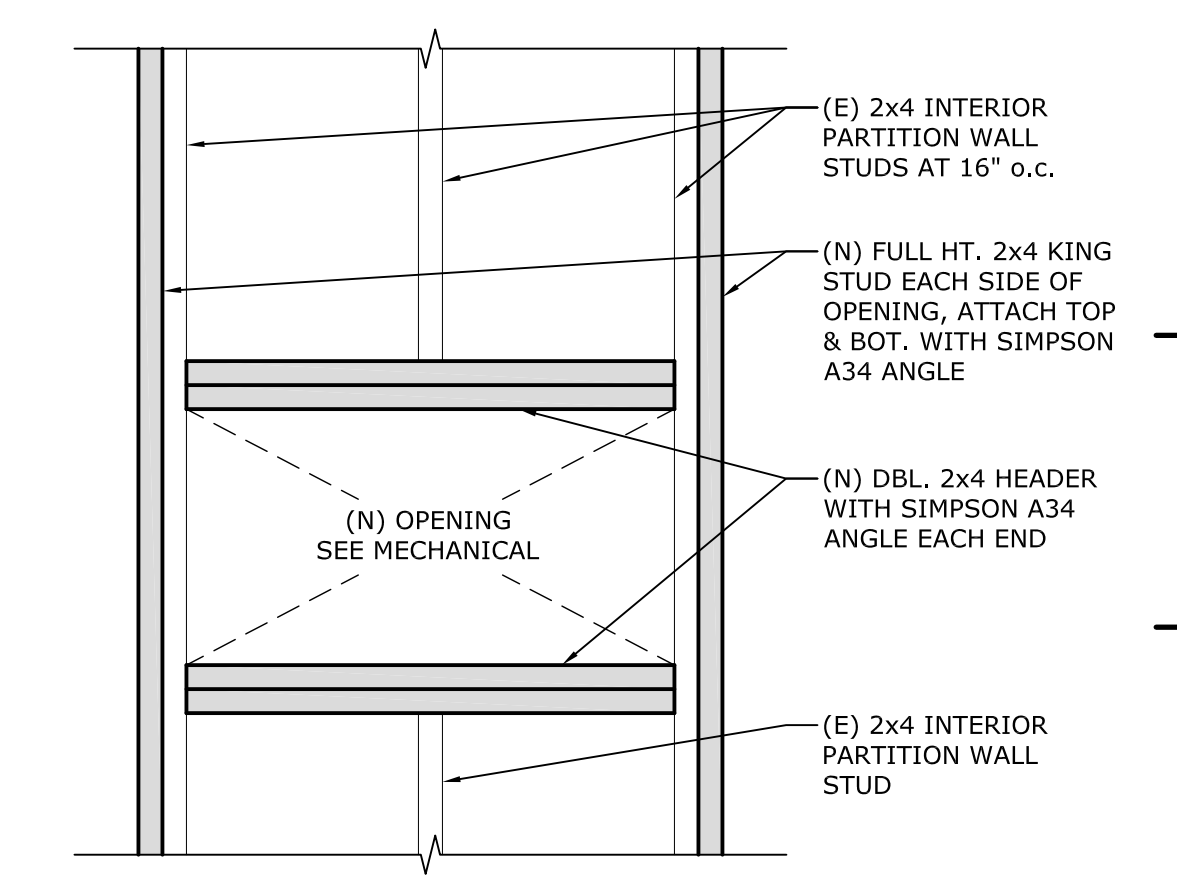
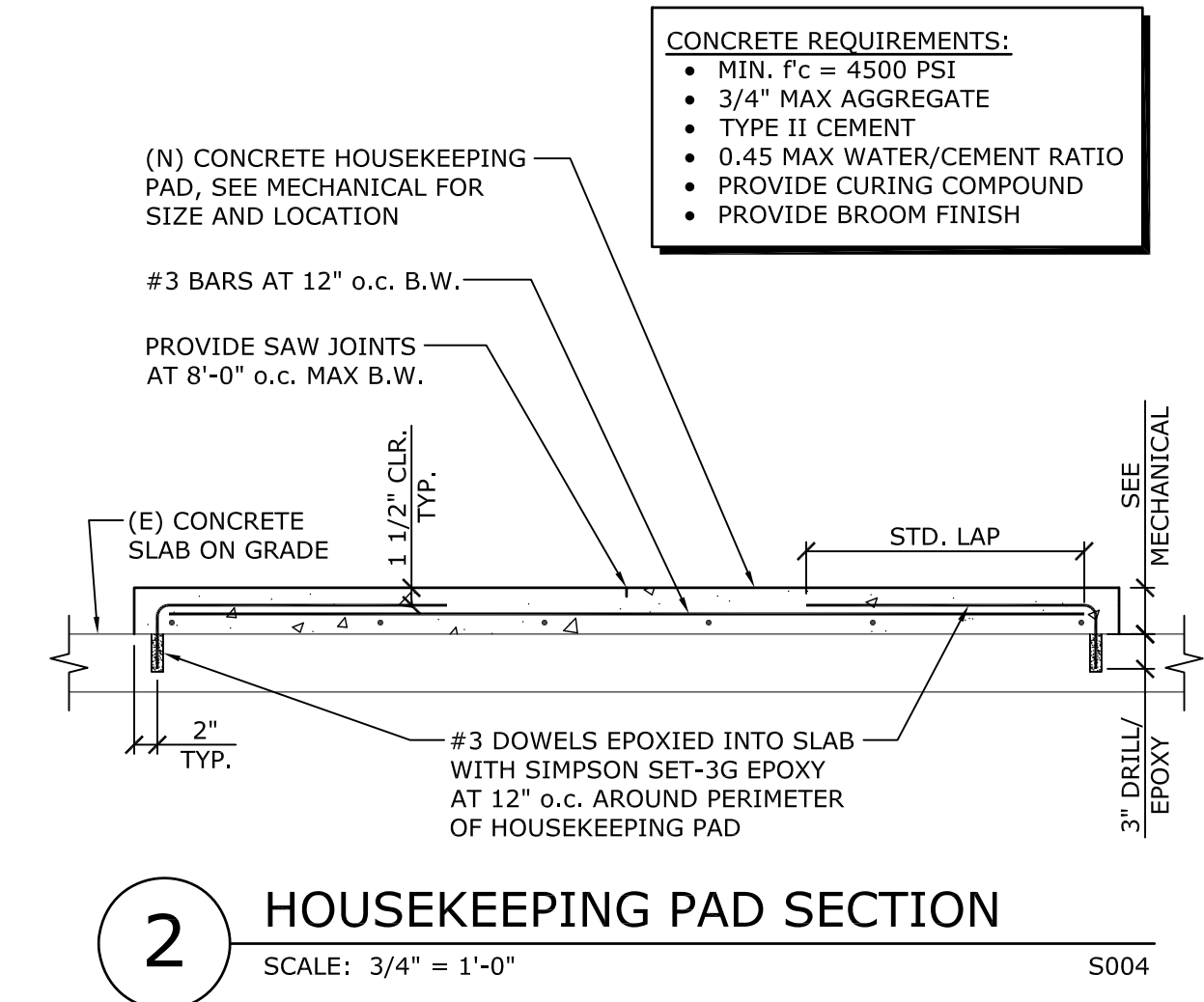


REGISTERED
ENGINEER
NO. 226



f _c	LAP SPLICE LENGTH (INCHES)										
	BAR SIZE										
2,500	31	41	51	61	89	102	115	127	140		
3,000	28	38	47	56	81	93	105	116	128		
3,500	26	35	43	52	75	86	97	108	118		
4,000	25	33	41	49	71	81	91	101	111		
4,500	23	31	38	46	67	76	86	95	104		
5,000	22	29	36	44	63	72	81	90	99		
MASONRY	18	24	30	40	46	61	68	-	-		

- 3** TYP. REINF. LAP SPLICE LENGTHS
Scale: 3/4" = 1'-0" S005
- LAP LENGTHS GIVEN MAY BE DECREASED 30% FOR NORMAL WEIGHT CONCRETE.
 - BARS LARGER THAN #11 SHALL NOT BE LAP SPLICED. PROVIDE APPROVED MECH. COUPLERS OR CP BUTT WELDS AT SPLICES OF BARS GREATER THAN #11.
 - LAP LENGTHS GIVEN SHALL BE INCREASED 20% FOR BUNDLED BARS.
 - INCREASE LAP LENGTHS AN ADDITIONAL 30% IF MORE THAN 12" OF CONCRETE IS POURED BELOW THE LAP AT ONE TIME.



HVAC RETROFIT
INYO ANNEX BUILDING
 168 N EDWARDS ST.
 INDEPENDENCE, CALIFORNIA

REVISIONS	
DRAWING TITLE	
MISC. DETAILS	
date:	02/04/20
job number:	19153
sketch:	SG
checked:	EG

S3.1R

STATE OF CALIFORNIA
MECHANICAL SYSTEMS
CERTIFICATE OF COMPLIANCE
Mechanical Systems
Project Name: Inyo County Annex Bldg Date Prepared: 1/3/2020

CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance January 2016

STATE OF CALIFORNIA
MECHANICAL SYSTEMS
CERTIFICATE OF COMPLIANCE
Mechanical Systems
Project Name: Inyo County Annex Bldg Date Prepared: 1/3/2020

CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance January 2016

STATE OF CALIFORNIA
MECHANICAL SYSTEMS
CERTIFICATE OF COMPLIANCE
Mechanical Systems
Project Name: Inyo County Annex Bldg Date Prepared: 1/3/2020

CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance January 2016

STATE OF CALIFORNIA
MECHANICAL SYSTEMS
CERTIFICATE OF COMPLIANCE
Mechanical Systems
Project Name: Inyo County Annex Bldg Date Prepared: 1/3/2020

CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance January 2016

STATE OF CALIFORNIA
HVAC DRY & WET SYSTEM REQUIREMENTS
CERTIFICATE OF COMPLIANCE
HVAC Dry & Wet System Requirements
Project Name: Inyo County Annex Bldg Date Prepared: 1/3/2020

CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance January 2016

STATE OF CALIFORNIA
HVAC DRY & WET SYSTEM REQUIREMENTS
CERTIFICATE OF COMPLIANCE
HVAC Dry & Wet System Requirements
Project Name: Inyo County Annex Bldg Date Prepared: 1/3/2020

CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance January 2016

STATE OF CALIFORNIA
HVAC DRY & WET SYSTEM REQUIREMENTS
CERTIFICATE OF COMPLIANCE
HVAC Dry & Wet System Requirements
Project Name: Inyo County Annex Bldg Date Prepared: 1/3/2020

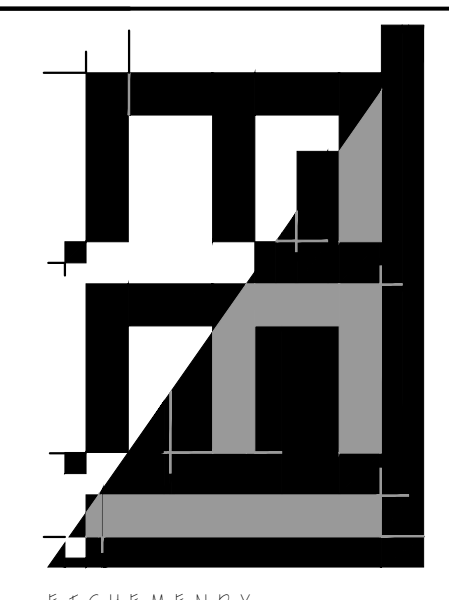
CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance January 2016

STATE OF CALIFORNIA
MECHANICAL VENTILATION AND REHEAT
CERTIFICATE OF COMPLIANCE
Mechanical Ventilation and Reheat
Project Name: Inyo County Annex Bldg Date Prepared: 1/3/2020

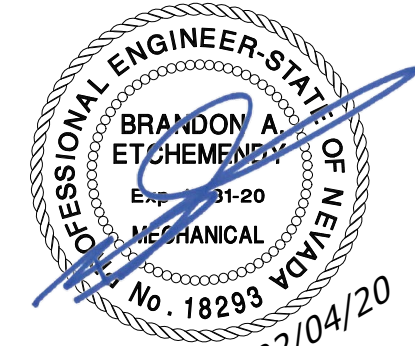
CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance May 2016

STATE OF CALIFORNIA
MECHANICAL VENTILATION AND REHEAT
CERTIFICATE OF COMPLIANCE
Mechanical Ventilation and Reheat
Project Name: Inyo County Annex Bldg Date Prepared: 1/3/2020

CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance May 2016



10947 POOL & SPA RENO NV 89503
P. 775-853-105 F. 775-852-2952
RENOENERGYMECH.COM



02/04/20

HVAC RETROFIT

168 N EDWARDS ST.
INDEPENDENCE, CALIFORNIA 93526

REVISIONS

DRAWING TITLE

T24 COMPLIANCE

Date: 02/04/20
Job Number: 19030
Drawn: SME
Checked: BAE

11.1R

STATE OF CALIFORNIA
FAN POWER CONSUMPTION
 CERTIFICATE OF COMPLIANCE
 Power Consumption of Fans Requirements
 Project Name: Inyo County Annex Bldg
 Date: 1/3/2020
 (Page 2 of 2)

DECLARATION STATEMENT
 I certify that the information provided on this Certificate of Compliance is true and correct.
 I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
 The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
 The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
 I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: Brandon Elchemendy
 Company: Elchemendy Engineering
 Address: 10597 Double R Blvd
 City/State/Zip: Reno, NV 89521
 Date Signed: [Signature]
 License: 36008
 Phone: (775) 853-1131

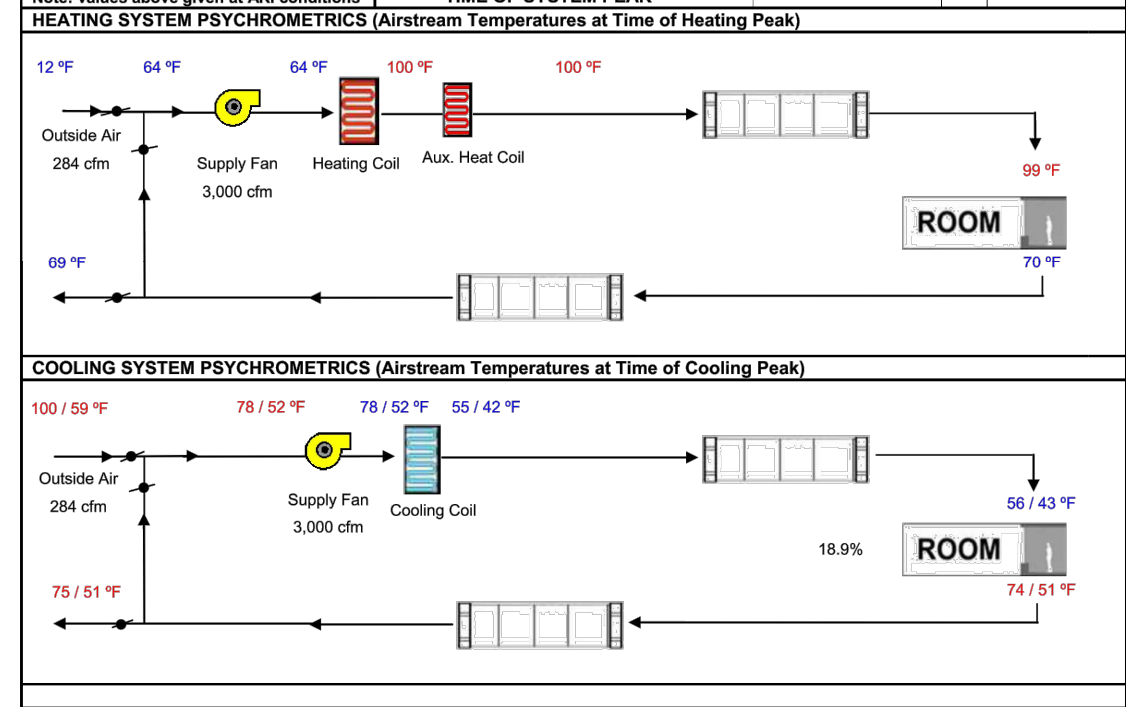
HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY
 Project Name: Inyo County Annex Bldg
 System Name: AHU-1
 Date: 1/3/2020
 Floor Area: 2,006

ENGINEERING CHECKS	SYSTEM LOAD	COIL COOLING PEAK			COIL HTG. PEAK	
		CFM	Sensible	Latent	CFM	Sensible
Number of Systems: 1						
Heating System	Total Room Loads					
Output per System: 117,200	Return Ventilated Lighting	4,122	66,433	4,897	1,955	53,238
Total Output (Btu/h): 117,200	Return Air Ducts					2,602
Output (Btu/h/ft²): 58.3	Return Fan					0
Cooling System	Ventilation	284	6,596	-770	284	15,144
Output per System: 81,600	Supply Fan					0
Total Output (Btu/h): 81,600	Supply Air Ducts					2,952
Output (Btu/h/ft²): 40.7						
Total Output (Tons): 6.6						
Total Output (Btu/h/ft²): 40.7						
Total Output (eq/ft²): 295.0						
	TOTAL SYSTEM LOAD	81,873	4,097			73,485

HVAC EQUIPMENT SELECTION

CFM per System	AHU-1	CFM	HTG. PEAK
3,000		63,213	0
Airflow (cfm)			47,164
Airflow (cfm/ft²)	1.50		21,843
Airflow (cfm/ft²)	1.50		21,843
Airflow (cfm/ft²)	9.78		69,007
Outside Air (%)	0.14		
Outside Air (cfm/ft²)	0.14		

TIME OF SYSTEM PEAK
 Heating System Psychrometrics (Airstream Temperatures at Time of Heating Peak): Jul 4 PM, Jan 1 AM
 Cooling System Psychrometrics (Airstream Temperatures at Time of Cooling Peak): Jul 4 PM, Jan 1 AM



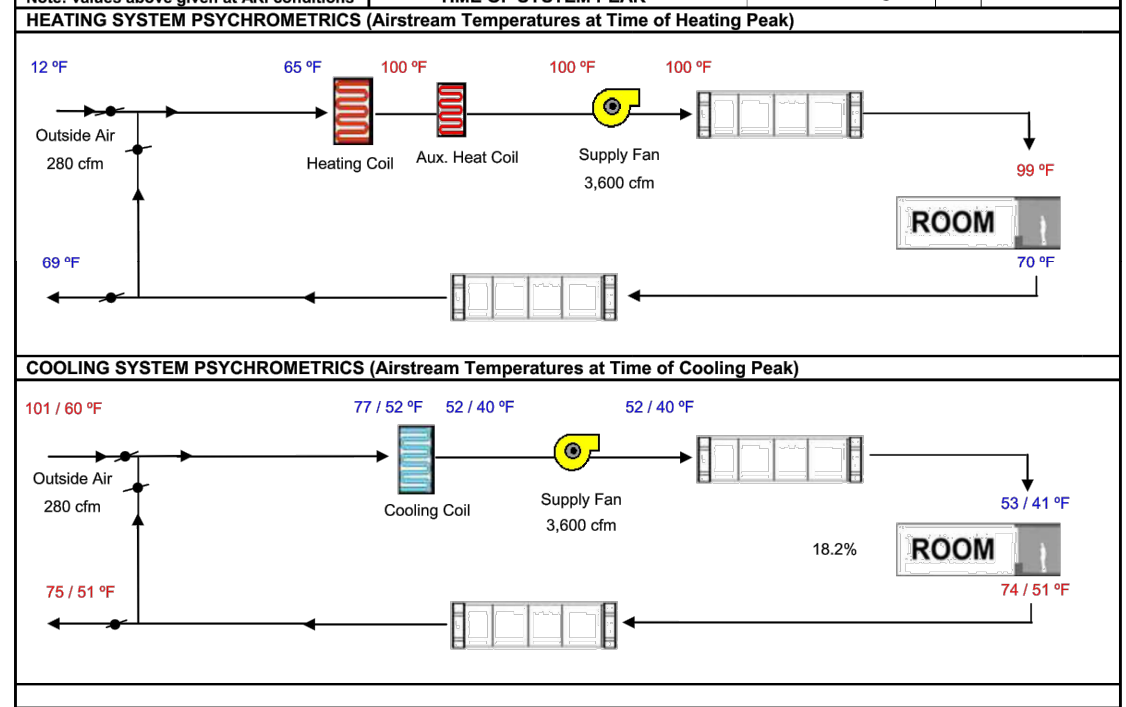
HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY
 Project Name: Inyo County Annex Bldg
 System Name: AHU-2
 Date: 1/3/2020
 Floor Area: 1,879

ENGINEERING CHECKS	SYSTEM LOAD	COIL COOLING PEAK			COIL HTG. PEAK	
		CFM	Sensible	Latent	CFM	Sensible
Number of Systems: 1						
Heating System	Total Room Loads					
Output per System: 110,000	Return Ventilated Lighting	3,680	71,923	4,758	2,509	67,832
Total Output (Btu/h): 110,000	Return Air Ducts					3,397
Output (Btu/h/ft²): 58.6	Return Fan					0
Cooling System	Ventilation	280	6,785	-604	280	14,912
Output per System: 99,170	Supply Fan					0
Total Output (Btu/h): 99,170	Supply Air Ducts					3,397
Output (Btu/h/ft²): 52.8						
Total Output (Tons): 5.1						
Total Output (Btu/h/ft²): 52.8						
Total Output (eq/ft²): 239.5						
	TOTAL SYSTEM LOAD	85,900	4,154			69,637

HVAC EQUIPMENT SELECTION

CFM per System	AHU-2	CFM	HTG. PEAK
3,000		76,051	0
Airflow (cfm)			44,342
Airflow (cfm/ft²)	2.73		33,857
Airflow (cfm/ft²)	2.73		33,857
Airflow (cfm/ft²)	7.93		78,159
Outside Air (%)	0.14		
Outside Air (cfm/ft²)	0.14		

TIME OF SYSTEM PEAK
 Heating System Psychrometrics (Airstream Temperatures at Time of Heating Peak): Aug 3 PM, Jan 1 AM
 Cooling System Psychrometrics (Airstream Temperatures at Time of Cooling Peak): Aug 3 PM, Jan 1 AM



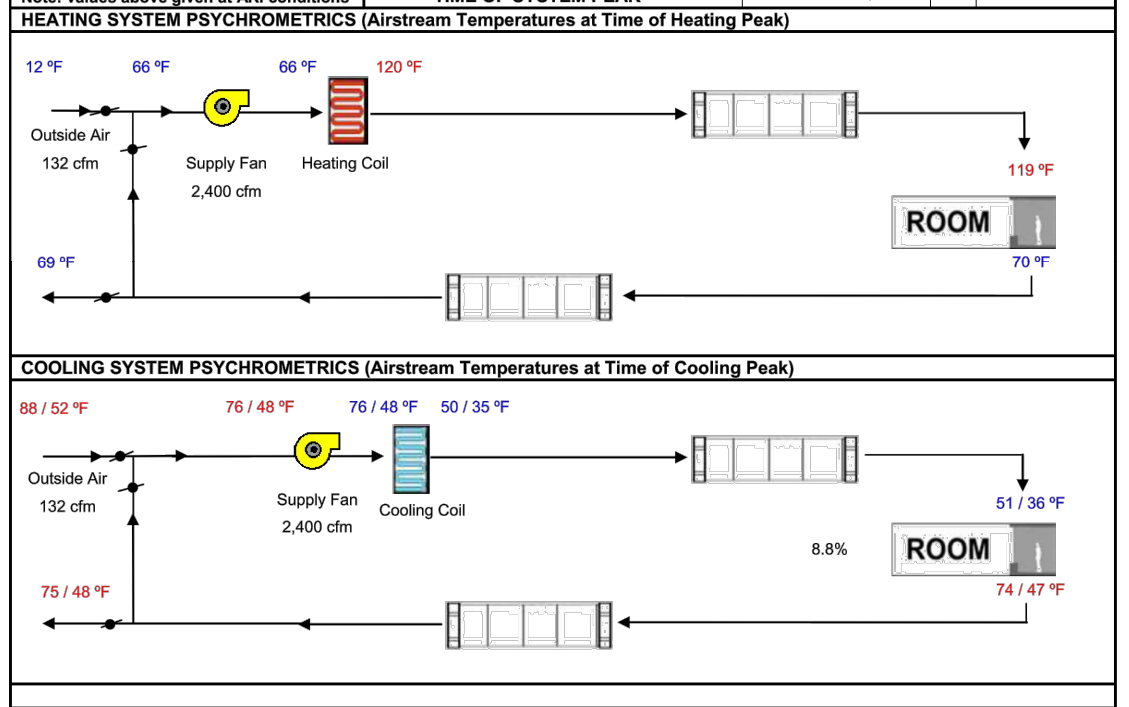
HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY
 Project Name: Inyo County Annex Bldg
 System Name: RTU-1
 Date: 1/3/2020
 Floor Area: 680

ENGINEERING CHECKS	SYSTEM LOAD	COIL COOLING PEAK			COIL HTG. PEAK	
		CFM	Sensible	Latent	CFM	Sensible
Number of Systems: 1						
Heating System	Total Room Loads					
Output per System: 134,400	Return Ventilated Lighting	2,691	57,112	1,854	899	41,208
Total Output (Btu/h): 134,400	Return Air Ducts					2,060
Output (Btu/h/ft²): 197.6	Return Fan					0
Cooling System	Ventilation	132	1,563	-152	132	7,037
Output per System: 67,720	Supply Fan					0
Total Output (Btu/h): 67,720	Supply Air Ducts					2,060
Output (Btu/h/ft²): 100.0						
Total Output (Tons): 3.1						
Total Output (Btu/h/ft²): 100.0						
Total Output (eq/ft²): 155.9						
	TOTAL SYSTEM LOAD	64,376	1,702			52,365

HVAC EQUIPMENT SELECTION

CFM per System	RTU-1	CFM	HTG. PEAK
2,400		52,741	0
Airflow (cfm)			134,400
Airflow (cfm/ft²)	2.73		33,857
Airflow (cfm/ft²)	2.73		33,857
Airflow (cfm/ft²)	5.53		134,400
Outside Air (%)	0.15		
Outside Air (cfm/ft²)	0.15		

TIME OF SYSTEM PEAK
 Heating System Psychrometrics (Airstream Temperatures at Time of Heating Peak): Sep 12 PM, Jan 1 AM
 Cooling System Psychrometrics (Airstream Temperatures at Time of Cooling Peak): Sep 12 PM, Jan 1 AM



CA Building Energy Efficiency Standards - 2016 Nonresidential Compliance January 2016

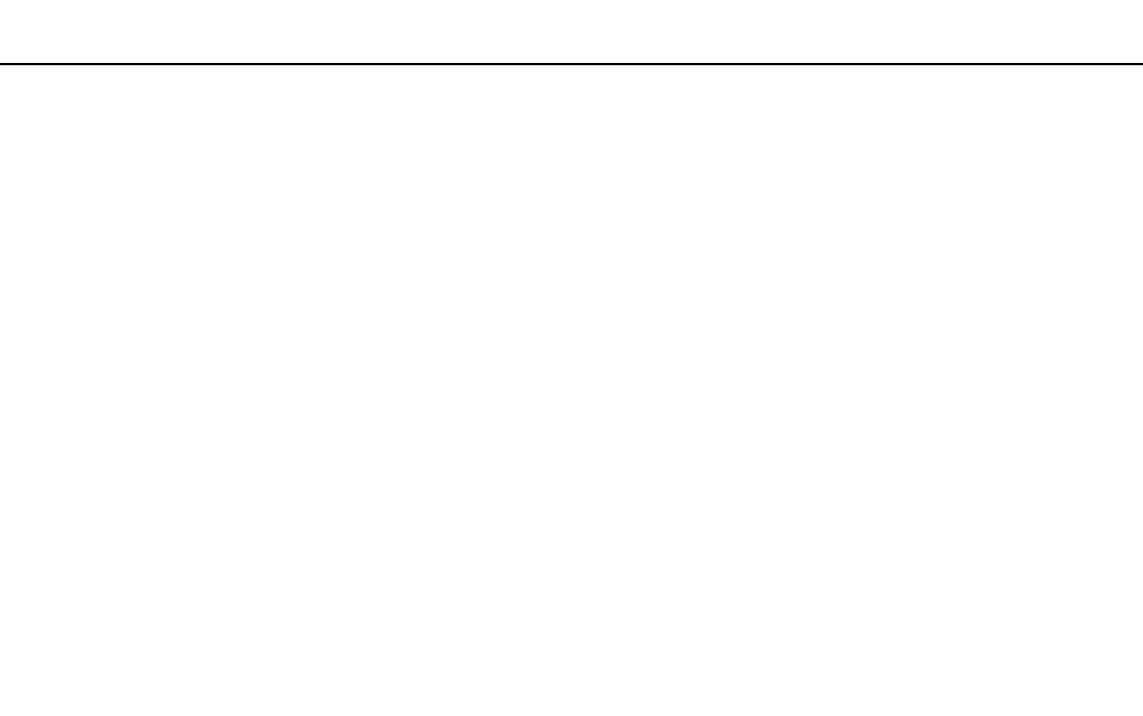
HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY
 Project Name: Inyo County Annex Bldg
 System Name: RTU-2
 Date: 1/3/2020
 Floor Area: 947

ENGINEERING CHECKS	SYSTEM LOAD	COIL COOLING PEAK			COIL HTG. PEAK	
		CFM	Sensible	Latent	CFM	Sensible
Number of Systems: 1						
Heating System	Total Room Loads					
Output per System: 134,400	Return Ventilated Lighting	2,414	47,676	1,854	854	35,370
Total Output (Btu/h): 134,400	Return Air Ducts					1,769
Output (Btu/h/ft²): 141.9	Return Fan					0
Cooling System	Ventilation	119	2,571	-102	119	6,398
Output per System: 78,270	Supply Fan					0
Total Output (Btu/h): 78,270	Supply Air Ducts					1,769
Output (Btu/h/ft²): 82.6						
Total Output (Tons): 6.5						
Total Output (Btu/h/ft²): 82.6						
Total Output (eq/ft²): 129.9						
	TOTAL SYSTEM LOAD	95,014	1,792			45,305

HVAC EQUIPMENT SELECTION

CFM per System	RTU-2	CFM	HTG. PEAK
3,000		60,199	0
Airflow (cfm)			134,400
Airflow (cfm/ft²)	3.54		489.9
Airflow (cfm/ft²)	3.54		489.9
Airflow (cfm/ft²)	4.05		134,400
Outside Air (%)	0.14		
Outside Air (cfm/ft²)	0.14		

TIME OF SYSTEM PEAK
 Heating System Psychrometrics (Airstream Temperatures at Time of Heating Peak): Jul 5 PM, Jan 1 AM
 Cooling System Psychrometrics (Airstream Temperatures at Time of Cooling Peak): Jul 5 PM, Jan 1 AM



HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY
 Project Name: Inyo County Annex Bldg
 System Name: RTU-3
 Date: 1/3/2020
 Floor Area: 593

ENGINEERING CHECKS	SYSTEM LOAD	COIL COOLING PEAK			COIL HTG. PEAK	
		CFM	Sensible	Latent	CFM	Sensible
Number of Systems: 1						
Heating System	Total Room Loads					
Output per System: 134,400	Return Ventilated Lighting	1,596	29,917	1,186	598	16,519
Total Output (Btu/h): 134,400	Return Air Ducts					836
Output (Btu/h/ft²): 226.8	Return Fan					0
Cooling System	Ventilation	89	1,059	-97	89	4,772
Output per System: 39,410	Supply Fan					0
Total Output (Btu/h): 39,410	Supply Air Ducts					826
Output (Btu/h/ft²): 66.3						
Total Output (Tons): 3.3						
Total Output (Btu/h/ft²): 66.3						
Total Output (eq/ft²): 190.6						
	TOTAL SYSTEM LOAD	33,863	1,089			22,943

HVAC EQUIPMENT SELECTION

CFM per System	RTU-3	CFM	HTG. PEAK
1,600		30,642	0
Airflow (cfm)			134,400
Airflow (cfm/ft²)	2.70		487.2
Airflow (cfm/ft²)	2.70		487.2
Airflow (cfm/ft²)	5.68		134,400
Outside Air (%)	0.15		
Outside Air (cfm/ft²)	0.15		

TIME OF SYSTEM PEAK
 Heating System Psychrometrics (Airstream Temperatures at Time of Heating Peak): Sep 12 PM, Jan 1 AM
 Cooling System Psychrometrics (Airstream Temperatures at Time of Cooling Peak): Sep 12 PM, Jan 1 AM



HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY
 Project Name: Inyo County Annex Bldg
 System Name: RTU-4
 Date: 1/3/2020
 Floor Area: 2,212

ENGINEERING CHECKS	SYSTEM LOAD	COIL COOLING PEAK			COIL HTG. PEAK	
		CFM	Sensible	Latent	CFM	Sensible
Number of Systems: 1						
Heating System	Total Room Loads					
Output per System: 168,000	Return Ventilated Lighting	3,972	71,356	4,888	1,855	54,425
Total Output (Btu/h): 168,000	Return Air Ducts					2,721
Output (Btu/h/ft²): 75.9	Return Fan					0
Cooling System	Ventilation	332	7,841	-500	332	17,792
Output per System: 117,900	Supply Fan					0
Total Output (Btu/h): 117,900	Supply Air Ducts					2,721
Output (Btu/h/ft²): 53.3						
Total Output (Tons): 6.8						
Total Output (Btu/h/ft²): 53.3						
Total Output (eq/ft²): 225.1						
	TOTAL SYSTEM LOAD	86,333	4,368			77,659

HVAC EQUIPMENT SELECTION

CFM per System	RTU-4	CFM	HTG. PEAK
5,000		90,261	0
Airflow (cfm)			168,000
Airflow (cfm/ft²)	2.26		509.8
Airflow (cfm/ft²)	2.26		509.8
Airflow (cfm/ft²)	6.93		168,000
Outside Air (%)	0.15		
Outside Air (cfm/ft²)	0.15		

TIME OF SYSTEM PEAK
 Heating System Psychrometrics (Airstream Temperatures at Time of Heating Peak): Jul 4 PM, Jan 1 AM
 Cooling System Psychrometrics (Airstream Temperatures at Time of Cooling Peak): Jul 4 PM, Jan 1 AM



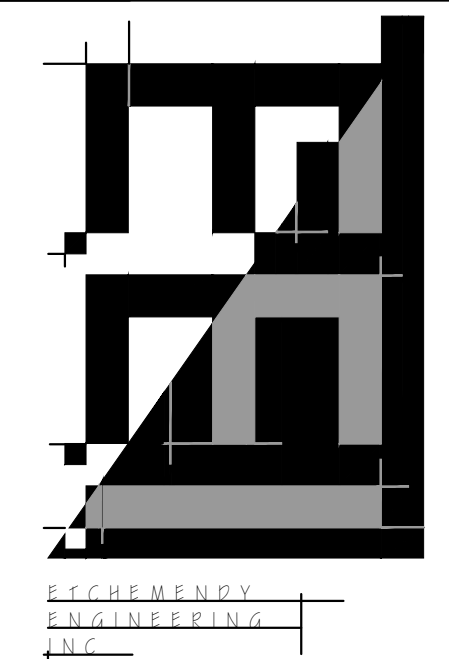
HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY
 Project Name: Inyo County Annex Bldg
 System Name: RTU-5
 Date: 1/3/2020
 Floor Area: 2,019

ENGINEERING CHECKS	SYSTEM LOAD	COIL COOLING PEAK			COIL HTG. PEAK	
		CFM	Sensible	Latent	CFM	Sensible
Number of Systems: 1						
Heating System	Total Room Loads					
Output per System: 134,400	Return Ventilated Lighting	3,604	75,198	4,076	1,456	65,966
Total Output (Btu/h): 134,400	Return Air Ducts					3,298
Output (Btu/h/ft²): 66.6	Return Fan					0
Cooling System	Ventilation	285	6,727	-428	285	15,590
Output per System: 67,720	Supply Fan					0
Total Output (Btu/h): 67,720	Supply Air Ducts					3,298
Output (Btu/h/ft²): 33.5						
Total Output (Tons): 3.1						
Total Output (Btu/h/ft²): 33.5						
Total Output (eq/ft²): 357.8						
	TOTAL SYSTEM LOAD	89,379	3,247			86,153

HVAC EQUIPMENT SELECTION

CFM per System	RTU-5	CFM	HTG. PEAK
2,400		52,758	0
Airflow (cfm)			134,400
Airflow (cfm/ft²)	1.19		425.3
Airflow (cfm/ft²)	1.19		425.3
Airflow (cfm/ft²)	12.33		134,400
Outside Air (%)	0.15		
Outside Air (cfm/ft²)	0.15		

TIME OF SYSTEM PEAK
 Heating System Psychrometrics (Airstream Temperatures at Time of Heating Peak): Jul 2 PM, Jan 1 AM
 Cooling System Psychrometrics (Airstream Temperatures at Time of Cooling Peak): Jul 2 PM, Jan 1 AM



PROFESSIONAL ENGINEER STATE OF NEVADA
 BRANDON ELCHEMENDY
 MECHANICAL
 No. 18293
 02/04/20

HVAC RETROFIT
 INYO ANNEX BUILDING
 168 N EDWARDS ST.
 INDEPENDENCE, CALIFORNIA 93526

REVISIONS

DRAWING TITLE
 T24 COMPLIANCE

Date: 02/04/20
 Job Number: 19030
 Drawn: SME
 Check: BAE

GENERAL NOTES:

STANDARDS AND CODES: LATEST EDITION OF THE CALIFORNIA MECHANICAL CODE (CMC), AS WELL AS ALL APPLICABLE STATE AND LOCAL CODES AND ORDINANCES. THIS DOES NOT RELIEVE THE CONTRACTOR FROM FURNISHING AND INSTALLING WORK SHOWN OR SPECIFIED WHICH MAY EXCEED THE REQUIREMENTS OF SUCH ORDINANCES, LAWS, REGULATIONS AND CODES.

COMPLETE INSTALLATION: PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, TOOLS, ACCESSORIES, ETC., NECESSARY TO ACCOMPLISH A COMPLETE MECHANICAL SYSTEM IN ACCORDANCE WITH THE PLANS TOGETHER WITH THE SPECIFICATIONS.

PERMITS: OBTAIN AND PAY FOR ALL BUILDING AND WORKING PERMITS AND INSPECTION FEES REQUIRED FOR THIS PROJECT.

DRAWINGS: DATA PRESENTED ON THESE DRAWINGS SHALL BE FIELD VERIFIED SINCE ALL DIMENSIONS, LOCATIONS, AND LEVELS ARE GOVERNED BY ACTUAL FIELD CONDITIONS. REVIEW ALL ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL, AND SPECIALTY SYSTEMS DRAWINGS AND ADJUST ALL WORK TO MEET THE REQUIREMENTS ON CONDITIONS SHOWN THEREON. DO NOT SCALE MECHANICAL PLANS FOR EQUIPMENT, DUCTING, PIPING, APPLIANCE ETC. LOCATIONS. USE CONFIGURED DIMENSIONS IF GIVEN OR CHECK ARCHITECTURAL DRAWINGS.

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LOCATIONS: INDICATED LOCATIONS OF ALL EQUIPMENT, DUCTING, PIPING ETC. ARE SUBJECT TO CHANGE. SHIFT/RELOCATE/RECONFIGURE ANY OR CONNECTION POINT UP TO 10' AS DIRECTED BY ENGINEER, AT NO ADDED COST.

RECORD DRAWINGS: CONTRACTOR SHALL PROVIDE, PRIOR TO FINAL ACCEPTANCE AND OBSERVATION, ONE SET OF REVISED RECORD MECHANICAL CONSTRUCTION DOCUMENTS ON REPRODUCIBLE MEDIUM, INDICATING THE FOLLOWING ADDITIONAL INFORMATION:

RECORD NOTATIONS SHALL BE CLEARLY DRAWN AT A DRAFTING APPEARANCE EQUAL TO THE ORIGINAL DRAWINGS. CONTRACTOR SHALL ALSO PROVIDE ALL OPERATING AND MAINTENANCE MANUALS PRIOR TO FINAL PAYMENT.

EXAMINATION OF SITE AND EXISTING CONDITIONS: BEFORE SUBMITTING A PROPOSAL, CONTRACTOR SHALL EXAMINE THE SITE AND FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS AND LIMITATIONS. NO EXTRAS WILL BE ALLOWED BECAUSE OF THE CONTRACTOR'S MISUNDERSTANDING OF THE AMOUNT OF WORK INVOLVED OR HIS LACK OF KNOWLEDGE OF ANY SITE CONDITIONS WHICH MAY AFFECT HIS WORK. ANY APPARENT VARIANCE OF THE DRAWINGS OR SPECIFICATIONS FROM THE EXISTING CONDITIONS AT THE SITE SHALL BE CALLED TO THE ATTENTION OF THE ENGINEER BEFORE SUBMITTING A PROPOSAL.

SEISMIC RESTRAINT: ALL BUILDING HVAC SYSTEMS, INCLUDING DUCTWORK, IS TO BE SEISMICALLY RESTRAINED PER THE UNIFORM MECHANICAL CODES, INTERNATIONAL BUILDING CODE, AMERICAN SOCIETY OF CIVIL ENGINEERS AND STRUCTURAL ENGINEERING INSTITUTE. RESTRAINT SYSTEMS ARE TO BE COMPLETED IN A "DESIGN BUILD" FASHION BY THE AWARDED CONTRACTOR AND ARE TO BE INCLUDED IN THE PROJECT BID. THE CONTRACTOR IS TO ENLIST A QUALIFIED LICENSED PROFESSIONAL TO PROVIDE COMPREHENSIVE DESIGN CALCULATIONS AND SHOP DRAWINGS FOR SAID SYSTEMS. ALL DESIGN DATA AND DETAILED DRAWINGS ARE TO BE PROVIDED TO THE ENGINEER AND AUTHORITY HAVING JURISDICTION FOR REVIEW AND APPROVAL DURING THE SUBMITTAL PROCESS.

EXISTING CONDITIONS: ALL (E) SIZES AND LOCATIONS ARE APPROXIMATIONS AND ARE TO BE FIELD VERIFIED BY THE CONTRACTOR PRIOR COMMENCEMENT OF ANY WORK. NO ADDITIONAL FEES WILL BE ALLOWED DUE TO LACK OF FIELD VERIFICATION.

EQUIPMENT: ALL HVAC AND REFRIGERATION EQUIPMENT SHALL NOT CONTAIN CFC OR HALONS.

DUCT LEAKAGE & VERIFICATION: ALL DUCT CONSTRUCTION SHALL COMPLY WITH TITLE 24 SECTION 120.4.1 (M) (B) (2) FOR ALTERED SYSTEMS. DUCT LEAKAGE FOR ENTIRELY NEW OR REPLACEMENT DUCT SYSTEMS SHALL BE EQUAL TO OR LESS THAN 4 PERCENT OF THE SYSTEM AIR HANDLER AIRFLOW. THIS IS TO BE CONFIRMED BY FIELD VERIFICATION AND DIAGNOSTIC TESTING BY THE AIR BALANCE CONTRACTOR. TESTING SHALL BE PER THE PROJECT SPECIFICATIONS (AABC CONTRACTOR) AND THE TITLE 24 NONRESIDENTIAL APPENDIX SECTION N42.1.4.2.

LISTINGS: ALL MECHANICAL EQUIPMENT AND DUCTWORK SHALL BE LISTED AND LABELED BY AN APPROVED AGENCY. INSTALLATION SHALL BE IN ACCORDANCE WITH APPROVED LISTING.

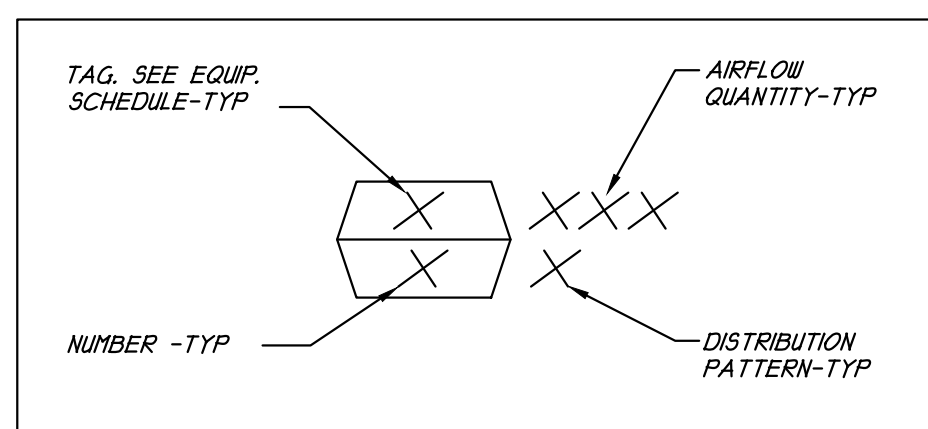
MECHANICAL LEGEND

SYMBOL	ABBREVIATION	INTENT
		RIGID DUCT
		INTERNALLY LINED DUCTWORK
		RIGID EXHAUST DUCT
		DUCT DOWN
		DUCT UP
		TURNING VANES
	D	SUPPLY AIR
	G	RETURN AIR
	EXH	EXHAUST AIR
	D	SUPPLY AIR
	G	RETURN AIR
	MVD	MANUAL VOLUME DAMPER
	AD	AUTOMATIC DAMPER (MOTORIZED)
	FLEX	FLEXIBLE DUCTWORK
		VERTICAL BRANCH WITH DAMPER
	DOWN	PIPE DOWN
	UP	PIPE UP
	Ø	DIAMETER ROUND
	(N)	NEW
	(E)	EXISTING
	●	POINT OF CONNECTION
	⊙	POINT OF DISCONNECT
	AFF	ABOVE FINISHED FLOOR
	BFF	BELOW FINISHED FLOOR
	AFG	ABOVE FINISHED GRADE
	TYP	TYPICAL
	MIN	MINIMUM
	CFM	CUBIC FEET PER MINUTE
	OSA	OUTSIDE AIR
	ESP	EXTERNAL STATIC PRESSURE
	BTU, BTUH	BRITISH THERMAL UNIT PER HOUR
	MBH	THOUSAND BTU
	CLG	COOLING
	HTG	HEATING
	CAP	CAPACITY
	SENS	SENSIBLE
	LTNT	LATENT
	C	CONDENSATE DRAIN
	RLL	REFRIGERATION LIQUID LINE
	RSL	REFRIGERATION SUCTION LINE
		BALL VALVE
		BALANCING VALVE
		BUTTERFLY VALVE
		AUTOMATIC CONTROL VALVE (2-8A1)
		AUTOMATIC CONTROL VALVE (3-8A1)
		MOTORIZED VALVE
		PRESSURE REDUCING VALVE

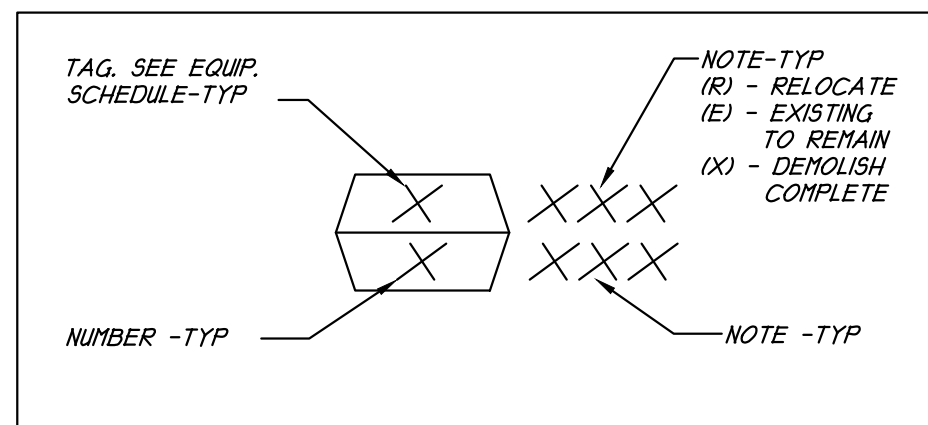
PROJECT NOTES:

- BUILDING TO REMAIN OPERATIONAL DURING CONSTRUCTION AND IMPACTS TO BUSINESS OPERATIONS ARE TO BE MINIMIZED TO ONLY THOSE ABSOLUTELY NECESSARY. ANY DISRUPTION TO BUSINESS OPERATIONS TO BE COORDINATED A MINIMUM OF 1 DAYS IN ADVANCE.
- WHERE POSSIBLE ALL DEMOLISHED EQUIPMENT ON THE 2ND FLOOR IS TO BE REMOVED THRU (E) ROOF OPENINGS OR (N) ROOF OPENINGS.
- MAXIMUM TWO AIR HANDLERS ARE TO BE REMOVED OR UN-OPERATIONAL AT ANY GIVEN TIME, DOWN TIME TO BE 1 WEEK MAXIMUM. ALL DOWNTIME TO BE SCHEDULED WITH OWNER MIN 14 DAYS IN ADVANCE.
- FIRST FLOOR AIR HANDLER DOWNTIME TO BE SCHEDULED WITH OWNER 1 MONTH IN ADVANCE.
- ALL HVAC SYSTEMS TO REMAIN FULLY OPERATIONAL, IN CURRENT CONDITIONS, UNTIL REPLACED. (E) CENTRAL PLANT TO REMAIN OPERATIONAL UNTIL FINAL CONNECTED AIR HANDLER IS DEMOLISHED.

DIFFUSER/GRILLE SYMBOL LEGEND



EQUIPMENT SYMBOL LEGEND



PACKAGED ROOFTOP UNIT SCHEDULE

TAG	MANUF	MODEL	COOLING CAPACITY				HEATING CAPACITY			EFFICIENCY		FAN SECTION			OSA		ELECTRICAL				WEIGHT	REMARKS
			TOTAL	SENS	LTNT	EAT	LAT	INPUT	EAT	LAT	EER	AFUE	CFM	ESP	BHP	CFM	VOLTAGE	PHASE	MCA	MOCP		
RTU 1	TRANE	YHC02F4	47.7	42.1	5.4	14"DB 57"WB	57"DB 46"WB	200	43"DB	125"DB	12.4	80%	2.3%	1.0"	0.82	240	400	3	20	25	1500	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
RTU 2	TRANE	YHC02F4	78.3	74.0	4.7	14"DB 57"WB	52"DB 47"WB	200	43"DB	113"DB	12.5	80%	3.000	1.0"	1.18	300	400	3	22	25	1500	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
RTU 3	TRANE	YHC04E4	39.4	34.8	2.4	14"DB 57"WB	53"DB 49"WB	120	43"DB	114"DB	11.5 SEER	80%	1.400	0.4"	0.47	140	400	3	14	20	1200	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12
RTU 4	TRANE	YSH50G1	117.9	117.5	0.4	14"DB 57"WB	54"DB 48"WB	250	43"DB	100"DB	11.0	80%	5.000	1.2"	3.44	500	400	3	32	40	1900	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
RTU 5	TRANE	YHC02F4	47.7	42.1	5.4	14"DB 57"WB	50"DB 46"WB	200	43"DB	124"DB	12.4	80%	2.400	0.4"	0.59	240	400	3	20	25	1500	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
RTU 6	TRANE	YHC02F4	78.3	74.0	4.3	14"DB 57"WB	52"DB 47"WB	200	43"DB	113"DB	12.5	80%	3.000	0.8"	1.05	300	400	3	22	25	1500	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

REMARKS:

- MOTORIZED 0-100% DRY BULB ECONOMIZER W/ BAROMETRIC RELIEF
- FACTORY INSTALLED SUPPLY AIR SMOKE DETECTOR
- UNIT MOUNTED BEV RECEPTACLE - FIELD WIRED
- 1" SEISMIC ROOF CURB
- REFRIGERANT SERVICE VALVES
- 2" PLEATED MERV 8 AIR FILTER - (2) SETS
- R-10A REFRIGERANT
- HINGED ACCESS PANELS
- FACTORY TOUCHSCREEN 1 DAY PROGRAMMABLE AUTO CHANGEOVER THERMOSTAT
- MODULATING GAS HEAT
- DIGITAL SCROLL COMPRESSOR

12. BACNET DDC CONTROLLER

NOTES:

- ALL HVAC UNITS OR SYSTEMS SERVING A COMMON AIR SPACE MUST BE INTERCONNECTED TO SHUT DOWN IMMEDIATELY UPON ALARM CONDITION FROM DUCT DETECTORS (OR FIRE ALARM SYSTEM WHEN USING AREA SMOKE DETECTORS IN LIEU OF DUCT DETECTORS) WITHOUT INTERFERENCE FROM EMS OR ANY OTHER SYSTEMS. ALL CONTROL RELAYS USED FOR SHUT DOWN MUST BE NEVADA STATE FIRE MARSHAL LISTED FOR RELEASING SERVICE.
- SUPPLY AIR SMOKE DETECTORS ARE TO BE SUPPLIED AND INSTALLED BY THE MECHANICAL CONTRACTOR. SMOKE DETECTORS ARE TO BE INDEPENDENTLY POWERED FROM THE BUILDING FIRE ALARM SYSTEM.

SPLIT SYSTEM OUTDOOR HEAT PUMP SCHEDULE

SYMBOL	DESCRIPTION	MODEL	CAPACITY	EEF	SUCTION	LIQUID	WEIGHT	ELECTRICAL	REMARKS
HP 1	AIR COOLED HEAT PUMP FOR AHU-1	TRANE MODEL TTA0R04MAB	CLG: 82 MBH HTG: 117 MBH	12.8 EER 3.3 COP	1/4"	3/8"	100	400V, 3Ø 15 MCA, 20 MOCP	1, 2, 3
HP 2	AIR COOLED HEAT PUMP FOR AHU-2	TRANE MODEL TBA0R04MAB	CLG: 99 MBH HTG: 131 MBH	12.7 EER 3.3 COP	1/4"	1/2"	800	400V, 3Ø 20 MCA, 25 MOCP	1, 2, 3

REMARKS:

- LOW AMBIENT
- HAIL/VANDAL GUARDS KIT
- RUBBER IN SHEAR ISOLATORS

SPLIT SYSTEM INDOOR AIR HANDLER SCHEDULE

SYMBOL	DESCRIPTION	MODEL	COOLING CAPACITY			HEATING CAPACITY			AIRFLOW	MIN OSA	HP	ELECTRICAL	ELECTRIC HEAT	WT (LBS)	REMARKS
			CAP	EAT	LAT	CAP	EAT	LAT							
AHU 1	HEAT PUMP AIR HANDLER	TRANE MODEL TBE0104H	82 MBH	14"DB 57"WB	52"DB 47"WB	117 MBH	43"DB	104"DB	3,000 CFM 14"ESP	300	3	400V, 3Ø, 4 MCA, 15 MOCP	400V, 3Ø 25W 44 MCA, 45 MOCP	450	1, 2, 3, 4
AHU 2	HEAT PUMP AIR HANDLER	TRANE MODEL TBE1204H	99 MBH	14"DB 57"WB	52"DB 47"WB	131 MBH	43"DB	98"DB	3,400 CFM 2.0"ESP	340	3	400V, 3Ø, 4 MCA, 15 MOCP	400V, 3Ø 25W 44 MCA, 45 MOCP	500	1, 2, 3, 4

REMARKS:

- FACTORY TOUCHSCREEN 1 DAY PROGRAMMABLE AUTO CHANGEOVER THERMOSTAT
- VFD - FIELD CONVERTED
- SUPPLY AIR SMOKE DETECTOR
- BACNET DDC CONTROLLER

NOTES:

- ALL HVAC UNITS OR SYSTEMS SERVING A COMMON AIR SPACE MUST BE INTERCONNECTED TO SHUT DOWN IMMEDIATELY UPON ALARM CONDITION FROM DUCT DETECTORS (OR FIRE ALARM SYSTEM WHEN USING AREA SMOKE DETECTORS IN LIEU OF DUCT DETECTORS) WITHOUT INTERFERENCE FROM EMS OR ANY OTHER SYSTEMS. ALL CONTROL RELAYS USED FOR SHUT DOWN MUST BE NEVADA STATE FIRE MARSHAL LISTED FOR RELEASING SERVICE.
- SUPPLY AIR SMOKE DETECTORS ARE TO BE SUPPLIED AND INSTALLED BY THE MECHANICAL CONTRACTOR. SMOKE DETECTORS ARE TO BE INDEPENDENTLY POWERED FROM THE BUILDING FIRE ALARM SYSTEM.
- VFDs ARE TO BE FIELD CONVERTED TO BE MOUNTED AND WIRED EXTERNALLY FROM THE UNIT. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR ATTAINING A PRICE FOR THE ELECTRICAL SCOPE TO ACCOMPLISH THIS.

AIR DISTRIBUTION SCHEDULE

SYMBOL	DESCRIPTION	MODEL	SIZE	FRAME	PANEL	FINISH	ACCESSORIES
D 1	STEEL MODULAR CORE SUPPLY AIR DIFFUSER	KRUEGER MODEL 1240	12"x12"	F23	24"x24"	BRITISH WHITE	-
D 2	STEEL MODULAR CORE SUPPLY AIR DIFFUSER	KRUEGER MODEL 1240P	20"x20"	F23	24"x24"	BRITISH WHITE	-
G 1	ALUMINUM CORE EGG-CRATE RETURN GRILLE	KRUEGER MODEL EGCS	22"x22"	F23	24"x24"	BRITISH WHITE	-
G 2	STEEL LOUVERED FACE RETURN AIR GRILLE	KRUEGER MODEL 55480H 30° DEFLECTION	14"x12"	F22	-	BRITISH WHITE	HORIZONTAL FRONT BLADES
G 3	STEEL LOUVERED FACE RETURN AIR GRILLE	KRUEGER MODEL 55480H 30° DEFLECTION	48"x48"	F22	-	BRITISH WHITE	HORIZONTAL FRONT BLADES

EXHAUST FAN SCHEDULE

SYMBOL	DESCRIPTION	MODEL	AIRFLOW	ELECTRICAL	WT (LBS)	REMARKS
EF 1	NEW INLINE MOUNTED EXHAUST FAN	COOK MODEL 2255QNT1VVF2	4400 CFM 1.3 ESP	480V, 3Ø 5 HP	440	1, 2, 3, 4, 5, 6

REMARKS:

- BACKDRAFT DAMPER
- BIRD SCREEN
- PREMIUM EFFICIENT MOTOR
- FACTORY WIRED DISCONNECT
- VIBRATION ISOLATION HANGERS
- VFD

NOTES:

- EF-1 IS TO BE INTERLOCKED WITH AHU-1 AND AHU-2 THROUGH BACNET CONTROLLER. EF-1 IS TO BE ENERGIZED WHEN AHU-1 AND AHU-2 ARE IN ECONOMIZER MODE OTHERWISE EF-1 SHOULD REMAIN OFF.
- VFD TO BE MOUNTED EXTERNALLY FROM THE UNIT. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR ATTAINING A PRICE FOR THE ELECTRICAL SCOPE TO ACCOMPLISH THIS.

THERMOSTAT SCHEDULE

TAG	DESCRIPTION	MODEL	ELECTRICAL	MOUNT HEIGHT	REMARKS
T 1	PROGRAMMABLE COMMERCIAL THERMOSTAT	FACTORY	24V	48"	1

REMARKS:

- ALL MOUNTING HARDWARE

NOTES:

-

CONTROL DAMPER SCHEDULE

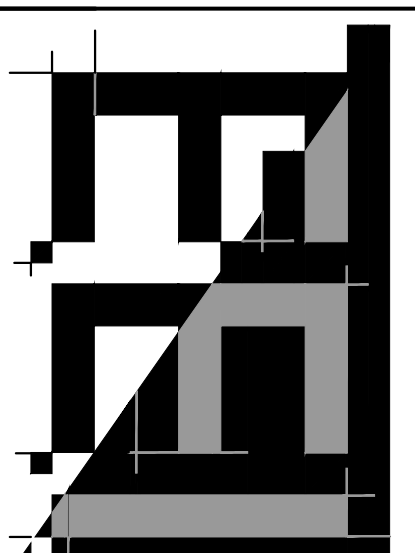
SYMBOL	DESCRIPTION	MODEL	SIZE	MIN AIRFLOW	ECONOMIZER AIRFLOW	REMARKS
CD 1	MOTORIZED CONTROL DAMPER	UNITED ENERTECH MODEL CD-51	26"x6"	300 CFM	3,000 CFM	1, 2, 3
CD 2	MOTORIZED CONTROL DAMPER	UNITED ENERTECH MODEL CD-51	40"x6"	2,700 CFM	0 CFM	1, 2, 3
CD 3	MOTORIZED CONTROL DAMPER	UNITED ENERTECH MODEL CD-51	54"x6"	3,240 CFM	0 CFM	1, 2, 3
CD 4	MOTORIZED CONTROL DAMPER	UNITED ENERTECH MODEL CD-51	30"x6"	340 CFM	3,400 CFM	1, 2, 3
CD 5	MOTORIZED CONTROL DAMPER	UNITED ENERTECH MODEL CD-51	30"x8"	0 CFM	4,400 CFM	1, 2, 3

REMARKS:

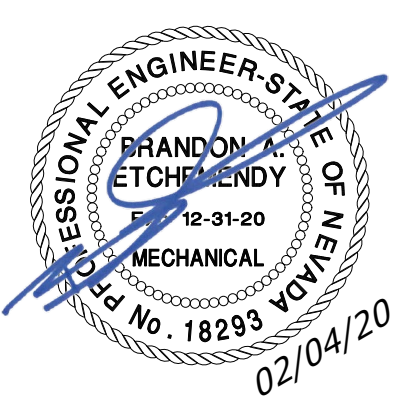
- EXTRUDED BOX FRAME
- INSULATED BLADES
- BELIMO LMB24-SR ACTUATOR

NOTES:

- DAMPERS WITH ELECTRICAL ACTUATORS ARE TO BE INTERLOCKED WITH ASSOCIATED AIR HANDLER VIA BACNET CONTROLLER. ACTUATORS ARE TO BE SET TO MIN AIRFLOW POSITIONS FOR REGULAR OPERATION AND SET AT ECONOMIZER AIRFLOW POSITIONS WHEN AHUs ARE IN ECONOMIZER MODE.
- CD 1-2 ARE TO BE INTERLOCKED WITH AHU-1
- CD 3-4 ARE TO BE INTERLOCKED WITH AHU-2
- CD-5 IS TO BE FULLY CLOSED DURING NORMAL OPERATION AND FULLY OPENED DURING ECONOMIZER MODE.



1000 P. 2015 REVISED BY BSEP
P. 775-854-05 F. 775-852-2542
REVISIONS



HVAC RETROFIT
 INYO ANNEX BUILDING
 168 N EDWARDS ST.
 INDEPENDENCE, CALIFORNIA 93526

REVISIONS

DRAWING TITLE
MECHANICAL NOTES & SCHEDULES

date: 02/04/20
job number: 19090
drawn: SME
checked: BAE

MO.IR

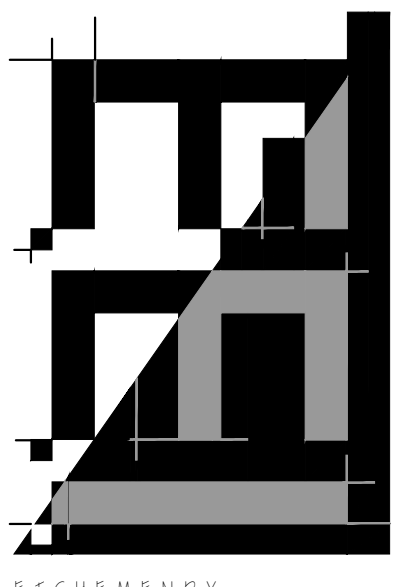
FRESH AIR CALCULATIONS

Building:	System Tag/Name:	Delete Zone	Inyo Annex HVAC Retrofit	System Tag/Name:	Delete Zone	Inyo Annex HVAC Retrofit																																																																								
Operating Condition Description:	Add Zone	IP		Operating Condition Description:	Add Zone	IP																																																																								
Units (select from pull-down list)				Units (select from pull-down list)																																																																										
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Outdoor air per person served by system (including diversity)	Vor/Ps	cfm/p	21.1																																																																																													
Outdoor air as a % of design primary supply air	Ypd	%	3%																																																																																													
	Inputs for System	Name	Units	System	Diversity	System		--	------	--------	--------	-----------	--------		Floor area served by system	As	sf	1,116				Population of area served by system	Ps	P	12	100%	12		Design primary supply fan airflow rate	Vpsd	cfm	3,000	100%	3,000		OA req'd per unit area for system (Weighted average)	Ras	cfm/sf	0.06				OA req'd per person for system area (Weighted average)	Rps	cfm/p	5.0				Outdoor air intake provided for system	OA	cfm																																												
	Inputs for Potentially Critical Zones	Zone Name	Show Values per Zone	Zone title turns purple (italic for critical zones)	Potentially Critical Zones	Assessor	Slouemire	Storage	Lobby		--	-----------	----------------------	---	----------------------------	----------	-----------	---------	-------		Zone Tag	ENTR			Entrance	ENTR	CONF	CONF	CONF		Occupancy Category										Floor Area of zone	Az	sf			304	178	290	344		Design population of zone	Pz	P			0	8.91	1.45	1.73		Design total supply to zone (primary plus local recirculated)	Vdtd	cfm			580	420	1,030	970		Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?										Frac. of local recirc. air that is representative of system RA	Er														
	Inputs for Operating Condition Analyzed	Ds	%	100%	100%	100%	100%	100%		--	----	---	------	-------	-------	-------	-------		Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%		Air distribution type at conditioned analyzed				CSCRH	CSCRH	CSCRH	CSCRH		Zone air distribution effectiveness at conditioned analyzed	Ez			0.80	0.80	0.80	0.80		Primary air fraction of supply air at conditioned analyzed	Ep																																																	
	Results of Minimum ASHRAE 62.1 Ventilation Rate Procedure (EQp1)	System Ventilation Efficiency	Ev		--	-------------------------------	----		--	-------------------------------	----								0.88																																																																													
Outdoor air intake required for system (EQp1)	Vor	cfm	145																																																																																													
Outdoor air per unit floor area	Vor/As	cfm/sf	0.13																																																																																													
Outdoor air per person served by system (including diversity)	Vor/Ps	cfm/p	12.0																																																																																													
Outdoor air as a % of design primary supply air	Ypd	%	5%																																																																																													
	Inputs for System	Name	Units	System	Diversity	System		--	------	--------	--------	-----------	--------		Floor area served by system	As	sf	1,308				Population of area served by system	Ps	P	11	100%	11		Design primary supply fan airflow rate	Vpsd	cfm	2,400	100%	2,400		OA req'd per unit area for system (Weighted average)	Ras	cfm/sf	0.06				OA req'd per person for system area (Weighted average)	Rps	cfm/p	5.0				Outdoor air intake provided for system	OA	cfm																																												
	Inputs for Potentially Critical Zones	Zone Name	Show Values per Zone	Zone title turns purple (italic for critical zones)	Potentially Critical Zones	Assessor	Slouemire	Storage	Lobby		--	-----------	----------------------	---	----------------------------	----------	-----------	---------	-------		Zone Tag	CONF			Conference	CONF	CONF	CONF	CONF		Occupancy Category										Floor Area of zone	Az	sf			176	158	135	242		Design population of zone	Pz	P			8.8	0.78	0.678	1.21		Design total supply to zone (primary plus local recirculated)	Vdtd	cfm			800	400	440	960		Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?										Frac. of local recirc. air that is representative of system RA	Er														
	Inputs for Operating Condition Analyzed	Ds	%	100%	100%	100%	100%	100%		--	----	---	------	-------	-------	-------	-------		Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%		Air distribution type at conditioned analyzed				CSCRH	CSCRH	CSCRH	CSCRH		Zone air distribution effectiveness at conditioned analyzed	Ez			0.80	0.80	0.80	0.80		Primary air fraction of supply air at conditioned analyzed	Ep																																																	
	Results of Minimum ASHRAE 62.1 Ventilation Rate Procedure (EQp1)	System Ventilation Efficiency	Ev		--	-------------------------------	----		--	-------------------------------	----								0.93																																																																													
Outdoor air intake required for system (EQp1)	Vor	cfm	108																																																																																													
Outdoor air per unit floor area	Vor/As	cfm/sf	0.15																																																																																													
Outdoor air per person served by system (including diversity)	Vor/Ps	cfm/p	9.4																																																																																													
Outdoor air as a % of design primary supply air	Ypd	%	4%																																																																																													

BUILDING AIRFLOW BALANCE

Unit	OSA CFM	Exhaust CFM
AHU-1	300	
AHU-2	360	
RTU-1	240	
RTU-2	300	
RTU-3	160	
RTU-4	500	
RTU-5	240	
RTU-6	300	
(E) Exhaust fan-Restrooms		830
(E) Exhaust fan-Stair		1430
Total	2400	2260



10497 P2018 EXHIBIT 147 29430
P. 775-854-05 F. 775-852-2942
REGIDENY@MEXI.COM

PROFESSIONAL ENGINEER-STATE OF CALIFORNIA
BRANDON A. ETCEMENDY
Exp. 12-31-20
MECHANICAL
No. 18293
02/04/20

HVAC RETROFIT
 INYO ANNEX BUILDING
 168 N EDWARDS ST.
 INDEPENDENCE, CALIFORNIA 93526

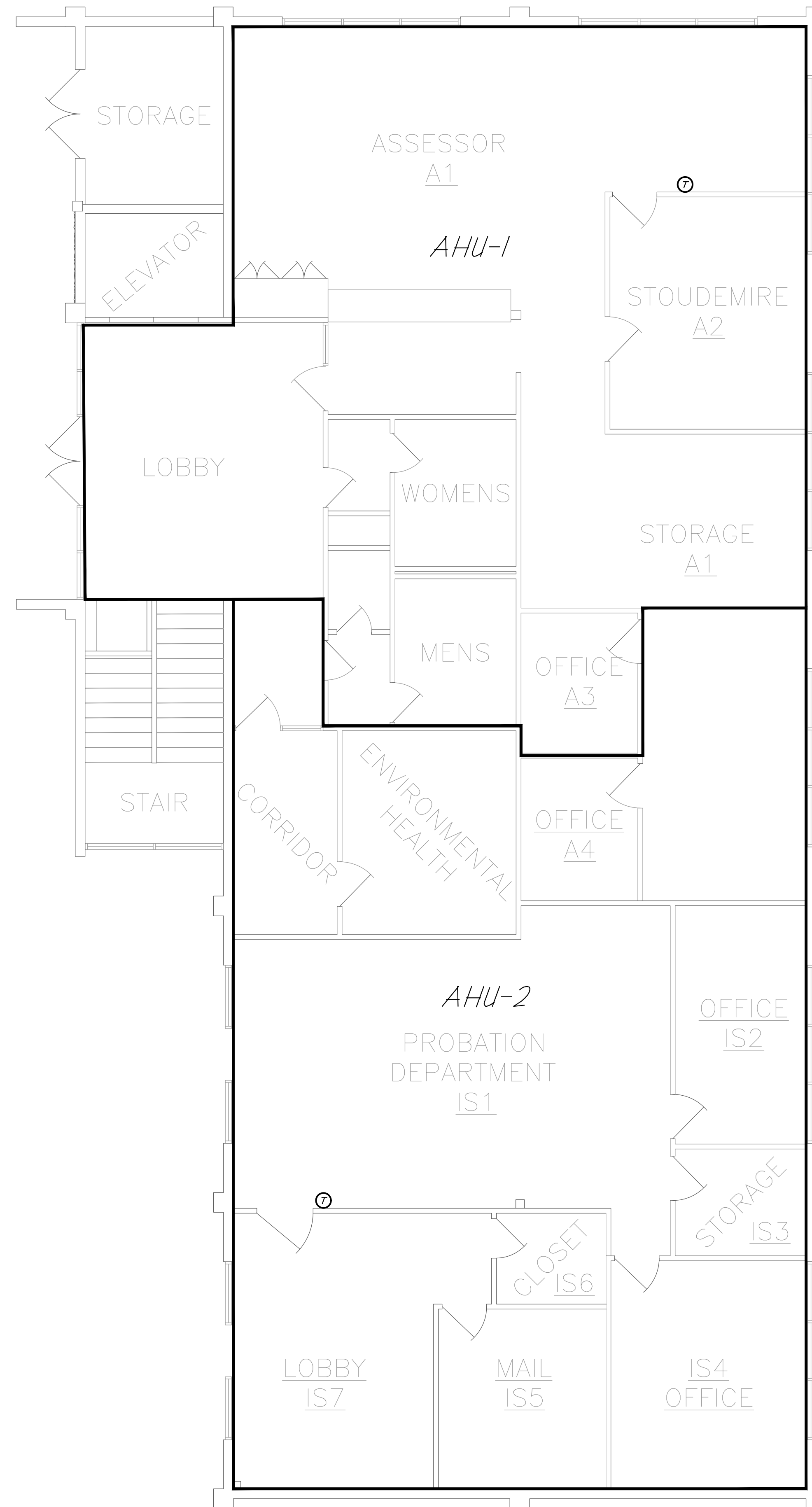
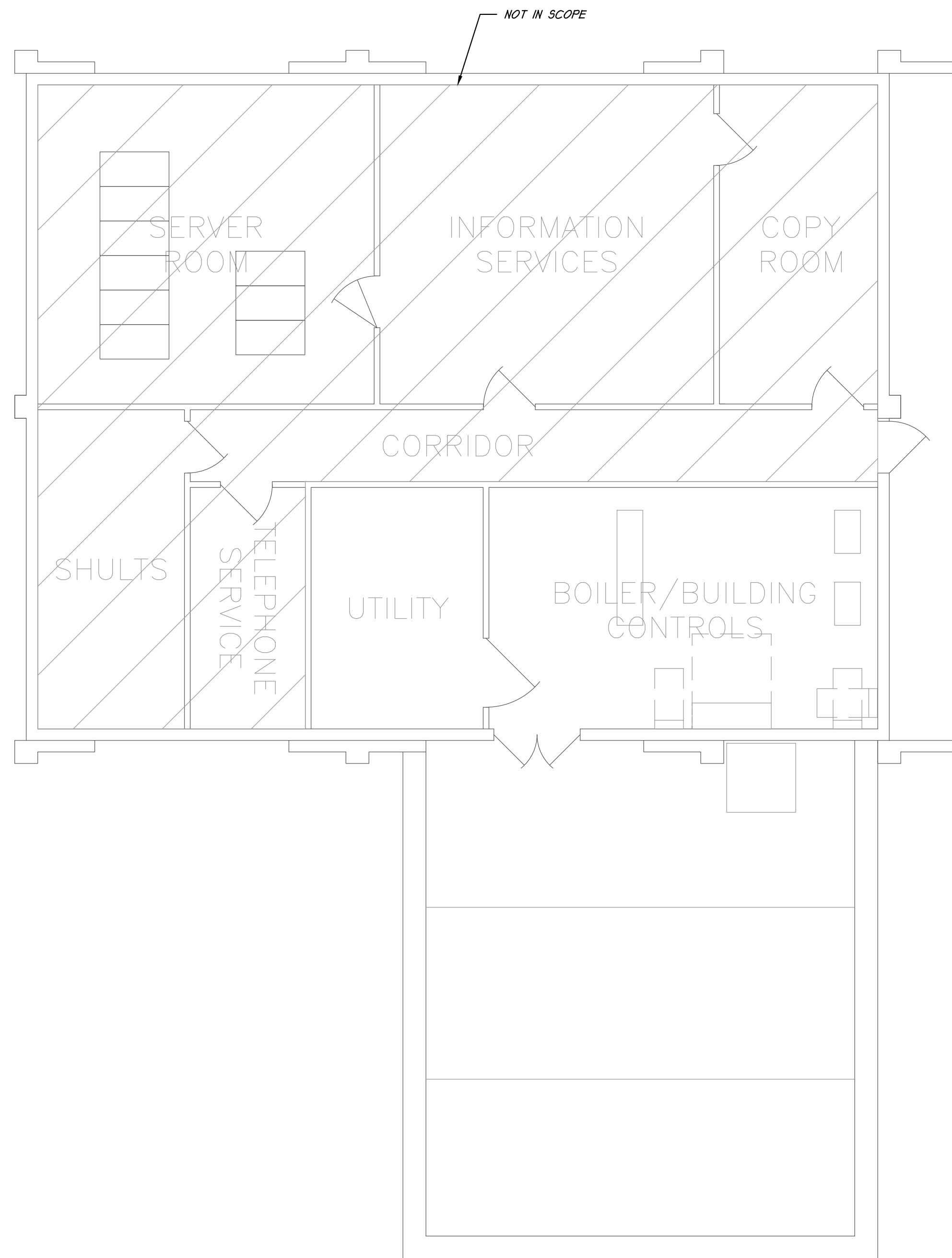
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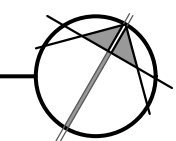
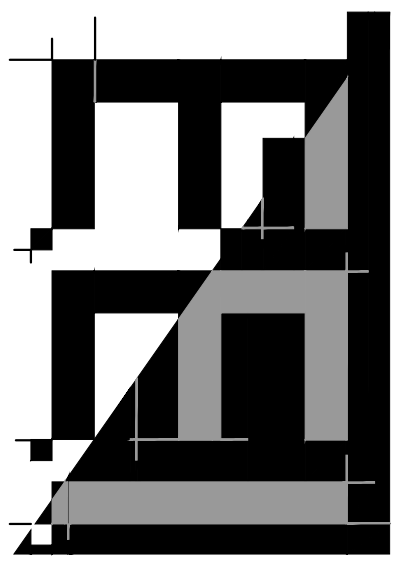
MECHANICAL CALCULATIONS

date: 02/04/20
job number: 19030
drawn: SME
checked: BAE

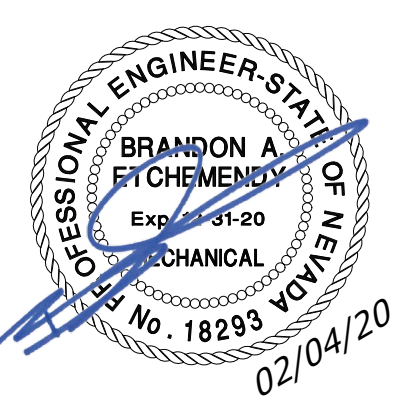
MO.2R



1ST FLOOR ZONING PLAN
SCALE: 3/16" = 1'-0"

FITCHMENT
ENGINEERING
INC.
10497 KINGS RD, SUITE 100
F. 775-854-05 F. 775-852-292
REDWOOD CITY, CA 94061



HVAC RETROFIT

INYO ANNEX BUILDING

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DRAWING TITLE

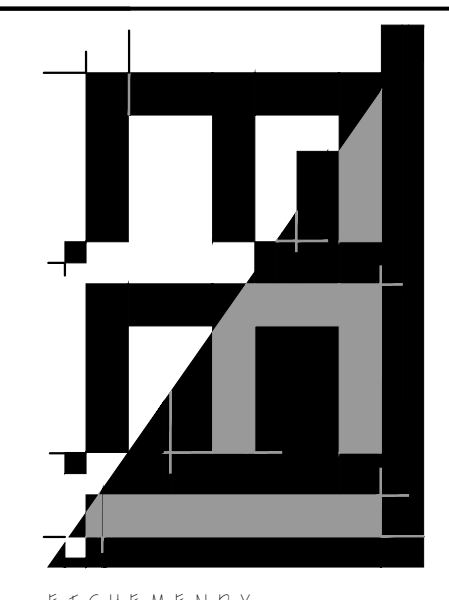
1ST FLOOR ZONING PLAN

date: 02/04/20
job number: 19030
drawn: SME
checked: BAE

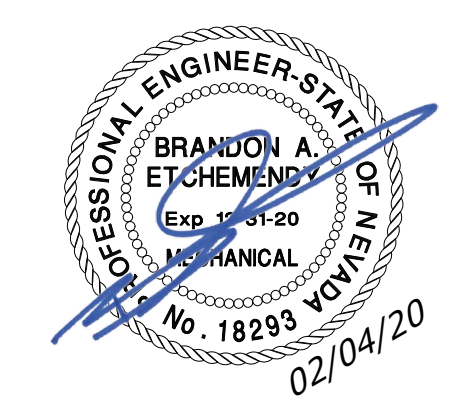
MO.3R



2ND FLOOR ZONING PLAN
 SCALE: 3/16" = 1'-0"



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 10497 PO BOX 85000 BLDG 100
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 REGD ENG/WR/ME/CE/EA



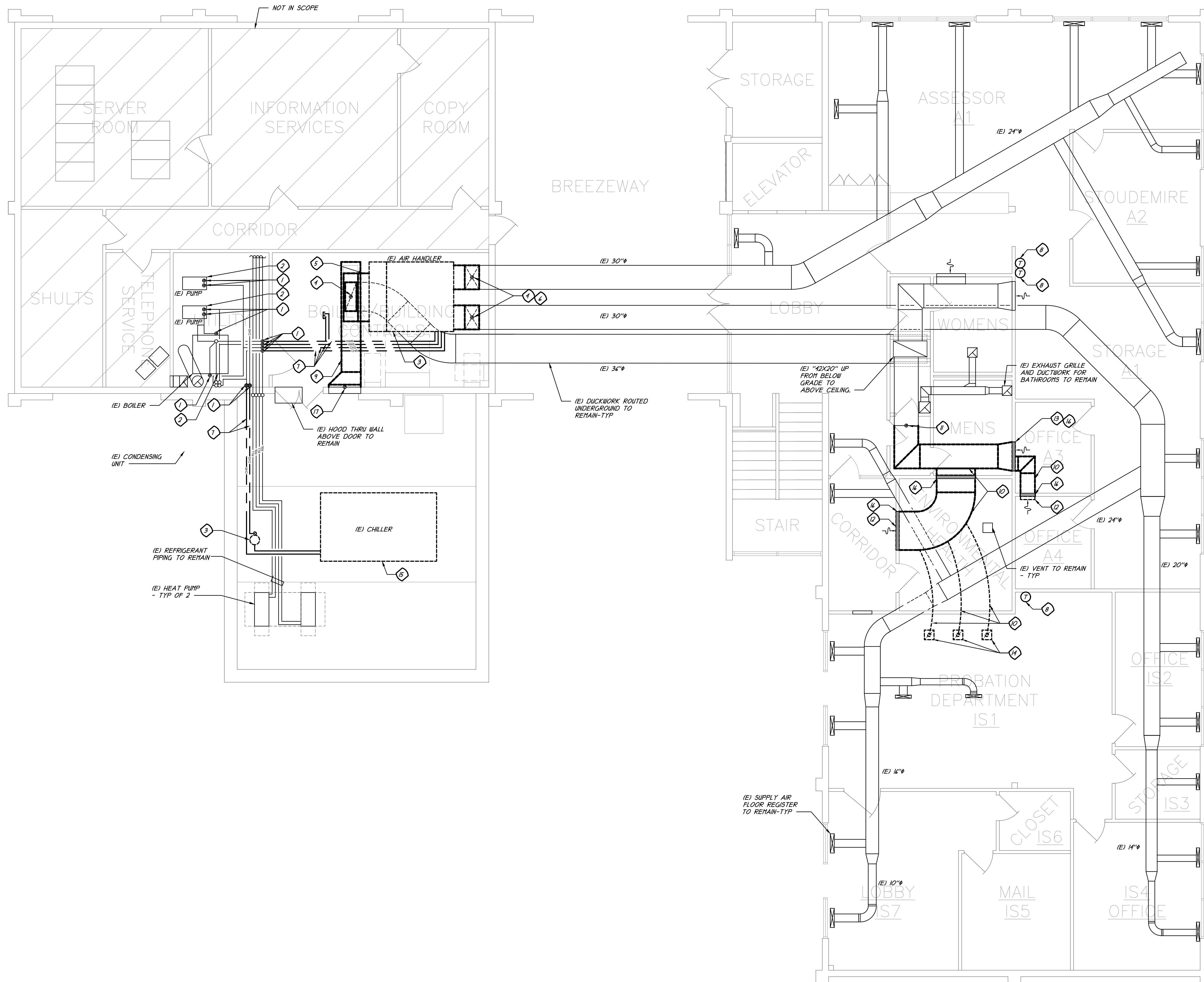
HVAC RETROFIT
INYO ANNEX BUILDING
 168 N EDWARDS ST.
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DRAWING TITLE
2ND FLOOR ZONING PLAN

date: 02/04/20
 job number: 19030
 drawn: SME
 checked: BAE

MO.4R

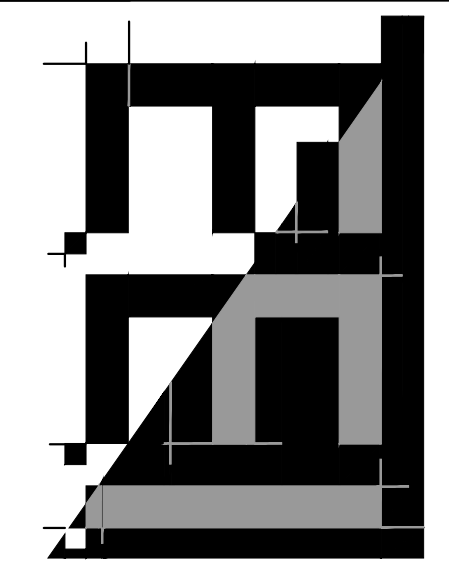


GENERAL NOTES:

1. ASBESTOS HAS BEEN FOUND TO BE PRESENT IN THE MECHANICAL ROOM AND MECHANICAL PIPING VIA TESTING. AVOID DISTURBING AND REMOVING MECHANICAL PIPING UNLESS OTHERWISE NOTED. COORDINATE ALL ASBESTOS CONTAINING MATERIALS WITH THE COUNTY AND COUNTIES TESTING REPORT.
2. UTILITY ROOM BOILER AND PUMPS TO BE DECOMMISSIONED AND ABANDONED IN PLACE.
3. UTILITY ROOM MECHANICAL PIPING IS TO BE DISCONNECTED AT MECHANICAL EQUIPMENT, PERMANENTLY CAPPED AND ABANDONED IN PLACE.

KEYED NOTES:

- 1 DISCONNECT (E) MECHANICAL PIPING AND PERMANENTLY CAP.
- 2 (E) MECHANICAL EQUIPMENT TO BE DISCONNECTED, LOCKED AND TAGGED OUT.
- 3 (E) MECHANICAL EQUIPMENT TO BE REMOVED COMPLETE.
- 4 DISCONNECT (E) DUCTWORK AT SLAB FOR RECONNECTION, COORDINATE WITH ELEVATION DETAIL V121.
- 5 (E) RETURN DUCTWORK FROM AIR HANDLER TO BE REMOVED COMPLETE.
- 6 (E) SUPPLY DUCT WORK FROM AIR HANDLER TO SLAB TO BE REMOVED COMPLETE.
- 7 (E) MECHANICAL PIPING TO BE REMOVED COMPLETE.
- 8 (E) THERMOSTAT TO BE REMOVED COMPLETE.
- 9 (E) OSA DUCT TO BE REMOVED COMPLETE.
- 10 (E) DUCTWORK ABOVE CEILING TO BE REMOVED COMPLETE.
- 11 (E) RETURN DUCTWORK ABOVE CEILING TO BE DISCONNECTED AND REMAIN FOR RECONNECTION.
- 12 (E) RETURN GRILLE TO BE REMOVED COMPLETE. PATCH/REPAIR WALL TO MATCH EXISTING.
- 13 (E) RETURN GRILLE TO BE REMOVED COMPLETE. NEW GRILLE TO BE INSTALLED, COORDINATE WITH H21.
- 14 (E) RETURN GRILLE TO BE REMOVED COMPLETE. PROVIDE NEW CEILING PANELS TO MATCH EXISTING.
- 15 (E) CHILLER TO BE REMOVED COMPLETE AND SALVAGED BACK TO OWNER.
- 16 INFILL (E) WALL OPENING WITH 2"x4" STUDS AT 16" ON CENTER.
- 17 DISCONNECT AND REMOVE (E) OSA DUCT FROM LOUVER.



10097 FOLSOM BLVD SUITE 100
 FOLSOM, CA 95630
 P. 916-939-1051 F. 916-939-2912
 BRANDON ETCEMENDY
 PROFESSIONAL ENGINEER
 LICENSE NO. 18293
 02/04/20

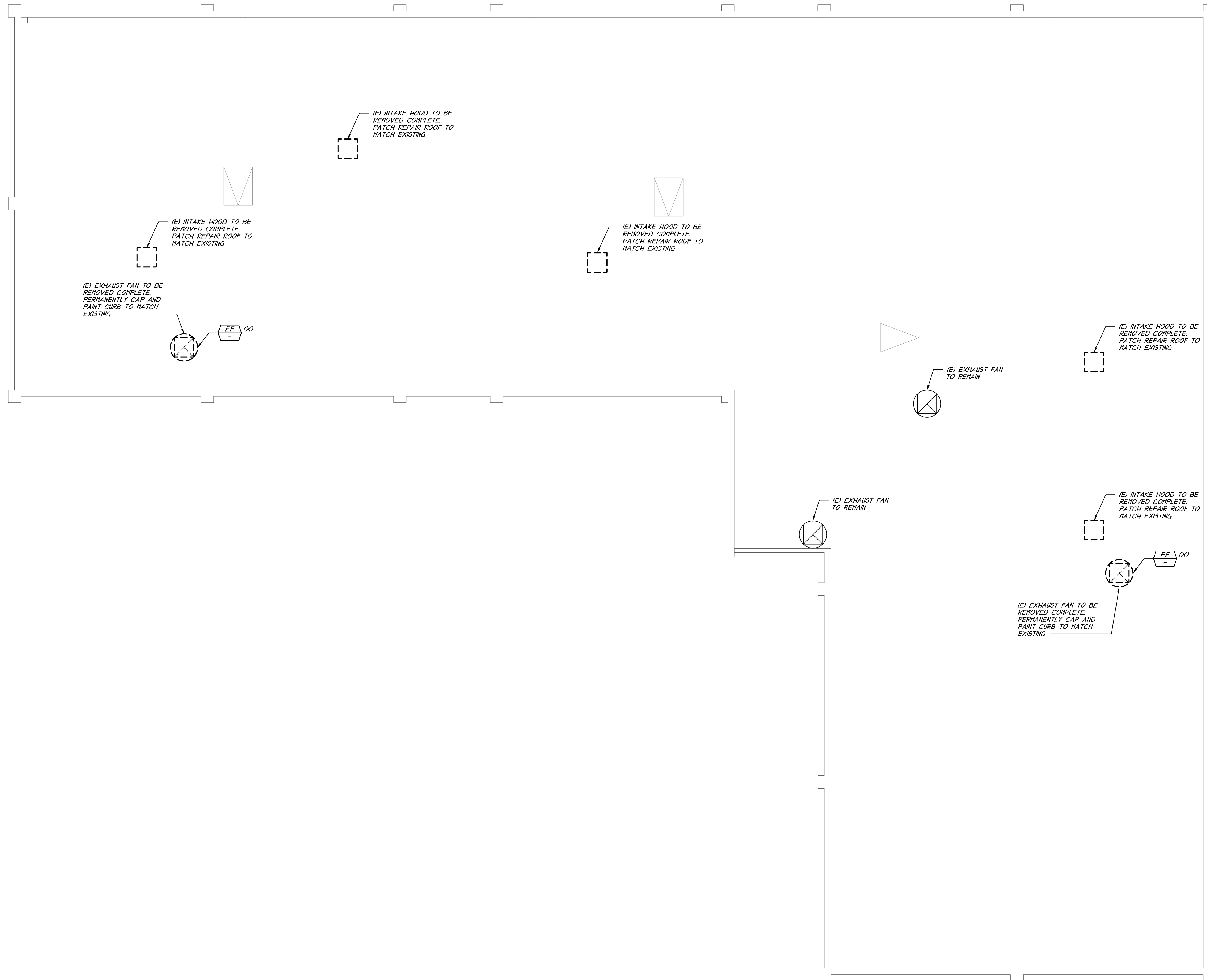
HVAC RETROFIT
INYO ANNEX BUILDING
 168 N EDWARDS ST.
 INDEPENDENCE, CALIFORNIA 93526

REVISIONS	

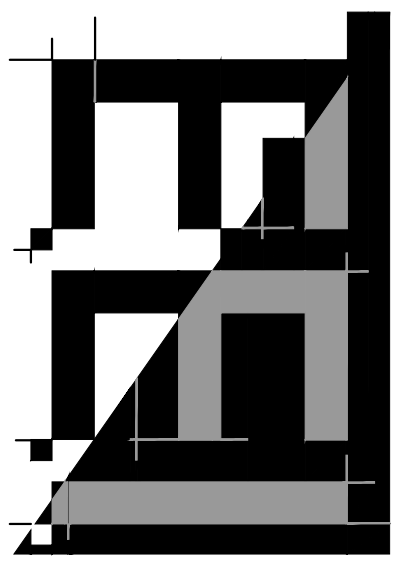
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1ST FLOOR DEMOLITION MECHANICAL PLAN	
date	02/04/20
job number	19030
drawn	SME
checked	BAE

1ST FLOOR DEMOLITION MECHANICAL PLAN
 SCALE: 3/16" = 1'-0"

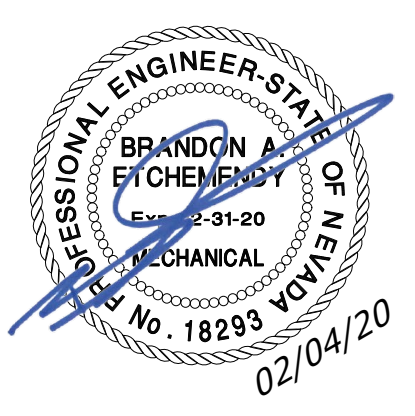
MI.IR



DEMOLITION MECHANICAL ROOF PLAN
 SCALE: 3/16" = 1'-0"



FITCHEMURY
 ENGINEERING, INC.
 10997 POINTE BLVD. SUITE 100
 F. 775-855-0505 T. 775-852-2502
 REGD. ENG. 1988-00000000



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REVISIONS

DRAWING TITLE
DEMOLITION MECHANICAL ROOF PLAN

date: 02/04/20
 job number: 19030
 drawn: SME
 checked: BAE

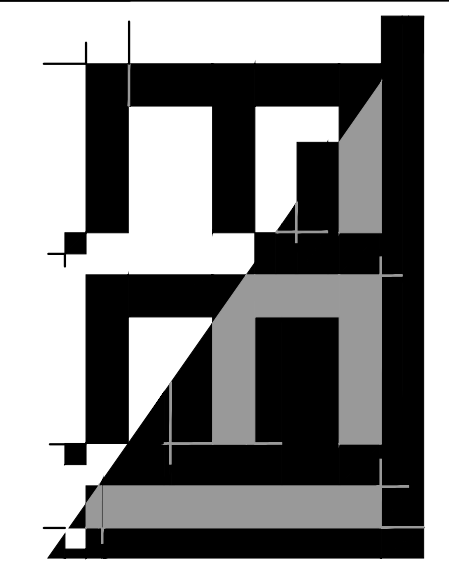
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GENERAL NOTES:

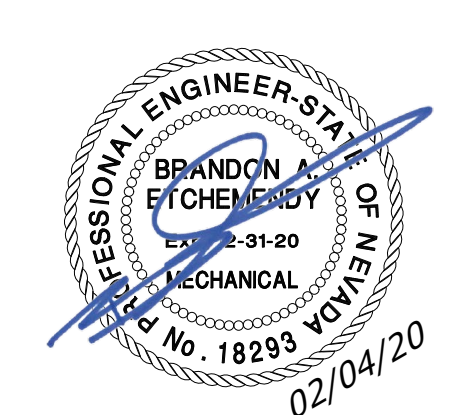
1 ASBESTOS HAS BEEN FOUND TO BE PRESENT IN THE MECHANICAL ROOM AND MECHANICAL PIPING VIA TESTING. AVOID DISTURBING AND REMOVING MECHANICAL PIPING UNLESS OTHERWISE NOTED. COORDINATE ALL ASBESTOS CONTAINING MATERIALS WITH THE COUNTY AND COUNTIES TESTING REPORT. ALL ABATEMENT REQUIRED TO PERFORM WORK IN QUESTION TO BE LISTED AS A SEPARATE LINE ITEM.

KEYED NOTES:

- 1 CONNECT (N) 20"x46" SUPPLY DUCT AT SLAB
- 2 CONNECT (N) 26"x46" SUPPLY DUCT AT SLAB
- 3 CONNECT (N) 80"x88" RETURN DUCT AT SLAB
- 4 (N) 40"x46" RETURN DUCT TO AHU-1
- 5 (N) 54"x46" RETURN DUCT TO AHU-2
- 6 (N) 26"x46" OSA DUCT TO AHU-1
- 7 (N) 30"x46" OSA DUCT TO AHU-2
- 8 MIN 22" SERVICE SPACE FOR AHU
- 9 MIN 24" SERVICE SPACE FOR AHU
- 10 (N) 20"x46" SUPPLY DUCT UP FROM AHU-1
- 11 (N) 58"x46" RETURN DUCT UP FROM SLAB
- 12 48" SERVICE SPACE FOR FRONT COIL REMOVAL
- 13 40" SERVICE SPACE FOR SIDE COIL REMOVAL
- 14 CONNECT (N) 30"x24" TO (E) HOOD ABOVE DOOR
- 15 (N) 30"x48" EXHAUST DUCT FROM 58"x46" RETURN DUCT
- 16 SEE STRUCTURAL DETAIL 1/53.R FOR CUTTING NEW OPENING THROUGH EXISTING INTERIOR PARTITION WALL
- 17 FIELD CONVERT VFD FOR AHU-1 TO BE MOUNTED ON WALL MAX 40" TO TOP OF UNIT. MAINTAIN MIN 48"x30" SERVICE CLEARANCE
- 18 FIELD CONVERT VFD FOR AHU-2 TO BE MOUNTED ON WALL MAX 40" TO TOP OF UNIT. MAINTAIN MIN 48"x30" SERVICE CLEARANCE
- 19 FIELD CONVERT VFD FOR EF-1 TO BE MOUNTED ON WALL MAX 40" TO TOP OF UNIT. MAINTAIN MIN 48"x30" SERVICE CLEARANCE



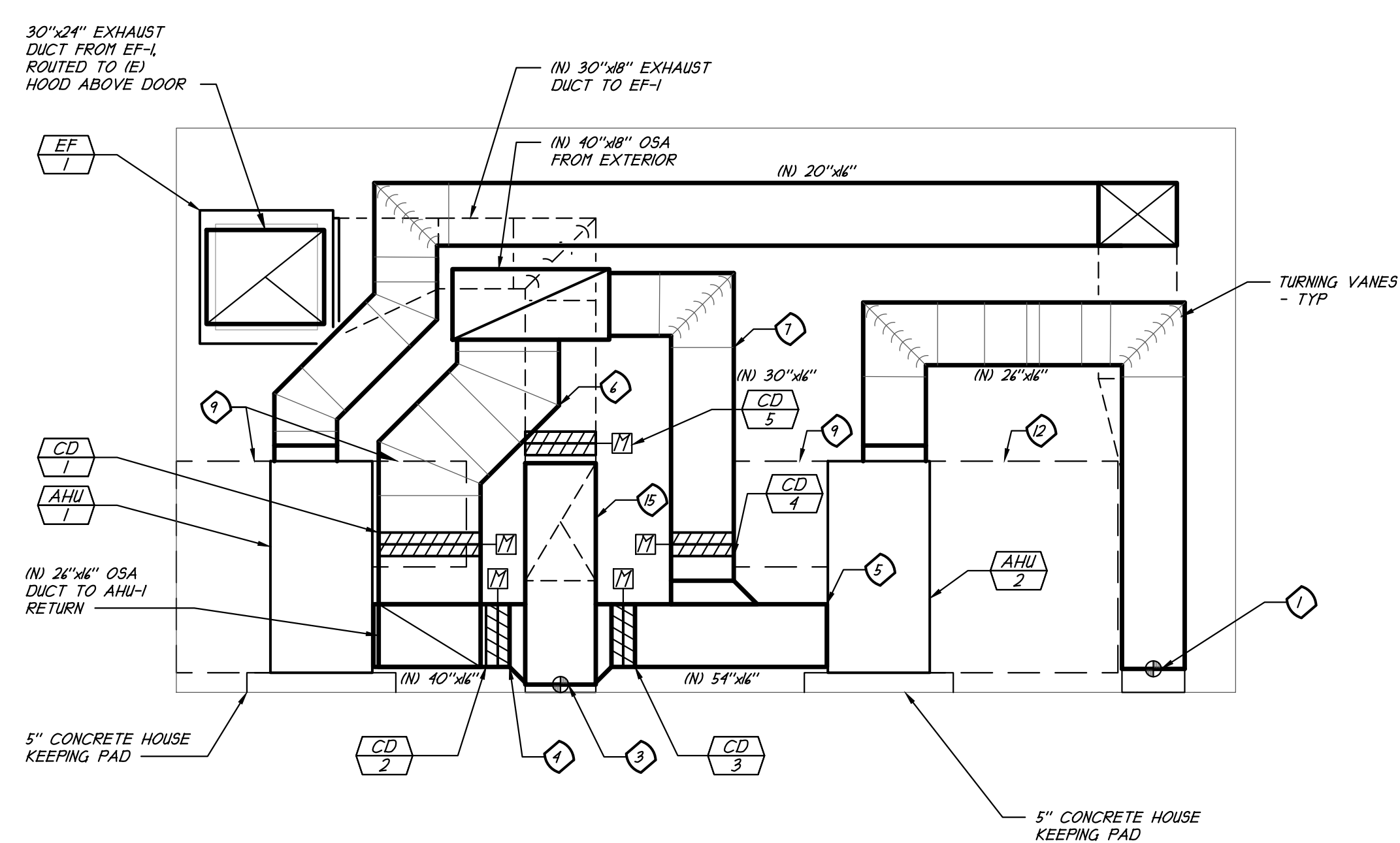
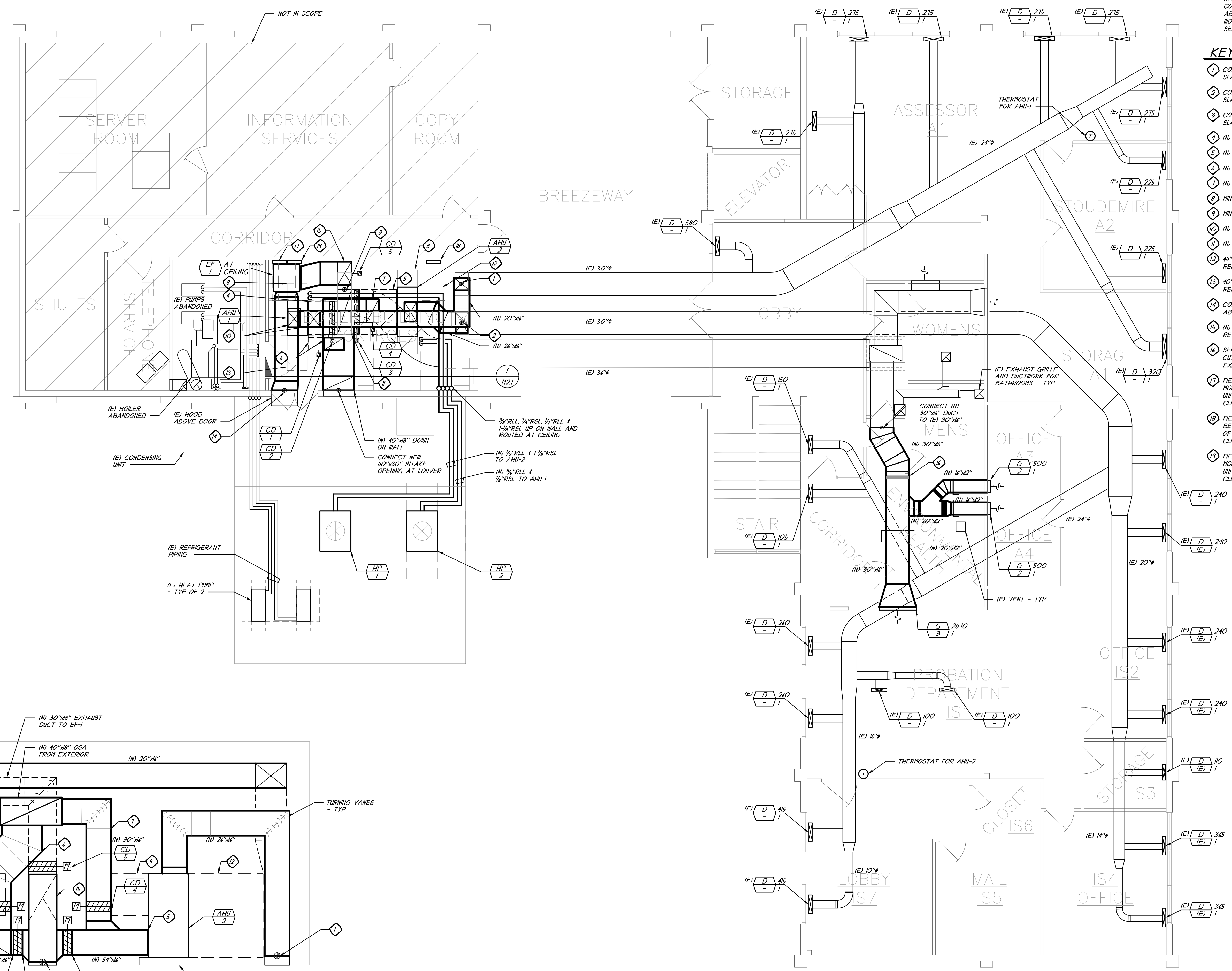
10497 POLARIS BLVD SUITE 100
F. 775-855-1051 T. 775-852-2942
MECHANICAL ENGINEERING



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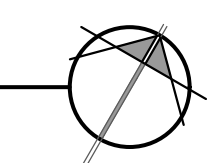
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date:	02/04/20
job number:	19030
drawn:	SME
checked:	BAE

M2.IR



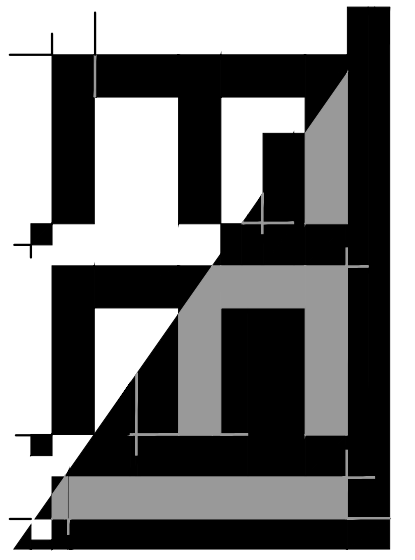
ELEVATION DETAIL
SCALE: 5/8" = 1'-0"

1ST FLOOR MECHANICAL PLAN
SCALE: 5/16" = 1'-0"

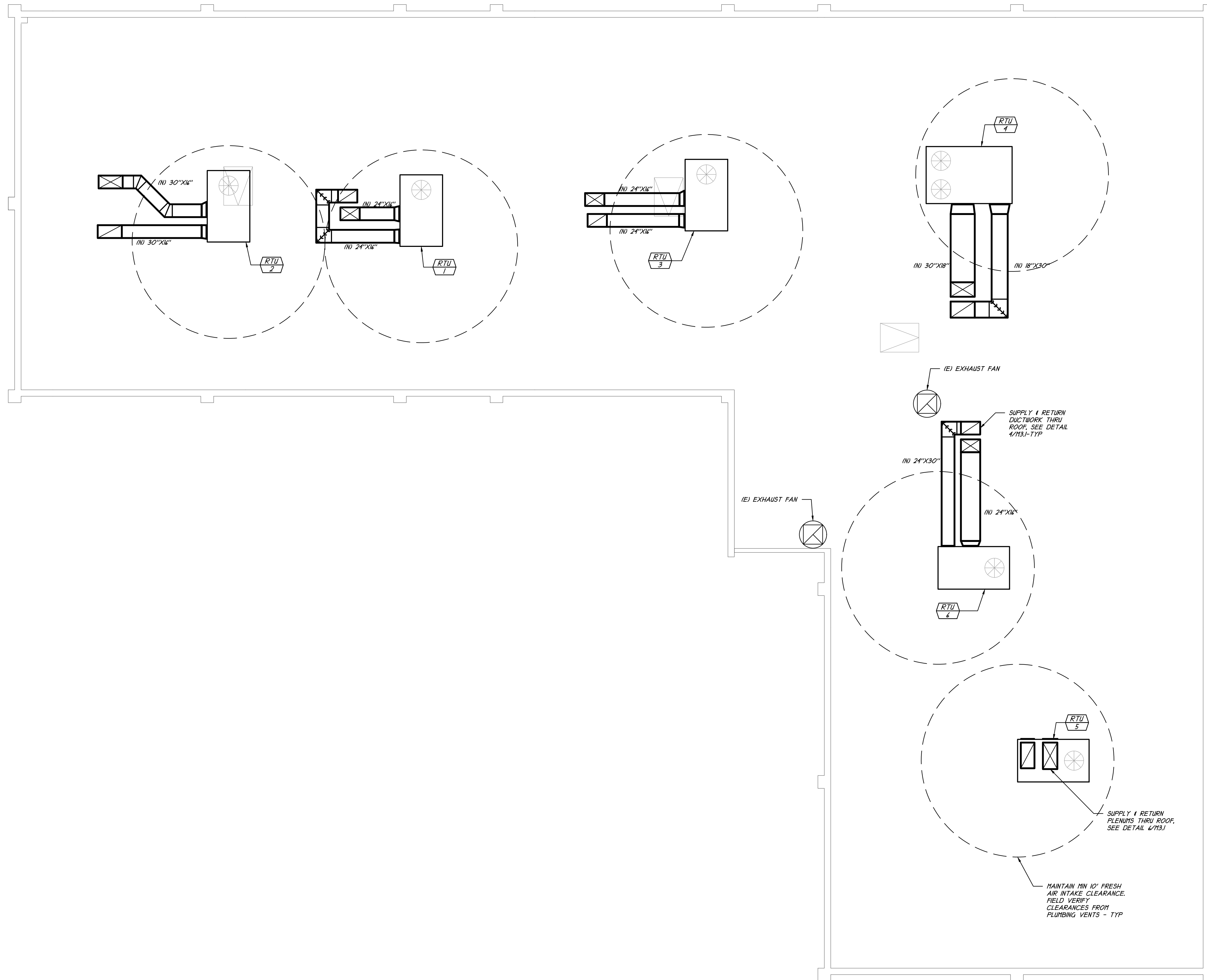


SHEET NOTES:

1. SEE DETAIL 1/13.1 FOR EXPOSED DUCTWORK INSULATING REQUIREMENTS.
2. SEE DETAILS 2/13.1 AND 3/13.1 FOR ROOF MOUNTED DUCTWORK SUPPORT.
3. SEE DETAIL 4/13.1 FOR DUCT PENETRATIONS THRU ROOF.
4. SEE DETAILS 5/13.1 & 6/13.1 FOR RTU ROOF CURB INFORMATION.
5. CONTRACTOR TO RETAIN THE ORIGINAL ROOFING INSTALLER FOR PATCHING AT THE NEW RTU CURBS TO MAINTAIN WARRANTY.



ETCHEMENDY
ENGINEERING
INC.
10497 POBLS RD, SUITE 100, SAN DIEGO, CA 92121
P. 775-854-0515 F. 775-852-2502
REGISTRATION NO. 1226



MECHANICAL ROOF PLAN
SCALE: 3/16" = 1'-0"

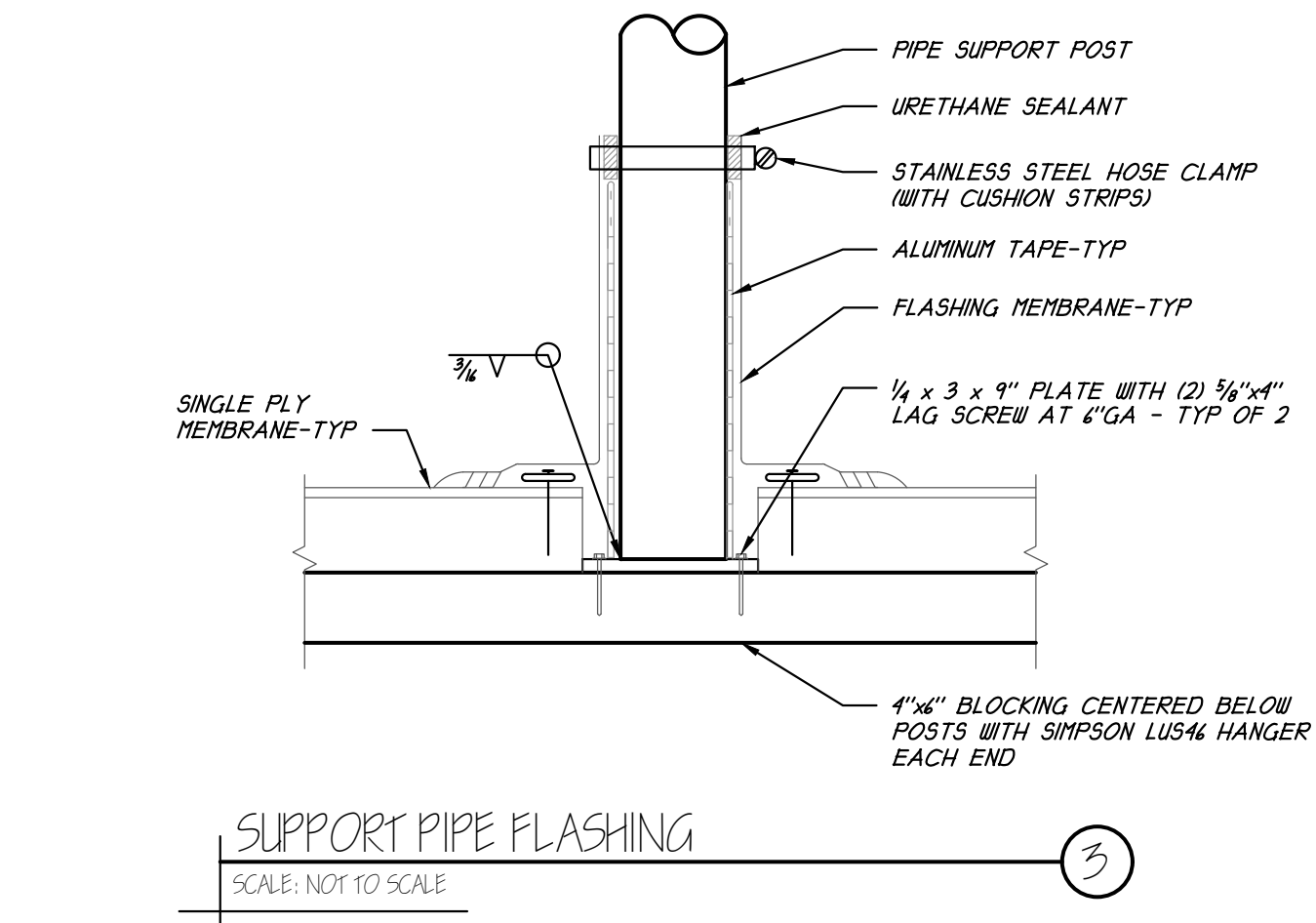
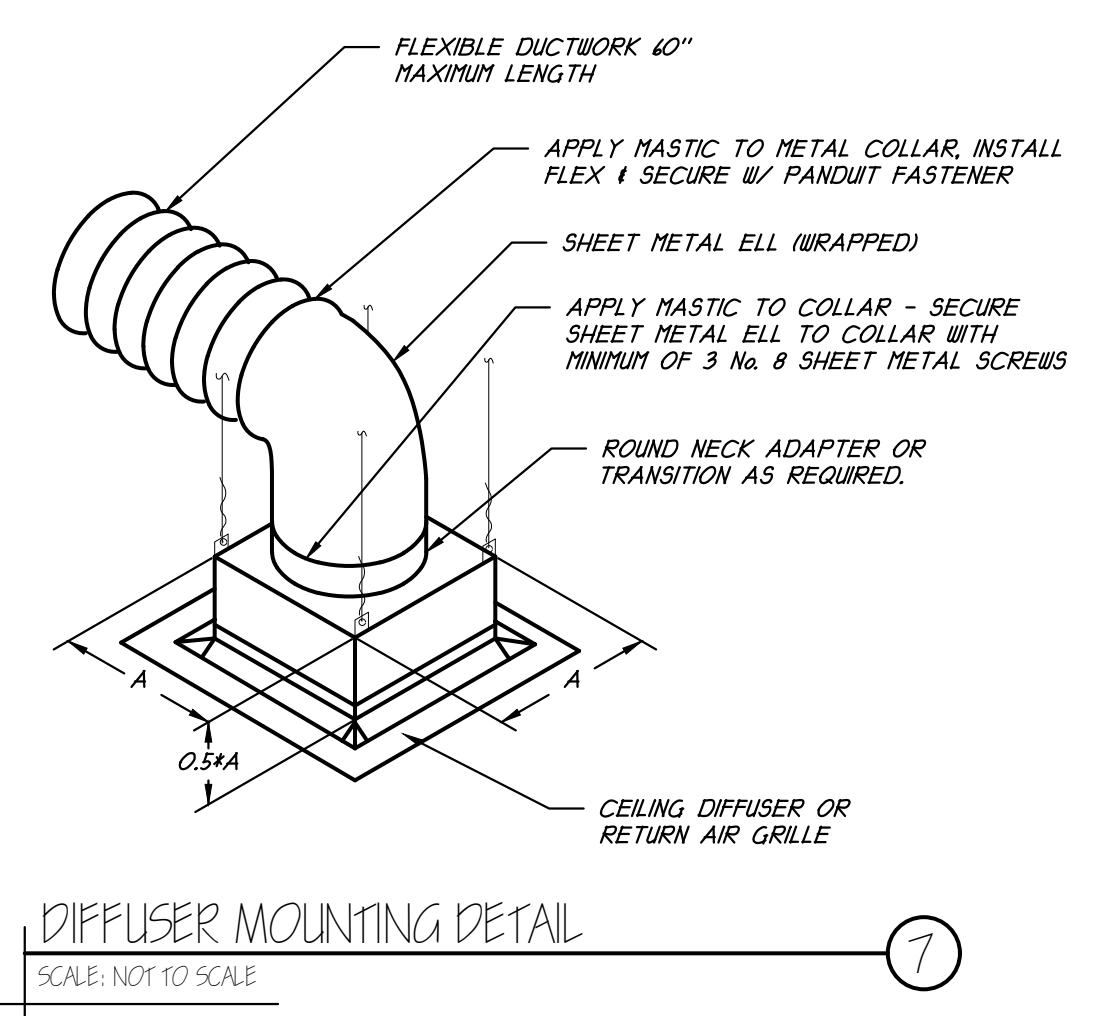
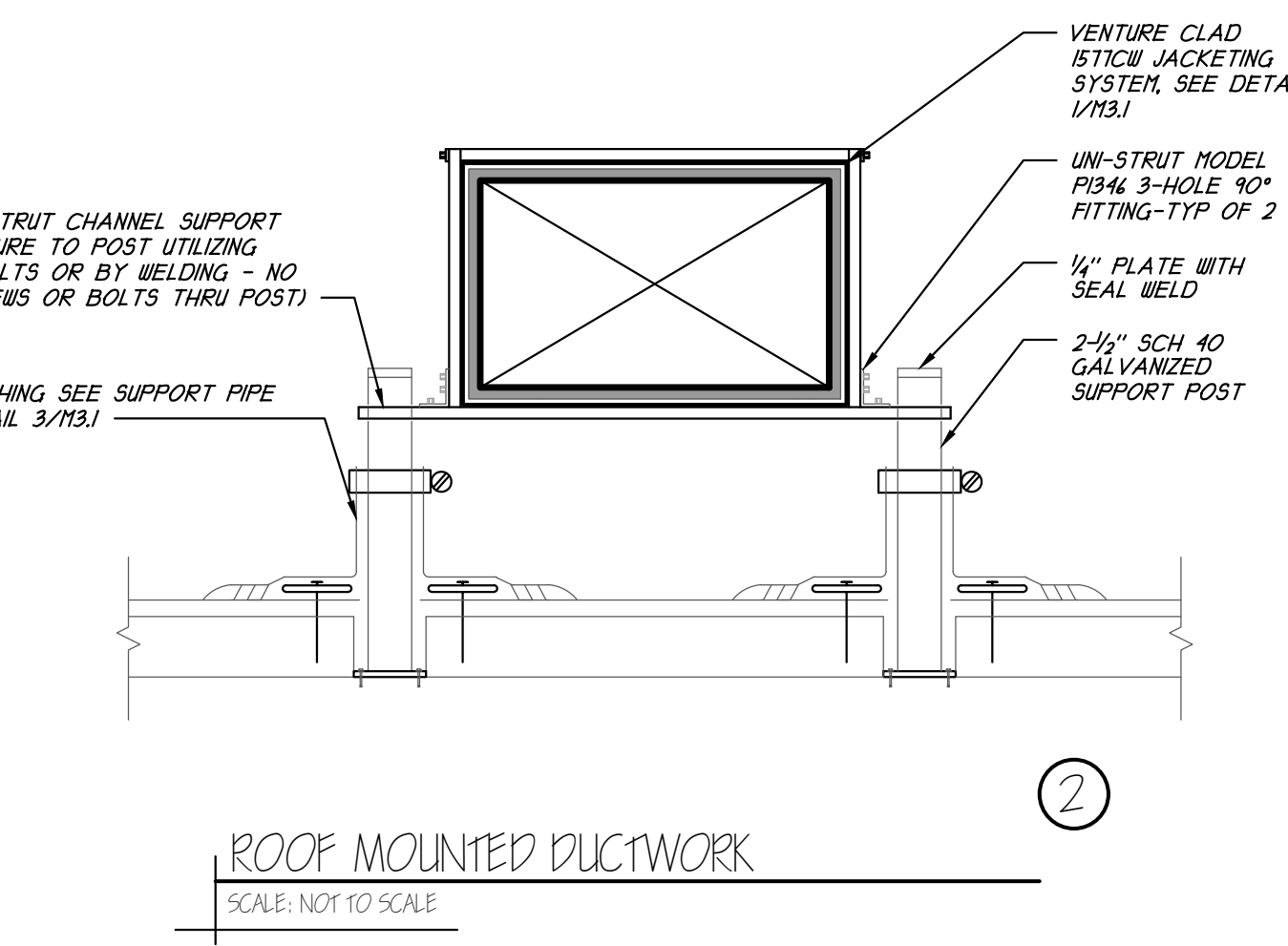
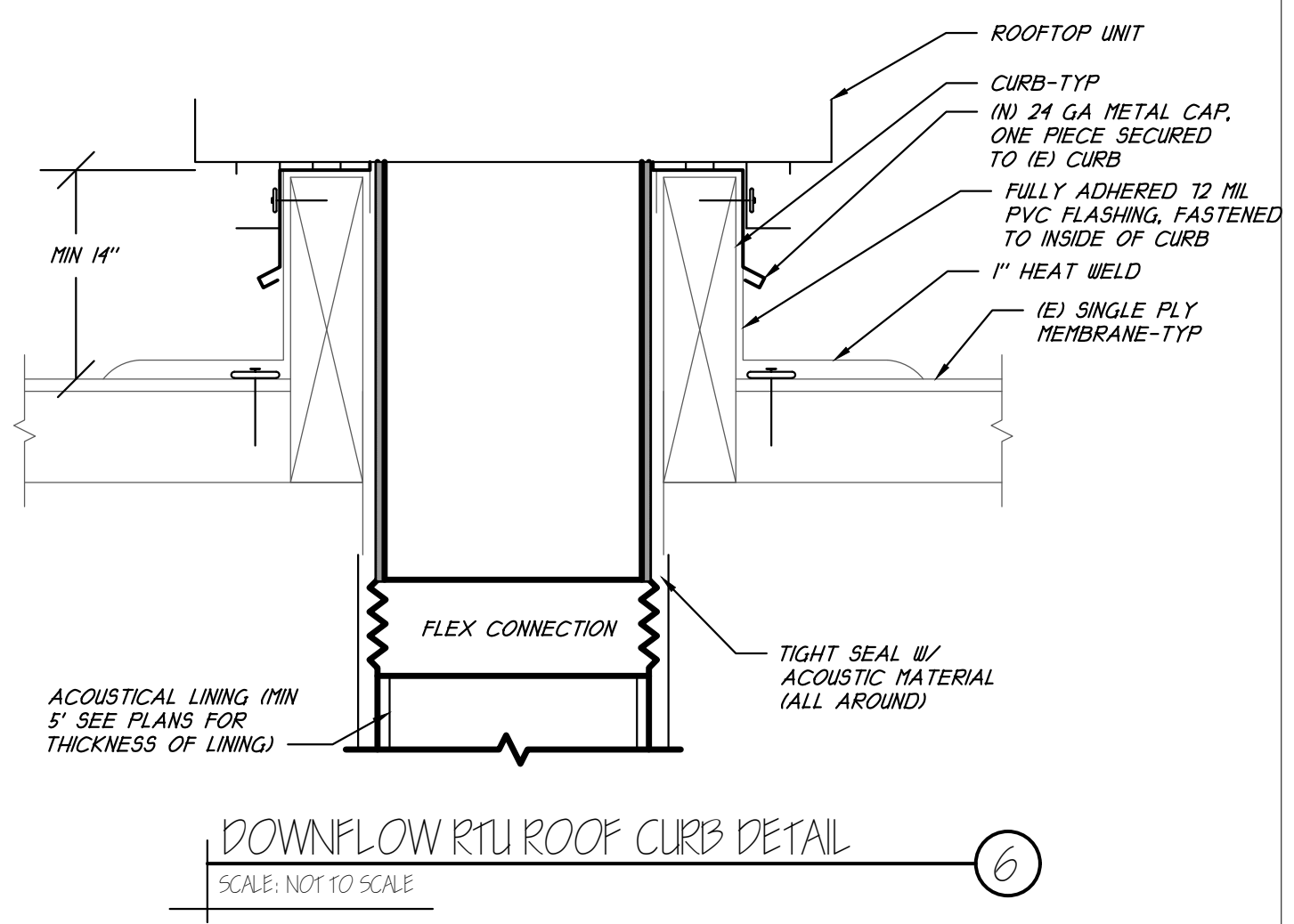
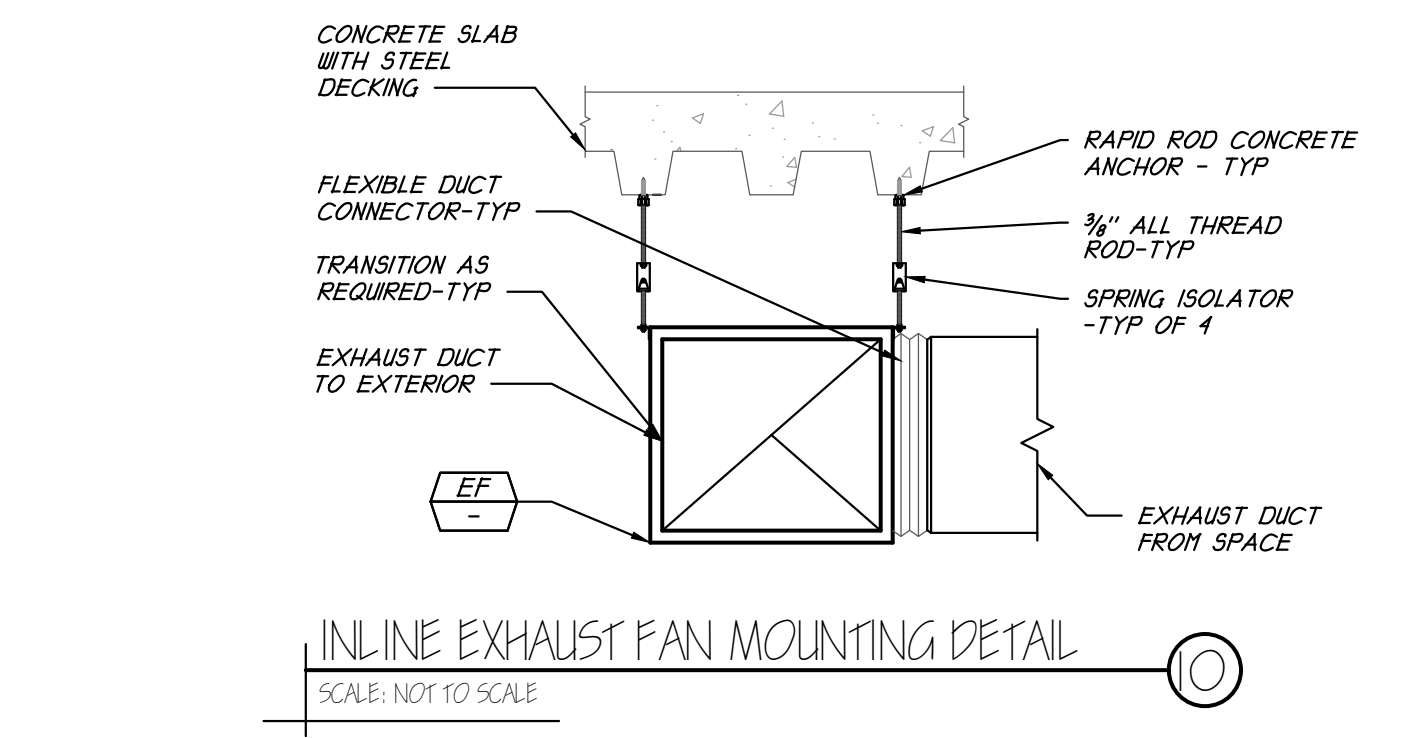
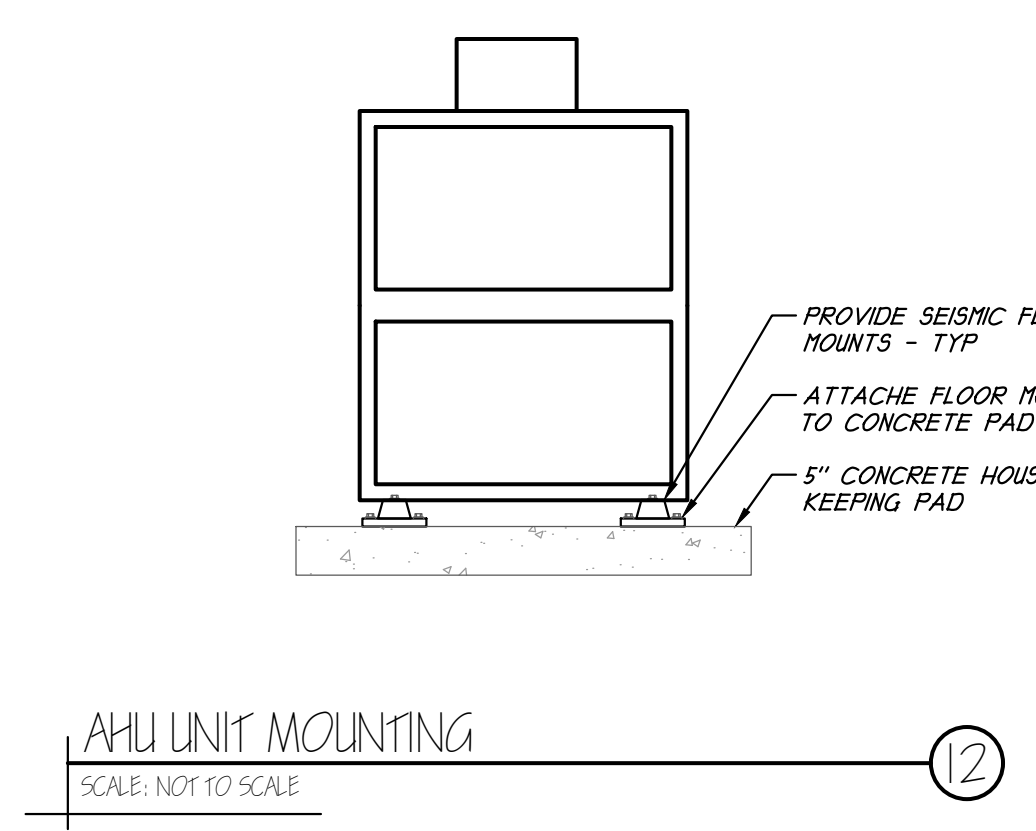
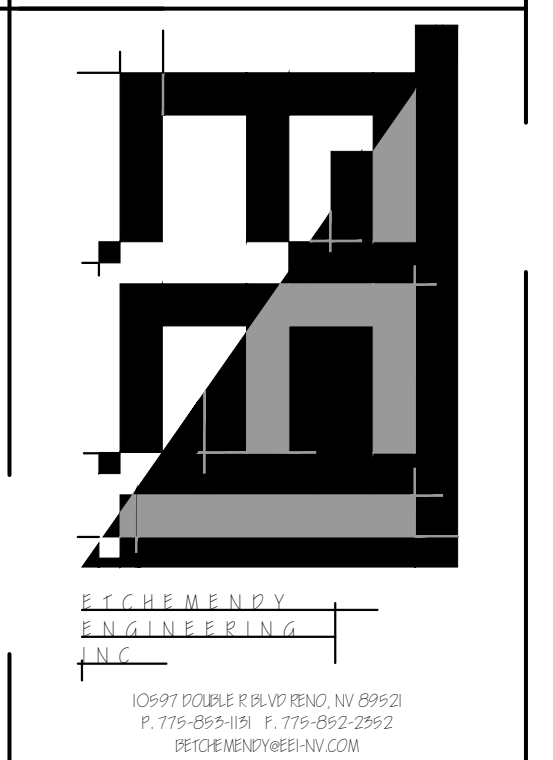
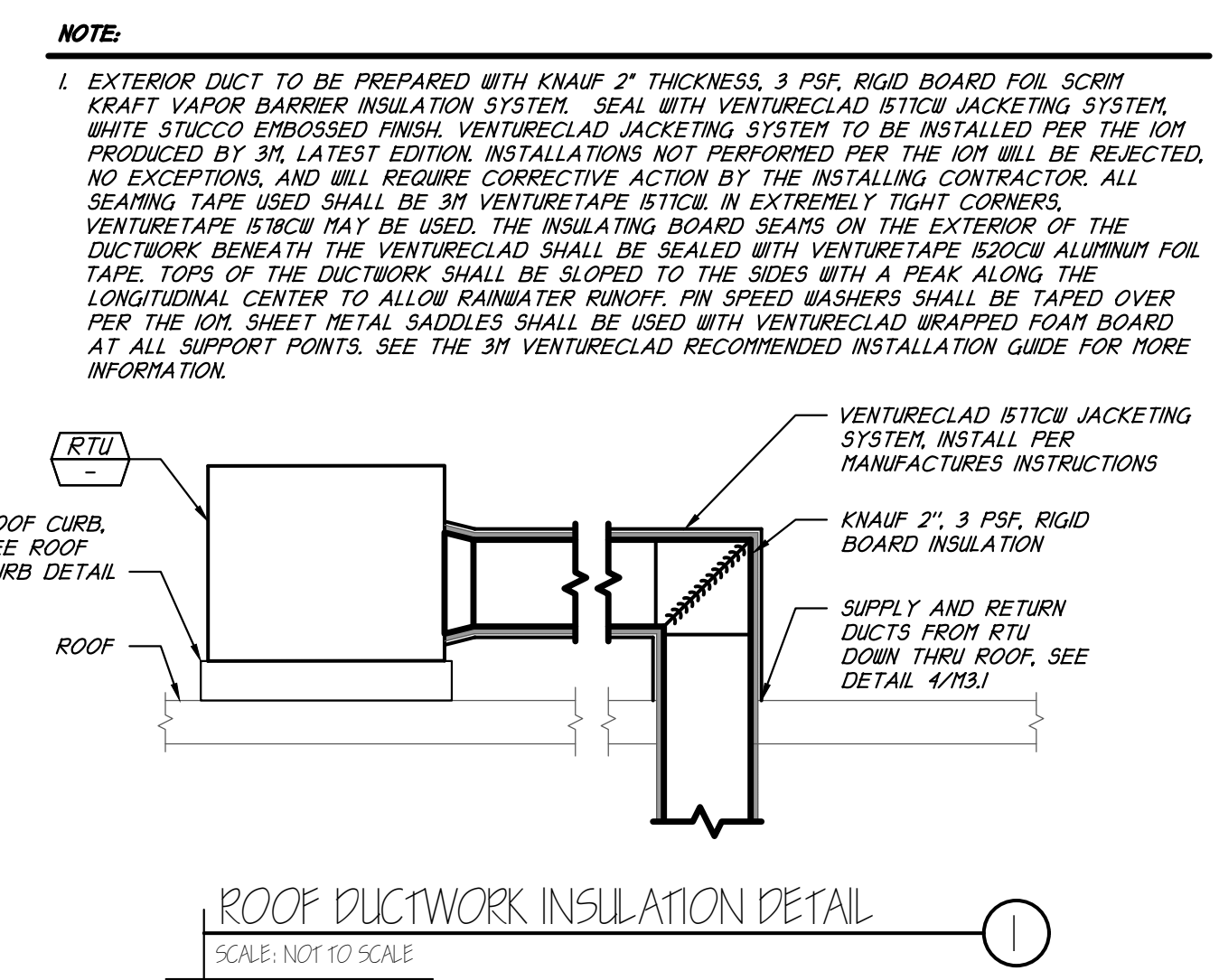
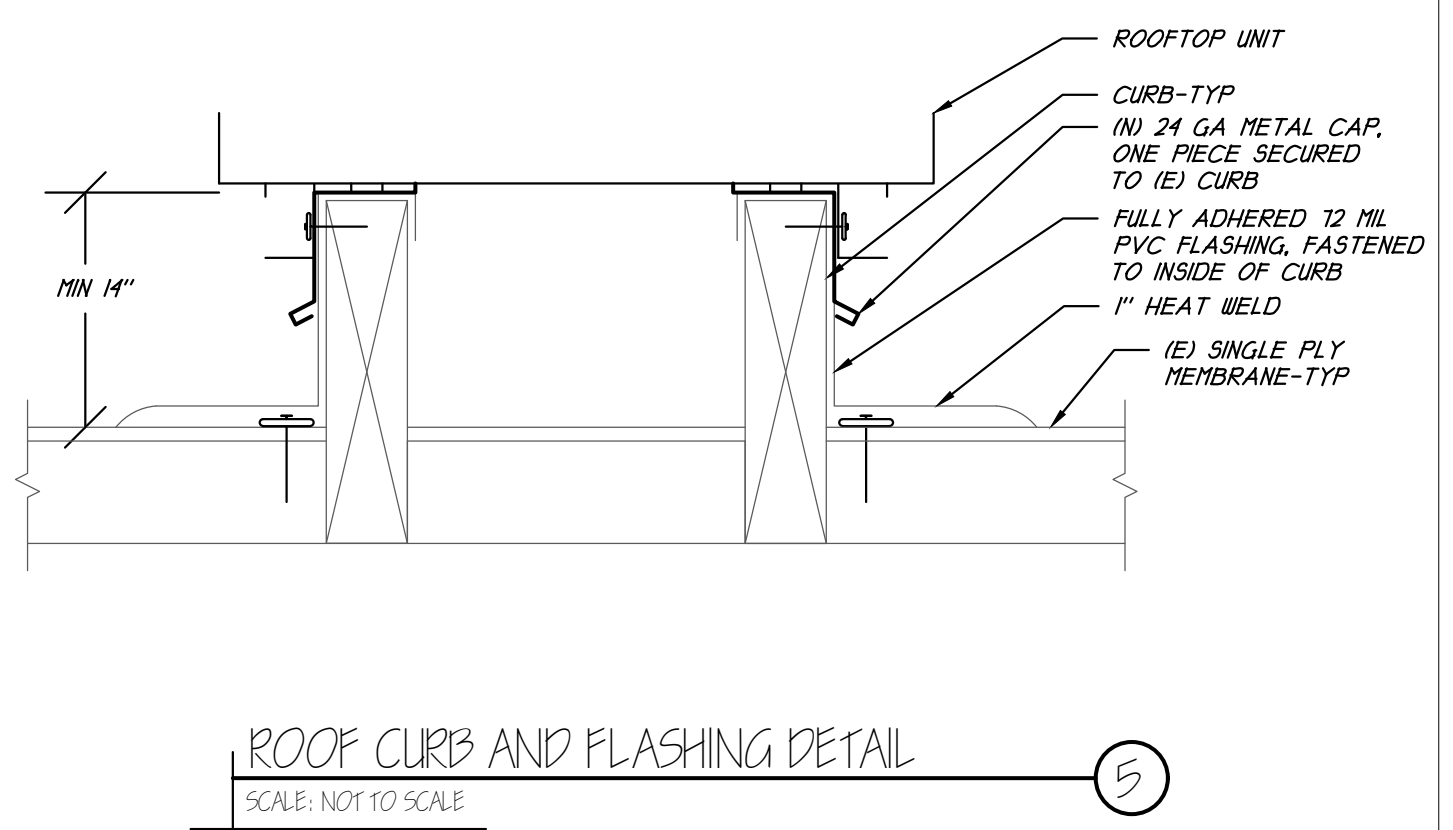
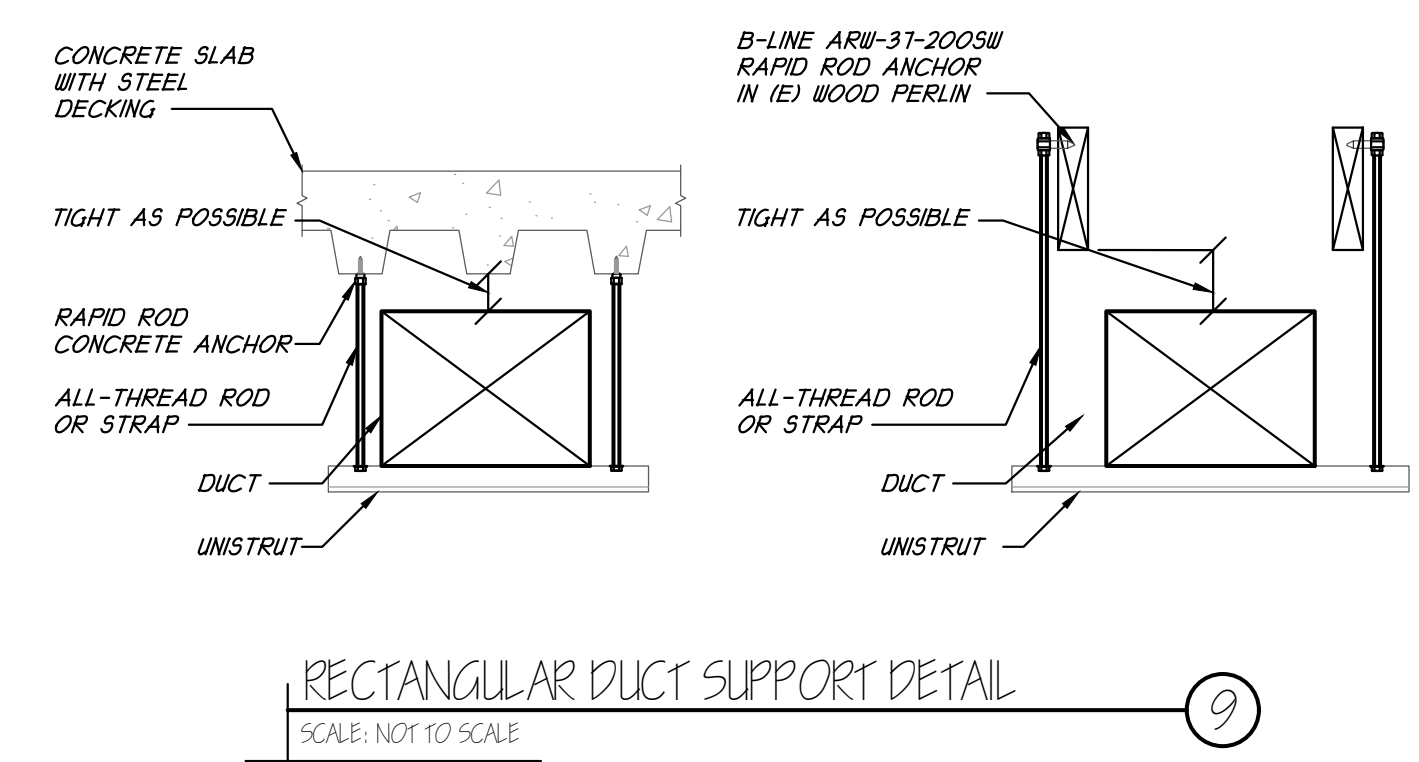
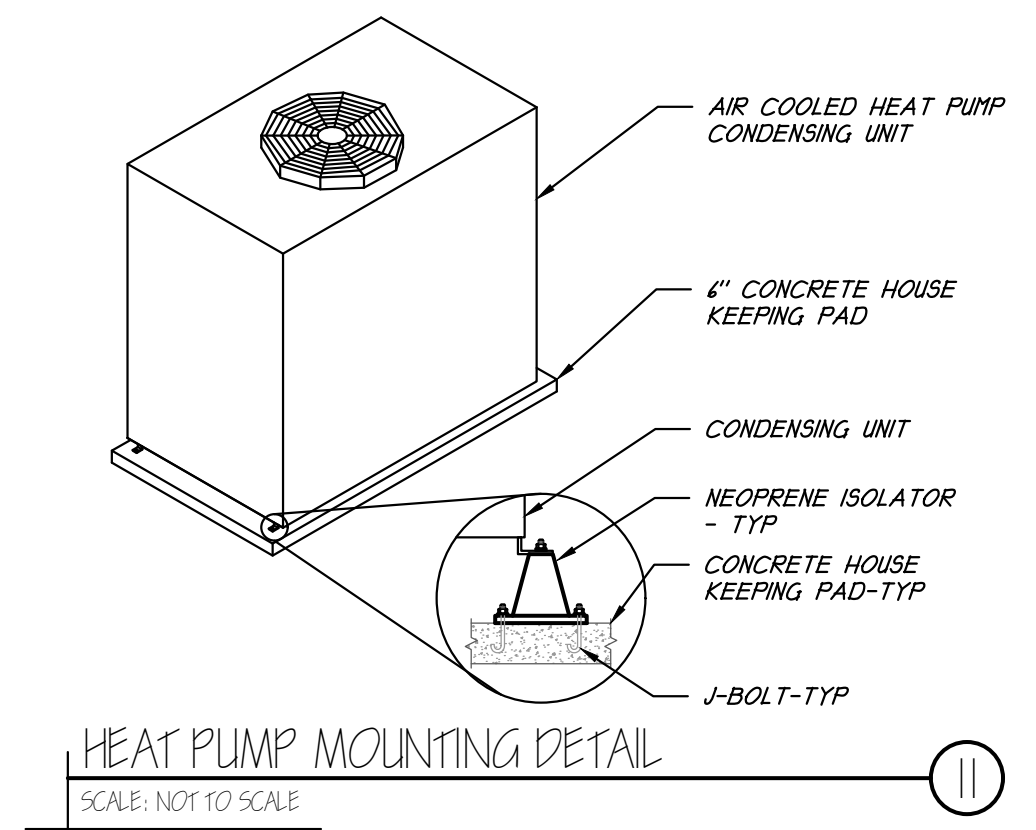
HVAC RETROFIT
INYO ANNEX BUILDING
168 N EDWARDS ST.
INDEPENDENCE, CALIFORNIA 93526

REVISIONS

DRAWING TITLE
MECHANICAL ROOF PLAN

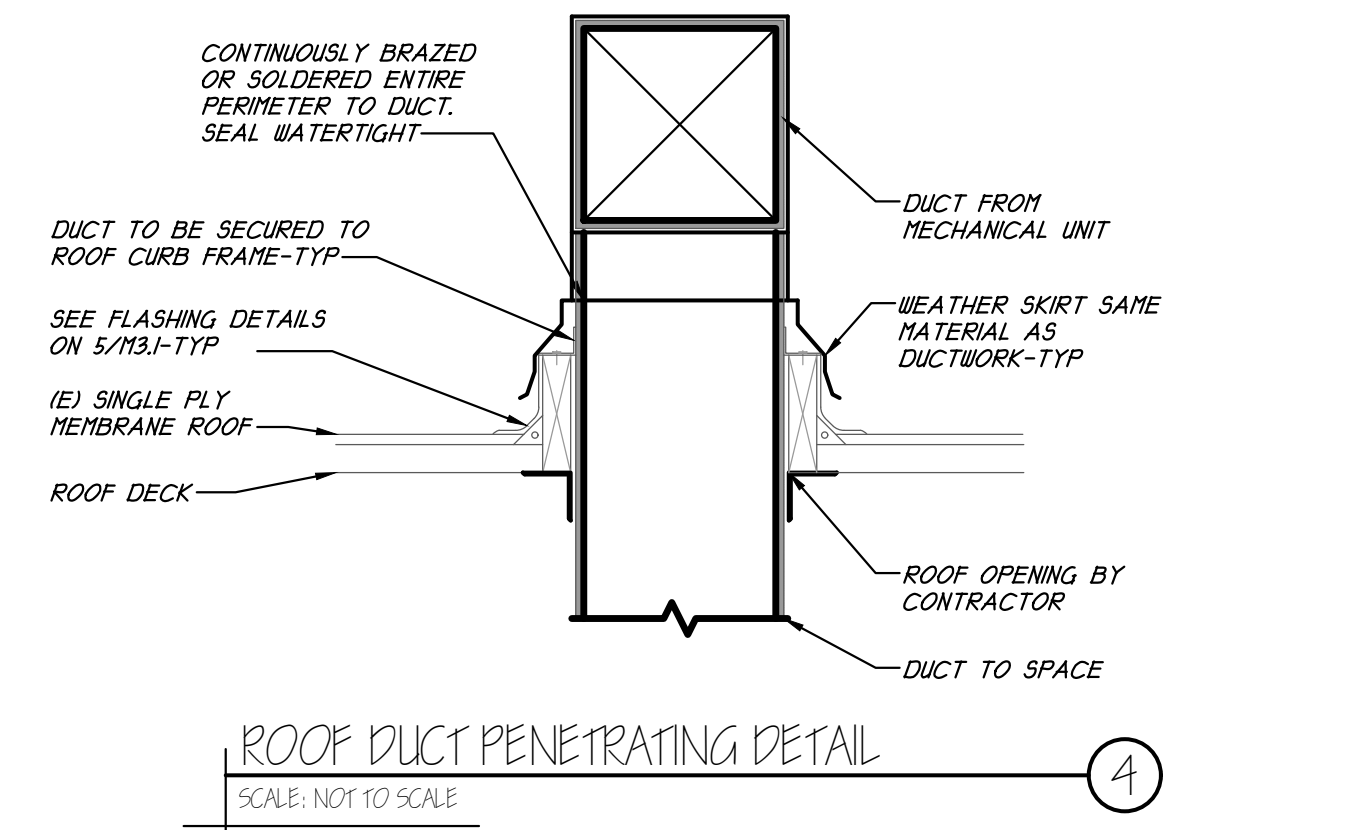
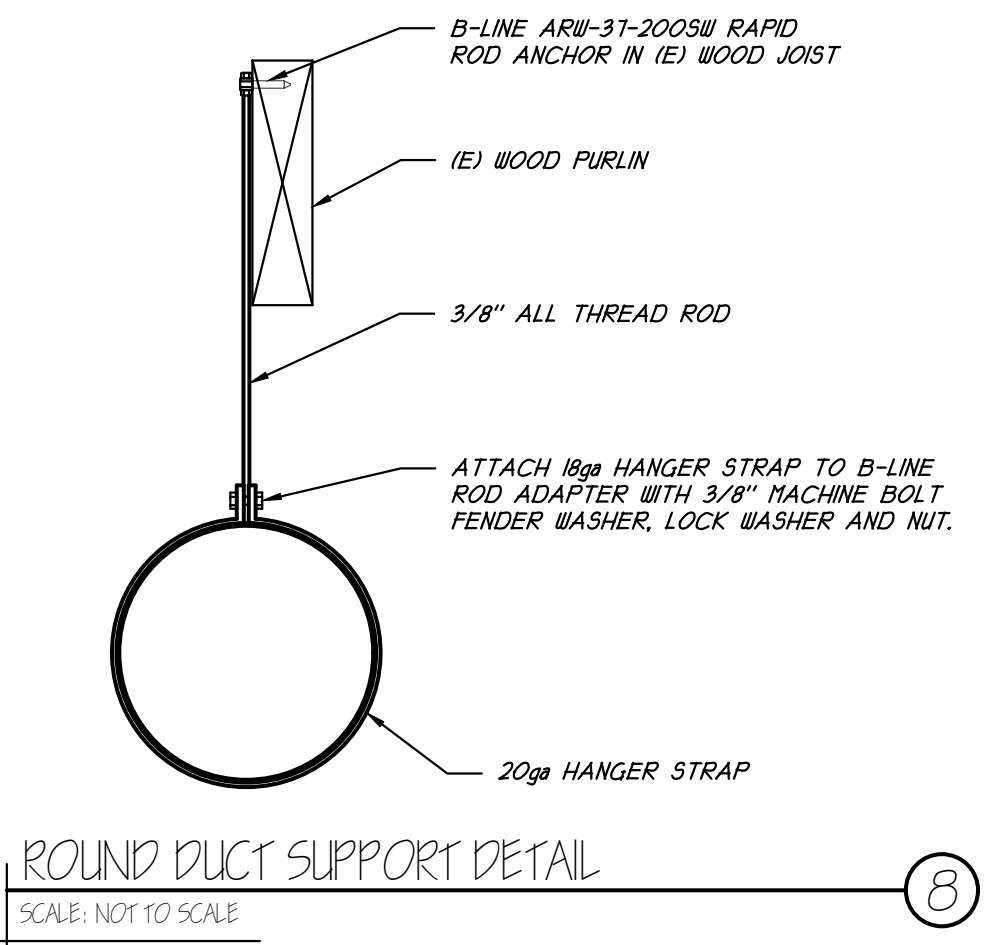
date: 02/04/20
job number: 19030
drawn: SME
checked: BAE

M2.3R



ELBOWS					
90° 5-GROVE ELBOW	3-GROVE ELBOW	2-GORE ELBOW	90° MITERED ELBOW w/ VANES	45° OFFSET	RECTANGULAR SMOOTH RADIUS ELBOW
LOLOSS TEE	LOLOSS REDUCING TEE	45° ROUND LATERAL	45° REDUCING LATERAL	RECTANGULAR TEE WITH 45° TRANSITION	RECTANGULAR TEE WITH 45° TRANSITION TO ROUND
CROSS					
LOLOSS 90° CROSS	LOLOSS 90° REDUCING CROSS	45° LATERAL CROSS	45° REDUCING LATERAL CROSS	45° RECTANGULAR LATERAL CROSS	
WYE/BULLHEAD					
Y-BRANCH	REDUCING Y-BRANCH	ROUND BULLHEAD TEE WITH VANES	BULLHEAD TEE WITH VANES	RECTANGULAR SMOOTH RADIUS DOVETAIL WYE	RECTANGULAR SMOOTH RADIUS WYE

ACCEPTABLE DUCT FITTINGS DETAIL
SCALE: NOT TO SCALE



HVAC RETROFIT
INYO ANNEX BUILDING
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 INDEPENDENCE, CALIFORNIA 93526

REVISIONS

DRAWING TITLE

MECHANICAL DETAILS

DATE: 02/04/20

JOB NUMBER: 19030

DRAWN: SME

CHECKED: BAE

M3.IR

GENERAL NOTES:

STANDARDS AND CODES: LATEST EDITION OF THE CALIFORNIA PLUMBING CODE (CPC), AS WELL AS ALL APPLICABLE STATE AND LOCAL CODES AND ORDINANCES. THIS DOES NOT RELIEVE THE CONTRACTOR FROM FURNISHING AND INSTALLING WORK SHOWN OR SPECIFIED WHICH MAY EXCEED THE REQUIREMENTS OF SUCH ORDINANCES, LAWS, REGULATIONS AND CODES.

COMPLETE INSTALLATION: PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, TOOLS, ACCESSORIES, ETC., NECESSARY TO ACCOMPLISH A COMPLETE PLUMBING SYSTEM IN ACCORDANCE WITH THE PLANS TOGETHER WITH THE SPECIFICATIONS.

PERMITS: OBTAIN AND PAY FOR ALL BUILDING AND WORKING PERMITS AND INSPECTION FEES REQUIRED FOR THIS PROJECT.

DRAWINGS: DATA PRESENTED ON THESE DRAWINGS SHALL BE FIELD VERIFIED SINCE ALL DIMENSIONS, LOCATIONS, AND LEVELS ARE GOVERNED BY ACTUAL FIELD CONDITIONS. REVIEW ALL STRUCTURAL, ELECTRICAL AND SPECIALTY SYSTEMS DRAWINGS AND ADJUST ALL WORK TO MEET THE REQUIREMENTS ON CONDITIONS SHOWN THEREON. DO NOT SCALE PLUMBING PLANS FOR FIXTURE, PIPING, APPLIANCE ETC. LOCATIONS. USE CONFIGURED DIMENSIONS IF GIVEN OR CHECK ARCHITECTURAL DRAWINGS.

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LOCATIONS: INDICATED LOCATIONS OF ALL FIXTURES, PIPING, EQUIPMENT ETC. ARE SUBJECT TO CHANGE. SHIFT/RELOCATE/RECONFIGURE ANY FIXTURE, PIPE, EQUIPMENT OR CONNECTION POINT UP TO 10' AS DIRECTED BY ENGINEER, AT NO ADDED COST.

RECORD DRAWINGS: CONTRACTOR SHALL PROVIDE, PRIOR TO FINAL ACCEPTANCE AND OBSERVATION, ONE SET OF REVISED RECORD PLUMBING CONSTRUCTION DOCUMENTS ON REPRODUCIBLE MEDIUM, INDICATING THE FOLLOWING ADDITIONAL INFORMATION:

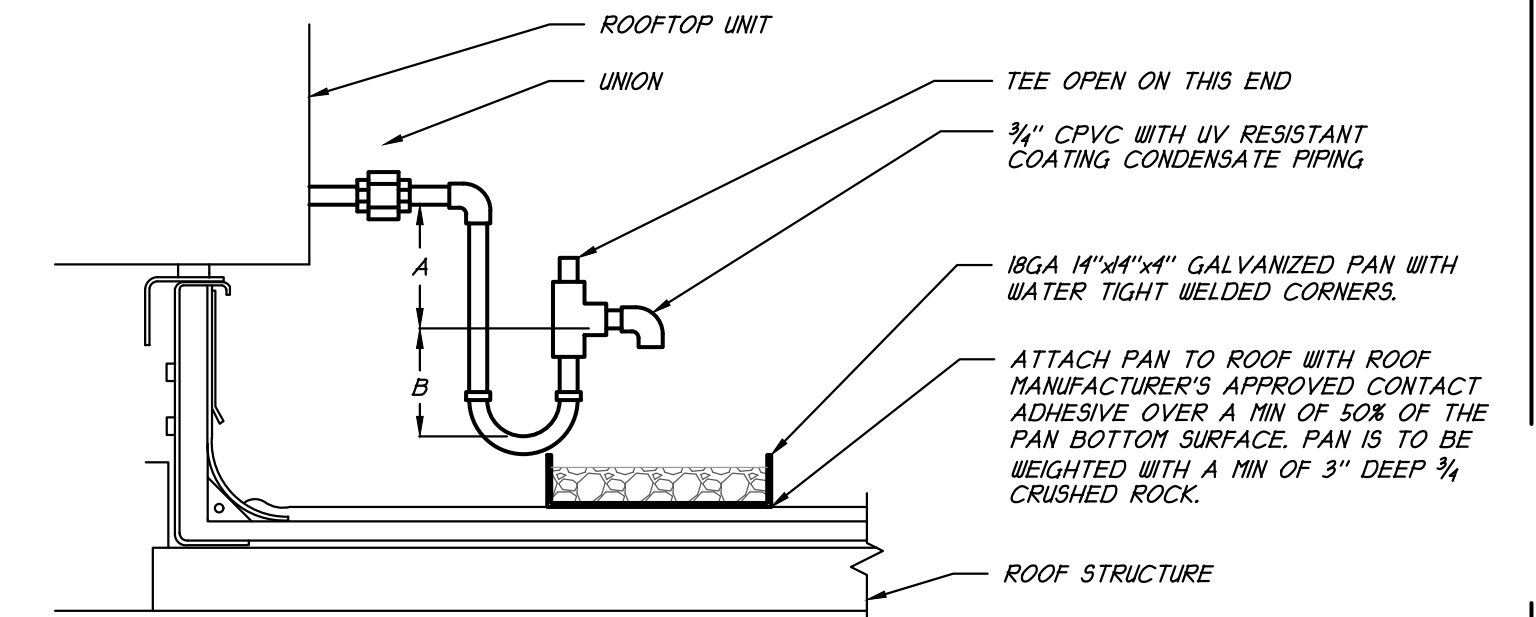
RECORD NOTATIONS SHALL BE CLEARLY DRAWN AT A DRAFTING APPEARANCE EQUAL TO THE ORIGINAL DRAWINGS. CONTRACTOR SHALL ALSO PROVIDE ALL OPERATING AND MAINTENANCE MANUALS PRIOR TO FINAL PAYMENT.

EXAMINATION OF SITE AND EXISTING CONDITIONS: BEFORE SUBMITTING A PROPOSAL, CONTRACTOR SHALL EXAMINE THE SITE AND FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS AND LIMITATIONS. NO EXTRAS WILL BE ALLOWED BECAUSE OF THE CONTRACTOR'S MISUNDERSTANDING OF THE AMOUNT OF WORK INVOLVED OR HIS LACK OF KNOWLEDGE OF ANY SITE CONDITIONS WHICH MAY AFFECT HIS WORK. ANY APPARENT VARIANCE OF THE DRAWINGS OR SPECIFICATIONS FROM THE EXISTING CONDITIONS AT THE SITE SHALL BE CALLED TO THE ATTENTION OF THE ENGINEER BEFORE SUBMITTING A PROPOSAL.

EXISTING CONDITIONS: ALL (E) SIZES AND LOCATIONS ARE APPROXIMATIONS AND ARE TO BE FIELD VERIFIED BY THE CONTRACTOR PRIOR COMMENCEMENT OF ANY WORK. NO ADDITIONAL FEES WILL BE ALLOWED DUE TO LACK OF FIELD VERIFICATION.

PLUMBING LEGEND

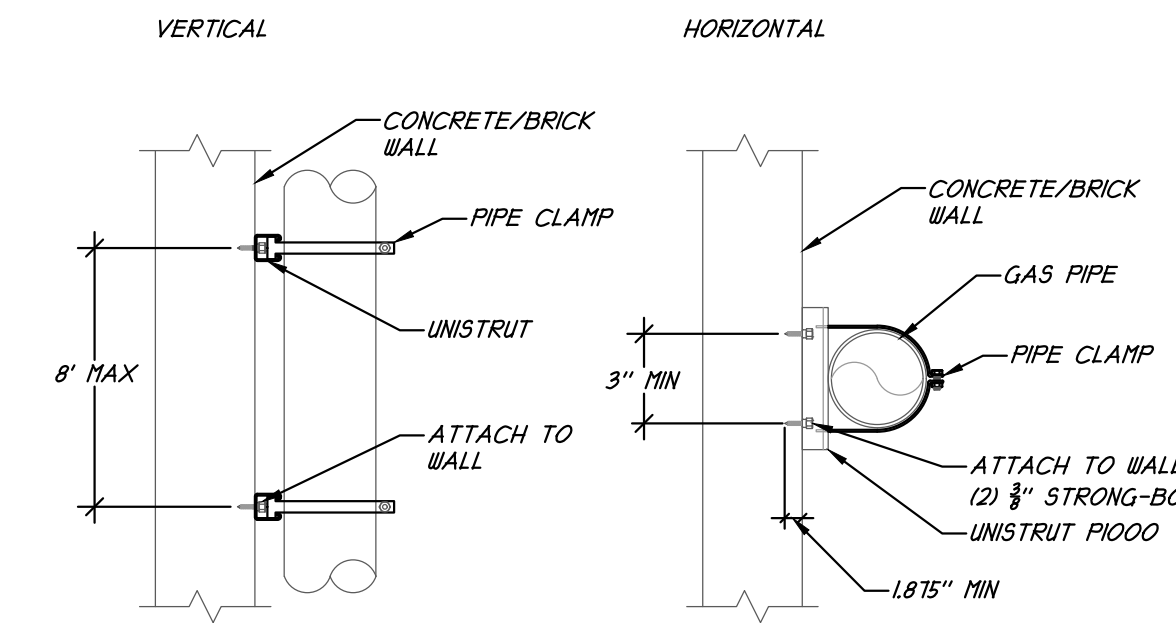
LINETYPE	ABBREVIATION	INTENT
	LP	LIQUID PROPANE GAS PIPING
	C	CONDENSATE PIPING
	UP	PIPE UP
	DOWN	PIPE DOWN
	POC	POINT OF CONNECTION
	POD	POINT OF DISCONNECT
	VTR	VENT THRU ROOF
		BALANCING VALVE
		BALL VALVE
	(N)	NEW
	(E)	EXISTING
	AFF	ABOVE FINISHED FLOOR
	AFG	ABOVE FINISHED GRADE
	BFF	BELOW FINISHED FLOOR
	BFG	BELOW FINISHED GRADE
	MIN	MINIMUM
	TYP	TYPICAL
	GPF	GALLONS PER FLUSH
	GPH	GALLONS PER HOUR
	GPM	GALLON PER MINUTE
	FCO	FLOOR CLEANOUT
	COTG	CLEANOUT TO GRADE
	WCO	WALL CLEAN OUT
	TDL	TOTAL DEVELOPED LENGTH



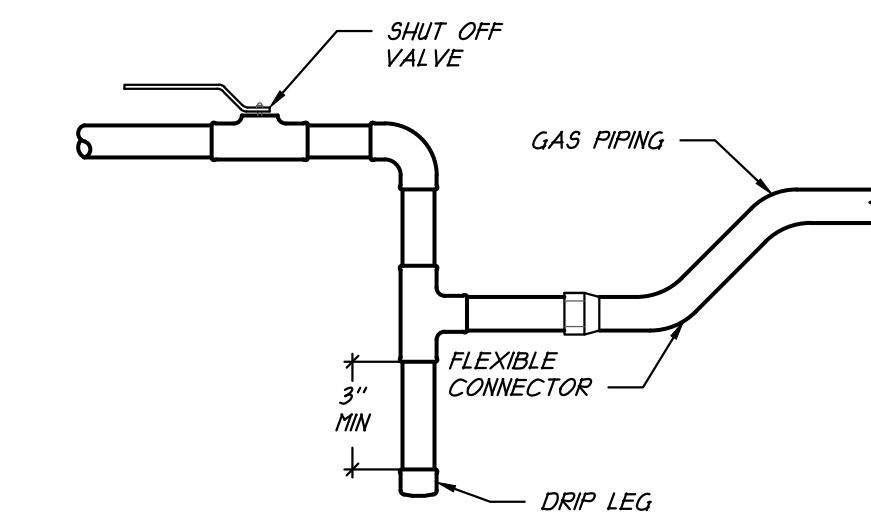
UNIT TYPE	A	B
DRAW THRU	2" + X	X
BLOW THRU	1" MIN	2 + X

X = STATIC PRESSURE IN PAN

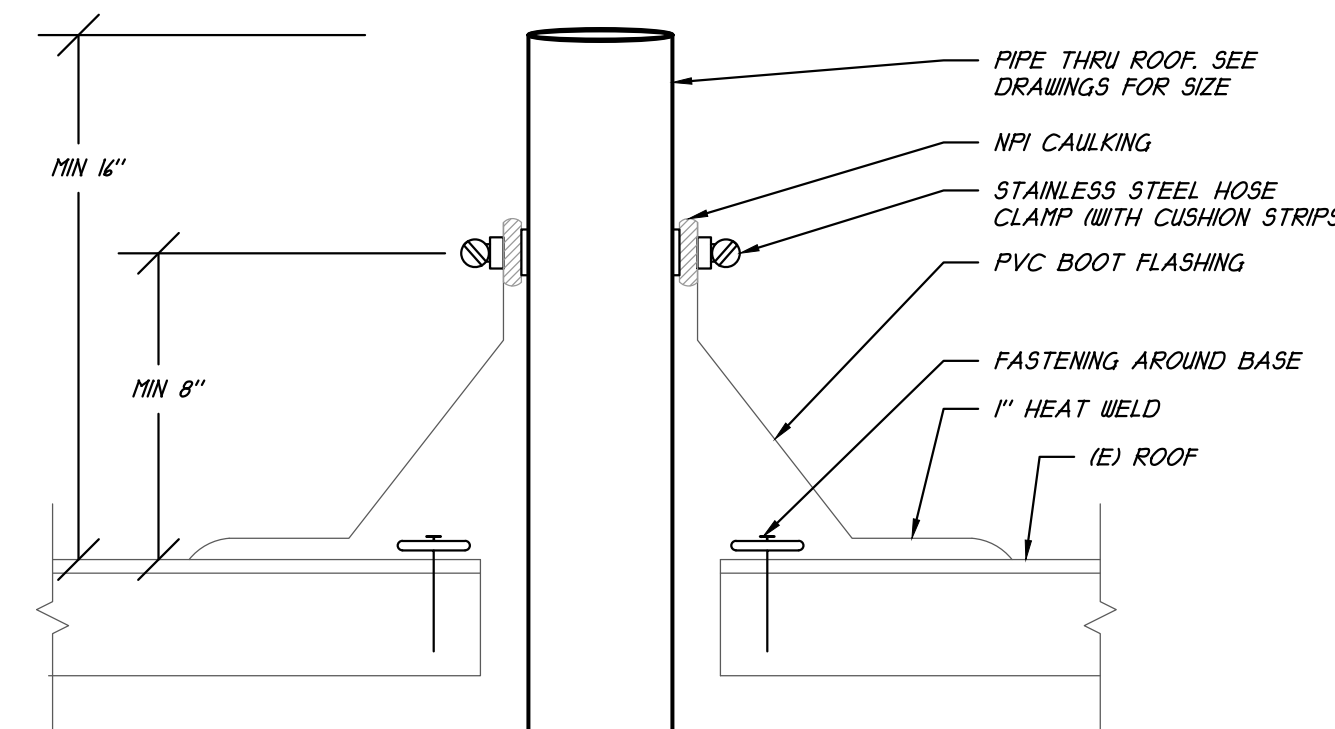
PACKAGE UNIT CONDENSATE
SCALE: NOT TO SCALE



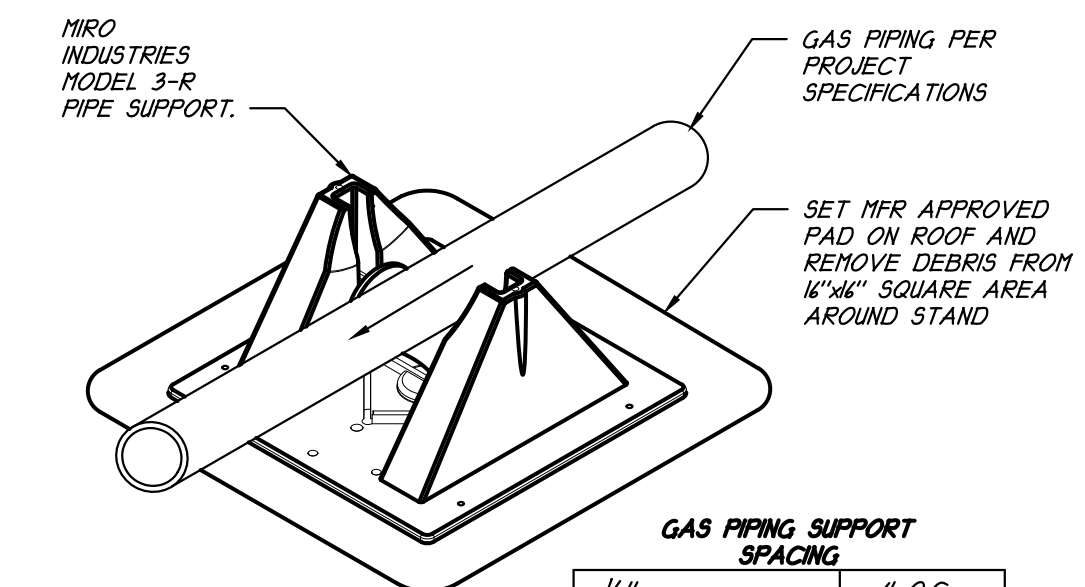
GAS PIPING WALL SUPPORT DETAIL
SCALE: NOT TO SCALE



GAS PIPE TERMINATION DETAIL
SCALE: NOT TO SCALE

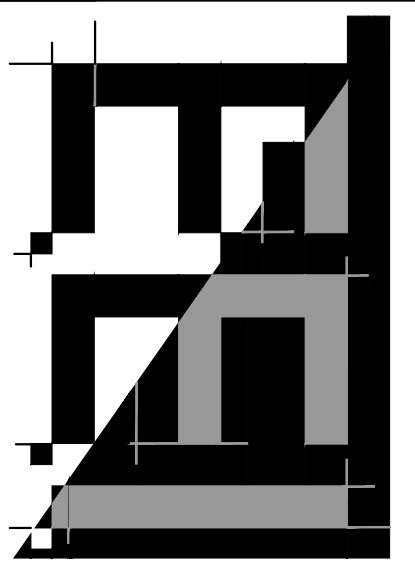


PIPE THRU ROOF PENETRATION
SCALE: NOT TO SCALE

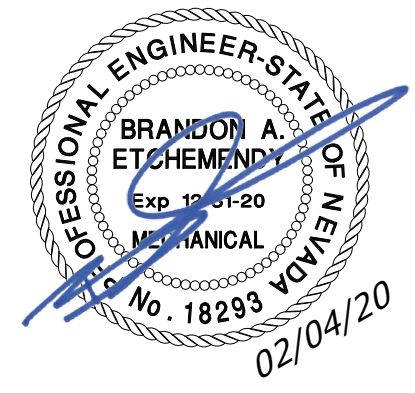


GAS PIPING SUPPORT SPACING	
1/2"	6' O.C.
3/4" - 1"	8' O.C.
1-1/4" + LARGER	10' O.C.

GAS PIPING SUPPORT DETAIL
SCALE: NOT TO SCALE



DATE: 02/04/20
JOB NUMBER: 19030
DRAWN: SME
CHECKED: BAE



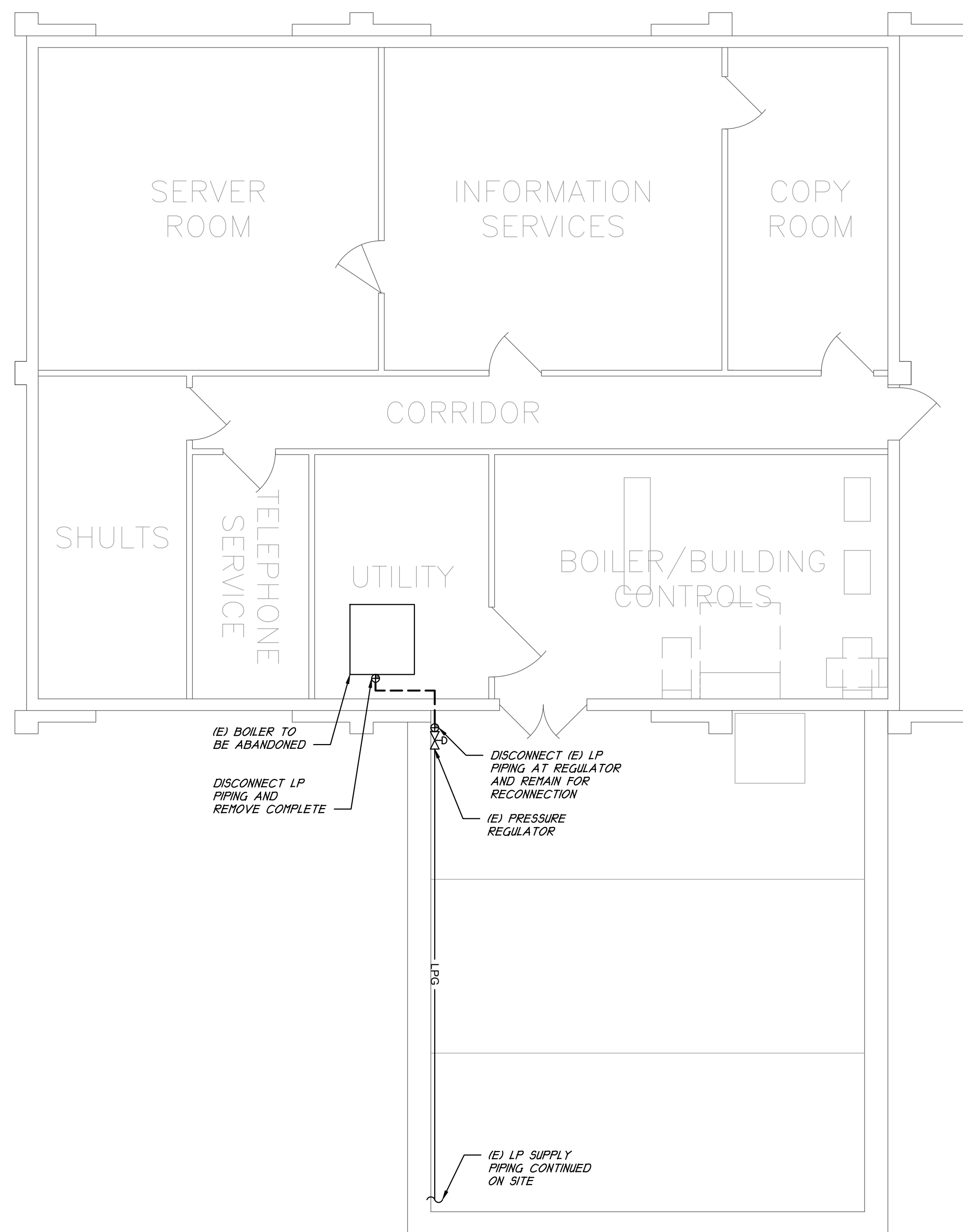
HVAC RETROFIT
INYO ANNEX BUILDING
 168 N EDWARDS ST.
 INDEPENDENCE, CALIFORNIA 93526

REVISIONS

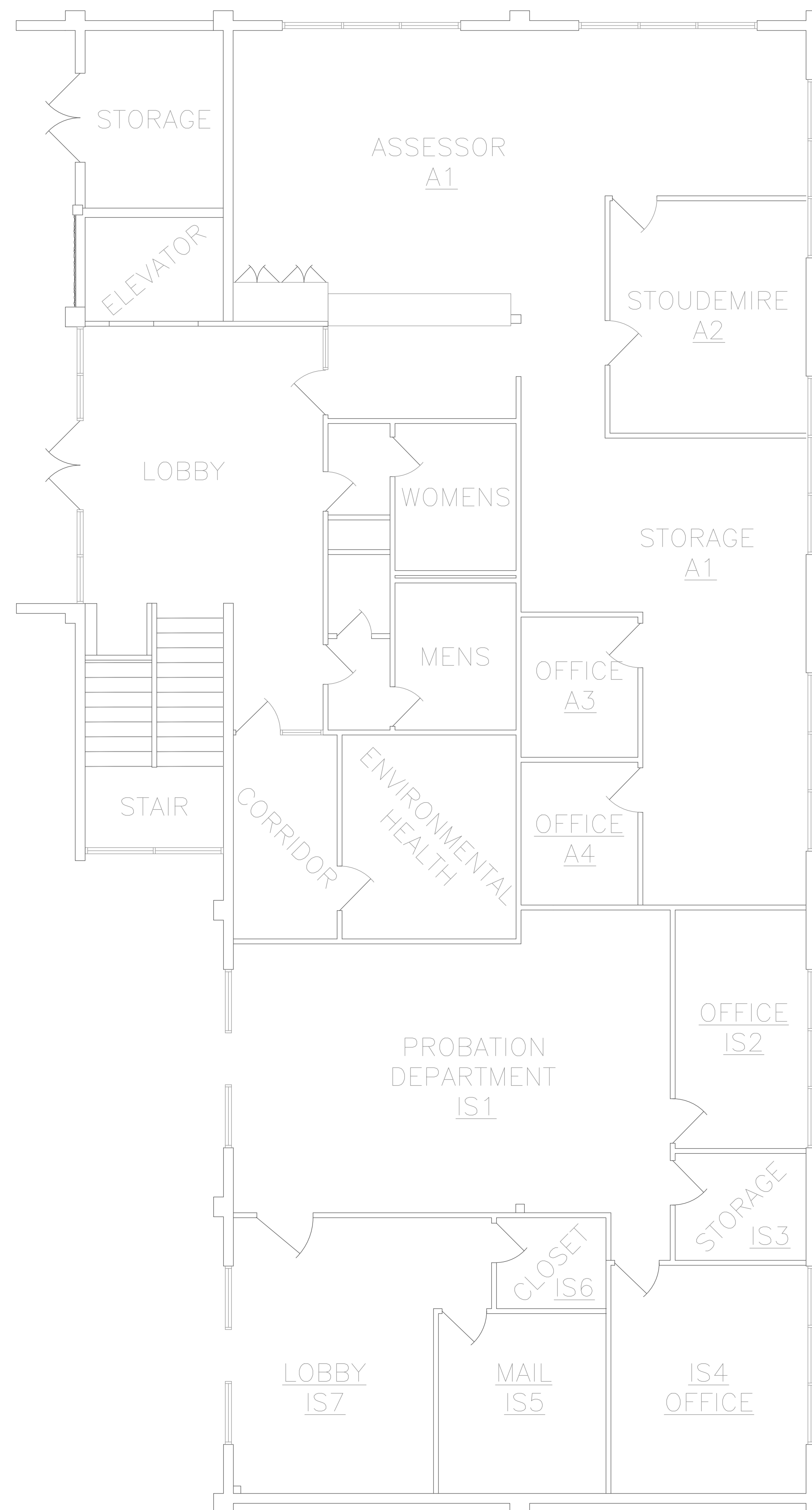
DRAWING TITLE
PLUMBING NOTES & DETAILS

DATE: 02/04/20
JOB NUMBER: 19030
DRAWN: SME
CHECKED: BAE

PO.IR

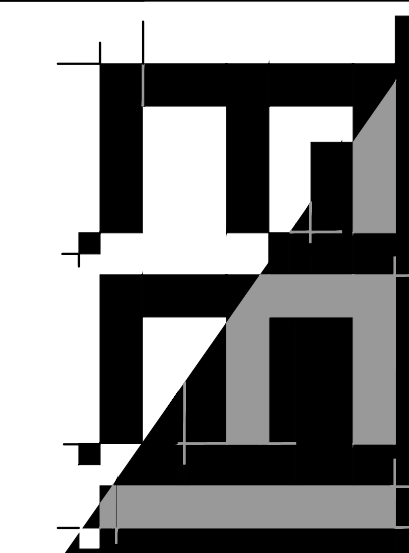


BREEZEWAY

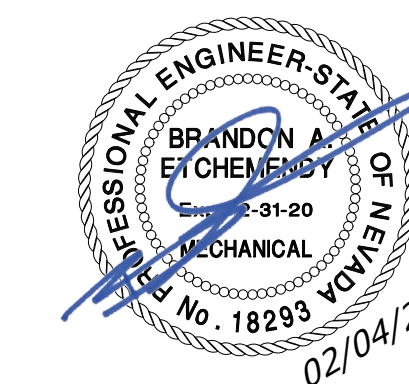


GENERAL NOTES:

1. ASBESTOS HAS BEEN FOUND TO BE PRESENT IN THE MECHANICAL ROOM AND MECHANICAL PIPING VIA TESTING. AVOID DISTURBING AND REMOVING MECHANICAL PIPING UNLESS OTHERWISE NOTED. COORDINATE ALL ASBESTOS CONTAINING MATERIALS WITH THE COUNTY AND COUNTIES TESTING REPORT. ALL ABATEMENT REQUIRED TO PERFORM WORK IN QUESTION TO BE LISTED AS A SEPARATE LINE ITEM.



TECHNICAL
ENGINEERING
INC.
10497 FOLSOM BLVD SUITE 100
F. 775-854-105 F. 775-852-2912
REGISTRATION NO. 12000



HVAC RETROFIT
INYO ANNEX BUILDING
168 N EDWARDS ST.
INDEPENDENCE, CALIFORNIA 93526

REVISIONS

DRAWING TITLE

1ST FLOOR
DEMOLITION
PLUMBING PLAN

date 02/04/20

job number 19030

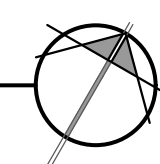
drawn SME

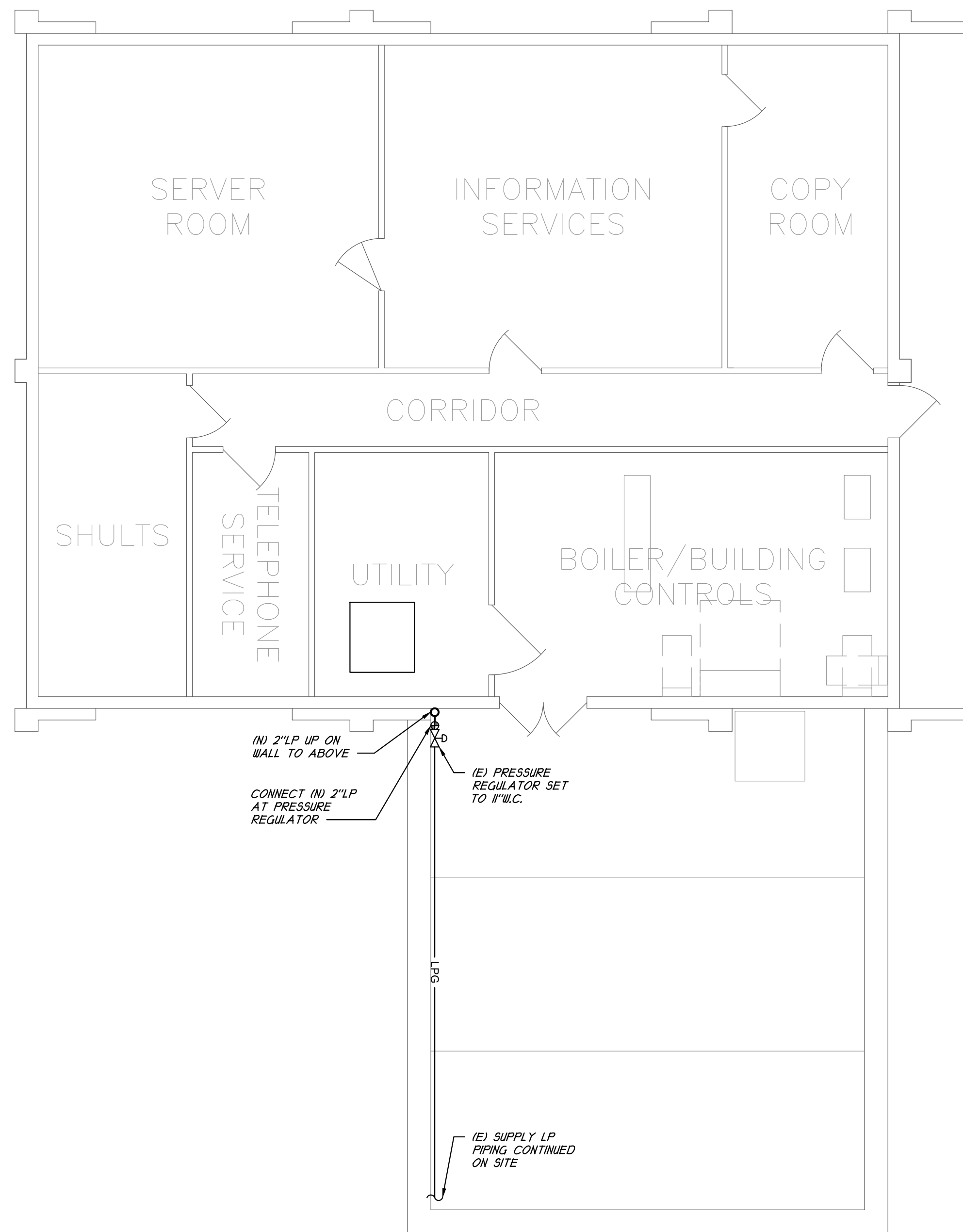
checked BAE

PI.R

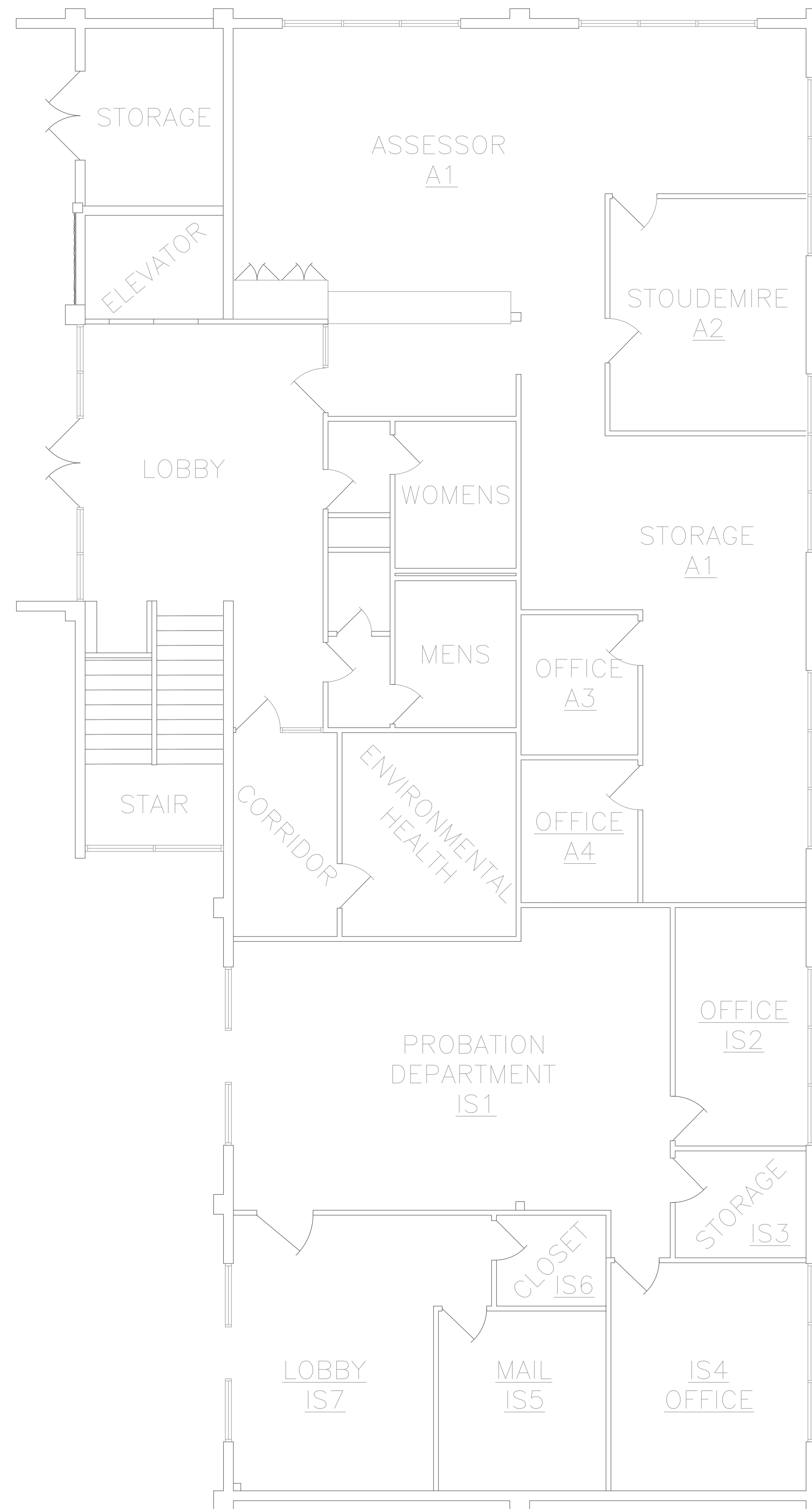
1ST FLOOR DEMOLITION PLUMBING PLAN

SCALE: 3/16" = 1'-0"



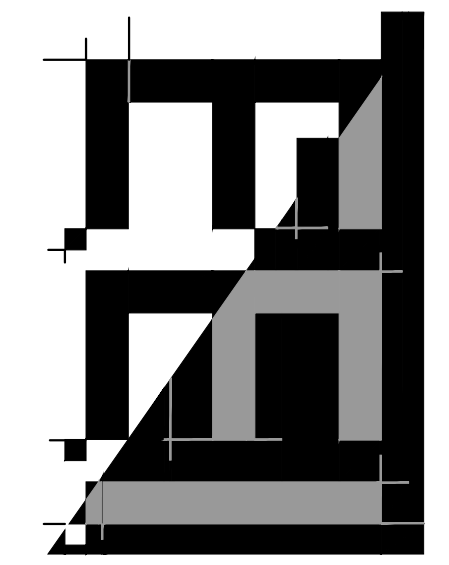


BREEZEWAY

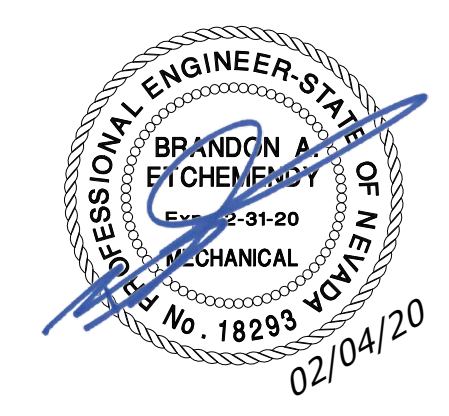


GENERAL NOTES:

1. ASBESTOS HAS BEEN FOUND TO BE PRESENT IN THE MECHANICAL ROOM AND MECHANICAL PIPING VIA TESTING. AVOID DISTURBING AND REMOVING MECHANICAL PIPING UNLESS OTHERWISE NOTED. COORDINATE ALL ASBESTOS CONTAINING MATERIALS WITH THE COUNTY AND COUNTIES TESTING REPORT. ALL ABATEMENT REQUIRED TO PERFORM WORK IN QUESTION TO BE LISTED AS A SEPARATE LINE ITEM.



REGISTERED PROFESSIONAL ENGINEER
 CIVIL
 10497 FOLSOM BLVD. SUITE 100
 F. 775-854-0505 P. 775-852-2502
 REGISTRATION NO. 1220



HVAC RETROFIT
INYO ANNEX BUILDING
 168 N EDWARDS ST.
 INDEPENDENCE, CALIFORNIA 93526

REVISIONS

DRAWING TITLE

1ST FLOOR
 PLUMBING PLAN

date: 02/04/20

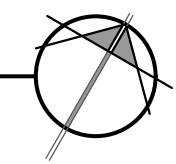
job number: 19030

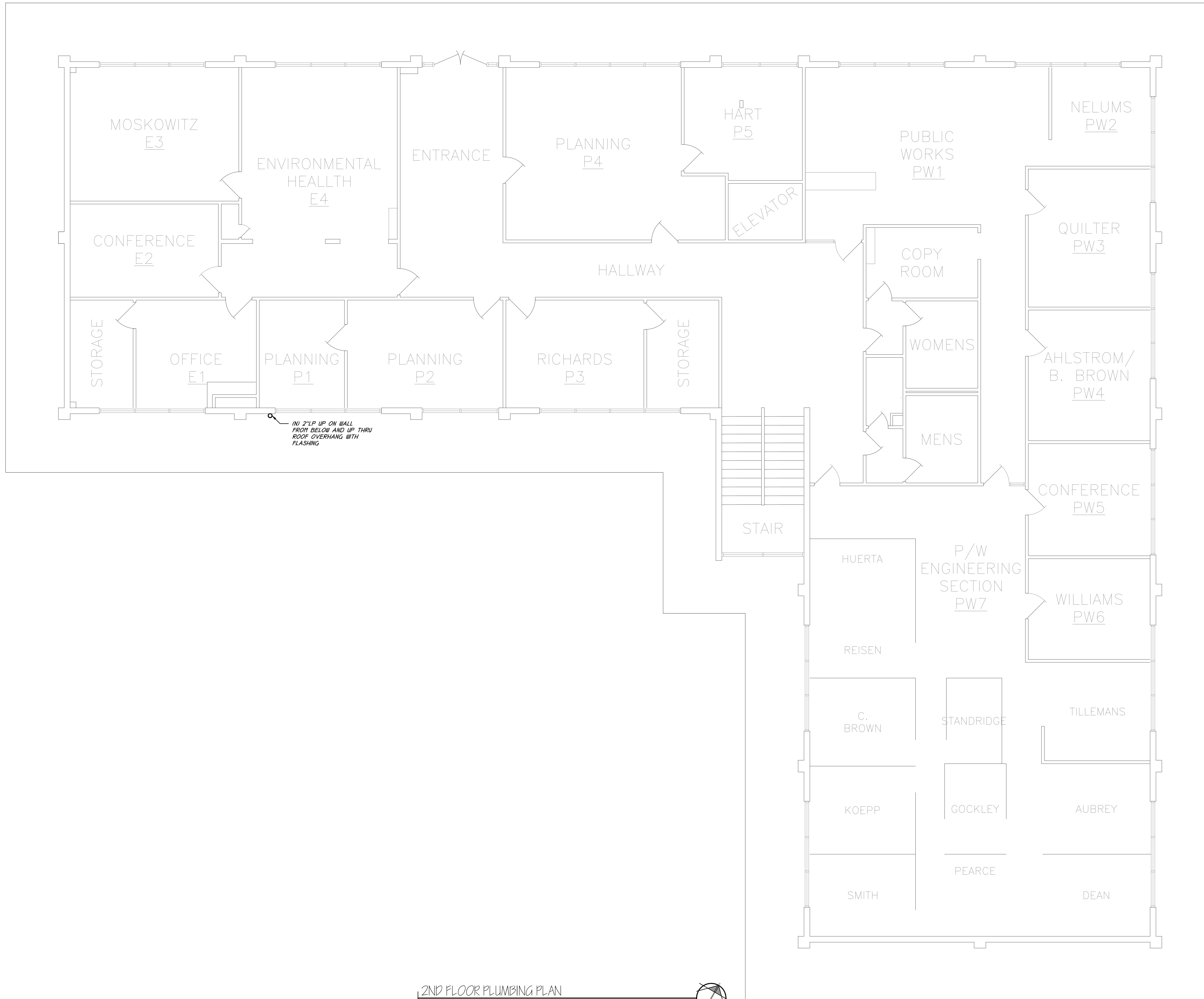
drawn: SME

checked: BAE

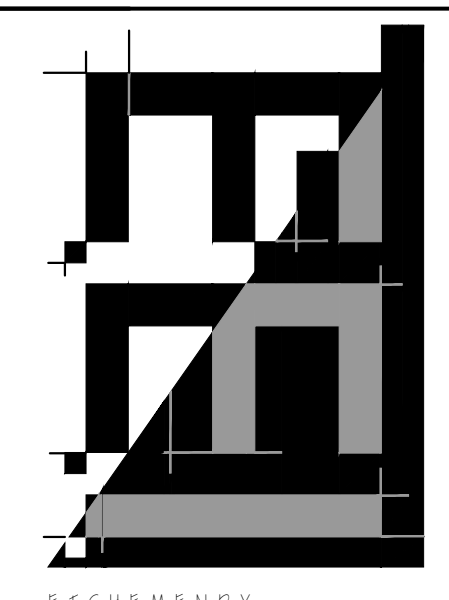
P2.IR

1ST FLOOR PLUMBING PLAN
 SCALE: 3/16" = 1'-0"

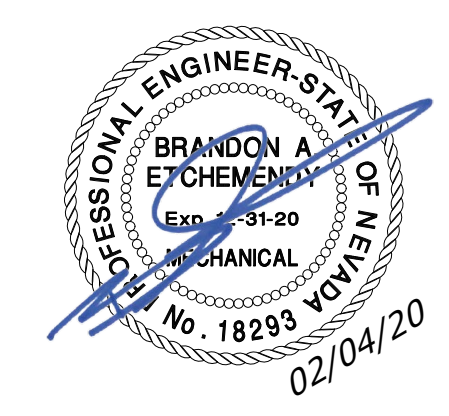




2ND FLOOR PLUMBING PLAN
 SCALE: 3/16" = 1'-0"



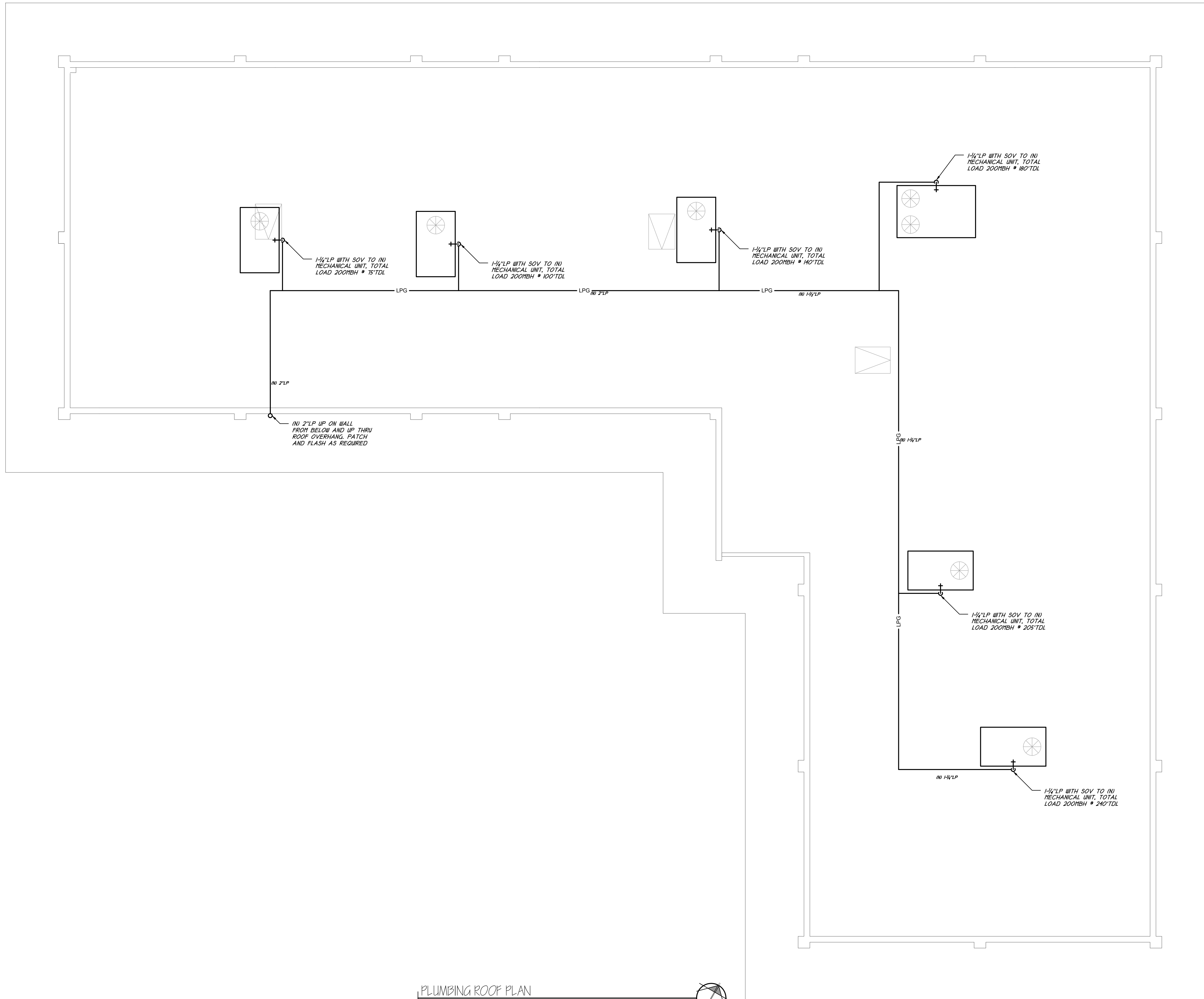
F. C. HENNING
 ENGINEERING
 INC.
 10497 PO BOX 8700 BEND, OR 97708
 P. 773-854-05 F. 773-852-2502
 REGISTRATION NO. 2202



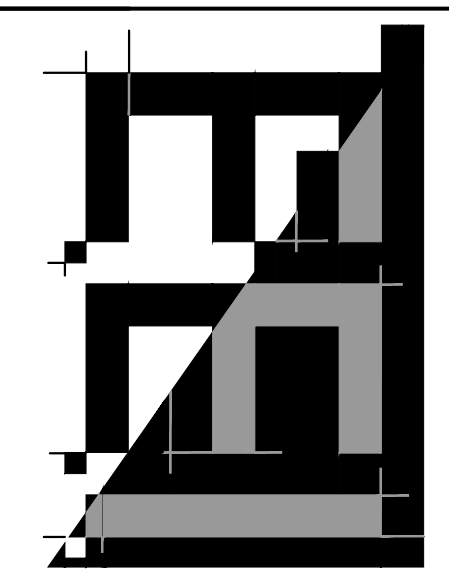
HVAC RETROFIT
INYO ANNEX BUILDING
 168 N EDWARDS ST.
 INDEPENDENCE, CALIFORNIA 93526

REVISIONS	
DRAWING TITLE	2ND FLOOR PLUMBING PLAN
date	02/04/20
job number	19030
drawn	SME
checked	BAE

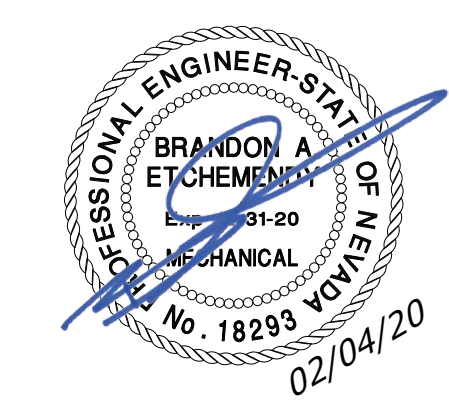
P2.2R



PLUMBING ROOF PLAN
 SCALE: 3/16" = 1'-0"



ETCHEMENTY
 ENGINEERING
 INC.
 10497 POINTE BLVD SUITE 100
 F. 775-854-0515 T. 775-862-2962
 REDDEN@ETCHENY.COM



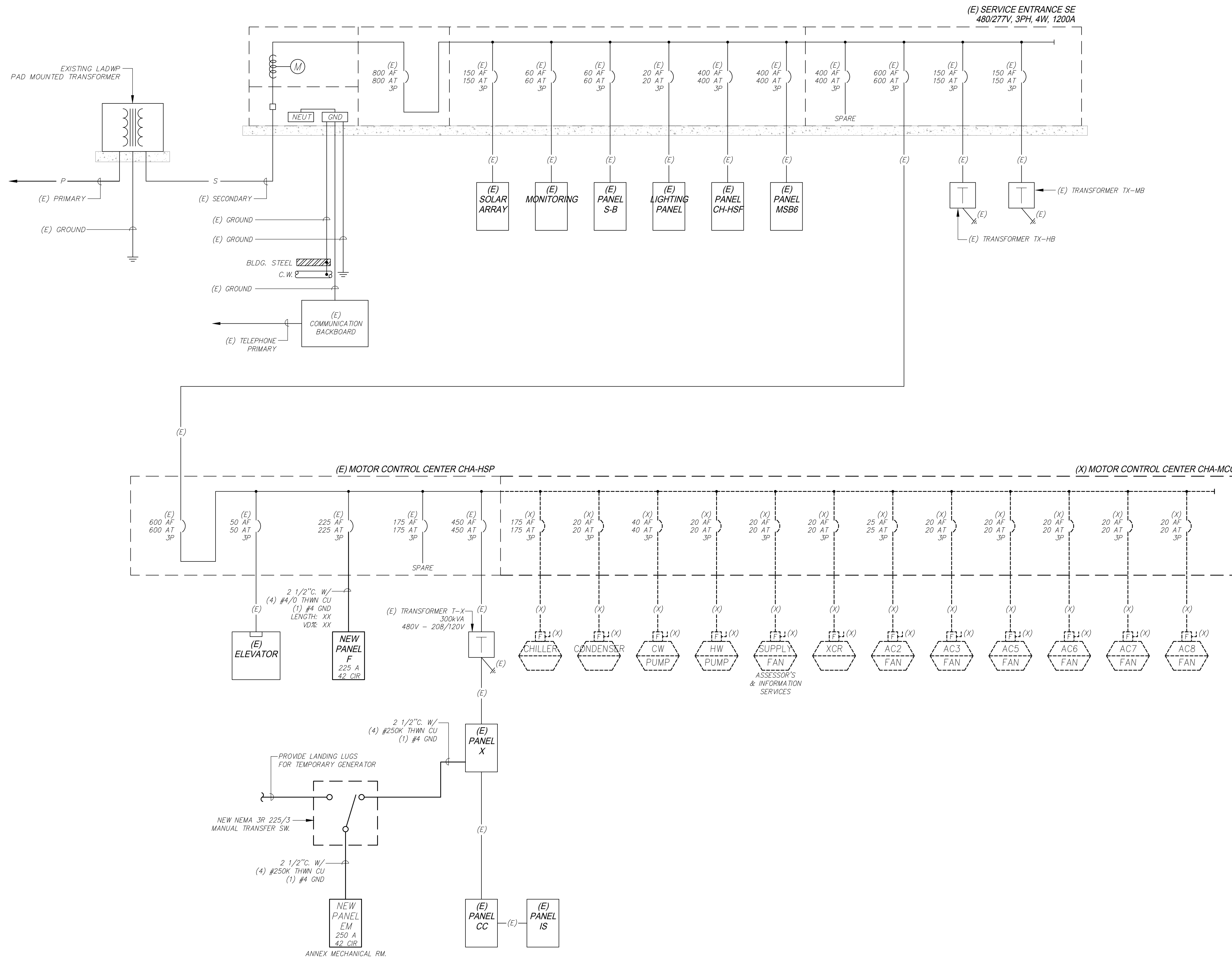
HVAC RETROFIT
INYO ANNEX BUILDING
 168 N EDWARDS ST.
 INDEPENDENCE, CALIFORNIA 93526

REVISIONS

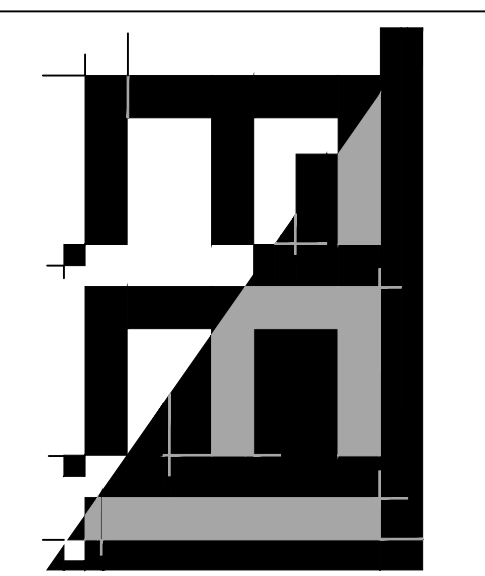
DRAWING TITLE
PLUMBING ROOF PLAN

date: 02/04/20
 job number: 19030
 drawn: SME
 checked: BAE

P2.3R



A	SINGLE LINE DIAGRAM
EO.2R	SCALE: NOT TO SCALE



ECHENREY
ENGINEERING
INC.
10997 DOUBLE R BLVD. STE. 101
RENO, NEVADA 89521
P: 775-852-2337
F: 775-852-2352
WWW.ECHENREY-ENG.COM

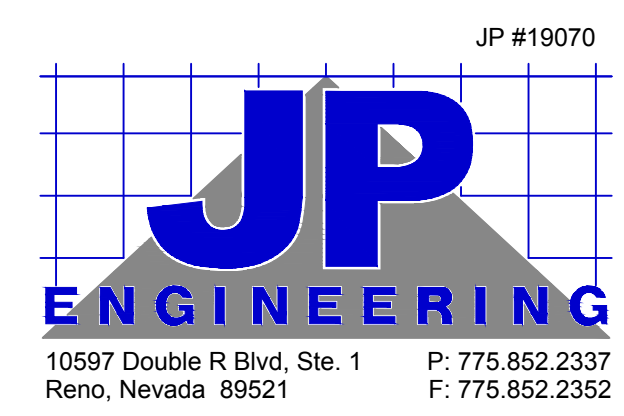


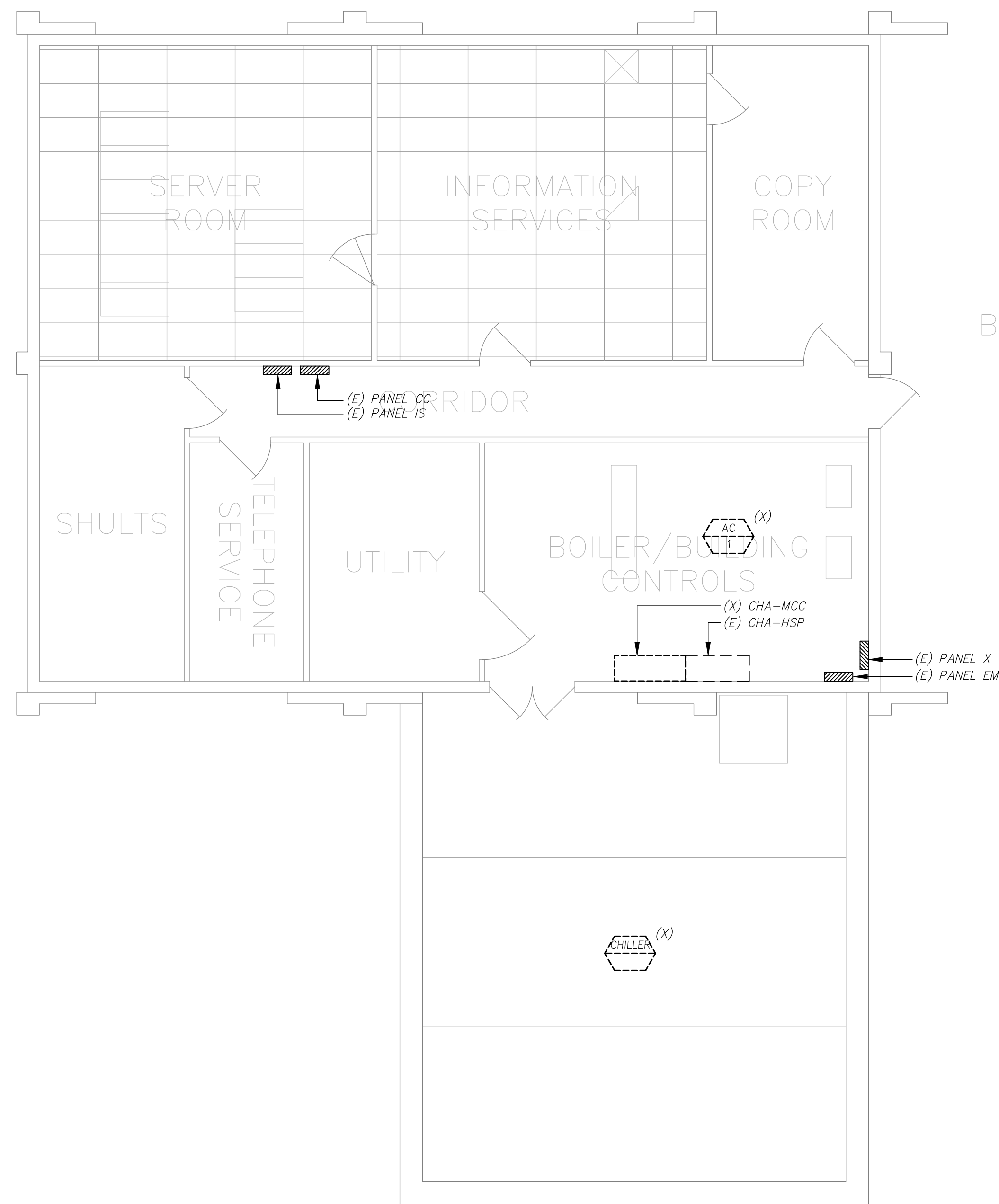
HVAC RETROFIT
INYO ANNEX BUILDING
 168 N EDWARDS ST.
 INDEPENDENCE, CALIFORNIA

REVISIONS	
DRAWING TITLE	SINGLE LINE DIAGRAM

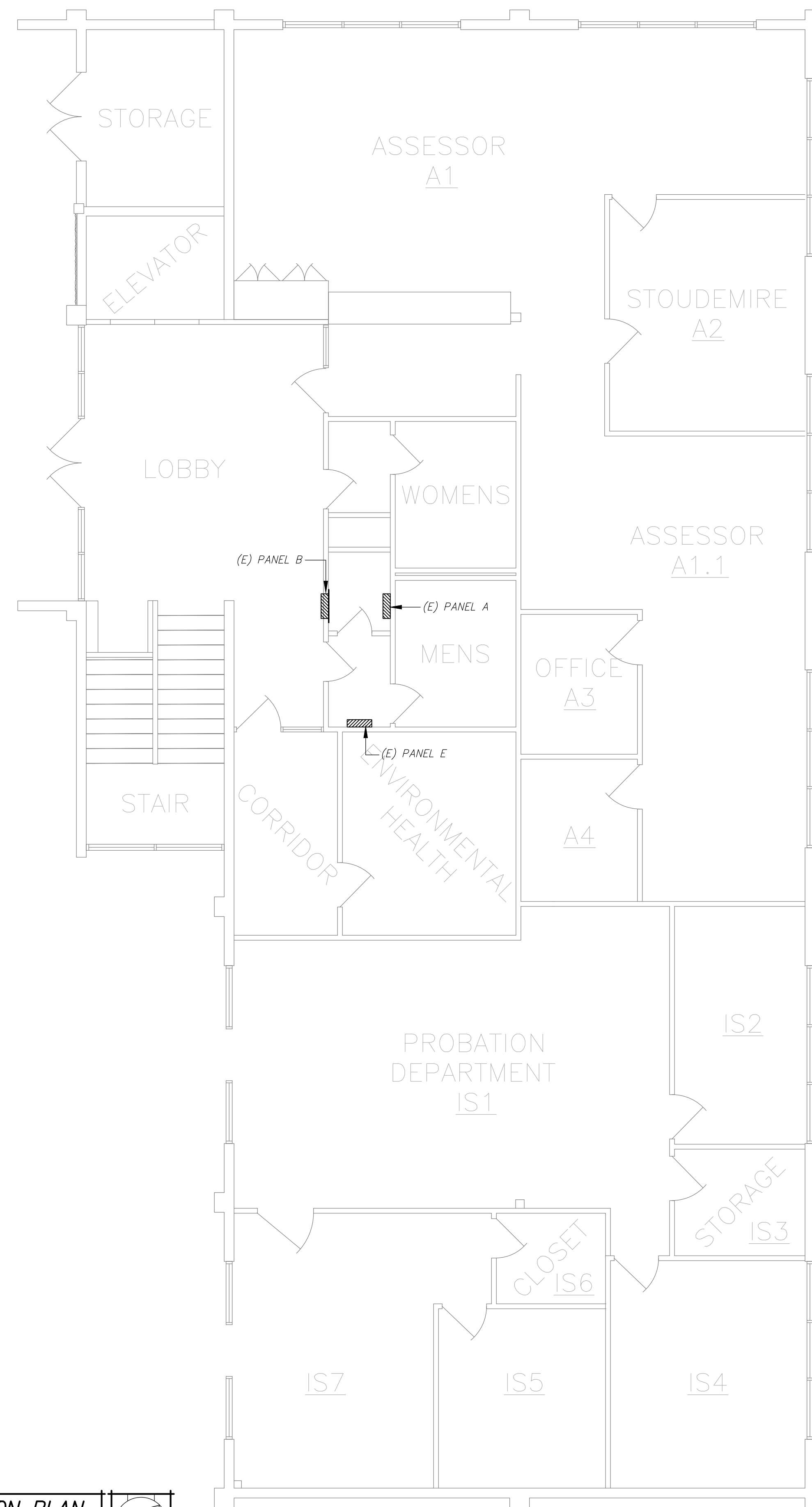
date	2/4/2020
job number	EEL #19030
drawn	RLP
checked	JP5

EO.2R

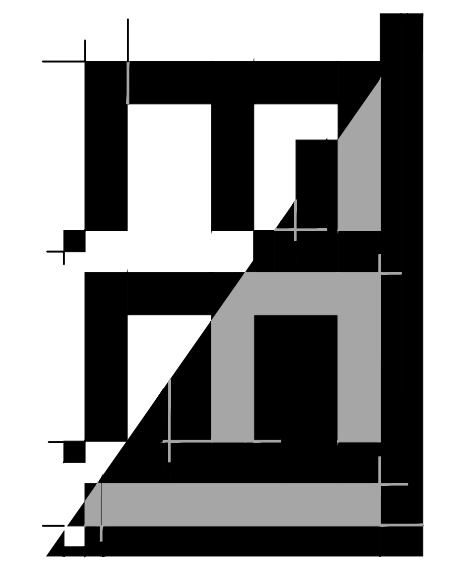




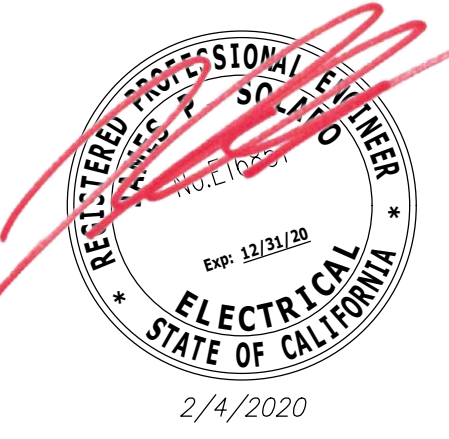
BREEZEWAY



A	FIRST FLOOR ELECTRICAL DEMOLITION PLAN	
E1.1R	SCALE: 3/16" = 1'-0"	



ECHENREY
ENGINEERING
INC.
10997 DOUBLE R BLVD, STE. 1
RENO, NEVADA 89521
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HVAC RETROFIT
INYO ANNEX BUILDING
 168 N EDWARDS ST.
 INDEPENDENCE, CALIFORNIA

REVISIONS

DRAWING TITLE

**ELECTRICAL
DEMOLITION
PLAN**

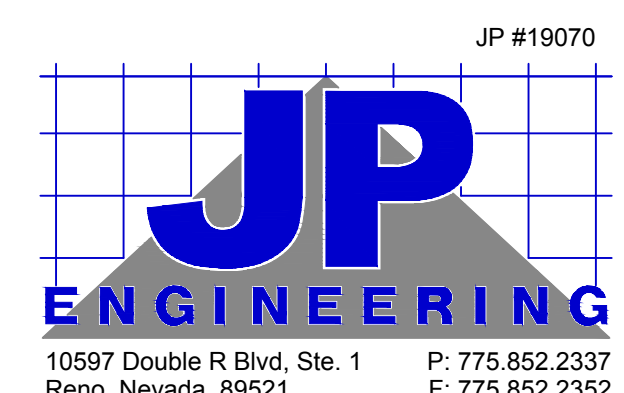
date 2/4/2020

job number EEI #19030

drawn RLP

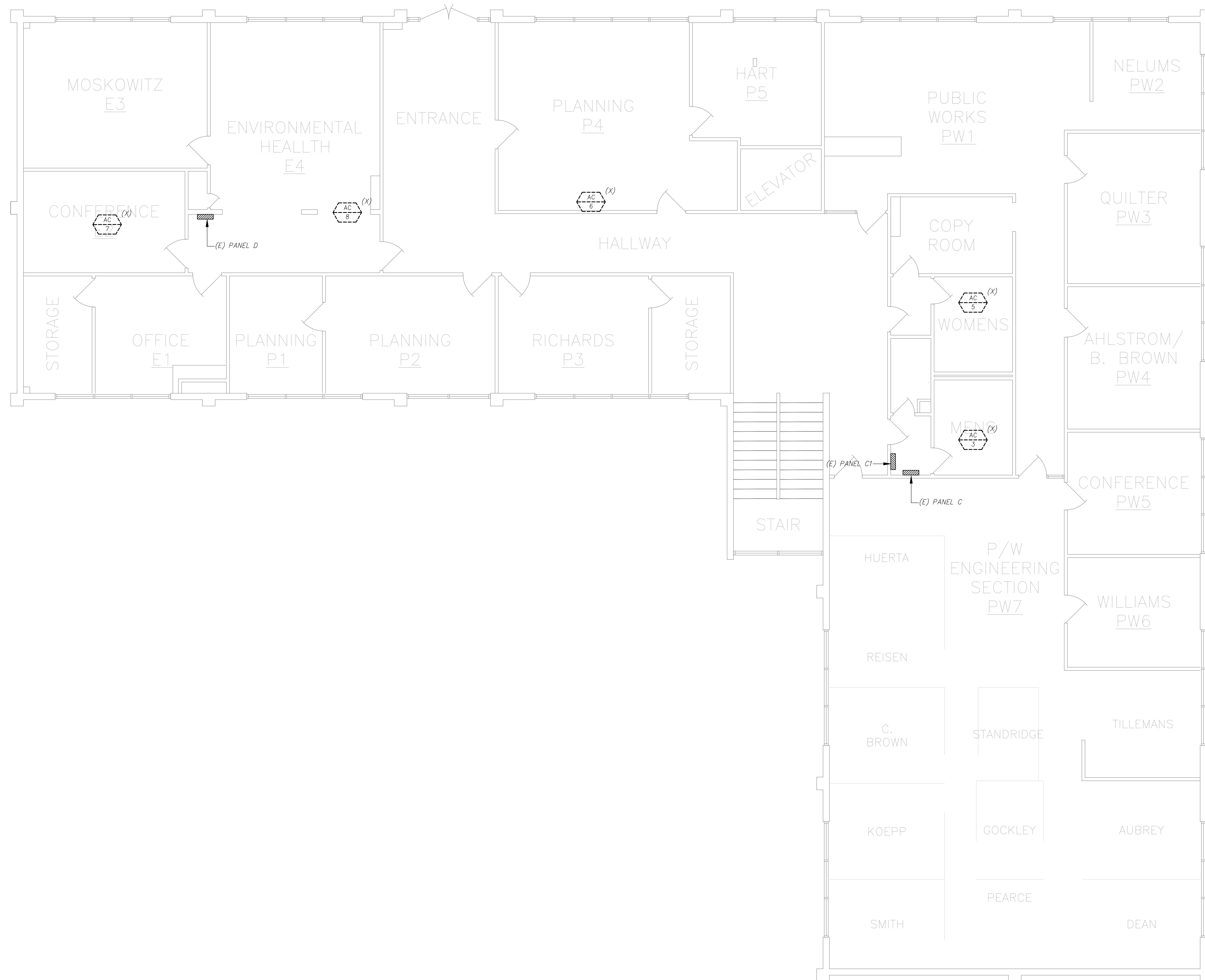
checked JPS

E1.1R

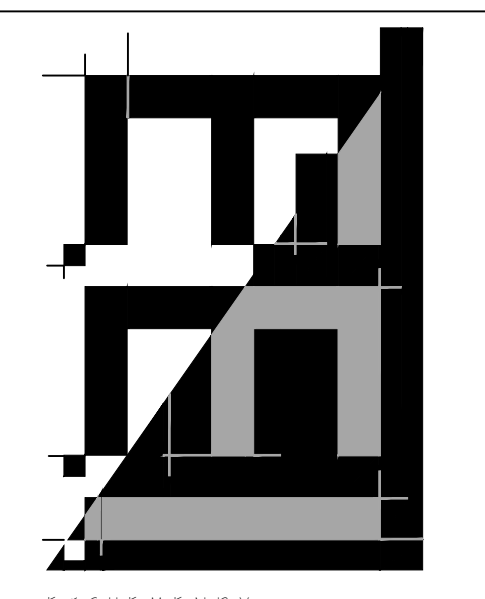


10997 Double R Blvd, Ste. 1
Reno, Nevada 89521
P: 775.852.2337
F: 775.852.2352

JP #19070



A	SECOND FLOOR ELECTRICAL DEMO PLAN	
E1.2R	SCALE: 3/16" = 1'-0"	



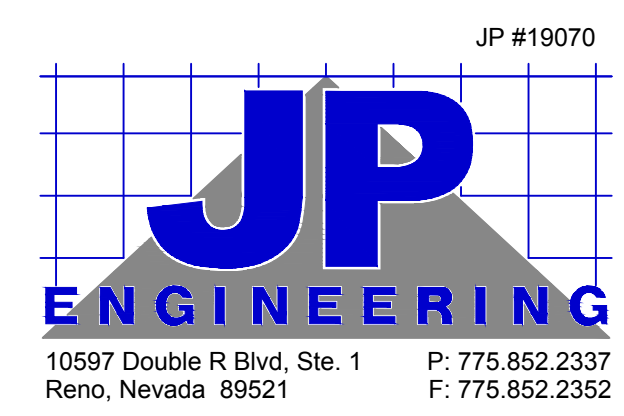
ECHENREY
ENGINEERING
INC.
10997 DOUBLE R BLVD. SUITE 100
RENO, NEVADA 89521
P: 775-852-2337
F: 775-852-2352
WWW.ECHENREYENGINEERING.COM



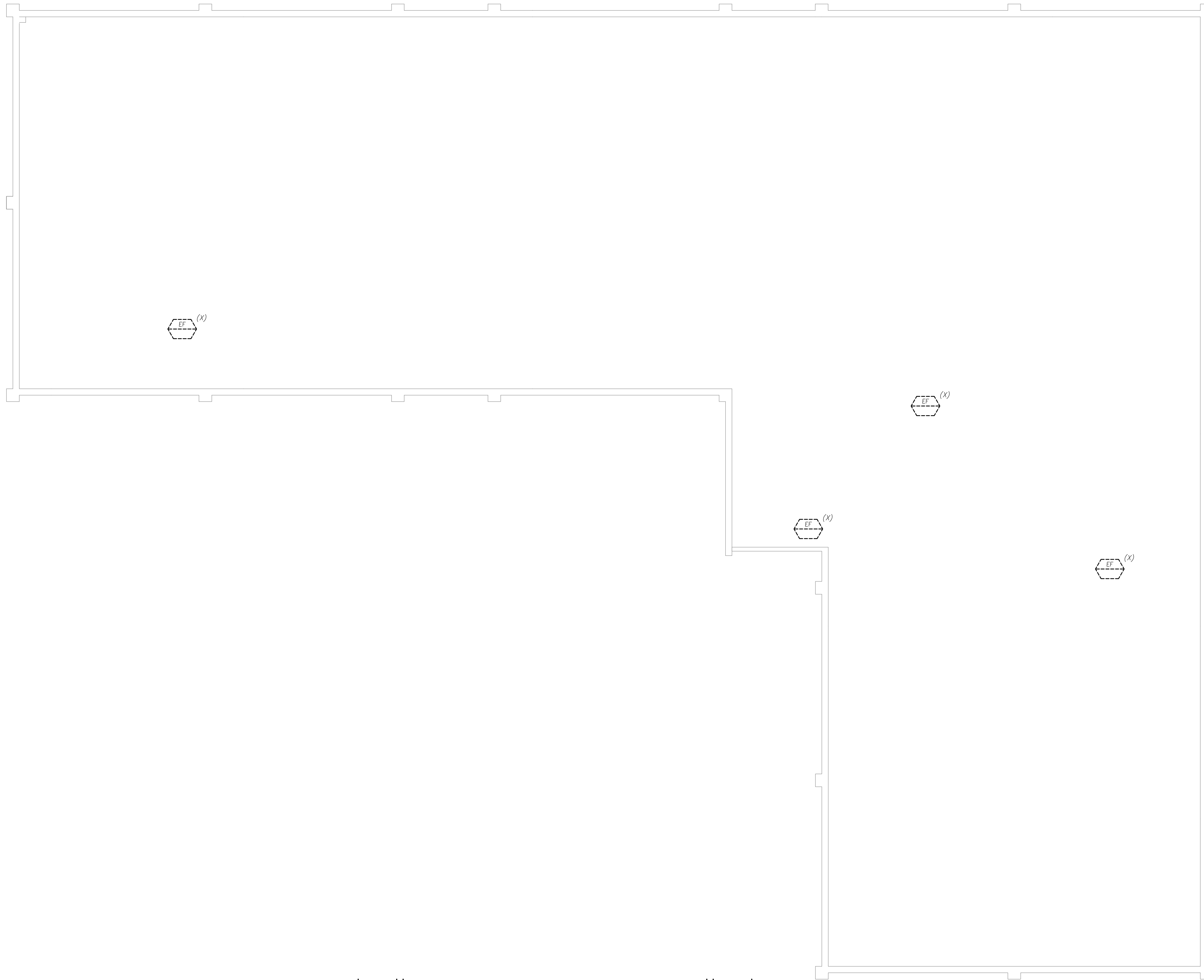
HVAC RETROFIT
INYO ANNEX BUILDING
 168 N EDWARDS ST.
 INDEPENDENCE, CALIFORNIA


REVISIONS	
DRAWING TITLE	2ND FLOOR ELECTRICAL DEMO PLAN
date	2/4/2020
job number	EEL #19030
drawn	RLP
checked	JP5

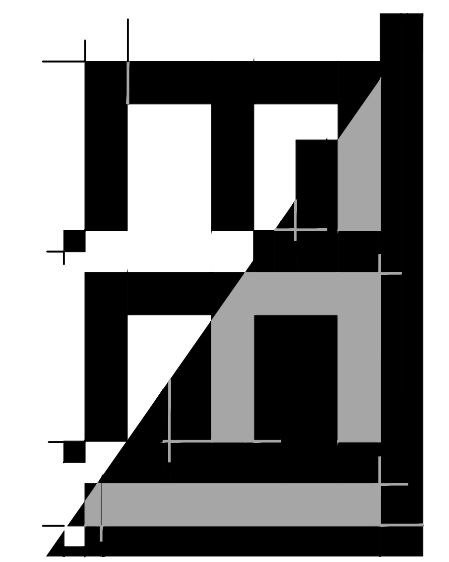
E1.2R



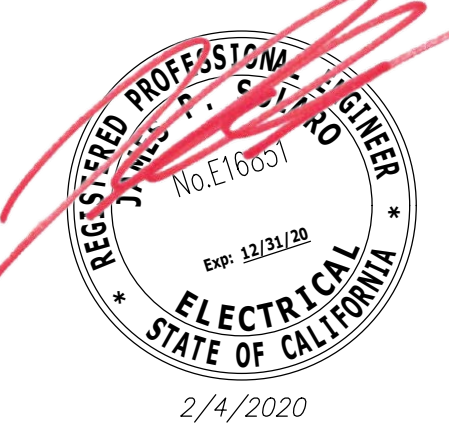
JP #19070
10597 Double R Blvd, Ste. 1
Reno, Nevada 89521
P: 775.852.2337
F: 775.852.2352



A	ROOF ELECTRICAL DEMOLITION PLAN	
E1.3R	SCALE: 3/16" = 1'-0"	



ECHENREY
ENGINEERING
INC.
10597 DOUBLE R BLVD. RENO, NV 89521
P: 775-852-4151 F: 775-852-2352
WE@ECHENREYENGINEERING.COM



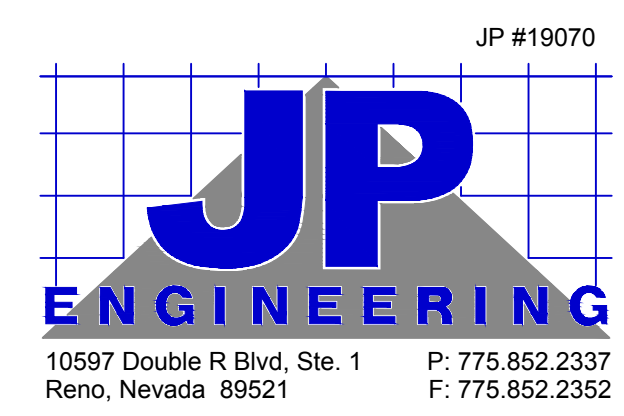
HVAC RETROFIT
INYO ANNEX BUILDING
 168 N EDWARDS ST.
 INDEPENDENCE, CALIFORNIA

REVISIONS	

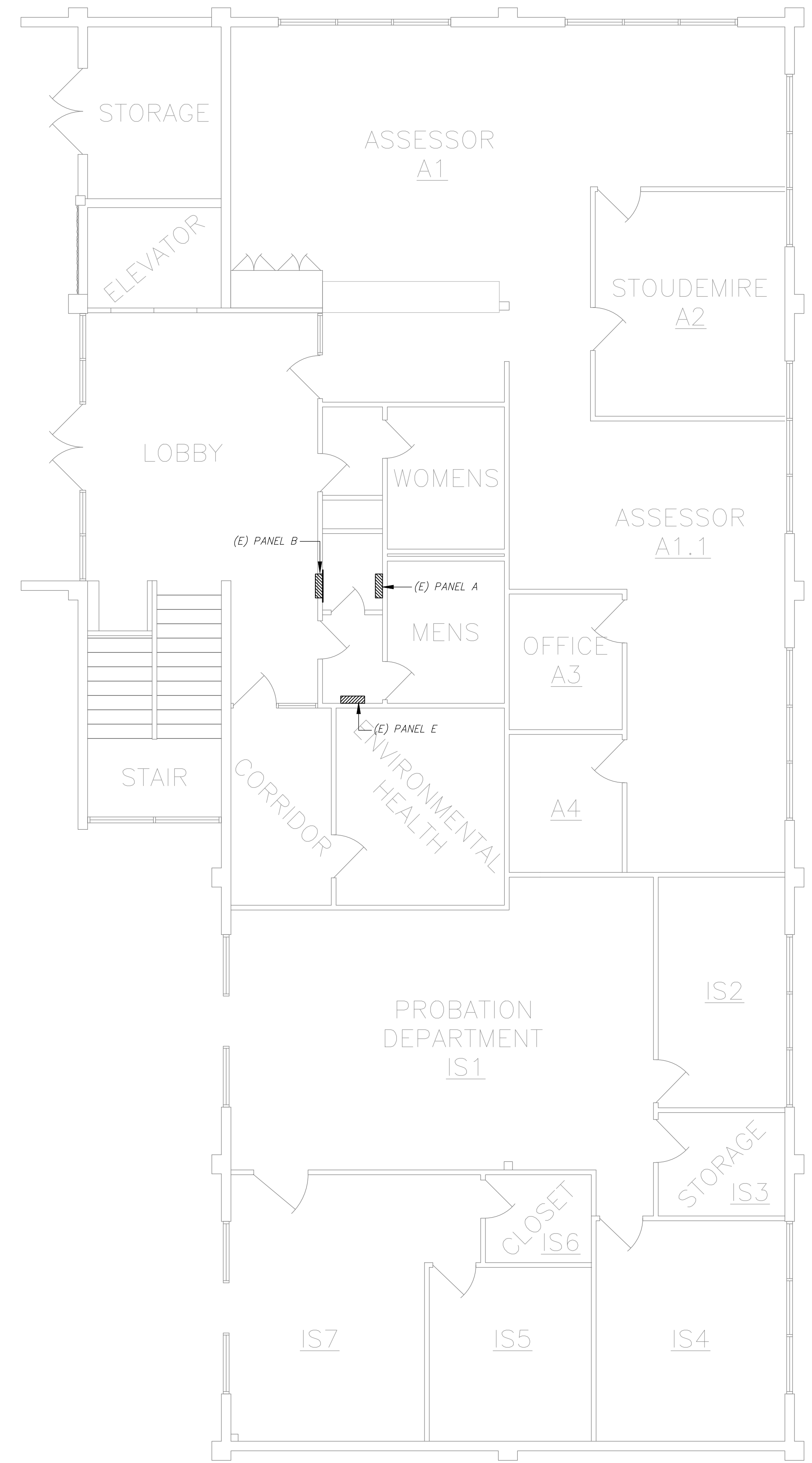
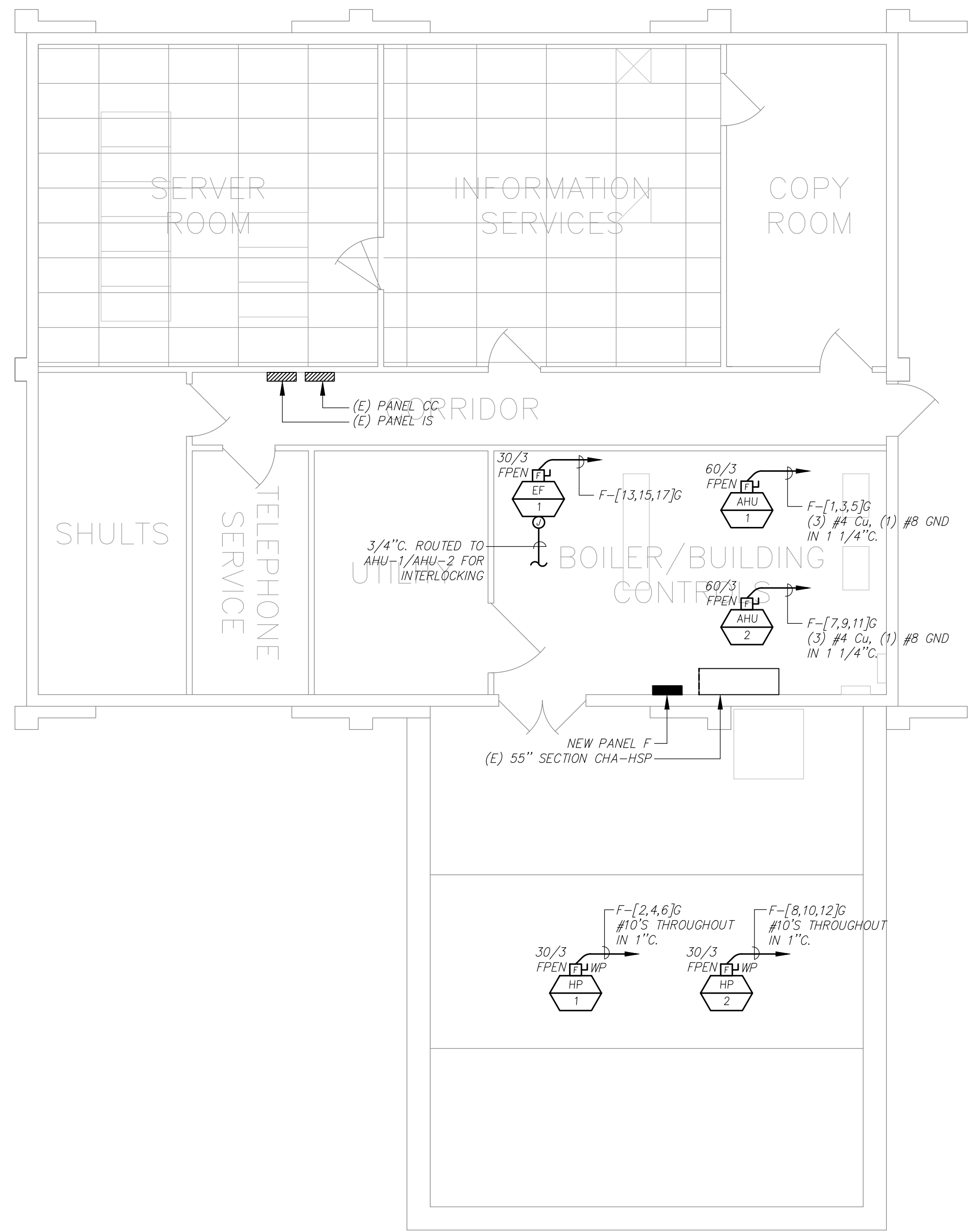
DRAWING TITLE
**ROOF
 ELECTRICAL
 DEMO PLAN**

date	2/4/2020
job number	E1.3R
drawn	R.P.
checked	J.P.S.

E1.3R

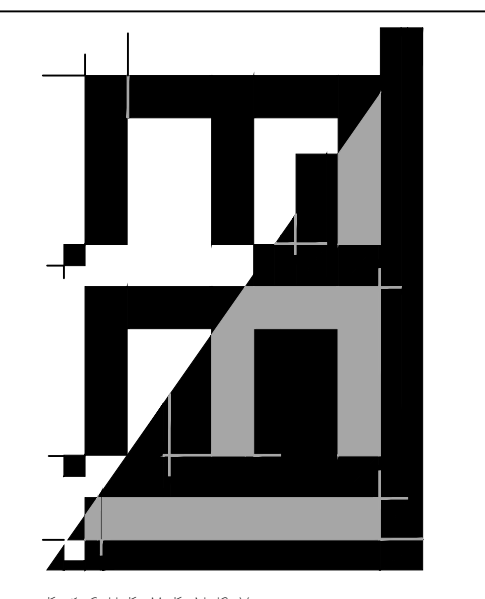


JP #19070



LOCATION: BOILER CONTROL RM.												
DF	DESCRIPTION	LOAD	BKR	CIR	A	B	C	CIR	BKR	LOAD	DESCRIPTION	DF
M1		6135	60	1	7975			2	20	1840		M
M1	AHU-1	6135	-	3		7975		4	-	1840	HP-1	M
M1		6135	3	5			7975	6	3	1840		M
M		6135	60	7	8590			8	30	2455		M
M	AHU-2	6135	-	9		8590		10	-	2455	HP-2	M
M		6135	3	11			8590	12	3	2455		M
M		1216	20	13	3671			14	30	2455		M
M	EF-1	1216	-	15		3671		16	-	2455	RTU-1	M
M		1216	3	17			3671	18	3	2455		M
M		2455	30	19	5155			20	30	2700		M
M	RTU-5	2455	-	21		5155		22	-	2700	RTU-2	M
M		2455	3	23			5155	24	3	2700		M
M		2700	30	25	4420			26	20	1720		M
M	RTU-6	2700	-	27		4420		28	-	1720	RTU-3	M
M		2700	3	29			4420	30	3	1720		M
				31	3925			32	40	3925		M
				33		3925		34	-	3925	RTU-4	M
				35			3925	36	3	3925		M
				37	0			38				
				39	0			40				
				41			0	42				
					33736		33736					
AMPS:		225			NEUTRAL BUS:		100%		CON. KVA:		101.2	
VOLTAGE:		480			GROUND BUS:		STANDARD		CON. AMPS:		121.7	
PHASE/WIRE:		3-PH, 4W			AIC RATING:		MATCH (E)		NET KVA:		105.8	
MAIN:					NEMA RATING:		1		NET AMPS:		127.3	
LUGS:		MLO			NEW PANEL:		F		Notes:			
MOUNTING:		SURFACE							PANEL AIC RATING SHALL MATCH THE AIC			
BUS:		COPPER							RATING OF THE BREAKER FEEDING IT.			
DOOR:		STANDARD										

A FIRST FLOOR ELECTRICAL PLAN
 E2.1R SCALE: 3/16" = 1'-0"

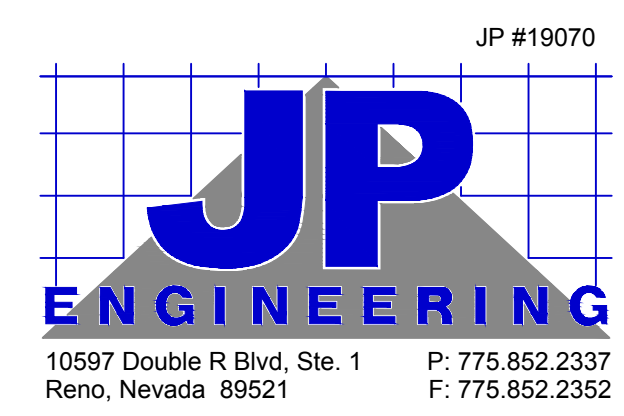


ECHENREY
ENGINEERING
INC.
10997 DOUBLE R BLVD. RENO, NV 89521
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HVAC RETROFIT
INYO ANNEX BUILDING
 168 N EDWARDS ST.
 INDEPENDENCE, CALIFORNIA

REVISIONS	
DRAWING TITLE	FIRST FLOOR ELECTRICAL PLAN
DATE	2/4/2020
JOB NUMBER	EEL #19030
DRAWN	R.P.
CHECKED	J.P.



E2.1R



County of Inyo



County Administrator - Parks & Recreation

DEPARTMENTAL - ACTION REQUIRED

MEETING: March 3, 2020

FROM: Leslie Chapman

SUBJECT: Inyo County Campground Leases.

RECOMMENDED ACTION:

Request Board approve twenty five (25) year leases between Inyo County and Los Angeles Department of Water and Power (LADWP) for the period beginning December 1, 2020 and ending November 30, 2045, for six (6) County campgrounds, and authorize the Chairperson to sign.

SUMMARY/JUSTIFICATION:

Inyo County leases seven County operated campgrounds with over 900 campsites including Diaz Lake and the campground at 101 Tuttle Creek Rd. in Lone Pine; Independence Creek, and Taboose Creek in Independence; Tinemaha in Aberdeen; Baker Creek in Big Pine; and Pleasant Valley in Bishop.

In September of 2016, a 24 year lease was negotiated for Diaz Lake, and the remaining six leases are in holdover status.

On April 19, 2019, your Board approved five year leases for the six remaining campgrounds. However, during Board discussion that day, many concerns were voiced, so DWP opted not to sign the leases and offered to renegotiate. The following changes resulted:

- All six of the leases presented today have twenty five year terms rather than five.
- The 180 day cancellation clause was removed. It stated that, "Lessor shall have the unconditional right to terminate this lease by giving Lessee one hundred eighty (180) days advance written notice of such termination."
- DWP's standard Cross-Default provision was removed. It stated, "A material breach of the terms of any other lease, license, permit, or contract held by Lessee with Lessor shall constitute a material breach of the terms of this lease, and shall give Lessor the right to terminate this lease for cause in accordance with the procedures set forth in Section 18."
- In Section 10 regarding campers, Section 10.2 established limits on how long campers could stay. County staff requested that references to specific timelines be removed and replaced with language that refers to the County ordinance. This gives the County the flexibility to change the ordinance without violating the lease provisions.

The longer terms of the leases increase the County's eligibility for grant funding, and the other changes make the leases more favorable to the County even though many provisions still favor the Lessor. Consequently, staff recommends approving the leases as presented.

While the rents remain modest they have increased from the prior leases. The annual amounts are shown below:

Campground	Current Amt.	New Amt.
Baker Creek	\$500	\$964
Independence Creek	\$360	\$579
Pleasant Valley	\$360	\$1,301
101 Tuttle Creek Rd.	\$360	\$579
Taboose Creek	\$360	\$916
Tinemaha	\$500	\$916

The leases are identical except for campground names and addresses, so only the Baker Creek lease is attached as an example.

Any questions or requests for additional information can be directed to Leslie Chapman at 760-878-0460 or lchapman@inyocounty.us.

BACKGROUND/HISTORY OF BOARD ACTIONS:

ALTERNATIVES AND CONSEQUENCES OF NEGATIVE ACTION:

If leases are not approved, they will remain in holdover status until vacated or until contracts are renegotiated.

OTHER AGENCY INVOLVEMENT:

FINANCING:

Rent increases are listed above and will be included in future budgets.

ATTACHMENTS:

1. Baker Creek Campground Lease 2020-2045

APPROVALS:

Leslie Chapman	Created/Initiated - 2/21/2020
Darcy Ellis	Approved - 2/21/2020
Leslie Chapman	Approved - 2/24/2020
Marshall Rudolph	Approved - 2/24/2020
Amy Shepherd	Approved - 2/24/2020
Clint Quilter	Final Approval - 2/24/2020

LEASE NO. 1333

BETWEEN

**COUNTY OF INYO
PARKS & RECREATION**

AND

**DEPARTMENT OF WATER AND POWER
OF THE CITY OF LOS ANGELES**

ARTICLE I. SPECIFIC TERMS AND PROVISIONS

The Department of Water and Power of the City of Los Angeles, hereinafter Lessor, and:

County of Inyo
Parks & Recreation

hereinafter Lessee, agree as follows:

1. **LEASED PREMISES:** Lessor leases to Lessee that certain real property consisting of 10.42 acres located at 1010 Baker Creek Road, Big Pine, California, commonly known as *Baker Creek Campground*, and more particularly shown on the drawing marked *Exhibit A*, attached hereto and made a part hereof.
2. **TERM:**
 - 2.1. **Term:** The term of this lease, upon approval by the Board of Water and Power Commissioners of the Department of Water and Power of the City of Los Angeles (Board of Water and Power Commissioners), or their designee(s), shall commence on December 1, 2020, and cease and terminate for all purposes on November 30, 2045, for a term of twenty five (25) years, unless sooner terminated as herein provided.
 - 2.1.1. Said term shall be divided into five (5) rental periods, each consisting of sixty (60) months, the first such period to begin on the commencement date of this lease, and shall represent the current term of use of the property, unless sooner terminated as herein provided.
 - 2.1.2. Each successive rental period shall commence at the expiration of the immediately preceding rental period.
 - 2.1.3. For each successive rental period of this lease, the rent shall be a sum agreed upon by Lessor and Lessee as provided in this lease in Article I, Subsection 4.3, entitled *Renegotiation of Rent*.
 - 2.2. **Renewal:** The term of this lease is for a period of twenty five (25) years only and no longer. Further, this lease is subject to the prior approval by the Board of Water and Power Commissioners, by resolution. Lessee further acknowledges that Lessor has no power or authority to agree to a renewal of this lease. Any approval for a lease after this lease term is not within the contemplation or understanding of the parties and would also similarly be subject to prior approval by the Board of Water and Power Commissioners as to which approval no inference, understanding, or expression is hereby made.
3. **DESIGNATED USE:** The leased premises shall be used as a site for a public campground only, and for no other purpose.

4. RENT:

4.1. Rent /Taxes:

- 4.1.1. *Rent:* Lessee shall pay to Lessor the sum of Nine Hundred Sixty Four and No/100 Dollars (\$964) per year, in advance, payable on the first day of each year commencing on December 1, 2020.
- 4.1.2. *Taxes:* In addition to the base rent, Lessee shall pay to Lessor a sum equal to the total amount of all taxes or general or special assessments of whatever nature levied or assessed upon the leased premises and which Lessor shall have paid or be obligated to pay, relative to the subject property for the fiscal year (July 1 through June 30) then current.

4.2. Rent Payment:

- 4.2.1. Lessee agrees to pay all rent, or any other amount due under the terms of this lease, promptly when due and without deduction, offset, prior notice, or demand, to the Department of Water and Power, 300 Mandich Street, Bishop, California 93514-3449. **All payments shall reference Account No. 16008.**
 - 4.2.1.1. Prompt payment shall mean payment at the office of Lessor not more than five (5) days after the due date for the rent as set forth in this lease. Rent due and not paid promptly shall be deemed delinquent.
- 4.2.2. Lessor is not required to make any demand on Lessee for the payments, whether on the leased premises or elsewhere. Billing for any payment shall be for the convenience of Lessee and not required of Lessor.
- 4.2.3. Rent not paid when due shall bear interest from due date until paid, at the rate of 10/12th of 1% per month (10% per annum) from the date rent is due. Said sum shall be deemed additional rent.
- 4.2.4. If any check offered by Lessee in payment of rent or any other amount due under this lease is returned for any reason other than that caused by Lessor's negligence, Lessee shall pay to Lessor a check return processing charge in the amount of Thirty and No/100 Dollars (\$30.00).

4.3. Renegotiation of Rent:

- 4.3.1. The rent to be paid by Lessee to Lessor for each five (5) year rental period or any portion thereof following and succeeding the first five (5) year rental period of the term of this lease shall be subject to readjustment. Six months prior to each rent adjustment period described above, Lessee and Lessor shall meet and confer to determine what the new rent will be on the adjustment date. Such rent shall be mutually agreed upon between Lessor and Lessee within 30 days, and shall be authorized on behalf of Lessor by its General Manager or General Manager's designee.
- 4.3.2. In the event Lessor and Lessee cannot agree upon the amount of such rent within 30 days, Lessee shall pay for an appraisal, to be performed by a certified licensed appraiser mutually agreed upon by both parties, to determine the new rent. Both parties shall mutually develop the scope of work for the appraiser.
 - 4.3.2.1. Lessee shall submit a copy of the appraisal to Lessor, along with a written reasonable determination of the fair market rent based on the appraised value. Both Lessor and Lessee shall work diligently, and

in good faith, towards a mutually agreed upon rent adjustment for the next five (5) year rental period or any portion thereof.

- 4.3.3. Notwithstanding the foregoing, the new rent shall not be less than the rent payable for the month immediately preceding the rent adjustment.
- 4.3.4. If for any reason said rent shall not be finally determined until after the beginning of any period for which the rent is to be adjusted, Lessee shall continue to pay at the former rate as a credit against the amount of the new rent when fixed, provided, however, that the amount fixed as new rent shall accrue from the beginning of said period, and proper adjustment shall be made for any payments made by Lessee at the former rates in the interim.

5. NOTICES:

- 5.1. Any notice to be given hereunder by either party to the other shall be in writing, and either served personally or sent by prepaid U.S. first-class mail. Any such notice shall be addressed as follows:

To Lessor:

Los Angeles Department of Water and Power
Real Estate Group
300 Mandich Street
Bishop, California 93514-3449

To Lessee:

County of Inyo
Parks & Recreation
163 May Street
Bishop, California 93514

- 5.2. Or to such other address as Lessor and Lessee may hereafter designate by written notice. Notice shall be deemed communicated within twenty-four (24) hours from the time of mailing if mailed as provided in this paragraph.

- 6. **DOMESTIC WATER:** Lessor is not obligated to furnish water to the premises, however, Lessor hereby authorizes Lessee to operate a domestic well(s) thereon and to take and use water therefrom on the premises during such time or times as surplus water shall be available. Availability shall be determined solely by Lessor, all subject to the provisions of the Charter of the City of Los Angeles and upon and subject to the following terms and conditions:

- 6.1. Any water used on the premises is for non-consumptive domestic use only.
- 6.2. At no time shall water taken from the well(s) be used for irrigation purposes.
- 6.3. The domestic water well(s) drilled on the premises shall be kept in good condition and repair by and at the expense of the Lessee, and Lessee shall take all reasonable precautions necessary to prevent any foreign matter or substance from entering well(s) and to protect and safeguard the waters therein from pollution as long as the same shall be used by Lessee.

- 6.4. It shall be Lessee's responsibility to operate and maintain the existing water system, including the well(s), pump, and other appurtenant equipment, at no cost or expense to the Lessor.
 - 6.5. Upon termination of this lease or upon any earlier abandonment of the well(s) drilled, Lessee shall, at the option of Lessor, cap or otherwise adequately cover the top of well to prevent access thereto or leave the well ready for Lessor's use, upon agreement with Lessor prior to the end of the lease term.
 - 6.6. Use of water from the well(s) drilled is permissive only, and Lessee cannot and shall not acquire any water right whatsoever by the drilling and operation of well(s), the Lessee's use or occupancy of the premises, the water thereon, or by reason of the operation of, and the use of water for any purpose from the well(s) located or drilled for water supply to the premises.
 - 6.7. All water taken by Lessee from well(s) shall be accepted by Lessee in the natural untreated state and condition in which it is there found, and in taking and using such water and in making the same available for use, Lessee shall be acting entirely at its own risk, and Lessor makes no representation or warranty whatsoever, express or implied, as to the quantity, quality, fitness, potability, or continued availability of any such water.
 - 6.8. The power costs to pump water shall be Lessee's responsibility, in accordance with Article II, Section 15 entitled, *Utilities*.
 - 6.9. Except for power costs and costs associated with any regulatory program, including compliance costs, charges for all water supplied to the premises from any well(s) drilled are included in the basic rental as set forth in this lease.
 - 6.10. Nothing herein shall preclude the making of further arrangements from time to time by and between Lessee and Lessor with respect to the pumping and furnishing of water for use on the premises.
 - 6.11. Lessee shall pump from said well(s) only such quantity of water as it may require for reasonable domestic use on the premises.
 - 6.12. Water taken from the premises, or any well(s) thereon, shall not be transmitted for use on any other premises.
 - 6.13. The determination as to whether surplus water is available is entirely with Lessor. Lessee uses domestic water and constructs, maintains, and operates wells and invests in use of domestic water at their peril. Lessee will decrease use or cease use of domestic water at the determination of Lessor.
7. **IRRIGATION/STOCKWATER:** Lessor shall not furnish irrigation water or stockwater for the premises.
8. **SIGNS:** Notwithstanding the provisions contained in Article II, Section 5, entitled *Signs*:
- 8.1. Lessee agrees, at its sole cost and expense, to erect and at all times hereunder to maintain on the leased premises a sign in accordance with Drawing A-13,235-A, marked *Exhibit B*, attached hereto and made a part hereof. Said sign is to be located at the main entrance to the leased premises.
 - 8.2. Lessee shall not allow any other permanent or temporary signs, banners, placards, or other advertising matter or devices other than usual and ordinary business signs of

Lessee to be placed, attached to, or maintained on the leased premises or any part thereof without the prior written consent of Lessor; and such business signs shall be placed, attached, and maintained in such a manner as Lessor shall prescribe.

9. SEWAGE DISPOSAL:

- 9.1. Lessee shall comply with all laws and lawful regulations concerning waste discharge facilities.
- 9.2. It shall be the responsibility of Lessee to operate and maintain the sewage disposal system, including the septic tank, outfall lines, and leach fields, to provide adequate and proper disposal of all sewage, and to prevent surface or subsurface pollution.
- 9.3. Plans and specifications for replacement of existing sewage disposal systems on the leased premises shall be submitted to Lessor for written approval prior to any construction or modification in accordance with Article II, Subsection 2.1, entitled *Lessee Improvements and Alterations*. Lessee shall obtain all permits and comply with all laws and lawful regulations concerning waste discharge facilities.

10. CAMPERS:

- 10.1. Use and occupancy of the leased premises by campers, if permitted during the term hereof, shall be permitted only under license or permit from Lessee.
- 10.2. Such licenses or permits for overnight camping shall comply with Inyo County Code Title 12 Roads and Parks, Chapter 12.16 County Parks, Subchapter 12.16.180 Camping-Permitted when.
- 10.3. Lessee shall, by barricade or other means, assure a minimum setback for campsites including recreational vehicles and trailers of twenty (20) feet from streambanks or lake banks. A setback distance of less than twenty (20) feet may be approved in writing by Lessor on a case by case basis.

11. POLLUTION: Lessee shall not cause, or permit existence of any condition upon the leased premises which might cause pollution of the water flowing in, on, over, under, thru, and across said leased premises.

12. STREAMS: Lessee and permittees of Lessee shall in no manner interfere with the flow of water in streams, ditches, or other water courses traversing the leased premises, or damage any operating structure owned by Lessor, or a state or federal agency, on the leased premises, and Lessor reserves the right of access at all times for the purpose of performing maintenance work on said streams and ditches as Lessor shall from time to time deem necessary.

13. FENCES & GATES: Lessee, at its sole cost and expense, shall install and maintain fencing and gates to prevent entry of stock from the established sheep driveway which adjoins the leased premises on the east. All gates shall be kept closed during sheep drives in the spring.

14. INYO/LOS ANGELES LONG-TERM GROUNDWATER MANAGEMENT PLAN: By entering into this lease, the parties are not altering, amending, or modifying the *Inyo/Los Angeles Long-Term Groundwater Management Plan* for Inyo County and Owens Valley, heretofore executed by the parties on October 18, 1991, in the form of a stipulation and order entered in Inyo County Superior Court Action No. 12908 on June 13, 1997, or the Memorandum of

Understanding, executed by the parties and the California Department of Fish and Game, the California State Lands Commission, the Sierra Club, and the Owens Valley Committee and submitted to the Third District Court of Appeals in Civil Case Number C004068 on April 11, 1997.

ARTICLE II. STANDARD TERMS AND PROVISIONS

1. LIMITATIONS/RESERVATIONS:

- 1.1. Limitations on Use of Leased Premises: Lessee shall not use the leased premises, nor any portion thereof, for any purpose other than that hereinabove set forth in Article I.
- 1.2. Reservations:
 - 1.2.1. This lease is subject to all existing uses, all matters of record, and to the reservations hereinafter set out.
 - 1.2.2. There is excepted from this lease and reserved to Lessor all water and water rights, whether surface, subsurface, or of any other kind; and all water and water rights appurtenant or in anywise incident to the lands or real property leased herein, or used thereon or in connection therewith, together with the right to develop, take, transport, control, regulate, and use all such water and water rights.
 - 1.2.3. There is also excepted and reserved to Lessor the right to use, operate, and maintain any ways, waterways, ditches, pipelines, canals, wells, and appurtenances thereto, or desirable in connection therewith, together with the right to grant easements, rights of way, licenses, and permits for other purposes that will not unreasonably interfere with Lessee's use of the leased premises.
 - 1.2.4. The right, from time to time to overflow, flood, submerge, and spread water upon the leased premises, provided, however, that if in the exercise of the rights defined and described in this Subsection, Lessor shall cause physical damage to any structure or improvement lawfully erected or maintained by Lessee upon the leased premises, Lessor shall pay just compensation for such physical damage, and no more.
 - 1.2.5. The right, from time to time, to raise or lower the water level underlying the leased premises by taking, or failing to take, water from the Mono Basin or Owens River watersheds or drainage areas, or both such areas, or by the importation or nonimportation of such water into the watershed within which the leased premises are located.
 - 1.2.6. The right to develop, take, collect, import, store, control, regulate, and use any and all such waters and, from time to time, at the option and discretion of Lessor, to transport and export any and all such waters to places and areas outside the Mono Basin or Owens River watersheds and drainage areas, or both such areas (including, but not limited to, the City of Los Angeles, Lessor herein), for any and all of the reasonable and beneficial uses and purposes of Lessor.
 - 1.2.7. The right to construct, maintain, control, and operate upon and within the leased premises dikes, dams, reservoirs, ponds, and settling basins, together with appurtenant facilities (including, but not limited to, ditches, pipelines, conduits, and wells), and to affect the leased premises in any way by raising or lowering, from time to time, the level of the water of any such reservoirs, ponds, or settling basins, or all of them.

- 1.2.8. The right to use any and all existing easements, servitudes, ways, waterways, and ditches on the leased premises; to make inspections, investigations, and surveys thereon; and to construct, maintain, and operate thereon works and structures in connection with Lessor's management and control of its works and properties.
- 1.2.9. The right to have ingress and egress to, from, in, and over, and enter upon the leased premises and every part thereof and thereon to do all things necessary or convenient in the exercise of the rights herein reserved.
- 1.2.10. The right, at any time during the term of this lease, to delete certain lands leased hereunder for public benefit.
- 1.2.11. UNLESS OTHERWISE STATED HEREIN, LESSEE SHALL HAVE NO RIGHTS OR ENTITLEMENT TO DEVELOP, TAKE, TRANSPORT, CONTROL, REGULATE, OR USE ANY WATER, WHETHER SURFACE, SUBSURFACE, OR OF ANY OTHER KIND, OR INFRINGE ON THE WATER RIGHTS OF LESSOR.
- 1.2.12. Lessor finds that (1) the property to be leased is not presently needed for Departmental purposes, and (2) the grant of the lease will not interfere with Departmental purposes.

2. IMPROVEMENTS:

2.1. Lessee Improvements and Alterations:

- 2.1.1. Lessee shall not make any structural improvements, additions, or alterations in, to or upon the leased premises without first obtaining the written consent of the Manager of Aqueduct of the Los Angeles Department of Water and Power (Manager). Any conditions, restrictions, or limitations placed upon the approval by Lessor shall be conditions of this lease as though fully set forth herein once the document is fully executed by both parties.
- 2.1.2. Prior to the construction of any improvements, additions, or alterations Lessee shall submit to Lessor, for concept approval, the preliminary plans and estimated construction cost for such improvements. Said approval, subject to the conditions set forth herein, shall be given in writing, in a reasonably timely manner. Upon approval by the Manager of Lessee's preliminary plans, Lessee shall prepare working drawings and specifications, which shall be true and correct developments of the preliminary plans so approved. Lessee shall then submit a written request for construction approval and a minimum of two (2) complete sets of said approved working drawings and copies of the specifications to Lessor for written approval by the Manager. Manager's written approval and any conditions related to the construction of the improvements or alterations shall become a part of the lease as though fully set forth herein once the document is fully executed by both parties. Upon receipt of Manager's approval, Lessee shall cause the construction called for by the approved working drawings and specifications to be commenced and completed promptly. No substantial changes, additions, or alterations shall be made in said working drawings or specifications, or in the construction called for thereby, without first obtaining Manager's approval in writing. Upon completion of the improvements, Lessee shall furnish to Lessor, at no charge, one (1) complete set of "as-built" drawings. These drawings must include any

applicable permit numbers, the structural and other improvements installed by Lessee in the leased premises, and the location and details of installation of all improvements, equipment, utility lines, heating, ventilating, and air-conditioning ducts and related matters. Lessee shall keep said drawings current by updating them in order to reflect any changes or modifications, which may be made in or to the leased premises.

- 2.1.3. For each and every construction or alteration project undertaken on the leased premises, Lessee shall prepare a construction report. This report shall contain the following elements: (1) type of improvement constructed or altered; (2) floor area or capacity of improvement constructed or altered; (3) total cost of construction or alteration; (4) completion date for construction or alteration; and (5) a copy of the certificate of occupancy. The construction report shall be mailed to Lessor at the address provided in this lease in Article I, Section 5, entitled *Notices*, not later than sixty (60) days following completion of the construction or alteration.
- 2.1.4. Lessee shall hold Lessor harmless from liability with respect to any claims regarding any improvements, additions, or alterations made thereto. Lessee shall also keep the leased premises and any improvements constructed thereon free and clear of liens for labor and material expended by or for Lessee or on its behalf in accordance with Article II, Section 3, entitled *Liens*.

2.2. Ownership of Improvements:

- 2.2.1. During the term the property is leased, title to all structures, improvements, facilities, or alterations constructed or installed by Lessee shall be vested to Lessee. Upon the termination of Lessee's tenancy, said structures, improvements, facilities, or alterations, other than machines, equipment, trade fixtures, and similar installations of a type commonly removed without structural damage to the leased premises, shall become a part of the land upon which they are constructed, or of the building to which they are affixed, and title thereto shall thereupon vest in Lessor, unless Lessor requests Lessee to remove some or all of said structures, improvements, facilities, or alterations, in which case Lessee shall promptly remove said items at Lessee's sole cost and expense. In the event the removal of any fixture damages any part of the leased premises, Lessee shall repair such damage and restore the leased premises to as good condition as the same was in prior to said damage, reasonable wear and tear excepted.
- 2.2.2. During the term of this lease, title to all structures, improvements, facilities, or alterations constructed or installed by Lessee for which Lessee has been reimbursed by Lessor shall thereupon vest in Lessor.
- 2.2.3. Upon vesting of title to said structures, improvements, facilities, or alterations in Lessor, Lessor shall be entitled to additional reasonable rent, fees and/or other charges, as determined by the Board of Water and Power Commissioners, and Lessee shall be obligated to pay the same for as long as Lessee occupies said structures, improvements, facilities and alterations.

2.3. Damage to or Destruction of Improvements:

- 2.3.1. If, during the term of this lease, any buildings, structures, or improvements on the leased premises, whether such improvements are Lessee- or Lessor-owned, are partially or totally destroyed from a risk covered by the

insurance described in Article II, Section 11, entitled *Insurance*, herein, thereby rendering said leased premises partially or totally inaccessible or unusable, such destruction shall not automatically terminate this lease, and Lessee, unless otherwise directed by Lessor, shall be obligated to restore the leased premises to substantially the same condition as they were immediately before destruction. Approval from Lessor for reconstruction of such improvements shall be in accordance with Article II, Subsection 2.1, entitled *Lessee Improvements and Alterations* and shall not unreasonably be withheld.

- 2.3.2. If, during the term of this lease, any improvements on the leased premises, whether such improvements are Lessee- or Lessor-owned, are partially or totally destroyed from a risk not covered by the insurance described in Article II, Section 11, entitled *Insurance*, herein, thereby rendering said leased premises partially or totally inaccessible or unusable, such destruction shall not automatically terminate this lease. If, however, the cost of restoration exceeds ten percent (10%) of the full replacement value of improvements, as said value existed immediately before destruction, Lessee may, at Lessee's option, terminate this lease by giving written notice to Lessor within sixty (60) days from the date of destruction. If Lessee elects to terminate as above provided, Lessee shall be obligated, unless otherwise directed by Lessor, to demolish all damaged improvements and remove all debris from the leased premises at Lessee's sole cost. If Lessee fails to exercise its right to terminate this lease, this lease shall continue in full force and effect for the remainder of the term specified herein and Lessee shall restore the leased premises to substantially the same condition as they were in immediately before destruction. Approval from Lessor for reconstruction of such improvements shall be in accordance with Article II, Subsection 2.1, entitled *Lessee Improvements and Alterations* and shall not unreasonably be withheld.
- 2.3.3. Lessee expressly waives the provisions of California Civil Code Sections 1932.2 and 1933.4.

3. **LIENS:** During the term of this lease, the fee interest in the real property underlying the leased premises shall not be used as security for any loans or mortgages nor otherwise have any liens placed on it. Additionally, Lessee shall keep any Lessor-owned improvements on the leased premises free and clear of any liens or other encumbrances. By way of specification without limitation, Lessee shall keep the leased premises free from any liens arising out of any work performed, materials furnished, or obligations incurred by or for Lessee, and shall indemnify, hold harmless, and defend Lessor from any liens and encumbrances arising out of any work performed or materials furnished by or at the request of Lessee. In the event that Lessee does not, within thirty (30) calendar days following the imposition of any such lien, cause such lien to be released of record by payment or posting of a proper bond, Lessor shall have, in addition to all other remedies provided herein and by law, the right, but not the obligation, to cause upon ten (10) business days prior written notice to Lessee the same to be released by such means as it shall deem proper, including payment in satisfaction of the claim giving rise to such lien. All such sums paid by Lessor and all expenses incurred by it in connection therewith, including costs and attorney's fees, shall be paid by Lessee to Lessor on demand. Nothing in this Section shall be construed to limit any rights of Lessee to use its leasehold interest as security for any loans to the extent that such use is permitted under this lease. Nothing in this Section shall be construed to place any obligations upon Lessee with respect to liens, loans, or mortgages placed upon the leased premises by Lessor, its Board of Water and Power Commissioners, City of Los Angeles, or their respective officers, agents, or employees.

- 4. MODIFICATION TO SIZE OF LEASED PREMISES:** It is mutually agreed that land not exceeding ten percent (10%) of the total area of the leased premises may be added to or deleted from said leased premises upon approval of the Manager and without requiring additional action by the Board of Water and Power Commissioners unless the modification involves an amount in excess of \$150,000 per year, in which case prior Board of Water and Power Commissioners approval shall be required. In all instances said changes shall become effective immediately upon written notice to Lessee. The amount of rent payable under this lease shall be increased or decreased on a pro rata basis to reflect any such addition to or deletion of lands.
- 5. SIGNS:**
- 5.1. No identification signs pertaining to Lessee's operations shall be installed or placed in or on the leased premises until Lessee has submitted to Lessor drawings, sketches, design dimensions, and type and character of such identification signs proposed to be placed thereon or therein and has received written approval from Lessor. Lessor's written approval and any conditions related to the subject signs shall become a part of the lease as though fully set forth herein.
- 5.2. Other than approved identification signs, Lessee shall not, at any time, under any circumstances, install, place, or maintain any type of advertising, on the leased premises.
- 6. LAWS, RULES, AND REGULATIONS:**
- 6.1. Lessee shall be solely responsible for fully complying with any and all applicable present and/or future rules, regulations, restrictions, ordinances, statutes, laws and/or orders of any federal, state, and/or local government authority.
- 6.2. Lessee shall be solely responsible for any and all civil and/or criminal penalties assessed as a result of its failure to comply with any of these rules, regulations and/or restrictions related to its use or operation of the leased premises, or with any ordinances, statutes, laws, orders, directives and or conditions.
- 7. CARE, MAINTENANCE, AND REPAIR OF LEASED PREMISES:**
- 7.1. Care of Leased Premises:
- 7.1.1. Lessee is the current tenant and has examined the leased premises, knows the condition thereof, and accepts possession thereof in its present condition relying solely on its own inspection and not on any representations that may have been made by Lessor or any of its agents.
- 7.1.2. Lessee agrees at its cost to keep the leased premises in good, clean, orderly, and sanitary condition, and shall not commit nor allow to be committed any waste, nuisance, or disposal of hazardous material or wastes upon the leased premises. Lessee further agrees to remove from the leased premises anything placed or stored there which Lessor considers to be undesirable or unsightly.
- 7.1.3. Any restoration of or repairs to the leased premises made necessary by the installation or removal of any structure, personal property, alteration, or trade fixture owned, placed, attached, or installed by Lessee on the leased premises shall be made at Lessee's sole cost and expense.

7.2. Maintenance and Repair:

- 7.2.1. As part of the consideration for this lease, Lessee agrees, at all times hereunder and at its own expense, to keep, maintain, paint, and repair the leased premises and all improvements thereon, if there be any whether owned by Lessor or Lessee, in as good and substantial condition and state of repair as the same now are or in such improved condition as the same may hereafter be placed, reasonable wear and tear and damages by causes beyond Lessee's control excepted, except that regardless of the present condition or state of repair and regardless of the reasonableness or cause of wear, tear, or damages, Lessee shall keep and maintain, at all times hereunder and at its own expense, the leased premises and all improvements and facilities thereon in as good condition and repair as may be necessary for the safety of all persons who may lawfully enter thereupon.
- 7.2.2. If Lessee fails to so maintain or repair the leased premises, Lessor may serve a "Notice to Cure" (Notice) upon Lessee. Said Notice shall prescribe the work to be accomplished by Lessee in order to correct the maintenance deficiencies and shall state the number of calendar days Lessee shall have to complete the work. A copy of the Notice may, at Lessor's election, be posted on the leased premises in a conspicuous place.
- 7.2.2.1. If, in the opinion of Lessor, any deficiency is of such nature that it cannot physically be corrected within the period originally specified by Lessor, and if Lessee has responded with a course of action and has commenced to remedy such deficiency promptly after the receipt of such Notice, and continuously and diligently proceeds in good faith to eliminate such default, then the period for correction may, at Lessor's election, be extended.
- 7.2.2.2. If the work prescribed in the Notice is not completed by Lessee in a manner reasonably satisfactory to Lessor, and Lessee fails to correct such work within the time specified by Lessor in the Notice, or as set forth in this Section, Lessor, in addition to all other remedies available to Lessor, may, at its sole option, and at Lessee's sole cost and expense, enter upon the leased premises and perform whatever work may, in the opinion of Lessor, be required to correct the maintenance deficiencies. If Lessor exercises this option, Lessee shall pay to Lessor a sum equal to the direct cost of labor and materials expended for said work, plus a surcharge equal to fifty percent (50%) of said direct cost. Payment shall be made by Lessee within thirty (30) days of the date of Lessor's invoice date for such costs and charges, or, if such payment is not made, Lessor may, upon thirty (30) days' written notice to Lessee, increase the lease rental by an amount necessary for Lessor to recover all or part of such payment, as Lessor shall determine, over the remaining term of this lease, or any lesser portion thereof as Lessor shall determine.
- 7.2.3. In the absence of a written agreement to the contrary, Lessor shall not be required at any time to maintain, paint, or make repairs, improvements, alterations, or additions on or to the leased premises. Lessor reserves the right, however, at any time to perform such maintenance or make such repairs

or perform such other acts on or to the leased premises as shall be by Lessor deemed necessary for the preservation of any portion thereof, or the protection of Lessor's investment therein, and the further right to remove trees, weeds, and other things which Lessor may deem to be unsightly or undesirable; but such works performed by Lessor shall constitute, in no event, a waiver of Lessee's obligation hereunder to keep said leased premises in good repair and free from rubbish, noxious weeds, and other unsightly matter.

- 7.2.4. Lessee waives the provisions of California Civil Code Sections 1941 and 1942 with respect to Lessor's obligations for tenantability of the leased premises and Lessee's right to make repairs and deduct the expenses of such repairs from rent.**

Lessee Initials

- 7.2.5. Should Lessor agree at the request of Lessee to perform any maintenance, repairs, removals, alterations, construction, or other works of improvement on the leased premises, Lessor may, at its sole option, and at Lessee's sole cost and expense, enter upon the leased premises and perform such works and either bill Lessee for the entire costs of same, which Lessee agrees to pay on demand, or Lessor may, upon thirty (30) days' written notice to Lessee, increase the lease rental by an amount necessary for Lessor to recover all or part of the cost of such works, as Lessor shall determine, over the remaining term of this lease, or any lesser portion thereof as Lessor shall determine.
- 7.3. Tree Maintenance: Lessee shall spray trees as needed for pest control, and maintain and trim trees for safe condition near buildings. No tree shall be cut down without Lessor's prior written consent.
- 7.4. Burn Permits: Lessee shall not burn off any part of the leased premises without first obtaining Lessor's written consent and all necessary permits and permissions from the governmental authorities with jurisdiction. Lessee, at all times and at its sole cost and expense, shall do all things reasonably necessary to protect said leased premises from fire and fire hazards.

8. DISABLED ACCESS:

- 8.1. Lessor hereby advises Lessee that the leased premises has not undergone an inspection by a certified access specialist. The following disclosure is hereby made pursuant to applicable California law: "A Certified Access Specialist (CASP) can inspect the subject premises and determine whether the subject premises comply with all of the applicable construction-related accessibility standards under state law. Although state law does not require a CASp inspection of the subject premises, the commercial property owner or lessor may not prohibit the lessee or tenant from obtaining a CASp inspection of the subject premises for the occupancy or potential occupancy of the lessee or tenant, if requested by the lessee or tenant. The parties shall mutually agree on the arrangements for the time and manner of the CASp inspection, the payment of the fee for the CASp inspection, and the cost of making any repairs necessary to correct violations of construction-related accessibility standards within the premises." [Cal. Civ. Code Section 1938(e)]. Lessor shall have no liability or responsibility to make any repairs or modifications to the leased premises in order to comply with accessibility

standards. Any CASp inspection shall be conducted in compliance with reasonable rules in effect at the leased premises with regard to such inspections and shall be subject to Lessor's prior written consent.

- 8.2. Lessee shall be solely responsible for fully complying with any and all applicable present and/or future rules, regulations, restrictions, ordinances, statutes, laws and/or orders of any federal, state, and/or local governmental entity and/or court regarding disabled access to improvements on the leased premises, including any services, programs, or activities provided by Lessee. Lessee shall be solely responsible for any and all damages caused by, and/or penalties levied as the result of, Lessee's noncompliance.
- 8.3. Should Lessee fail to comply with this Section, then Lessor shall have the right, but not the obligation, to perform, or have performed, whatever work is necessary to achieve equal access compliance. Lessee will then be required to reimburse Lessor for the actual cost of achieving compliance, plus a fifteen percent (15%) administrative charge.

9. HAZARDOUS SUBSTANCES:

- 9.1. Indemnification – Environmental: Lessee, on behalf of itself, and its officers, employees, agents, contractors and sub-contractors of any tier, and all persons acting or purporting to act on its behalf, and its successors, assigns, and sub-lessees, further undertakes and agrees to indemnify and hold harmless the City of Los Angeles, Lessor, the Board of Water and Power Commissioners of the City of Los Angeles, and all of their officers, agents, successors in interest, insurers, assigns and/or employees (individually and collectively, "Indemnitees"), and at the option of Lessor, defend by counsel satisfactory to Lessor, the Indemnitees from and against any and all liens and claims of lien, suits, causes of action, claims, charges, damages, demands, judgments, civil fines, penalties (including, but not limited to, costs, expenses, and legal liability for environmental investigations, monitoring, containment, abatement, removal, repair, cleanup, restoration, remediation, penalties, and fines arising from the violation of any local, regional, state, or federal law, or regulation, disbursements, and other environmental response costs), or losses of any kind or nature whatsoever that are incurred by or asserted against the Indemnitees, for death, bodily injury or personal injury to any person, including Lessee's officers, employees, sub-lessees, contractors and sub-contractors of any tier, customers, invitees, and agents, or other persons who enter onto the leased premises, or damage or destruction or loss of use of any property of either party hereto, or third persons in any manner arising by reason of, incident to, or connected in any manner to the acts, errors, omissions to act, willful misconduct, or non-performance or breach by Lessee of any term and/or condition of this agreement, relating directly or indirectly to the release or spill of any pollutant, contaminant, hazardous waste or hazardous substance resulting from or incident to the presence upon or performance of activities by Lessee, or its officers employees, sub-lessees, contractors and sub-contractors of any tier, customers, invitees, and agents, or other persons acting or purporting to act on its behalf, or its successors or assigns, with respect to the leased premises regardless of any negligence on the part of Indemnitees, except for the sole negligence or willful misconduct of the Lessor. It is the specific intent of this Section that this Indemnification shall apply and be effective for all accidents, occurrences, and/or events occurring during the term of this agreement that give rise to future claims, even if the actual claim comes against the Indemnitees after the agreement has expired or terminated. This Indemnification shall be in addition to any other rights or remedies that Indemnitees have under law or under this agreement.

9.2. **Survival of Obligations:** This Section, and the obligations herein, shall survive the expiration or earlier termination of this lease.

10. LESSOR'S RIGHT OF ACCESS AND INSPECTION: Lessor, by and through its officers, employees, agents, representatives, and contractors, shall have the right at all reasonable times and in a reasonable manner, upon notice to Lessee, to enter upon the leased premises for the purpose of inspecting the same or for doing any act or thing that Lessor may be obligated or have the right to do under this lease, or otherwise, and no abatement of rental shall be claimed by or allowed to Lessee by reason of the exercise of such rights. In the exercise of its rights under this Section, Lessor, its officers, employees, agents, and contractors shall not unreasonably interfere with the conduct of Lessee's business on the leased premises as herein authorized.

11. INSURANCE:

11.1. Additional Insured Status Required: Lessee shall procure at its own expense, and keep in effect at all times during the term of this lease, the types and amounts of insurance specified in the *Contract Insurance Requirements*, marked *Exhibit C*, attached hereto and made a part hereof. Such insurance shall not limit or qualify the liabilities and obligations of Lessee assumed under this lease.

11.2. Severability of Interests and Cross Liability Required: Each Specified insurance policy shall contain a Severability of Interest and Cross Liability clause, and a Contractual Liability Endorsement.

11.3. Primary and Non-Contributory Insurance Required: All such insurance shall be Primary and Noncontributing with any other insurance held by Lessor where liability arises out of, or results from, the acts, errors or omissions of Lessee, its agents, employees, officers, assigns, or any person or entity acting for or on behalf of Lessee. Any insurance carried by Lessor, which may be applicable, shall be deemed to be excess insurance and Lessee's insurance is primary for all purposes despite any conflicting provision in Lessee's policies to the contrary.

11.4. Proof of Insurance for Renewal or Extension Required: Within ten (10) days of the expiration date of any of the policies required on the attached *Exhibit C* (Contract Insurance Requirements), Lessee shall submit documentation showing that the insurance coverage has been renewed and evidence shall be submitted to Lessor.

11.5. Submission of Acceptable Proof of Insurance and Notice of Cancellation: Lessee shall provide proof to the Risk Manager of the Department of Water and Power of the City of Los Angeles all specified insurance and related requirements either by use of Lessor's own endorsement form(s) or by other written evidence of insurance acceptable to the Risk Manager, but always in a form acceptable to the Risk Manager. The documents evidencing all specified coverage shall be filed with Lessor prior to Lessee beginning operations or occupying the leased premises hereunder. Said proof shall contain, at a minimum, the applicable policy number, the inclusive dates of policy coverage, the date the protection begins for Lessor, and the insurance carrier's name. Said evidence shall provide that such insurance shall not be subject to cancellation, material reduction in coverage or non-renewal except after written notice by certified mail, return receipt requested, to the Office of the Risk Manager at least thirty (30) calendar days prior to the effective date thereof. The notification shall be sent by registered mail to:

The Office of the Risk Manager
Financial Services Division
Room 465 – John Ferraro Building
Post Office Box 51111
Los Angeles, California 90051-0100

- 11.6. Claims-Made Insurance Conditions: Should any portion of the required insurance be on a "Claims Made" policy, Lessee shall, at the policy expiration date following the lease term, provide evidence that the "Claims Made" policy has been renewed with a retroactive inception date to the original policy in affect at the onset or effective date of this lease.
- 11.7. Failure to Maintain and Provide Proof as Cause for Termination: Failure to maintain and provide acceptable evidence of the required insurance for the required period of coverage shall constitute a breach of this lease, upon which Lessor may terminate or suspend this lease and pursue any and all available remedies.
- 11.8. Contractor and Sub-Contractor Compliance: Lessee shall be responsible for all contractor's and sub-contractor's compliance with the insurance requirements set forth herein.

12. LESSOR HELD HARMLESS / INDEMNIFICATION: Lessee acknowledges that it has inspected the leased premises, knows the condition thereof, and on behalf of itself, and its officers, employees, agents, contractors and sub-contractors of any tier, and all other persons acting or purporting to act on its behalf, and its successors, assigns, and sub-lessees undertakes and agrees to indemnify and hold harmless the Indemnitees, and at the option of Lessor, defend by counsel satisfactory to Lessor, the Indemnitees from and against any and all liens and claims of lien, suits, causes of action, claims, charges, damages (including but not limited to indirect, consequential, and incidental), demands, judgments, civil fines, penalties, or losses of any kind or nature whatsoever that are incurred by or asserted against the Indemnitees, for death, bodily injury, or personal injury to any person, including but not limited to Lessee's officers, employees, sub-lessees, contractors and sub-contractors of any tier, customers, invitees and agents, or other persons who enter onto the leased premises, or damage (including environmental damage) or destruction or loss of use of any property of either party hereto, or third persons in any manner arising by reason of, incident to, or connected in any manner to this agreement or to the leased premises covered under this agreement, regardless of any negligence on the part of Indemnitees, except for the sole negligence or willful misconduct of Lessor. It is the specific intent of this Section that this Indemnification shall apply and be effective for all accidents, occurrences, and/or events occurring during the term of this agreement that give rise to future claims, even if the actual claim comes against the Indemnitees after the agreement has expired or terminated. This Indemnification shall be in addition to any other rights or remedies that Indemnitees have under law or under this agreement. This Section, and the obligations herein, shall survive the expiration or earlier termination of this lease.

13. CITY OF LOS ANGELES ORDINANCE-MANDATED PROVISIONS:

- 13.1. Non-Discrimination: During the term of this lease, Lessee shall not discriminate in its employment practices against any employee or applicant for employment because of race, religion, national origin, ancestry, sex, sexual orientation, age disability, marital status, domestic partner status, or medical condition. Any subleases shall contain a like nondiscrimination clause. The applicable provisions of Executive Order No. 11246 of September 24, 1965; Part 60-741 of 41 CFR pertaining to handicapped workers, including 60-741.4 Affirmative Action Clause; and Sections 10.8 to 10.13 of the

Los Angeles Administrative Code pertaining to nondiscrimination in employment in the performance of City contracts are incorporated herein by reference and made a part hereof as if they were fully set forth herein.

- 13.2. Affirmative Action Plan: Lessee shall have, as per Los Angeles Administrative Code Section 10.8.4, an Affirmative Action Plan on file with the Director of Corporate Purchasing Services. Lessee's Plan shall be submitted on Lessor's form, available from the Director of Corporate Purchasing Services.
- 13.3. Child Support Assignment Orders: Lessee shall comply with Section 10.10, of the Los Angeles Administrative Code. Lessor requires all lessees and sublessees entering into a contract with Lessor to comply with all reporting requirements and court-ordered wage earning assignments.
- 13.4. Service Contractor Worker Retention Ordinance and Living Wage Ordinance: Under provisions of Section 10.36 et seq., and Section 10.37 et seq. of the Los Angeles Administrative Code, all employers (except where specifically exempted) under contracts primarily for the furnishing of services to or for Lessor and that involve an expenditure in excess of \$25,000 and a contract term of at least three months; leases; use permits, licenses; or, certain recipients of Lessor financial assistance, shall comply with all applicable provisions of the Ordinances. Lessor shall have the authority, under appropriate circumstances, to terminate the contract and otherwise pursue legal remedies that may be available, if Lessor determines that the subject contractor or financial recipient violated the provisions of the referenced Code Section.
- 13.5. Equal Benefits Ordinance: This lease is subject to Section 10.8.2.1 of the Los Angeles Administrative Code related to equal benefits to employees. Lessee agrees to comply with the provisions of Section 10.8.2.1.
- 13.6. Slavery Disclosure Ordinance: This lease is subject to the applicable provisions of the Slavery Disclosure Ordinance (SDO) Section 10.41, et seq., of the Los Angeles Administrative Code. Unless otherwise exempt in accordance with the provisions of this Ordinance, Lessee certifies that it has complied with the applicable provisions of the Ordinance. Under the provisions of Section 10.41.2(b) of the Los Angeles Administrative Code, Lessor has the authority, under appropriate circumstances, to terminate this lease and otherwise pursue legal remedies that may be available to Lessor if Lessor determines that Lessee failed to fully and accurately complete the SDO affidavit or otherwise violated any provision of the SDO.
- 13.7. Prevailing Wages:
 - 13.7.1 To the extent applicable Lessee shall pay or cause to be paid to all workers employed in connection with the construction of the improvements, not less than the prevailing rates of wages, as provided in the statutes applicable to City public work contracts, including without limitation Sections 1770-1780 of the California Labor Code.
 - 13.7.2. If federal funds were at any time used in the acquisition of this land or will be used in connection with the construction of any improvements, Lessee shall comply with or cause its general contractor and all subcontractors to comply with the requirements of the Davis-Bacon Act (40 U.S.C. 276 et. seq.). The Davis-Bacon Act requires the payment of wages to all laborers and mechanics at a rate not less than the minimum wage specified by the Secretary of Labor in

periodic wage rate determinations as described in the Federal Labor Standards Provisions (HUD-4010). In the event both State Prevailing wages and Davis-Bacon Act wages will be required, all works shall be paid at the higher of the two wages.

- 13.7.3. Prior to the commencement of construction, and as soon as practicable in accordance with the applicable Schedule of Performance, Lessee shall contact the City to schedule a preconstruction orientation meeting with Lessee and with the general contractor to explain such matters as the specific rates of wages to be paid to workers in connection with the construction of the improvements, preconstruction conference requirements, record keeping and reporting requirements necessary for the evaluation of Lessee's compliance with this Section.
 - 13.7.4. Lessee shall monitor and enforce any applicable prevailing wage requirements imposed on its contractors and subcontractors, including withholding payments to those contractors or subcontractors who violate these requirements. In the event that Lessee fails to monitor or enforce these requirements against any contractor or subcontractor, Lessee shall be liable for the full amount of any underpayment of wages, plus costs and attorney's fees, as if Lessee was the actual employer, and the City or the State Department of Industrial Relations may withhold monies owed to Lessee, may impose penalties on Lessee in the amounts specified herein, may take action directly against the contractor or subcontractor as permitted by law, and/or may declare Lessee in default of this lease and thereafter pursue any of the remedies available under this lease.
 - 13.7.5. Lessee agrees to include, or cause to be included, the above provisions in all bid specifications for work covered under this lease.
 - 13.7.6. Lessee shall indemnify, hold harmless and defend (with counsel reasonably acceptable to the City) the Indemnitees against any claim for damages, compensation, fines, penalties or other amounts arising out of the failure or alleged failure of any person or entity (including Lessee, its contractor and subcontractors) to pay prevailing wages as determined pursuant to California Labor Code Sections 1720 et seq. and implementing regulation or comply with the other applicable provisions of California Labor Code Sections 1720 et seq. and implementing regulations of the Department of Industrial Relations in connection with construction of the improvements or any other work undertaken or in connection with the leased premises. This indemnity shall apply whether occurring during the term of this lease and any time thereafter, and shall be in addition to any other rights or remedies which Indemnitees have under law or under this lease. This Section and the obligations herein, shall survive the expiration or earlier termination of this lease.
- 13.8. Amendments to Ordinances and Codes: The obligation to comply with the aforementioned ordinances and Los Angeles Administrative Code Sections, which have been incorporated into this lease by reference, shall extend to any amendments, which may be made to those ordinances and Administrative Code Sections during the term of this lease.

14. TAXES:

14.1. General:

- 14.1.1. Lessee shall pay any and all taxes of whatever character that may be levied or charged upon the leased premises, or upon Lessee's improvements, fixtures, equipment, or other property thereon or upon Lessee's use thereof.
 - 14.1.2. Lessee shall also pay all license or permit fees necessary or required by law or regulation for the conduct of Lessee's business or use of the leased premises.
 - 14.1.3. If a claim is made against Lessor for any of the above charges, Lessor shall promptly notify Lessee in writing; provided, however, that failure by Lessor to give such notice shall not constitute a waiver of Lessee's obligation to pay such taxes, license and/or permit fees.
- 14.2. **Special Assessments:** In the event any special assessments or taxes are levied against the leased premises by a district, special district, assessment district, or any other political entity or public corporation with power to levy taxes and/or assessments, such as a watermaster service or a water district, Lessor shall pay said taxes and/or assessments, and said payment, unless Lessor shall otherwise find and determine, will be added to the basic rental at the beginning of any rental period.
- 14.3. **Substitute and Additional Taxes:** If at any time during the term of this lease the State of California or any political subdivision of the state, including any county, city, public corporation, district, or any other political entity or public corporation of this state, levies or assesses against Lessor a tax, fee, or excise on rents on the square footage of the leased premises on the act of entering into this lease or on the occupancy of Lessee, or levies or assesses against Lessor any other tax, fee, or excise, however described, including, without limitation, a so-called value-added tax, as a direct substitution in whole or in part for or in addition to any real property taxes, Lessee shall pay before delinquency that tax, fee, or excise. Lessee's share of any such tax, fee, or excise shall be substantially the same as Lessee's proportionate share of real property taxes as provided in this lease.
- 14.4. **Possessory Interest Tax:** By executing this lease and accepting the benefits thereof, a property interest may be created known as a "possessory interest," and such property interest will be subject to property taxation. Lessee, as the party in whom the possessory interest is vested, will be subject to the payment of the property taxes levied upon such interest. Lessee herewith acknowledges that by this paragraph, Lessor has provided notice of possessory liability as required by California Revenue and Taxation Code Section 107.6.
- 14.5. The obligations of Lessee under this Section 14, however, shall not prevent Lessee from contesting the validity and/or applicability of any of the above charges and during the period of any such lawful contest, Lessee may refrain from making, or direct the withholding of, any such payment without being in breach of the above provisions. Upon a final determination in which Lessee is held responsible for such taxes and/or fees, Lessee shall promptly pay the required amount plus all legally imposed interest, penalties and surcharges. If all or any part of such taxes and/or fees, penalties, or surcharges are refunded to Lessor, Lessor shall remit to Lessee such sum(s) to which Lessee is legally entitled.

15. UTILITIES: Lessee agrees to promptly pay all charges for public utility services furnished for use on the leased premises and any other charges accruing or payable in connection with Lessee's use and occupancy of the leased premises.

16. ASSIGNMENTS AND SUBLEASES:

16.1 Lessee shall not, in any manner, assign, transfer, or encumber this lease, or any portion thereof or any interest therein, nor sublet or sublease the whole or any part of the leased premises, nor license or permit the use of the same, in whole or in part, without the prior written consent of Lessor. Any attempts to transfer, assign, or sublease without the consent required by this Section shall be void and shall transfer no rights to the leased premises. Consent to one assignment, subletting, or use, or occupation shall not be deemed to be a consent to any subsequent assignment, subletting, occupation, or use. This lease shall not, nor shall any interest therein, be assignable as to the interest of Lessee by operation of law without the prior written consent of Lessor.

16.2. Involuntary Assignment:

16.2.1 No interest of Lessee in this lease shall be assignable by operation of law (including, without limitation, the transfer of this lease by testacy or intestacy). Each of the following acts shall be considered an involuntary assignment:

16.2.1.1. If Lessee is or becomes bankrupt or insolvent; makes an assignment for the benefit of creditors; institutes, or is a party to, a proceeding under the Bankruptcy Act in which Lessee is the bankrupt or debtor; or, if Lessee is a partnership or consists of more than one person or entity, if any partner of the partnership or other person or entity is or becomes bankrupt or insolvent, or makes an assignment for the benefit of creditors;

16.2.1.2. If a writ of attachment or execution is levied on this lease; or

16.2.1.3. If, in any proceeding or action to which Lessee is a party, a receiver is appointed with authority to take possession of the leased premises.

16.2.2. An involuntary assignment shall constitute a default by Lessee, and Lessor shall have the right to terminate this lease, in which case this lease shall not be treated as an asset of Lessee. If a writ of attachment or execution is levied on this lease, Lessee shall have thirty (30) days in which to cause the attachment or execution to be removed. If any involuntary proceeding in bankruptcy is brought against Lessee, or if a receiver is appointed, Lessee shall have sixty (60) days in which to have the involuntary proceeding dismissed or the receiver removed.

16.3. Corporation or Partnership:

16.3.1. If Lessee is a corporation, this lease is to the corporation as it currently exists. Any dissolution, merger, consolidation, or other reorganization of Lessee, or the sale or other transfer of stock ownership of the corporation, voluntary, involuntary, or by operation of law, greater than ten percent (10%) shall be deemed a voluntary assignment of this lease and, therefore, subject to the provisions of this lease as to voluntary assignment thereof, including that provision requiring Lessor's prior written consent. This paragraph shall not apply to corporations the stock of which is traded through an exchange.

- 16.3.2. If Lessee is a partnership, this lease is to the partnership as it currently exists. A withdrawal or change, voluntary, involuntary, or by operation of law, of any partner, or the dissolution of the partnership shall be deemed a request to assign this lease and, therefore, subject to the provisions of this lease as to voluntary assignment thereof.
 - 16.4. Each request for consent to an assignment shall be in writing, accompanied by the following:
 - 16.4.1. A copy of the purchase/sale agreement, which shall include a detailed list of the assets that comprises the sales price.
 - 16.4.2. A copy of the escrow instructions pertaining to the transaction.
 - 16.4.3. Information relevant to Lessor's determination as to the financial and operational responsibility and appropriateness of the proposed assignee, including but not limited to the intended use and/or required modification of the leased premises, if any, together with a fee of \$500 as consideration for Lessor's considering and processing said request.
 - 16.4.4. Lessee agrees to provide Lessor with such other or additional information and/or documentation as may be reasonably requested.
 - 16.5. In the case of an assignment, Lessee shall pay to Lessor any monetary or other economic consideration received by Lessee that is attributed to the leasehold as an asset. Said amount shall be over and above the amount of Lessee's rental and other payments due Lessor pursuant to this lease.
 - 16.6. In the case of a sublease, it shall not be deemed to be an unreasonable restraint by Lessor, as a condition to the Consent to Sublease, for Lessor to require that Lessee pay to Lessor a percentage, to be negotiated, of any monetary or other economic consideration received by Lessee as a result of the sublease over and above the amount of Lessee's rental and other payments due Lessor pursuant to this lease.
- 17. CONDEMNATION:** The parties hereby agree that if the leased premises, or any portion thereof, or any interest therein, are taken by eminent domain for public use, or otherwise, by any governmental authority, or by a "quasi-public entity" having the power of condemnation, or sold to a governmental authority threatening to exercise the power of eminent domain, this lease, and Lessee's obligation to pay rent hereunder, shall terminate as to the part so taken as of the date the condemning authority takes title or possession, whichever first occurs, and the rent, fees and/or other charges hereunder shall be apportioned and paid to the date of such taking. A taking of the leased premises includes the taking of easements for air, light and any other easements in the land, including, but not limited to an impairment or taking of access to adjoining streets.
 - 17.1. Effect of Partial Condemnation: In the event a portion of the leased premises are appropriated or taken and Lessee, at its sole discretion, determines that the remainder thereof is not suitable for the continued use of the leased premises by Lessee for conducting Lessee's operations thereon in the same manner and extent as carried on prior to such taking, Lessee shall have the right to terminate this lease upon giving Lessor written notice of its intent to exercise said right. Said notice shall be given not more than one hundred twenty (120) days following the date of service of a complaint in eminent domain upon Lessee, or one hundred twenty (120) days following Lessor's

demand that Lessee acknowledge its intent to terminate this lease, unless Lessor and Lessee agree, in writing, to an earlier termination or to extend said period. If Lessee exercises its right to terminate this lease pursuant to this Subsection, Lessee shall give Lessor thirty (30) days prior written notice of the effective date of said termination.

- 17.1.1. If, in the event of such taking of a portion of the leased premises, Lessee does not terminate this lease, this lease shall continue in full force and effect as to the part not taken, and the rent to be paid by Lessee during the remainder of the term, subject to adjustment as provided elsewhere in this lease, shall be as follows: the land and improvement rental shall be reduced in the same proportion as the land taken by eminent domain bears to the area of the leased premises before the taking.
- 17.1.2. In determining whether a partial condemnation renders the remainder of the leased premises unsuitable for the use then being made of the leased premises by Lessee, Lessee, among other things, shall take into consideration the cost of restoration, the rentable area of the remaining improvements and the suitability of the remaining leased premises for conducting Lessee's operations thereon in the same manner and extent as carried on prior to such taking.
- 17.1.3. Except as provided for in Article II, Subsection 2.2, entitled *Ownership of Improvements*, should Lessee terminate this lease pursuant to this Section, title to all improvements, additions or alterations constructed or installed by Lessee upon the leased premises and which have not already vested in Lessor shall thereupon vest in Lessor.

17.2. Application of Award Upon a Total or Partial Taking:

- 17.2.1. If this lease is terminated pursuant to this Section, or, if all or a portion of the leased premises are taken, then the entire award or compensation paid for land, improvements, and buildings owned by Lessor, the amortized portion of the value of buildings and improvements built by Lessee and which will become the property of Lessor upon termination of this lease, shall be the property of Lessor.
- 17.2.2. Lessee shall have the right to receive compensation for the unamortized value of the buildings and any improvements that are still owned by Lessee and that were placed on the leased premises by Lessee and located thereon at the time of such taking or appropriation, and for its trade fixtures, equipment, and supplies, and for loss or damage to Lessee's business goodwill. The "amortized value" that Lessor shall be entitled to receive is a portion of the award for said Lessee-owned buildings and improvements equal to an amount determined by a ratio equal to the number of years the building and/or improvements have been in existence over the original term of the lease, without consideration of any possibility or probability of renewal, or of options, if any. There shall be no amortization of partially constructed improvements authorized by Lessor, if said construction is incomplete within the time period set forth in the approval granted by Lessor. The value, to be determined by Lessor, of such partially constructed improvements shall be paid to Lessee.

- 17.3. Severance Damages: The entire award of compensation paid for any severance damages, whether paid for impairment of access, for land, buildings, and/or improvements shall be the property of Lessor, regardless of whether any buildings or

improvements so damaged are owned or were constructed by Lessor or Lessee. However, should Lessor determine that improvements are to be restored, that portion of the severance damages necessary to pay the cost of restoration, as set forth in this Section, shall be paid to Lessee upon the written request of Lessee, accompanied by evidence that the sum requested has been paid for said restoration and is a proper item of such cost and used for such purpose.

- 17.4. Partial Taking: Restoration: In case of a taking of the leased premises other than a total taking and/or should Lessee elect not to terminate this lease pursuant to this Section, Lessor and Lessee may mutually agree that Lessee shall restore any improvements on the leased premises, and Lessee shall, at Lessee's expense, whether or not the awards or payments, if any, on account of such taking are sufficient for the purpose, promptly commence and proceed with reasonable diligence to effect (subject to Force Majeure) restoration of the improvements on the remaining portion of the leased premises as nearly as possible to their condition and character immediately prior to such taking, except for any reduction in area caused thereby, or with such changes or alterations as may be made at the election of Lessee in accordance with Article II, Subsection 2.1, entitled *Lessee Improvements and Alterations*.

17.4.1. In the event the improvements damaged and/or taken belong to Lessor, Lessor shall not be obligated to restore said improvements should Lessor, in its sole discretion, determine not to do so.

- 17.5. Taking for Temporary Use: In the event of a taking of all or any portion of the leased premises for temporary use, this lease shall continue in full force and effect without reduction or abatement of rental or other sum payable hereunder, and Lessee shall be entitled to make claim for, recover and retain any awards or proceeds made on account thereof, whether in the form of rent or otherwise, unless such period of temporary use or occupancy extends beyond the term of this lease, in which case such awards or proceeds shall be apportioned between Lessor and Lessee as heretofore specified. Lessee shall restore or cause to be restored any such areas temporarily taken to the condition existing before the taking.

18. DEFAULT:

- 18.1. Default Events: The occurrence of the following shall constitute a default by Lessee:

18.1.1. Failure to pay rent when due as provided for in paragraphs concerning rent payment and taxes.

18.1.2. Lessee fails to comply with any term, provision, condition, or covenant of this lease, other than paying rent, and does not cure such failure within thirty (30) days (or within such longer period of time as may be granted by Lessor in writing) after Lessor has sent written notice to Lessee specifying such failure.

- 18.2. Lessor's Remedies: Upon the occurrence of a Default Event, Lessor, in addition to any other rights or remedies available to Lessor at law or in equity, shall have the right to:

18.2.1. Terminate this lease and all rights of Lessee under this lease, by giving Lessee thirty (30) days written notice that this lease is terminated, in which case, Lessor may recover from Lessee the aggregate sum of:

18.2.1.1. The worth at the time of award of any unpaid rent that had been earned at the time of termination;

- 18.2.1.2. The worth at the time of award of the amount by which (A) the unpaid rent that would have been earned after termination until the time of award exceeds (B) the amount of rental loss, if any, that Lessee affirmatively proves could be reasonably avoided;
- 18.2.1.3. The worth at the time of award of the amount by which (A) the unpaid rent for the balance of the term after the time of award exceeds (B) the amount of rental loss, if any, that Lessee affirmatively proves could be reasonably avoided;
- 18.2.1.4. Any other amount necessary to compensate Lessor for all the detriment caused by Lessee's failure to perform its obligations or that, in the ordinary course of things, would be likely to result from Lessee's failure; and
- 18.2.1.5. All other amounts in addition to or in lieu of those previously set out as may be permitted from time to time by applicable California law
- 18.2.1.6. As used in Subsections 18.2.1.1 and 18.2.1.2, the "worth at the time of award" is computed by allowing interest at the rate of ten percent (10%) per annum.
- 18.2.1.7. As used in Subsection 18.2.1.3, the "worth at the time of award" is computed by discounting that amount at the discount rate of the Federal Reserve Bank of San Francisco at the time of the award plus one percent (1%).
- 18.2.1.8. As used in this Section, the term "rent" shall include the Rent and any and all other payments required by Lessee under this lease.
- 18.2.2. Continue this lease, and from time to time, without terminating this lease, either:
 - 18.2.2.1. Recover all rent and other amounts payable as they become due; or
 - 18.2.2.2. Re-let the leased premises or any part on behalf of Lessee on terms and at the rent that Lessor, in Lessor's sole discretion, may deem advisable, all with the right to make alterations and repairs to the leased premises, at Lessee's sole cost, and apply the proceeds of re-letting to the rent and other amounts payable by Lessee. To the extent that the rent and other amounts payable by Lessee under this lease exceed the amount of the proceeds from re-letting, Lessor may recover the excess from Lessee as and when due.
- 18.2.3. Upon the occurrence of a Default Event, Lessor shall also have the right, with or without terminating this lease, to re-enter the leased premises and remove all property from the leased premises. Lessor may store the property removed from the leased premises at the expense and for the account of Lessee.
- 18.2.4. None of the following remedial actions, alone or in combination, shall be construed as an election by Lessor to terminate this lease unless Lessor has in fact given Lessee written notice that this lease is terminated or unless a court of competent jurisdiction decrees termination of this lease: any act by Lessor to maintain or preserve the leased premises; any efforts by Lessor to re-let the leased premises; any re-entry, repossession, or re-letting of the leased premises

by Lessor pursuant to this Section. If Lessor takes any of the previous remedial actions without terminating this lease, Lessor may nevertheless, at any later time, terminate this lease by written notice to Lessee.

- 18.2.5. If Lessor re-lets the leased premises, Lessor shall apply the revenue from the re-letting as follows: first, to the payment of any indebtedness other than rent due from Lessee to Lessor; second, to the payment of any cost of re-letting; third, to the payment of the cost of any maintenance and repairs to the leased premises; and fourth, to the payment of rent and other amounts due and unpaid under this lease. Lessor shall hold and apply the residue, if any, to payment of future amounts payable under this lease as the same may become due, and shall be entitled to retain the eventual balance with no liability to Lessee. If the revenue from re-letting during any month, after application pursuant to the previous provisions, is less than the sum of (a) Lessor's expenditures for the leased premises during that month and (b) the amounts due from Lessee during that month, Lessee shall pay the deficiency to Lessor immediately upon demand.
- 18.2.6. After the occurrence of a Default Event, Lessor, in addition to or in lieu of exercising other remedies, may, but without any obligation to do so, cure the breach underlying the Default Event for the account and at the expense of Lessee. However, Lessor must by prior written notice first allow Lessee a reasonable opportunity to cure, except in cases of emergency, where Lessor may proceed without prior notice to Lessee. Lessee shall, upon demand, immediately reimburse Lessor for all costs, including costs of settlements, defense, court costs, and attorney fees that Lessor may incur in the course of any cure.
- 18.2.7. No security or guaranty for the performance of Lessee's obligations that Lessor may now or later hold shall in any way constitute a bar or defense to any action initiated by Lessor or unlawful detainer or for the recovery of the leased premises, for enforcement of any obligation of Lessee, or for the recovery of damages caused by a breach of this lease by Lessee or by a Default Event.
- 18.2.8. Except where this is inconsistent with or contrary to any provisions of this lease, no right or remedy conferred upon or reserved to either party is intended to be exclusive of any other right or remedy, or any right or remedy given now or later existing at law or in equity or by statute. Except to the extent that either party may have otherwise agreed in writing, no waiver by a party of any violation or nonperformance by the other party of any obligations, agreements, or covenants under this lease shall be deemed to be a waiver of any subsequent violation or nonperformance of the same or any other covenant, agreement, or obligation, nor shall any forbearance by either party to exercise a remedy for any violation or nonperformance by the other party be deemed a waiver by that party of the rights or remedies with respect to that violation or nonperformance.

18.3. Waiver:

- 18.3.1. No delay or omission in the exercise of any right or remedy of Lessor on any default by Lessee shall impair such a right or remedy or be construed as a waiver.

- 18.3.2. The receipt and acceptance by Lessor of delinquent rent shall not constitute a waiver of any other default; it shall constitute only a waiver of timely payment for the particular rent payment involved.
 - 18.3.3. No act or conduct of Lessor, including, without limitation, the acceptance of the keys to the leased premises, shall constitute an acceptance of the surrender of the leased premises by Lessee before the expiration of the term. Only a notice from Lessor to Lessee shall constitute acceptance of the surrender of the leased premises and accomplish a termination of the lease.
 - 18.3.4. Lessor's consent or approval of any act by Lessee requiring Lessor's consent or approval shall not be deemed to waive or render unnecessary Lessor's consent to or approval of any subsequent act by Lessee.
 - 18.3.5. Any waiver by Lessor of any default shall not be a waiver of any other default concerning the same or any other provision of the lease.
- 18.4. Cumulative Nature of Remedies: Lessor shall have the remedies allowed in this lease if Lessee commits a default. These remedies are not exclusive; they are cumulative in addition to any remedies now or later allowed by law.

19. TERMINATION BY PARTIES:

- 19.1. This lease may be terminated by either party by giving to the other party not less than thirty (30) days' advance written notice of such termination; but, for reasons other than nonpayment of rent, such right of termination shall be exercised by Lessor only when Lessee is in default of this lease, or in the event the Board of Water and Power Commissioners determine that the operations of Lessor or the public interest require such termination.
- 19.2. During and upon termination of this lease for whatever reason, Lessee shall be responsible, to the extent caused by or introduced onto the leased premises by Lessee, for any and all cleanup costs and expenses including, but not limited to, any fines, penalties, judgments, litigation costs, and attorneys' fees incurred as a result of any and all discharge, leakage, spillage, emission of material which is, or becomes, defined as any pollutant, contaminant, hazardous waste or hazardous substance, under all federal, state, local, or municipal laws, rules, orders, regulations, statutes, ordinances, codes, decrees, or requirements of any governmental authority regulating, or imposing liability or standards of conduct concerning any pollutant, contaminant, hazardous waste or hazardous substance on, under, or about the leased premises, as now or may at any later time be in effect, including without limitation, the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (42 USCS §§9601 et seq.); the Resource Conservation and Recovery Act of 1976 (42 USCS §§6901 et seq.); the Clean Water Act, also known as the Federal Water Pollution Control Act (33 USCS §§1251 et seq.); the Toxic Substances Control Act (15 USCS §§2601 et seq.); the Hazardous Materials Transportation Act (49 USCS §§5101 et seq.); the Federal Insecticide, Fungicide, Rodenticide Act (7 USCS §§136 et seq.); the Superfund Amendments and Reauthorization Act (42 USCS §§9601 et seq.); the Clean Air Act (42 USCS §§7401 et seq.); the Safe Drinking Water Act (42 USCS §§300f et seq.); the Solid Waste Disposal Act (42 USCS §§6901 et seq.); the Surface Mining Control and Reclamation Act (30 USCS §§1201 et seq.); the Emergency Planning and Community Right to Know

Act (42 USCS §§11001 et seq.); the Occupational Safety and Health Act (29 USCS §§651 et seq.); the California Underground Storage of Hazardous Substances Act (H&SC §§25280 et seq.); the Carpenter-Presley-Tanner Hazardous Substance Account Act (H&SC §§25300 et seq.); the California Hazardous Waste Control Act (H&SC §§25100 et seq.); the California Safe Drinking Water and Toxic Enforcement Act (H&SC §§25249.5 et seq.); and the Porter-Cologne Water Quality Control Act (Wat. C. §§13000 et seq.); together with any amendments of or regulations promulgated under the statutes cited above and any other federal, state, or local law, statute, ordinance, or regulation now in effect or later enacted that pertains to any pollutant, contaminant, hazardous waste or hazardous substances on, under, or about the leased premises, including ambient air, soil, soil vapor, groundwater, surface water, or land use. Said cleanup shall be accomplished to the satisfaction of Lessor and any governmental body having jurisdiction there over.

20. SURRENDER OF LEASED PREMISES:

- 20.1. Upon the expiration of the term of this lease or sooner termination as herein provided, Lessor has the right to discontinue leasing the leased premises and has no obligation to Lessee to renew, extend, transfer, or re-lease the leased premises. If this right is exercised by Lessor, Lessee shall vacate the leased premises and shall peaceably surrender the same. Lessee is obliged to, and shall remove any and all Lessee-owned personal property, trade fixtures, and goods, and hazardous materials and wastes located in or upon the leased premises, except for trees and shrubs, and structures and improvements, title to which automatically passes to Lessor pursuant to this lease. Lessee shall leave the leased premises in a level, graded condition.
- 20.2. Lessor may waive the obligation to remove and restore, in writing, upon prior written request therefor by Lessee. If the obligation is waived, Lessee shall quit and surrender possession of the leased premises to Lessor in at least as good and usable condition as the same are required to be maintained under this lease. In this event, Lessor shall acquire title to any and all such personal property, trade fixtures and goods, located in or upon the leased premises and remaining there upon the expiration or any termination of this lease, and Lessee agrees that title to same shall and by this agreement does vest in Lessor, and that Lessee shall thereafter have no rights whatsoever in any such personal property, trade fixtures, and goods left on the leased premises.
- 20.3. Should Lessee fail to remove any Lessee-owned or sublessee-owned personal property, trade fixtures, and goods or fail to request Lessor's waiver of removal, Lessor can elect to retain or dispose of, in any manner, any such personal property, trade fixtures, and goods that Lessee does not remove from the leased premises on expiration or termination of the term as allowed or required by this lease by giving thirty (30) days' written notice to Lessee. Title to any such personal property, trade fixtures, and goods shall vest in Lessor on the expiration of the thirty (30) day notice. Lessee waives all claims against Lessor for any damage to Lessee resulting from Lessor's retention or disposal of any such property. Lessee shall be liable to Lessor for Lessor's costs for storing, removing, or disposing of any property of Lessee or sublessees.

21. **HOLDING OVER:** If Lessee shall hold over after expiration or other termination of this lease, whether with the apparent consent or without the consent of Lessor, such shall not constitute a renewal or extension of this lease, nor a month-to-month tenancy, but only a tenancy at will with liability for reasonable rent, and in all other respects on the same terms and conditions as are

herein provided. The term reasonable rent as used in this Section shall be no less than 1/12th of the total yearly rents, taxes, and assessments provided for elsewhere in this lease, per month, and said reasonable rent during the holdover period shall be paid, in advance, on the first day of each month.

- 22. QUITCLAIM OF LESSEE'S INTEREST UPON TERMINATION:** Upon termination of this lease for any reason, including, but not limited to, termination because of default by Lessee, Lessee shall execute, acknowledge, and deliver to Lessor immediately upon written demand therefor a good and sufficient deed whereby all right, title, and interest of Lessee in the leased premises is quitclaimed to Lessor. Should Lessee fail or refuse to deliver the required deed to Lessor, Lessor may prepare and record a notice reciting the failure of Lessee to execute, acknowledge, and deliver such deed, and said notice shall be conclusive evidence of the termination of this lease and of all right of Lessee or those claiming under Lessee in and to the leased premises.
- 23. SUCCESSORS IN INTEREST:** This lease shall inure to the benefit of, and be binding upon parties hereto and any heirs, successors, executors, administrators, and any permitted assigns, as fully and to the same extent specifically mentioned in each instance, and every term, covenant, condition, stipulation, and agreement contained in this lease shall extend to and bind any heir, successor, executor, administrator, and assign, all of whom shall be jointly and severally liable hereunder.
- 24. AUDITS:** Lessor may, at its sole discretion and with reasonable notice to Lessee, require Lessee to provide access to all records and other information necessary to perform an audit of rental, fees, and other charges paid and payable to Lessor. Lessor's right to access such records and information shall survive three (3) years beyond the expiration or early termination of this lease. Lessee shall retain all records and other information necessary to perform an audit as described above for a minimum of seven (7) years.
- 25. RECORDING:** Neither this lease nor a memorandum thereof shall be recorded without Lessor's consent in writing.
- 26. ESTOPPEL CERTIFICATES:**
- 26.1. Estoppel Certificate From Lessee: Within fifteen (15) days following any written request that Lessor may make from time to time pursuant to the request of a lender or prospective purchaser, Lessee shall execute and deliver to Lessor a statement certifying: (a) the commencement date of this lease; (b) the fact that this lease is unmodified and in full force and effect (or, if there have been modifications hereto, that this lease is in full force and effect as modified, and stating the date and nature of the such modifications); (c) the date to which the rental and other sums payable under the lease have been paid; and (d) the fact that there are no current defaults under the lease by either party except as specified in Lessee's statement. The parties intend that any statement delivered pursuant to this Section may be relied on by any mortgagee, beneficiary, purchaser or prospective purchaser of the leased premises or any interest therein.
- 26.2. Lessee's Failure to Provide Statement: Lessee's failure to deliver such statement within such time shall be conclusive upon Lessee that (a) this lease is in full force and effect, without modification except as may be represented by Lessor; and that (b) there are no uncured defaults in Lessor's performance.

26.3. Estoppel Certificate From Lessor: Within fifteen (15) business days following any written request that Lessee may make from time to time pursuant to the request of a prospective assignee or sublessee, Lessor shall execute and deliver to Lessee a statement certifying: (a) the commencement date of this lease; (b) the fact that this lease is unmodified and in full force and effect (or, if there have been modifications hereto, that this lease is in full force and effect, as modified, and stating the date and nature of such modifications); (c) the date to which the rental and other sums payable under this lease have been paid; and (d) the fact that there are no current defaults under this lease by Lessee, except as specified in Lessor's statement. The parties intend that any statement delivered pursuant to this Section may be relied upon by the proposed assignee or sublessee for whom it was requested. Lessor's failure to deliver such statement within such time shall be conclusive upon Lessor that (1) this lease is in full force and effect without modification, except as represented by Lessee; and that (2) there are no uncured defaults of Lessee under the lease; provided, however, that such conclusive effect is applicable only to the failure of Lessor to respond after an additional five (5) working days' notice to Lessor and only with respect to the proposed assignee or sublessee for whom it was requested.

27. MISCELLANEOUS PROVISIONS:

- 27.1. Fair Meaning: The language of this lease shall be construed according to its fair meaning, and not strictly for or against either Lessor or Lessee.
- 27.2. Section Headings: The section and subsection headings appearing herein are for the convenience of Lessor and Lessee, and shall not be deemed to govern, limit, modify, or in any manner affect the scope, meaning, or intent of the provisions of this lease.
- 27.3. Void Provisions: If any provision of this lease is determined to be void by any court of competent jurisdiction, then such determination shall not affect any other provision of this lease, and all such other provisions shall remain in full force and effect.
- 27.4. Two Constructions: It is the intention of the parties hereto that if any provision of this lease is capable of two constructions, one of which would render the provision void and the other of which would render the provision valid, then the provision shall have the meaning which renders it valid.
- 27.5. Laws of California: This lease shall be construed and enforced in accordance with the laws of the State of California.
- 27.6. Lessor's Consent: In each instance herein where the City of Los Angeles', Board's or Lessor's approval or consent is required before Lessee may act, such approval or consent may be withheld in the City's, Board's or Lessor's, respectively, sole and absolute discretion.
- 27.7. Gender: The use of any gender herein shall include all genders, and the use of any number shall be construed as the singular or the plural, all as the context may require.
- 27.8. Time: Time shall be of the essence in complying with the terms, conditions, and provisions of this lease.
- 27.9. Integration Clause: It is understood that no alteration or variation of the terms of this lease shall be valid unless made in writing and signed by the parties hereto, and that no oral understanding or agreement, not incorporated herein in writing, shall be binding on any of the parties hereto.

- 27.10. Force Majeure: Except as otherwise provided in this lease, whenever a day is established in this lease on which, or a period of time, including a reasonable period of time, is designated within which, either party hereto is required to do or complete any act, matter or thing, the time for the doing or completion thereof shall be extended by a period of time equal to the number of days on or during which such party is prevented from, or is unreasonably interfered with, the doing or completion of such act, matter or thing because of strikes, lockouts, embargoes, unavailability of services, labor or materials, disruption of service or brownouts from utilities not due to action or inaction of Lessor, wars, insurrections, rebellions, civil disorder, declaration of national emergencies, acts of God, or other causes beyond such party's reasonable control--financial inability excepted; provided, however, that nothing contained in this Subsection shall excuse Lessee from the prompt payment of any rental or other monetary charge required of Lessee hereunder.
- 27.11. Approvals: Any consent or approvals required by Lessor under this lease shall be approvals of Lessor acting as Lessor and shall not relate to, constitute a waiver or, supersede or otherwise limit or affect the governmental approvals or rights of Lessor as a governmental agency, including the approval of any permits required for construction maintenance of the leased premises and the passage of any laws including those relating to zoning, land use, building and safety.
- 27.12. Conflicts in this Lease: If there are any direct conflicts between the provisions of Article I and Article II of the lease, the provisions of Article I shall be controlling.
- 27.13. Days: Unless otherwise specified, "days" shall mean calendar days.
- 27.14. Deprivation of Lessee's Rights: Lessor shall not be liable to Lessee for any diminution or deprivation of Lessee's rights under this lease that may result from Lessee's obligation to comply with any and all applicable laws, rules, regulations, restrictions, ordinances, statutes, and/or orders of any federal, state and/or local government authority and/or court hereunder on account of the exercise of any such authority as is provided in this Section, nor shall Lessee be entitled to terminate the whole or any portion of the lease by reason thereof.
- 27.15. Executed in Counterpart: This lease may be executed in any number of counterparts and by different parties hereto in separate counterparts, each of which when so executed shall be deemed to be an original and all of which taken together shall constitute one and the same instrument.
28. **OTHER AGREEMENTS NOT AFFECTED**: Except as specifically stated herein, this lease, and the terms, conditions, provisions and covenants hereof, shall apply only to the leased premises herein particularly described, and shall not in any way change, amend, modify, alter, enlarge, impair, or prejudice any of the rights, privileges, duties, or obligations of either of the parties hereto, under or by reason of any other agreement between said parties, except that nothing contained in such other agreement shall limit the use by Lessee of the within leased premises for the herein referred to purpose.
29. **SUPERSEDURE**: This lease, upon becoming effective, shall supersede and annul any and all permits, leases, or rent agreements heretofore made or issued for the leased premises between Lessor and Lessee; and any such permits, leases, or rental agreements shall hereafter be void and of no effect except as to any rentals, royalties, or fees that may have accrued thereunder.

30. ENTIRE UNDERSTANDING: This lease contains the entire understanding of the parties, and Lessee, by accepting the same, acknowledges that it supersedes and annuls any writings or oral discussions, statements, understandings, or representations that may have been made concerning the subject matter hereof; and that there is no other written or oral understanding between the parties in respect to the leased premises or the rights and obligations of the parties hereto. No modification, amendment, or alteration of this lease shall be valid unless it is in writing and signed by the parties hereto.

LEASE NO.: 1333
ACCOUNT NO.: 16008

IN WITNESS WHEREOF, the parties hereto have themselves, or through their duly authorized officers, caused this lease to be executed as of the day and year herein below written.

The signature affixed hereto of Lessee, or the authorized representative of Lessee, certifies that Lessee has read and does understand each and every section and paragraph contained in this lease and agrees to abide by and be bound by same.

Date _____

By _____
County of Inyo

County of Inyo
Parks & Recreation
163 May Street
Bishop, CA 93514

LESSEE

LEASE NO.: 1333
ACCOUNT NO.: 16008

IN WITNESS WHEREOF, the parties hereto have themselves, or through their duly authorized officers, caused this lease to be executed as of the day and year herein below written:

DEPARTMENT OF WATER AND POWER
OF THE CITY OF LOS ANGELES BY
BOARD OF WATER AND POWER COMMISSIONERS

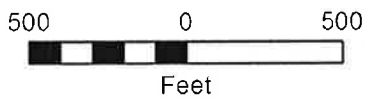
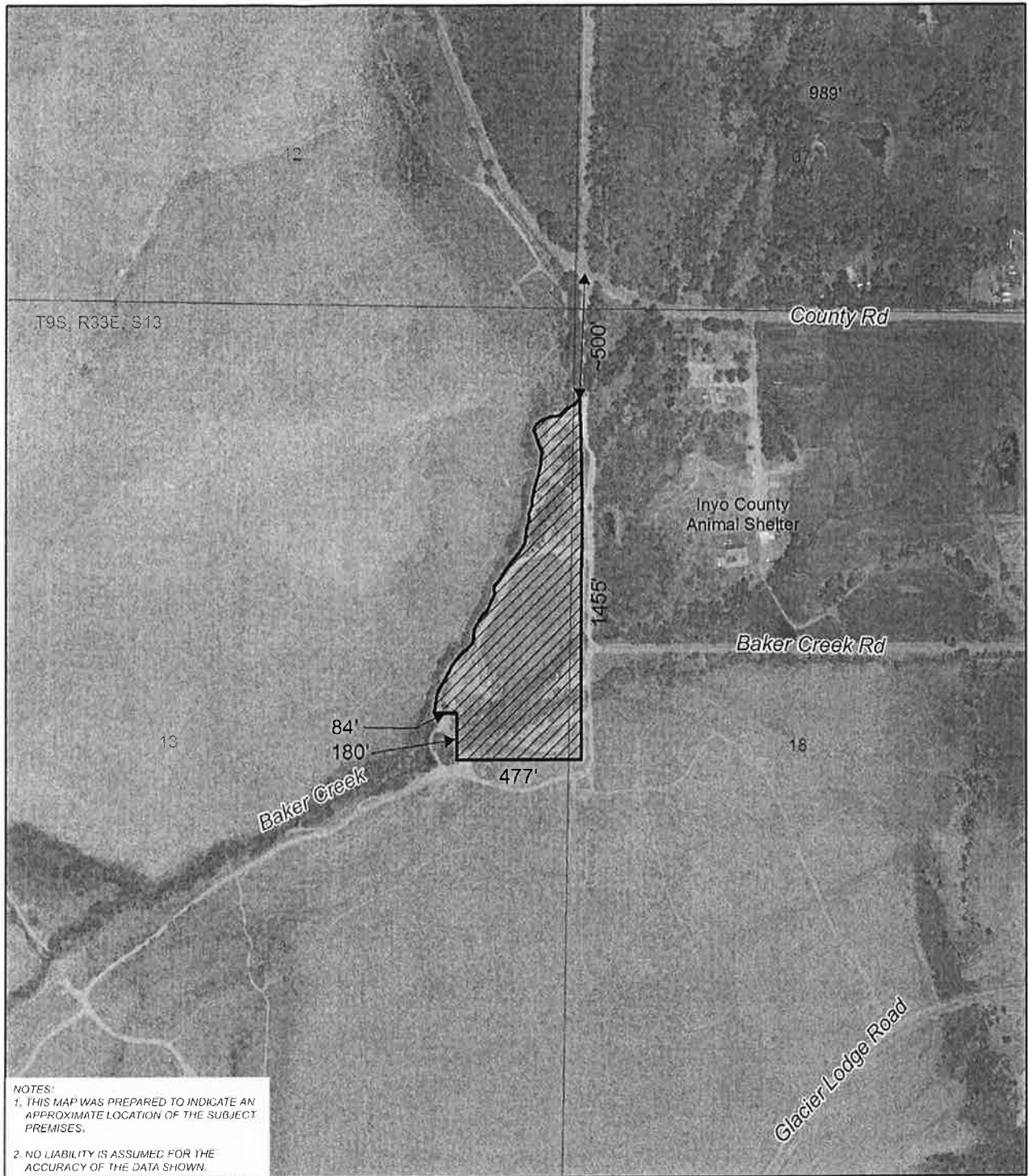
By: _____
MARTIN L. ADAMS
General Manager and Chief Engineer

Date: _____

And: _____
SUSAN A. RODRIGUEZ
Board Secretary

LESSOR

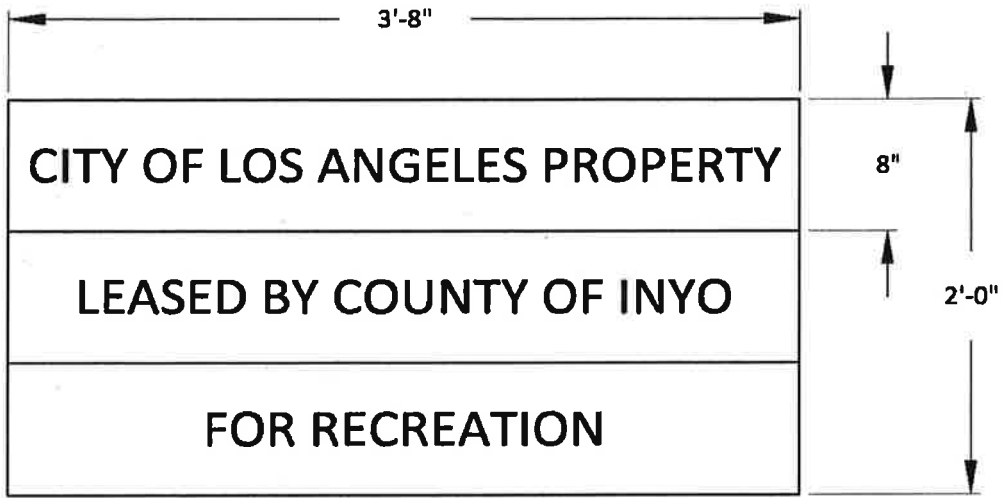
EXHIBIT A



Subject Premises
10.42 Ac.
BL 1333

18-040-01, 2

EXHIBIT B



SIGN TO BE CONSTRUCTED OF STANDARD 2" x 8" REDWOOD ASSEMBLED TO AN OVERALL DIMENSION OF 24" X 44". SURFACE TO BE SMOOTH AND FREE OF KNOTS.

SIGN TO BE MOUNTED ON STANDARD 4"X 4" REDWOOD POSTS, FINISHED FOUR SIDES, PLACED IN CONCRETE AND 36" ON CENTER, TO AN OVERALL HEIGHT OF 5'.

LETTERING TO BE ROUTED ON ONE SIDE ONLY, 2" MINIMUM HEIGHT, AND LETTERS PAINTED WITH A BRIGHT OR LUMINOUS YELLOW PAINT.

COMPLETED SIGN AND POSTS TO BE STAINED WITH A REDWOOD STAIN AND COATED WITH A CLEAR, DURABLE, EXTERIOR FINISH.

SIGN IS TO BE MAINTAINED IN A SAFE, SECURE, AND LEGIBLE MANNER, PLEASING IN APPEARANCE AND COMPATIBLE WITH THE SURROUNDINGS. SURFACE TO BE REFINISHED AS NECESSARY.

O.V. A13,235

STANDARD SIGN FOR RECREATION LEASE

R E F E R E N C E S				DEPARTMENT OF WATER AND POWER		CITY OF LOS ANGELES	
				WATER SYSTEM			
		DESIGNED	NAME	DATE	APPROVED		
		DRAWN	MJD	03/18			
		CHECKED			MJD ASHEET.DWG 10/01		

A

EXHIBIT C

**CONTRACT INSURANCE REQUIREMENTS -- DEPARTMENT OF WATER AND POWER
For Contractors, Service Providers, Vendors, and Tenants**

Agreement/Activity/Operation:	a site for a public campground
Reference/Agreement:	BL-1333 County of Inyo
Term of Agreement:	Twenty five years – 12/1/2020 through 11/30/2045
Contract Administrator and Phone:	Mrs. Karen McCoy/ Bishop / Ext. 30234
Risk Manager/Date	LC / 1/28/20

Contract-required types and amounts of insurance as indicated below by checkmark are the minimum which must be maintained. All limits are Combined Single Limit (Bodily Injury/Property Damage) unless otherwise indicated. Firm 30 day Notice of Cancellation required by Receipted Delivery.

PER OCCURENCE LIMITS

- () **WORKERS' COMPENSATION** (Stat. Limits)/Employer's Liability: (\$1,000,000)
 - () Broad Form All States Endorsement () US L&H (Longshore and Harbor Workers)
 - () Jones Act (Maritime Employment) () Outer Continental Shelf
 - () Waiver of Subrogation () Black Lung (Coal Mine Health and Safety)
 - () Other: _____ () Other: _____

- () **AUTOMOBILE LIABILITY:** (\$1,000,000)
 - () Owned Autos () Any Auto
 - () Hired Autos () Non-Owned Auto
 - () Contractual Liability () Additional Insured
 - () MCS-90 (US DOT) () Trucker's Form
 - () Waiver of Subrogation () Other: _____

- () **GENERAL LIABILITY:** () Limit Specific to Project () Per Project Aggregate (\$3,000,000)
 - () Broad Form Property Damage () Contractual Liability () Personal Injury
 - () Premises and Operations () Products/Completed Ops. () Independent Contractors
 - () Fire Legal Liability () Garagekeepers Legal Liab. () Child Abuse/Molestation
 - () Corporal Punishment () Collapse/Underground () Explosion Hazard
 - () Watercraft Liability () Pollution () Addition Insured Status
 - () Waiver of Subrogation () Airport Premises () Hangarkeepers Legal Liab.
 - () Marine Contractors Liability () Other: _____ () Other: _____

- () **PROFESSIONAL LIABILITY:**
 - () Contractual Liability () Waiver of Subrogation () 3 Year Discovery Tail
 - () Additional Insured () Vicarious Liability Endt. () Other: _____

- () **AIRCRAFT LIABILITY:**
 - () Passenger Per Seat Liability () Contractual Liability () Hull Waiver of Subrogation
 - () Pollution () Additional Insured () Other: _____

- () **PROPERTY DAMAGE:** () Loss Payable Status (AOIMA)
 - () Replacement Value () Actual Cash Value () Agreed Amount
 - () All Risk Form () Named Perils Form () Earthquake: _____
 - () Builder's Risk: \$ _____ () Boiler and Machinery () Flood: _____
 - () Transportation Floater: \$ _____ () Contractors Equipment: \$ _____

- () **Loss of Rental Income:** _____
 - () Scheduled Locations/Propt. () Other: _____ () Other: _____

- () **WATERCRAFT:**
 - () Protection and Indemnity () Pollution () Additional Insured
 - () Waiver of Subrogation () Other: _____ () Other: _____

- () **POLLUTION:**
 - () Incipient/Long-Term () Sudden and Accidental () Additional Insured
 - () Waiver of Subrogation () Contractor's Pollution () Other: _____

- () **CRIME:** () Joint Loss Payable Status () Additional Insured
 - () Fidelity Bond () Financial Institution Bond () Loss of Monies/Securities
 - () Employee Dishonesty () In Transit Coverage () Wire Transfer Fraud
 - () Computer Fraud () Commercial Crime () Forgery/Alteration of Docs.
 - () Other: _____ () Other: _____

- () **ASBESTOS LIABILITY:** () Additional Insured ()



LADWP Wildfire Mitigation Plan Owens Valley

Inyo County Board of Supervisors

March 3, 2020

Background

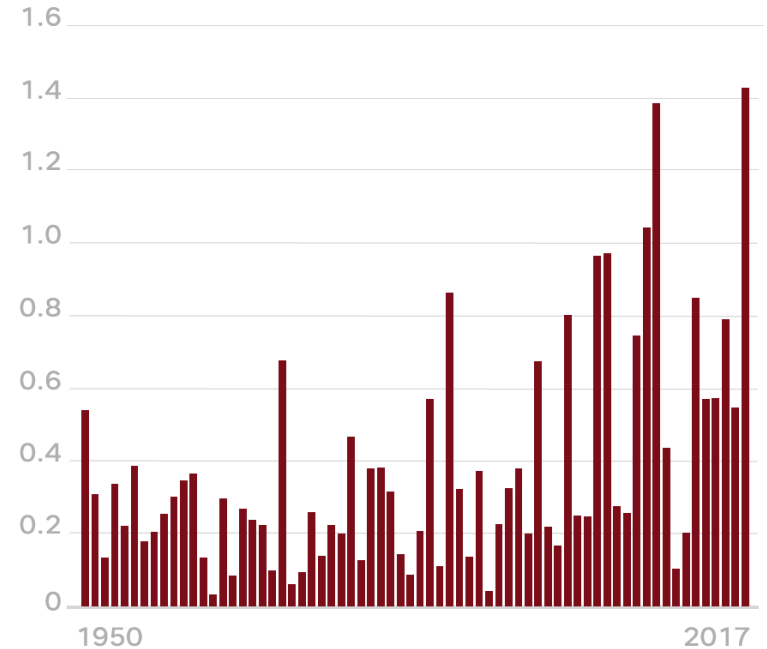
Background Climate Change

- New normal
- Changing weather patterns
- Increasing wildfire intensity and frequency



Credit: Left - Mellimage/Shutterstock.com, center - Montree Hanlue/Shutterstock.com

Number of acres burned per year (in millions)



Source: Cal Fire, George Petras, Mitchell Thorson, Shawn Sullivan, USA TODAY

Background

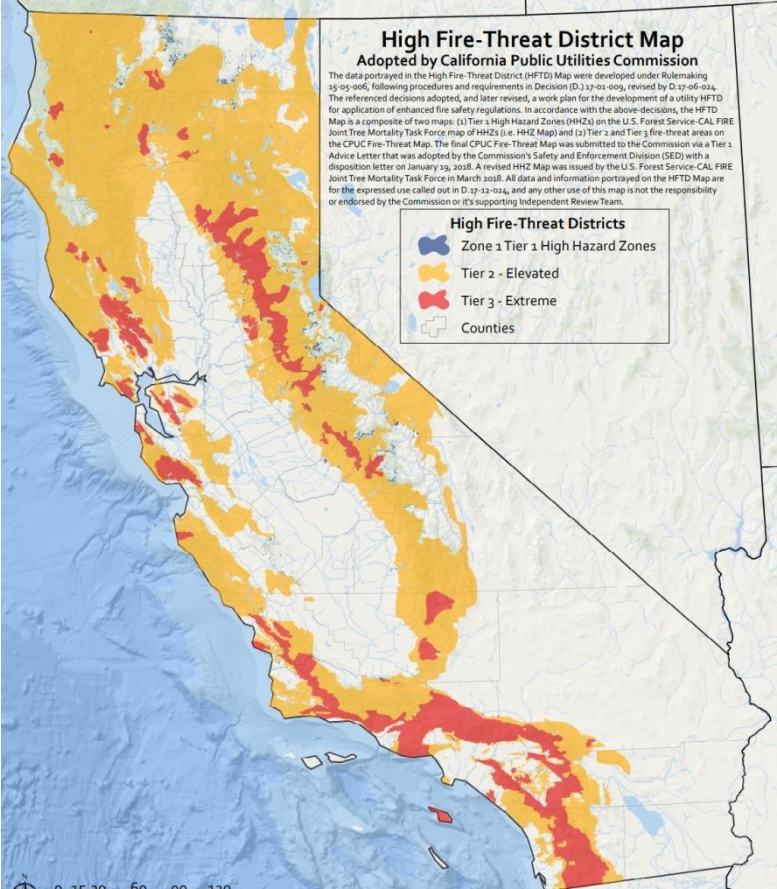
Legislation on Wildfires

- California Senate Bill 901
 - Wildfire Mitigation Plan before January 1, 2020
- California Assembly Bill 1054
 - Submit Wildfire Mitigation Plan to California Wildfire Safety Advisory Board by July 1, 2020
- Required annual updates with comprehensive revisions every three years



Background

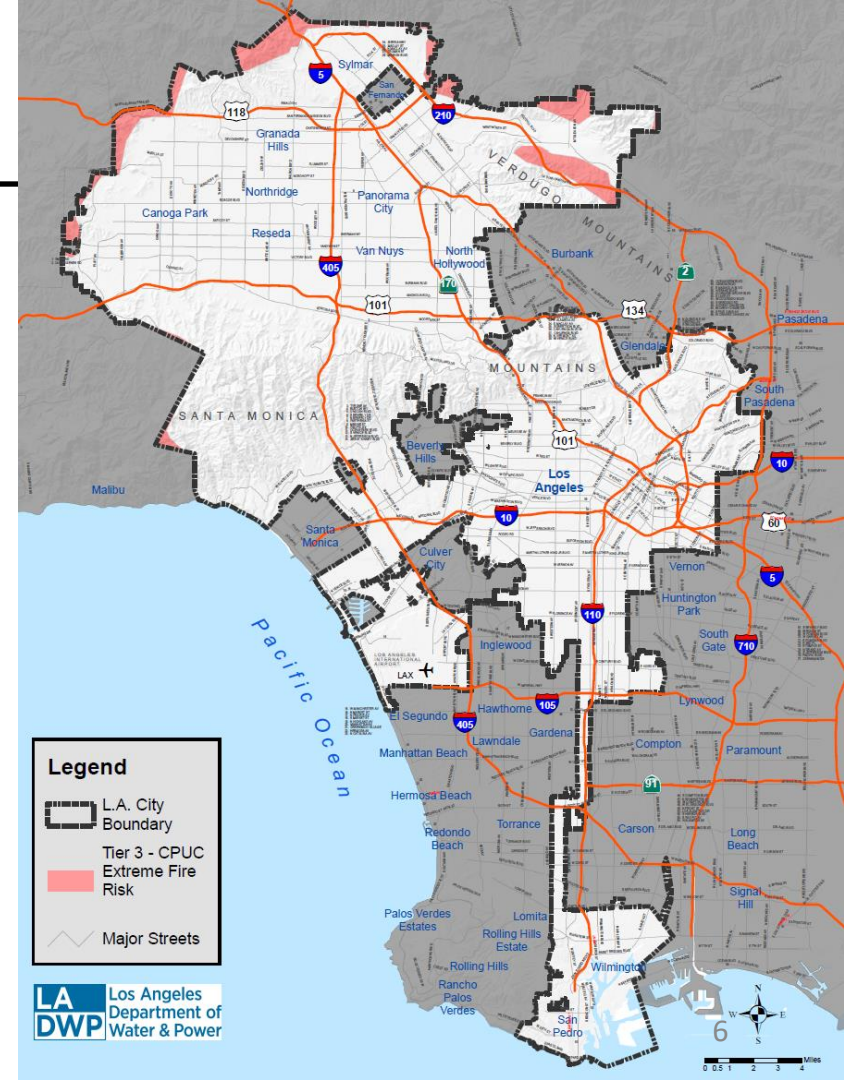
CPUC High Fire Threat Districts



Background

High Fire Threat Districts – City of L.A.

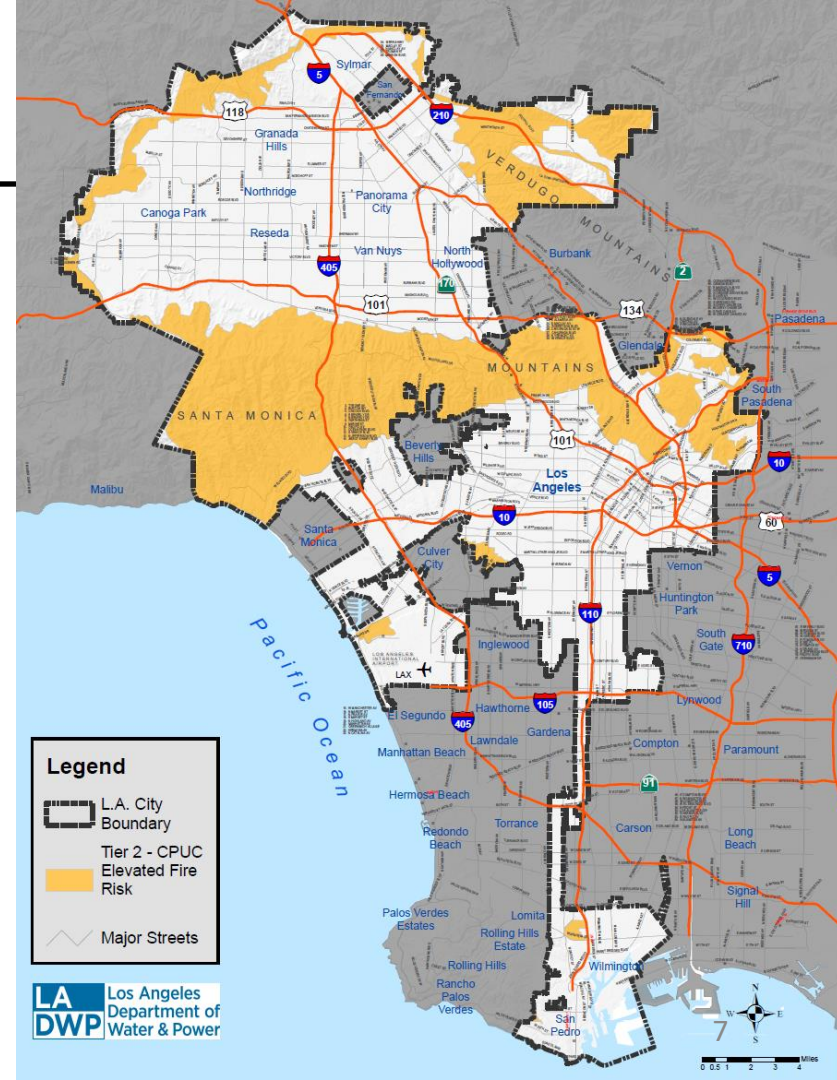
- CPUC Wildfire Threat Map
 - Tier 3 (Extreme Risk)



Background

High Fire Threat Districts – City of L.A.

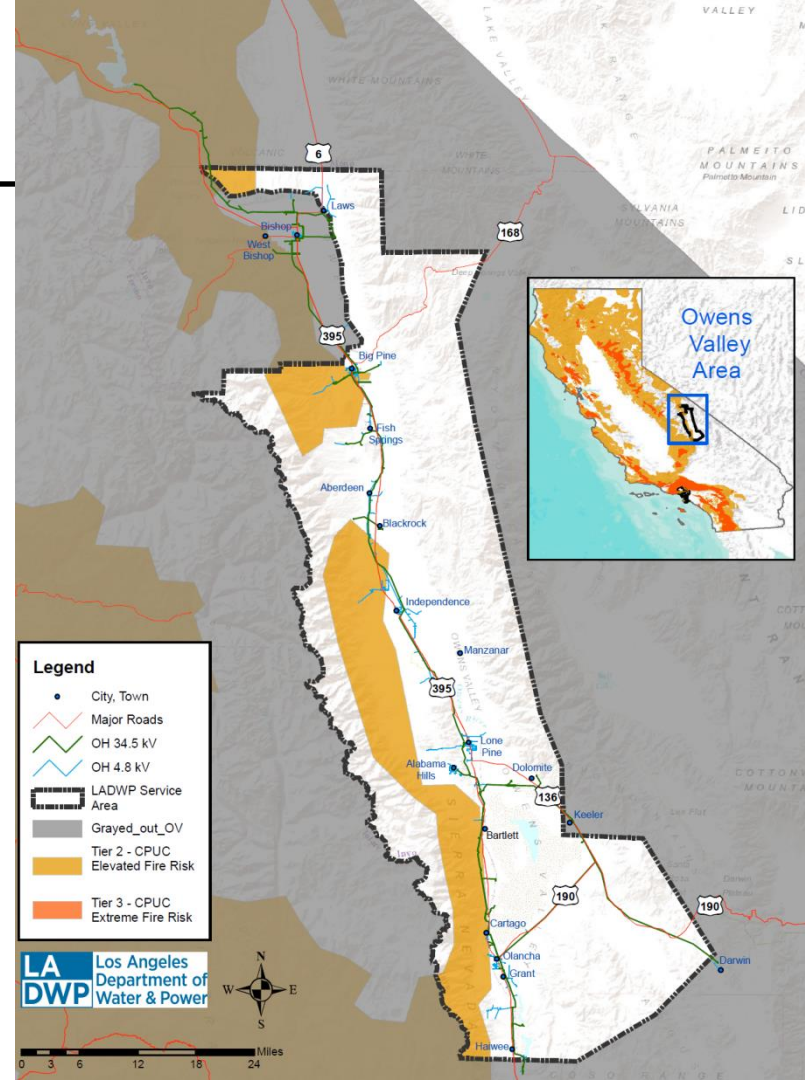
- CPUC Wildfire Threat Map
 - Tier 3 (Extreme Risk)
 - Tier 2 (Elevated Risk)



Background

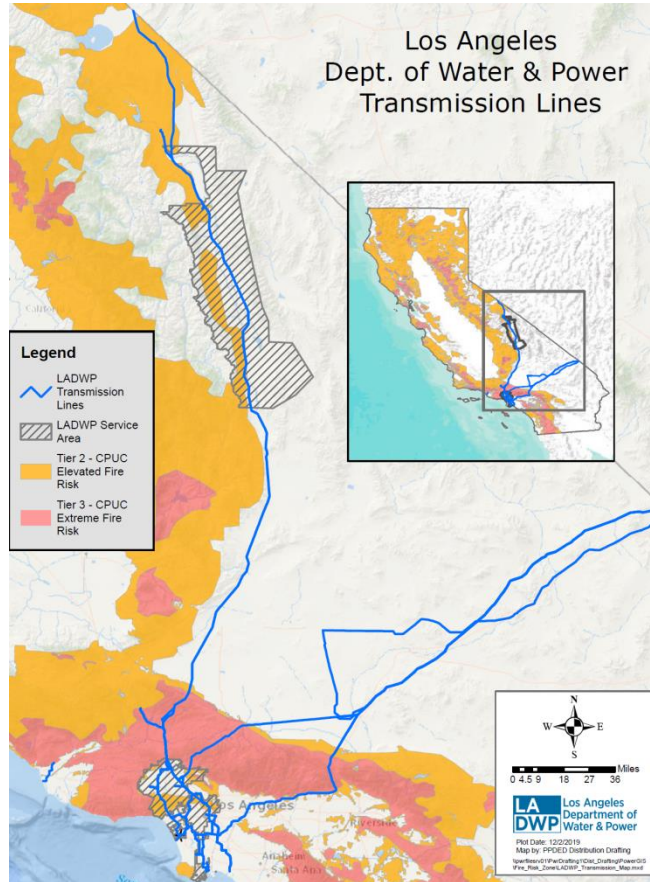
High Fire Threat Districts – Owens Valley

- Owens Valley (Tier 2 Only)



Background

High Fire Threat Districts – Transmission Lines



Objectives of the Plan

Objectives of the Plan

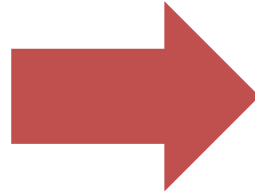
LADWP's Wildfire Mitigation Plan

- Develop a Wildfire Mitigation Plan consistent with state law
- Higher level of collaboration
 - LAFD and other local fire agencies
 - Water and Power Systems
 - Mutual Assistance
 - California Utilities Emergency Association
- Ensure public safety by minimizing sources of ignition
 - Focus on safety, prevention, mitigation, response, and recovery
 - Diminish the contribution of transmission/ distribution systems
- Intentional focus to minimize wildfire risks
 - Improving processes, leveraging partnerships, hardening the power system, and exploring innovative technologies

Wildfire Risk Drivers and Assessments

Risk Drivers

- **Human Activity**
- **High Wind Event**
- **Vegetation Contact**
- **Conductor Failure**
- **Conductor Slap**
- **Pole/Hardware Failure**
- **Aging Infrastructure**
- **Wildlife Contact**
- **Mylar Balloons**



Possible Consequences

- **Service Interruption**
- **Community Impact**
- **Property Damage**
- **Equipment Loss/Damage**
- **Cost of Insurance**
- **Injuries or Fatalities**

Wildfire Risk Drivers and Assessments

Assets in Wildfire Threat Zones

Assets Within the Owens Valley Service Territory

	Asset	CPUC Tier 3 (Extreme)	CPUC Tier 2 (Elevated)	LADWP Total
Distribution	Poles	NONE	2,348	308,366
			0.8%	
	Circuit Miles		102	7,252
			1.4%	
Transmission	Towers	NONE	251	15,452
			1.6%	
	Circuit Miles		52	4,716
			1.1%	

Wildfire Risk Drivers and Assessments

Assets in Wildfire Threat Zones

	Tier 2	Tier 3
% of Overhead Distribution Circuit Miles	14.1%	0.5%
% of Overhead Transmission Circuit Miles	5.4%	7.4%

Power System Reliability Program

Power System Reliability Program Overview

- Maintain a robust, reliable, and safe power system
- Rebuild the aging infrastructure
- Conduct proactive maintenance
- \$3.9 billion spent over the last 5 years
- Replace poles, crossarms, and distribution transformers
- Help reduce frequency and duration of system interruptions

Preventative Strategies and Programs

Design and
Infrastructure

Vegetation
Management

**Preventative
Strategies**

Operations and
Protocols

Inspection and
Maintenance

Preventative Strategies

Design and Infrastructure - Hardening the System

- Electrical equipment and facilities are designed and constructed to meet or exceed applicable federal, state, or industry standards
- Increased construction standards to reduce risk in high wind and fire hazard areas
 - Alternatives besides wooden poles
 - Using insulated conductors instead of bare
 - Reinforcing poles to sustain higher wind pressure

Preventative Strategies

Alternatives Pole Materials

Wood Pole



Steel Pole



Preventative Strategies

Increased Conductor Size

Standard



0.184"



Size: #6 Copper

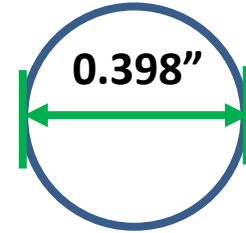
Conductor
Diameter



High Fire Risk Areas



0.398"

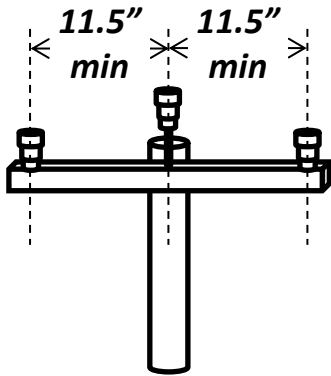


Size: 1/0 Aluminum

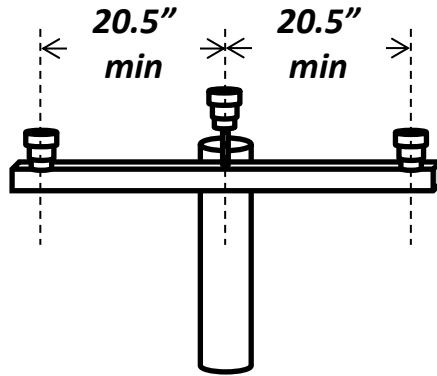
Preventative Strategies

Increased Conductor Spacing

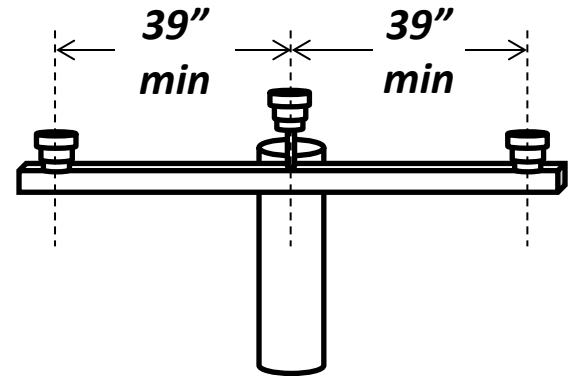
**State-Required
Minimum**



LADWP Standard



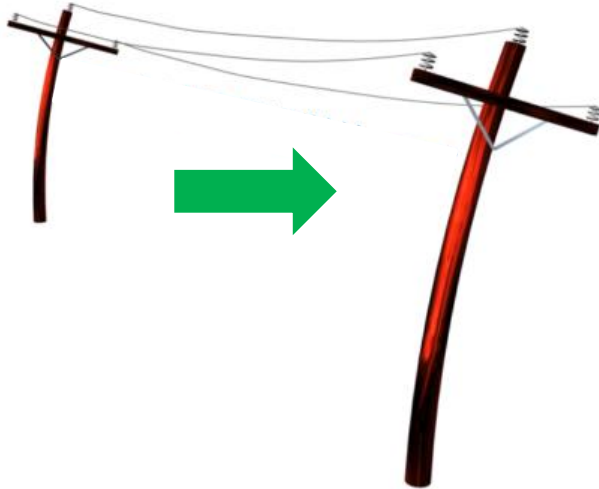
**LADWP Standard
in Fire Risk Areas**



Preventative Strategies Increased Wind Loading

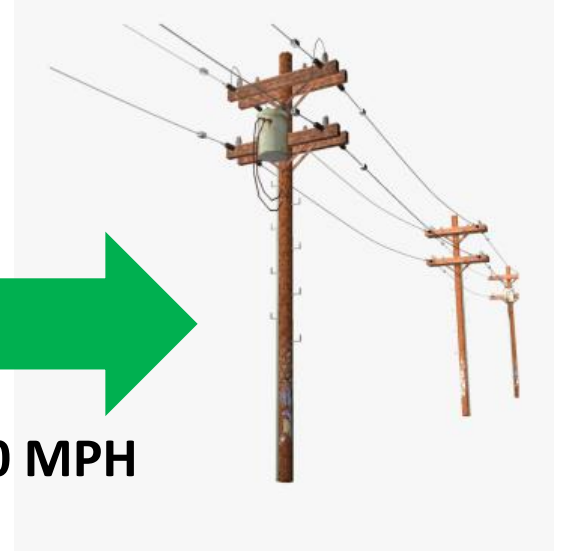
Standard

56 MPH



LADWP Minimum for High Fire Risk Areas

Up to 80 MPH



Preventative Strategies

Covered Conductors

Bare Conductor



Image by Proof Positive Copper Conductor

Covered Conductor

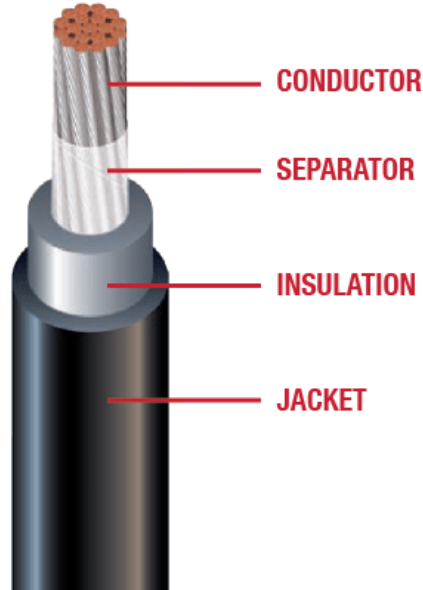


Image by Board Sales Supply Chain Solutions

**Recent Procurement
(6000 feet)**



Preventative Strategies

Vegetation Management

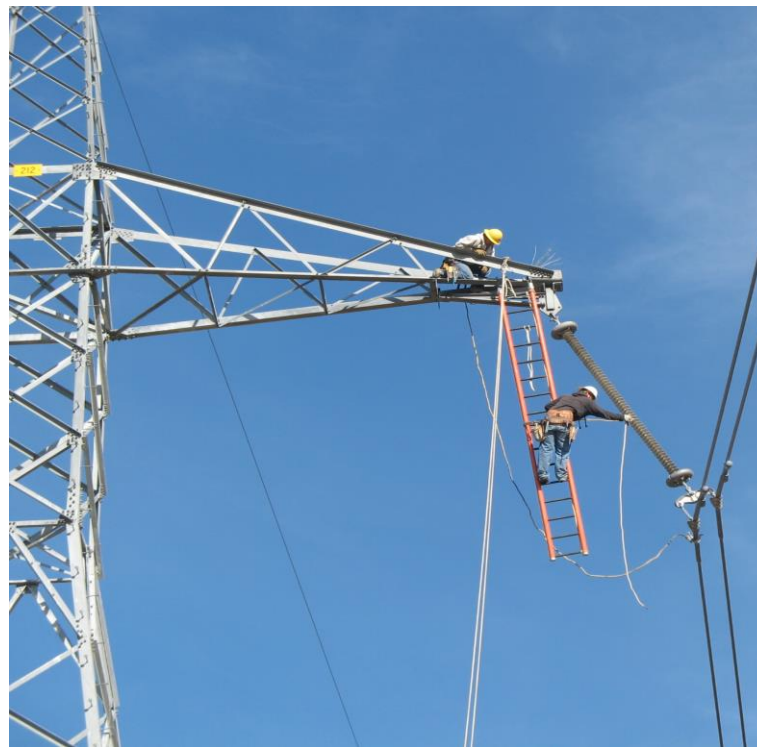
- Maintain database of 400,000+ trees
- Prune 185,000 trees per year
- Perform annual evaluation of every tree that may contact lines
- Inspect 100% of transmission and distribution lines per year
- Conduct extra mid-cycle inspection in high fire threat districts
- Remove dead trees which pose increased risk



Preventative Strategies

Inspection and Maintenance

- Patrol power distribution system annually
- Wildfire risk areas are patrolled pre-fire season
- Utilize various types of inspections
 - Patrol Inspections
 - Detailed Inspections
 - Pole Intrusive Inspections
 - Infrared Inspections
- Repair and maintenance work



Preventative Strategies

Operations and Protocols

- Utilize different operational protocols depending on conditions
 - Normal Operating Conditions
 - Red Flag Warning
- Recloser blocking/de-energization
 - Incident-based and condition-based

(Adverse impact on health and safety of customers outweighs perceived benefits of pre-emptive power shutoffs)

Operating Conditions

Normal

Red Flag

Preventative Strategies

Operations and Protocols

- Collaboration with local fire department and external agencies
- ALERTWildfire (network of fire cameras to enhance situational awareness)
- Weather stations and cameras
- Explore new emerging technologies



Performance Metrics

Performance Metrics

Incident Tracking Statistics

- Tracking of ALL Outages
 - Communities and districts
 - Potential causes - animals, balloons, vegetation, lightning, etc.
 - Repair and recovery status
- Power System Reliability Program (PSRP)
 - All PSRP activities in the Owens Valley
- Used data to measure the performance for future improvements of Plan

Looking Ahead

Looking Ahead

- Regular presentations to LADWP's Board of Commissioners
- Submittal to California Wildfire Safety Advisory Board
- Partnership with local universities
- Continue to explore new technologies and methods
- Monitor state level legislation and actions related to wildfire
- Continuous update – living document
- LADWP will continue to monitor, correct deficiencies, and improve upon the effectiveness of its Wildfire Mitigation Plan

The Siemens logo is displayed in white, uppercase letters on a teal rectangular background in the top left corner.

SIEMENS

The Advisian logo is in the top right corner, featuring the word "Advisian" in a large, bold, black sans-serif font, with "Worley Group" in a smaller font below it, all on a white background.

Advisian
Worley Group

A semi-transparent data visualization box titled "Grid Connected" is overlaid on the city scene. It contains several data points and a small line graph.

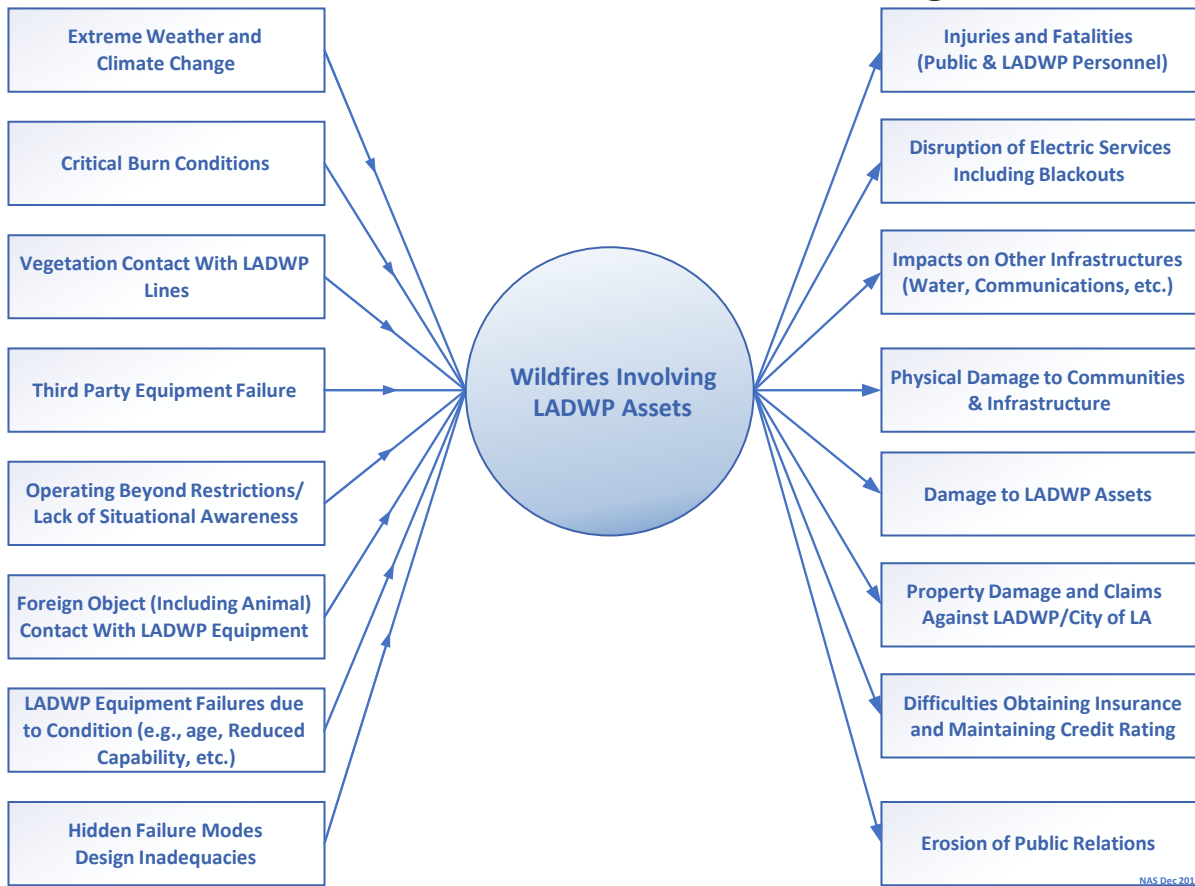
Grid Connected

Capacity	100 MW
Annual Grid Output	1.2 TWh
Grid Efficiency	95%

The main title of the report is located in the bottom left corner, written in a large, white, bold sans-serif font against the dark blue background of the city at night.

**Independent Contractor Review
of Wildfire Mitigation Plan**

LADWP Wildfire Mitigation Plan



Objectives

- ❑ Create a Wildfire Mitigation Plan that is consistent with the California SB 901 requirements and objectives.
- ❑ Minimize the probability the LADWP electric system might become the original or contributing source of ignition for wildfires.
- ❑ Implement a plan that embraces safety, prevention, mitigation, and fast recovery as central priority for LADWP's planning, operation and maintenance practices.

Independent Contractor Review of Wildfire Mitigation Plan

Consistency with PUC 8387

- ✓ Wildfire plan by 1/1/2020
- ✓ Responsibilities for execution
- ✓ Objectives of plan
- ✓ Preventive strategies and programs
- ✓ Metrics
- ✓ Communications
- ✓ Vegetation management
- ✓ Inspections
- ✓ Geographic mapping of risk areas
- ✓ Independent review

Recommended Enhancements

- Details of risk identification and potential consequences, risk drivers, and prioritization
- How plan was informed by historical wildfire performance
- Specific actions with assignments and targets to address risks
- Audit and continuous feedback to improve performance and lessons learned
- More specific wildfire metrics
- More specificity on protocols for disabling reclosers and deenergizing circuits
- Address transmission assets including: PDCI, IPPDC, and Victorville-Century; address substation and generation assets
- In general, greater specificity of actions, targets and accountabilities

LADWP Power Safety Contacts:

Power System:

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Daniel.barnes@ladwp.com

818-535-6948

Bernie Rogers

bernard.rogers2@ladwp.com

310-524-8766

William Arriolla

William.arriolla@ladwp.com

760-876-6010

Emergency Response PIO:

Joseph Ramallo

joseph.ramallo@ladwp.com

818-515-9327

Ellen Cheng

ellen.cheng@ladwp.com

626-716-4770; 213-798-8837

Questions?



County of Inyo



Public Works

CONSENT - ACTION REQUIRED

MEETING: March 3, 2020

FROM: Travis Dean

SUBJECT: Approval of Plans and Specifications for the Lone Pine Dog Park.

RECOMMENDED ACTION:

Request Board: A) approve the plans and specifications for the Lone Pine Dog Park Project; and B) authorize the Public Works Director to advertise and bid the Project contingent on LADWP's approval of the plans and specifications.

SUMMARY/JUSTIFICATION:

Inyo County currently leases the Park at the north end of Lone Pine, west of Highway 395, known as the Russell Spainhower Park (or Spainhower Park) from Los Angeles Department of Water and Power. At the north end of the Spainhower Park is an existing baseball field that is no longer used as a baseball field. Public Works, at the request of the Inyo County Parks and Recreation Department, has prepared plans and specifications for the construction of a Dog Park, as Lone Pine does not currently have a recreational area for pets.

BACKGROUND/HISTORY OF BOARD ACTIONS:

ALTERNATIVES AND CONSEQUENCES OF NEGATIVE ACTION:

The Board could choose not to approve the plans, specifications, and advertisement of the project. This is not recommended as currently there are no recreational areas for pets in the Lone Pine area.

OTHER AGENCY INVOLVEMENT:

The Public Works Department
Parks and Recreation
County Counsel
Auditor

FINANCING:

There is no fiscal impact from bidding the project. Once the successful bidder and price are identified staff will use funds appropriated in the Parks and Recreation budget to fund the project. If additional funds are required, staff will propose a budget amendment before a contract is awarded.

ATTACHMENTS:

1. LP DOG PARK PLANS
2. Lone Pine Dog Park Project Bid Package

APPROVALS:

Travis Dean	Created/Initiated - 2/11/2020
Darcy Ellis	Approved - 2/11/2020
Travis Dean	Approved - 2/11/2020
Leslie Chapman	Approved - 2/18/2020
Breanne Nelums	Approved - 2/18/2020
Marshall Rudolph	Approved - 2/27/2020
Amy Shepherd	Approved - 2/27/2020
Michael Errante	Final Approval - 2/27/2020

GENERAL NOTES

1. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF DISCREPANCIES BETWEEN THE INFORMATION SHOWN ON THESE DRAWINGS AND THE CONDITIONS EXISTING IN THE FIELD. THE CONTRACTOR SHALL COMPARE ALL DRAWINGS AND VERIFY THE FIGURES BEFORE LAYING OUT THE WORK AND WILL BE RESPONSIBLE FOR ANY ERRORS WHICH MIGHT HAVE BEEN AVOIDED THEREBY. IF THE CONTRACTOR FAILS TO NOTIFY THE ENGINEER IN A TIMELY MANNER OF ANY APPARENT ERROR OR OMISSION ON THE PLANS OR SPECIFICATIONS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECTING WORK INCORRECTLY DONE AT THE CONTRACTOR'S OWN EXPENSE.
2. PAYMENT FOR WORK SHOWN ON THESE PLANS EITHER SPECIFIED OR INFERRED, BUT NOT IN THE BID PROPOSAL SHALL BE CONSIDERED AS INCLUDED IN OTHER ITEMS OF WORK.
3. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THESE PLANS AND SPECIFICATIONS, THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION STANDARDS, THE 2003 INTERNATIONAL BUILDING CODE (IBC), CALIFORNIA BUILDING CODE (CBC), THE UNIFORM BUILDING CODE (UBC), THE UNIFORM FIRE CODE (UFC), AND OTHER GOVERNING REGULATIONS.
4. ALL CONSTRUCTION WILL BE SUBJECT TO FINAL APPROVAL BY THE INYO COUNTY PUBLIC WORKS DEPARTMENT.
5. INSPECTION AND DURING CONSTRUCTION SHALL BE REQUIRED TO ENSURE CONSTRUCTION MATERIALS AND METHODS ARE IN ACCORDANCE WITH THE INYO COUNTY PUBLIC WORKS STANDARD SPECIFICATIONS AND THESE PLANS.
6. THE PROJECT SHALL BE BUILT PER PLAN. ALL FIELD CHANGES MUST BE PRE-APPROVED BY THE INYO COUNTY ENGINEER.
7. ALL WATER PIPE AND APPURTENANCES INSTALLED BY THE CONTRACTOR OR OTHERWISE PROVIDED BY THEM SHALL BE NSF 61 AND NSF-372 APPROVED, UL/FM APPROVED AS AVAILABLE, CAPABLE OF 150 PSI WORKING PRESSURE EXCEPT FOR THE WOODFORD IOWA YARD HYDRANTS (125 PSI WORKING PRESSURE), AND BE CHLORINATED DURING INSTALLATION AND FLUSHED & BACTERIOLOGICAL TESTED FOR TOTAL COLIFORM AND FECAL COLIFORM BY A LABORATORY CERTIFIED BY THE STATE TO PERFORM SUCH ANALYSIS.
8. ANY PART OF THE WORK WHICH IS NOT MENTIONED IN THE SPECIFICATIONS BUT IS SHOWN ON THE PLANS, OR ANY PART NOT SHOWN ON THE PLANS BUT DESCRIBED IN THE SPECIFICATIONS, BUT IS NECESSARY OR NORMALLY REQUIRED AS A PART OF SUCH WORK, OR IS NECESSARY OR REQUIRED TO MAKE EACH INSTALLATION SATISFACTORILY AND LEGALLY OPERABLE, SHALL BE PERFORMED BY THE CONTRACTOR AS INCIDENTAL WORK WITHOUT EXTRA COST TO THE COUNTY, AS IF FULLY DESCRIBED IN THE SPECIFICATIONS AND SHOWN ON THE PLANS, AND THE EXPENSE THEREOF SHALL BE INCLUDED IN THE PRICE BID.
9. IN ACCORDANCE WITH THE GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR THE CONDITIONS OF THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. THE DUTIES OF THE PROJECT ENGINEER DO NOT INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY IN, ON OR NEAR THE CONSTRUCTION SITE.
10. PROJECT LOCATION: 445 N. MAIN STREET, LONE PINE, CA 93545



COUNTY OF INYO
DEPARTMENT OF PUBLIC WORKS

**PLANS FOR THE
LONE PINE DOG PARK**

PROJECT NO. RR 19-012
TO BE SUPPLEMENTED BY CALTRANS 2010 STANDARD
PLANS AND SPECIFICATIONS AND ALL ISSUED REVISIONS

INDEX OF SHEETS

1. TITLE AND LOCATION MAP
2. SITE PLAN
3. IRRIGATION PLAN
4. DETAILS
5. DETAILS
6. DETAILS
7. DETAILS

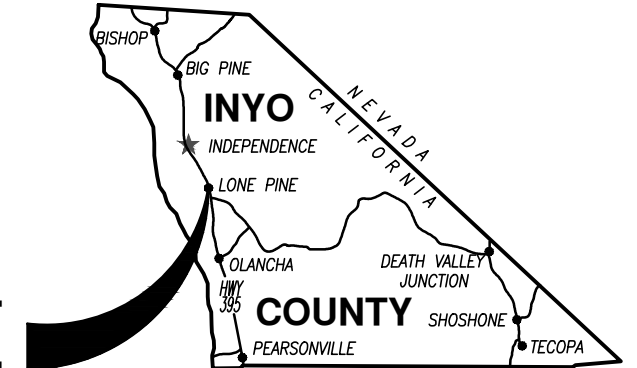
**PROJECT
LOCATION**



VICINITY MAP
SCALE: NONE



**PROJECT
LOCATION**



LOCATION MAP



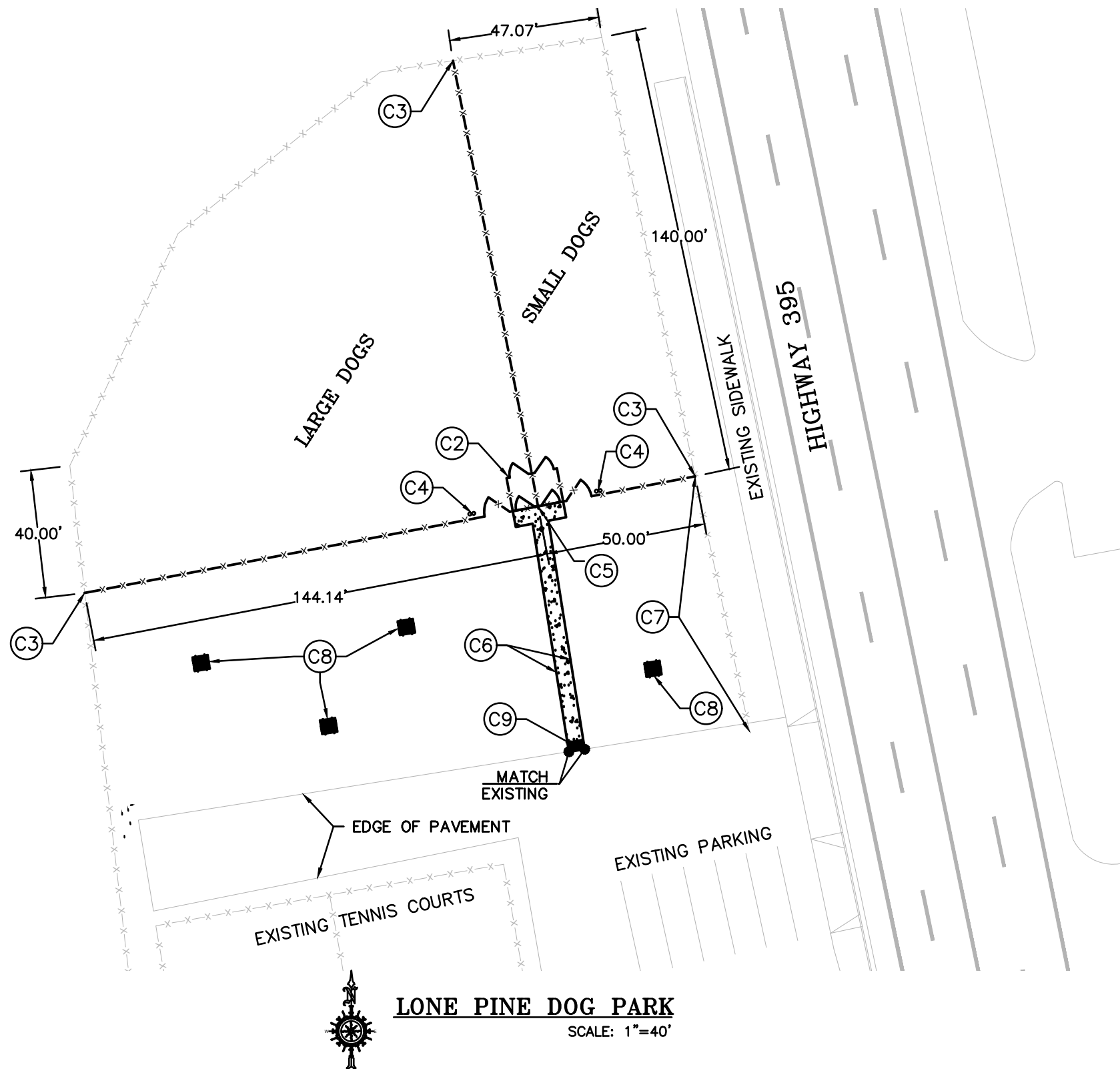
MICHAEL ERRANTE, DIRECTOR
INYO COUNTY PUBLIC WORKS

DATE

Drawing Prepared by:
INYO COUNTY PUBLIC WORKS
168 N. Edwards, P.O. Drawer Q
Independence, CA 93526
(760) 878-0201

LONE PINE DOG PARK
LONE PINE, CA

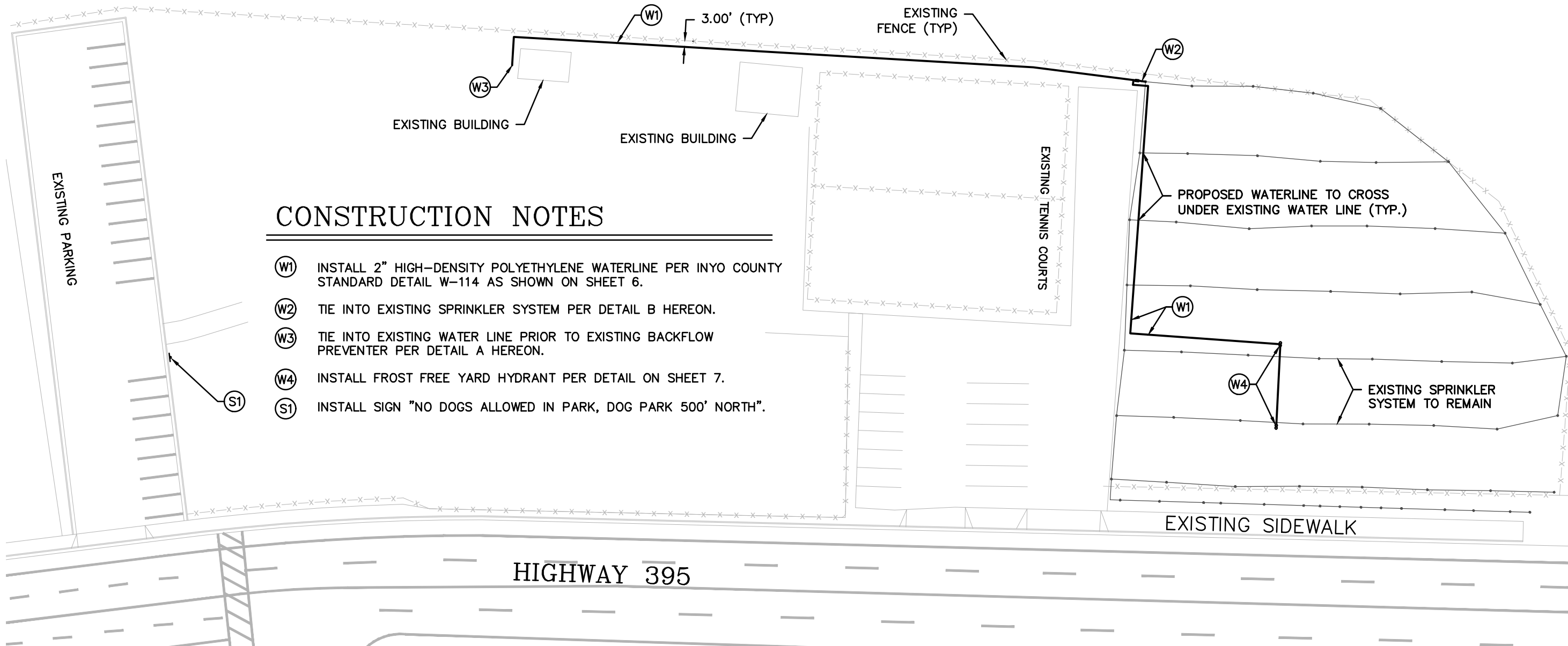
Drawn by: T. DEAN	Date: 1/20	Checked By: M. ERRANTE	Date: 1/20	Date: JANUARY 2020	Drawing Name: LP_DOG PARK.dwg	SHEET 1 OF 7
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CONSTRUCTION NOTES

- (C1) CONSTRUCT 6' HIGH, 11 GAUGE, CHAIN LINK FENCE PER CALTRANS RSP A85. 3" DIAMETER POSTS SHALL BE USED FOR THE TYPICAL MEMBER SECTION AND 4" DIAMETER POSTS SHALL BE USED AT CORNERS. GATE POSTS SHALL BE 4.5" IN DIAMETER.
- (C2) INSTALL GATES PER CALTRANS RSP A85. DETAILS SHOWN ON SHEET 4 AND SHEET 5.
- (C3) TIE PROPOSED FENCE INTO EXISTING CHAIN LINK FENCE.
- (C4) INSTALL FROST FREE YARD HYDRANT. (SHOWN ON THIS PAGE FOR REFERENCE)
- (C5) ADHERE SIGNS TO FENCE PER DETAIL ON SHEET 6.
- (C6) CONCRETE WALKWAY PER DETAIL ON SHEET 5.
- (C7) REMOVE FENCE.
- (C8) PLACE NEW PICNIC BENCH.
- (C9) INSTALL DETECTABLE SURFACE PER INYO COUNTY STANDARD DETAIL AS SHOWN ON SHEET 4.

Drawing Prepared by: INYO COUNTY PUBLIC WORKS 168 N. Edwards, P.O. Drawer Q Independence, CA 93526 (760) 878-0201				LONE PINE DOG PARK LONE PINE, CA		
Drawn by: T. DEAN	Date: 1/20	Checked By: M. ERRANTE	Date: 1/20	Date: JANUARY 2020	Drawing Name: LP_DOG PARK.dwg	SHEET 2 OF 7

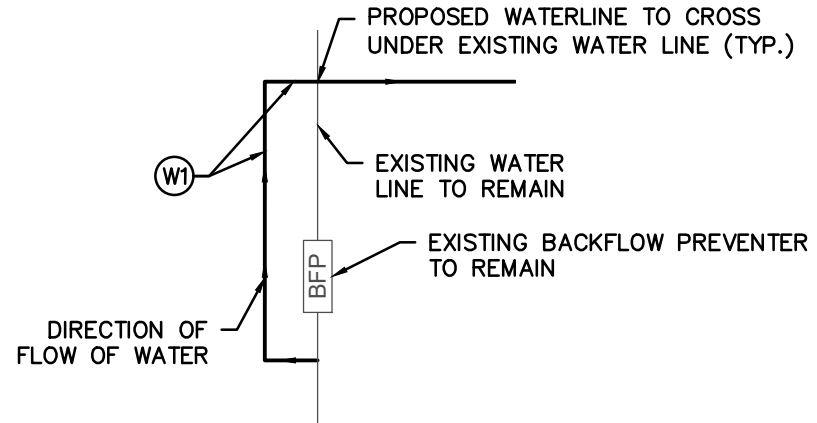


CONSTRUCTION NOTES

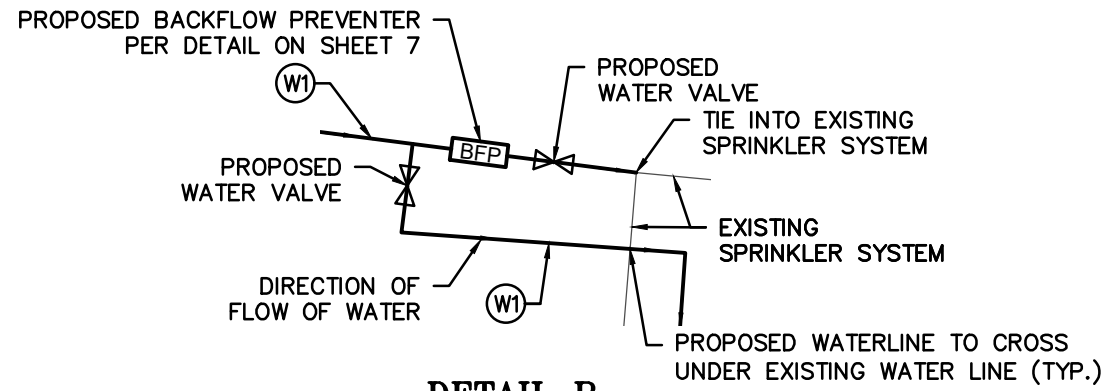
- Ⓜ1 INSTALL 2" HIGH-DENSITY POLYETHYLENE WATERLINE PER INYO COUNTY STANDARD DETAIL W-114 AS SHOWN ON SHEET 6.
- Ⓜ2 TIE INTO EXISTING SPRINKLER SYSTEM PER DETAIL B HEREON.
- Ⓜ3 TIE INTO EXISTING WATER LINE PRIOR TO EXISTING BACKFLOW PREVENTER PER DETAIL A HEREON.
- Ⓜ4 INSTALL FROST FREE YARD HYDRANT PER DETAIL ON SHEET 7.
- Ⓢ1 INSTALL SIGN "NO DOGS ALLOWED IN PARK, DOG PARK 500' NORTH".



LONE PINE DOG PARK
SCALE: 1"=50'



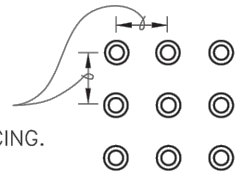
DETAIL A
N.T.S.



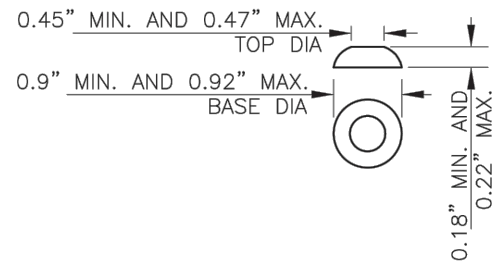
DETAIL B
N.T.S.

Drawing Prepared by: INYO COUNTY PUBLIC WORKS 168 N. Edwards, P.O. Drawer Q Independence, CA 93526 (760) 878-0201		LONE PINE DOG PARK LONE PINE, CA	
Drawn by: T. DEAN	Date: 1/20	Checked By: M. ERRANTE	Date: 1/20
Date: JANUARY 2020		Drawing Name: LP_DOG PARK.dwg	SHEET 3 OF 7

2.3" MIN. AND 2.4" MAX.
CENTER TO CENTER SPACING.



RAISED TRUNCATED DOME PATTERN (IN-LINE)
DETECTABLE WARNING SURFACE



RAISED TRUNCATED DOME

NOTES:

- CURB RAMPS SHALL HAVE A DETECTABLE WARNING SURFACE THAT EXTENDS THE FULL WIDTH AND 3'-0" DEPTH OF THE RAMP. A 4'-0" WIDE DETECTABLE WARNING SURFACE MAY BE USED ON A 4'-2" WIDE CURB RAMP. DETECTABLE WARNING SURFACES SHALL CONFORM TO THE REQUIREMENTS IN THE STANDARD SPECIFICATIONS.
- THE EDGE OF THE DETECTABLE WARNING SURFACE NEAREST THE STREET SHALL BE BETWEEN 6" AND 8" FROM THE GUTTER FLOWLINE.
- DETECTABLE WARNING SURFACE MAY HAVE TO BE CUT TO ALLOW REMOVAL OF UTILITY COVERS WHILE MAINTAINING FULL DETECTABLE WIDTH AND DEPTH.

INYO COUNTY PUBLIC WORKS DEPT.

DATE: SEPT 2015

DRAWN BY: TD

APPROVED BY: JA

Clint Quilter
CLINT QUILTER - Director

DETECTABLE SURFACE DETAIL

A-131

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GATE POST

FENCE HEIGHT (Max)	SLATED	B (in)	L (ft)	SECTION	ROUND OD PIPE	WEIGHT (lb/ft)
5'-0"	NO	12"	2'-6"	3 Std	3.50"	7.58
6'-0"	NO	12"	2'-6"	3 Std	3.50"	7.58
8'-0"	NO	12"	3'-0"	3 Std	3.50"	7.58
10'-0"	NO	14"	3'-6"	3 Std	3.50"	7.58
5'-0"	YES	12"	3'-0"	3 1/2 Std	4.00"	9.12
6'-0"	YES	14"	3'-6"	4 Std	4.50"	10.80
8'-0"	YES	18"	3'-6"	5 Std	5.56"	14.60
10'-0"	YES	20"	4'-0"	6 Std	6.63"	19.00

Above post dimensions and weights are minimums. Larger sizes may be used upon approval. Maximum Gate Width is 24'-0".

TYPICAL MEMBER DIMENSIONS (See Notes)

FENCE HEIGHT (Max)	SLATED	B (in)	L (ft)	LINE POSTS				BRACES					
				ROUND PIPE		ROLL FORMED		ROUND PIPE		ROLL FORMED			
				SECTION	ROUND OD PIPE	WEIGHT (lb/ft)	SECTION	WEIGHT (lb/ft)	SECTION	WEIGHT (lb/ft)			
5'-0"	NO	8"	2'-6"	1 1/2 Std	1.90"	2.72	1.875" x 1.625"	1.85	1 1/2 Std	1.90"	2.72	1.625" x 1.250"	1.35
6'-0"	NO	10"	2'-6"	2 Std	2.38"	3.66	1.875" x 1.625"	2.40	2 Std	2.38"	3.66	1.625" x 1.250"	1.35
8'-0"	NO	12"	3'-0"	2 1/2 Std	2.88"	5.80	3.250" x 2.500"	4.50	2 Std	2.38"	3.66	1.625" x 1.250"	1.35
10'-0"	NO	14"	3'-6"	3 Std	3.50"	7.58	3.250" x 2.500"	4.50	2 1/2 Std	2.88"	5.80	1.625" x 1.250"	1.35
5'-0"	YES	12"	3'-0"	3 1/2 Std	4.00"	9.12	N/A	N/A	2 Std	2.38"	3.66	N/A	N/A
6'-0"	YES	14"	3'-6"	4 Std	4.50"	10.80	N/A	N/A	2 Std	2.38"	3.66	N/A	N/A
8'-0"	YES	18"	3'-6"	5 Std	5.56"	14.60	N/A	N/A	2 Std	2.38"	3.66	N/A	N/A
10'-0"	YES	20"	4'-0"	6 Std	6.63"	19.00	N/A	N/A	2 1/2 Std	2.88"	5.80	N/A	N/A

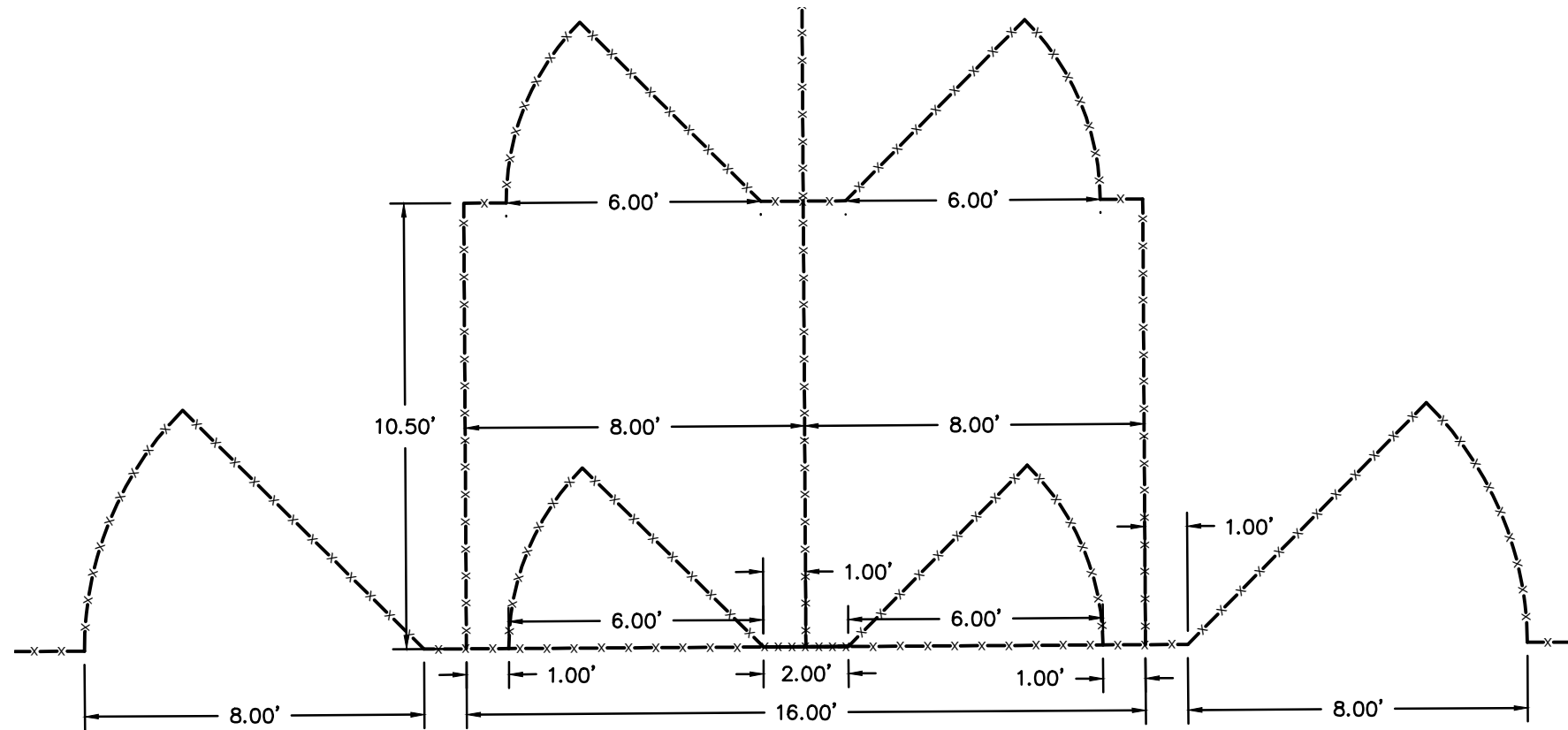
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
CHAIN LINK FENCE
NO SCALE
RSP A85 DATED JANUARY 20, 2017 SUPERSEDES RSP A85 DATED JULY 15, 2016 AND RSP A85 DATED JULY 18, 2014 AND STANDARD PLAN A85 DATED MAY 20, 2011 - PAGE 112 OF THE STANDARD PLANS BOOK DATED 2010.
REVISED STANDARD PLAN RSP A85

2010 REVISED STANDARD PLAN RSP A85

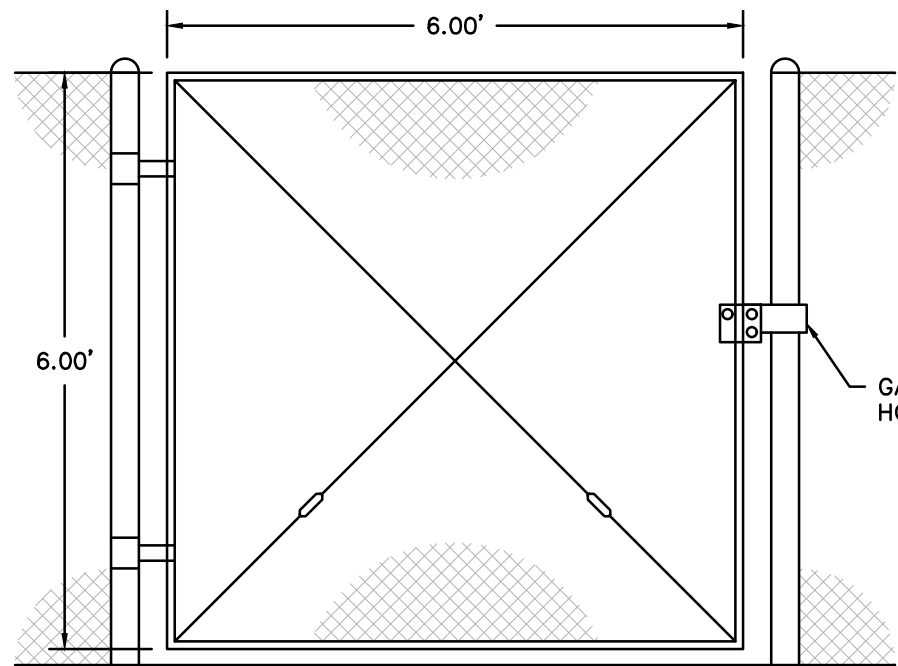
Drawing Prepared by:
INYO COUNTY PUBLIC WORKS
168 N. Edwards, P.O. Drawer Q
Independence, CA 93526
(760) 878-0201

LONE PINE DOG PARK
LONE PINE, CA

Drawn by: T. DEAN	Date: 1/20	Checked By: M. ERRANTE	Date: 1/20	Date: JANUARY 2020	Drawing Name: LP_DOG PARK.dwg	SHEET 4 OF 7
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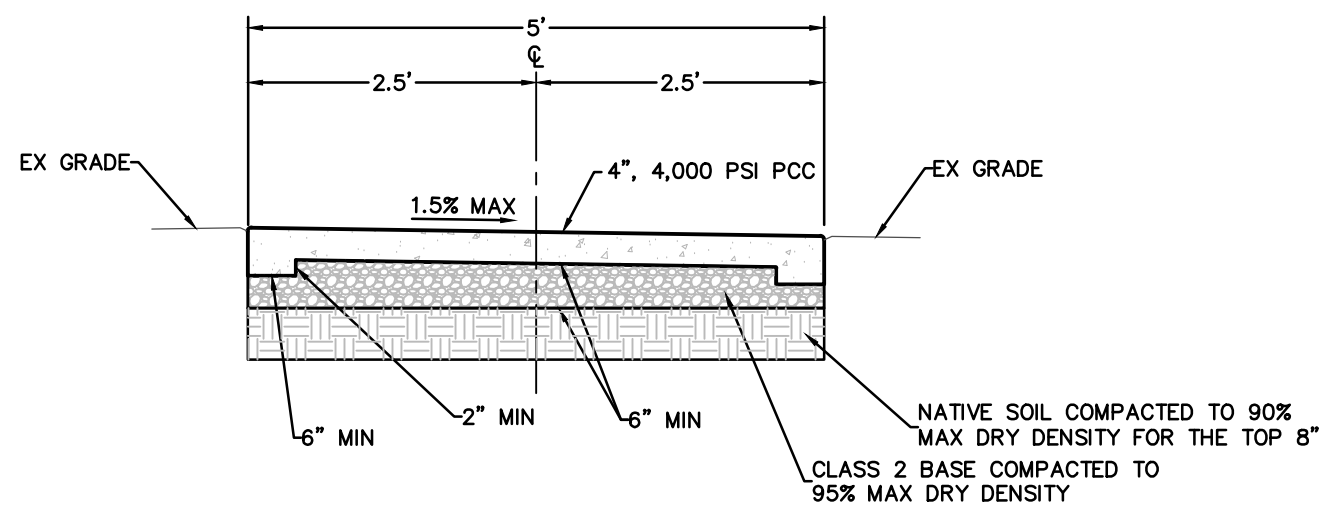


ENTRANCE DETAIL
SCALE: 1"=4'



6' GATE DETAIL
SCALE: 1"=2'

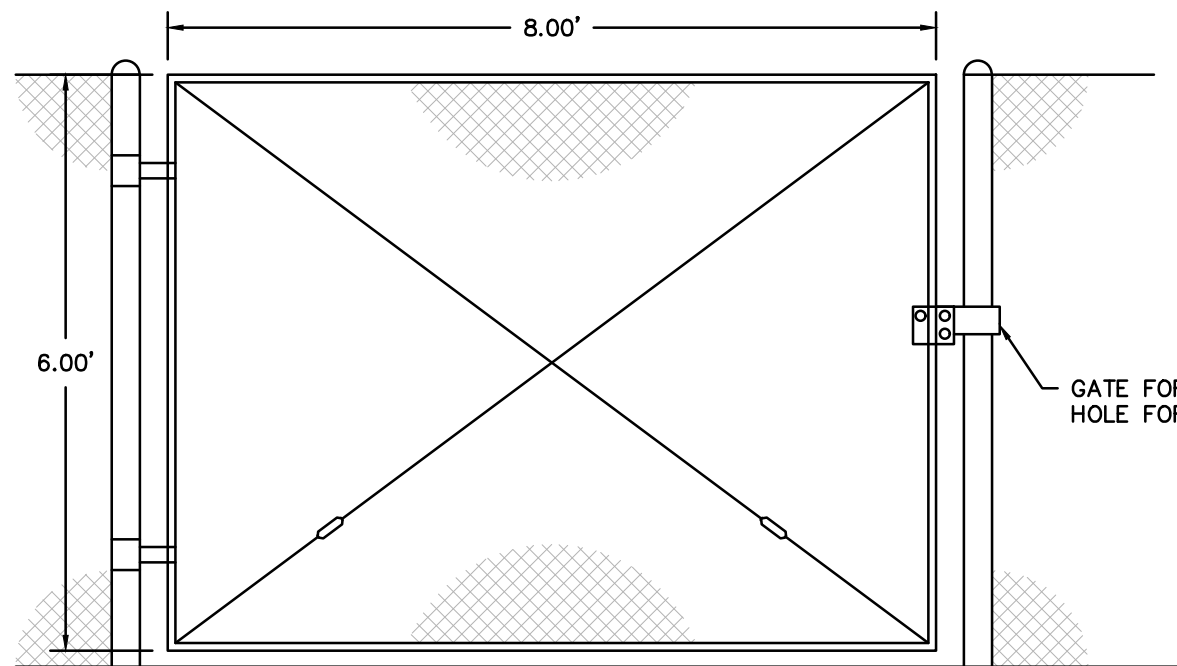
NOTE: "LARGE DOG/SMALL DOG AREA" SIGN TO BE POSTED ON EXTERIOR GATE 6' GATES



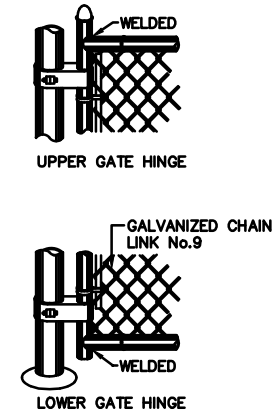
SIDEWALK DETAIL
NOT TO SCALE

NOTES:

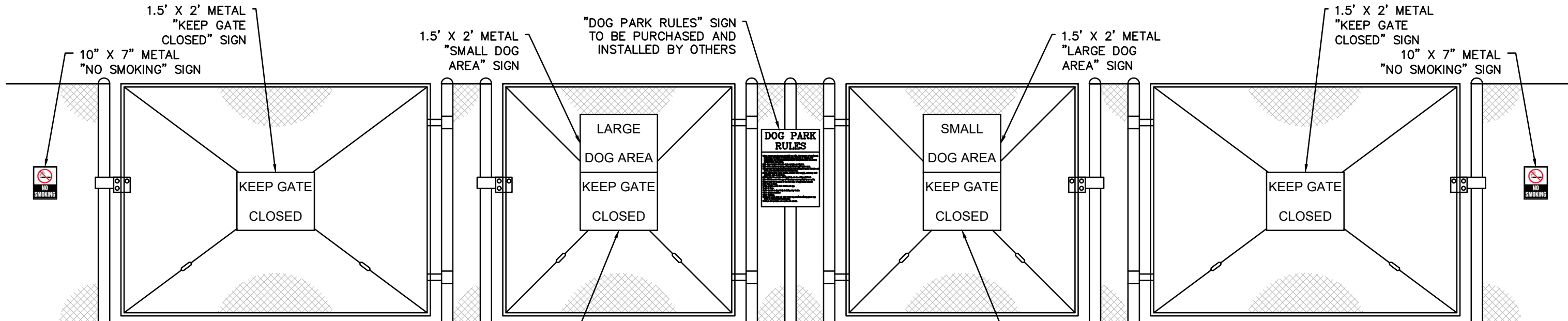
1. INSERT 1/4" CRACK CONTROL JOINT EVERY 10'.
2. INSERT 3/4" EXPANSION JOINT EVERY 20'.
3. CONCRETE SHALL BE 4,000 PSI MIN.
4. MIN 6" CLASS 2 BASE COMPACTED TO 95% MAX DRY DENSITY UNDER PCC PATH.
5. NATIVE SOIL BENEATH PATH SHALL BE COMPACTED TO 90% MAX DRY DENSITY FOR THE TOP 8"



8' GATE DETAIL
SCALE: 1"=2'

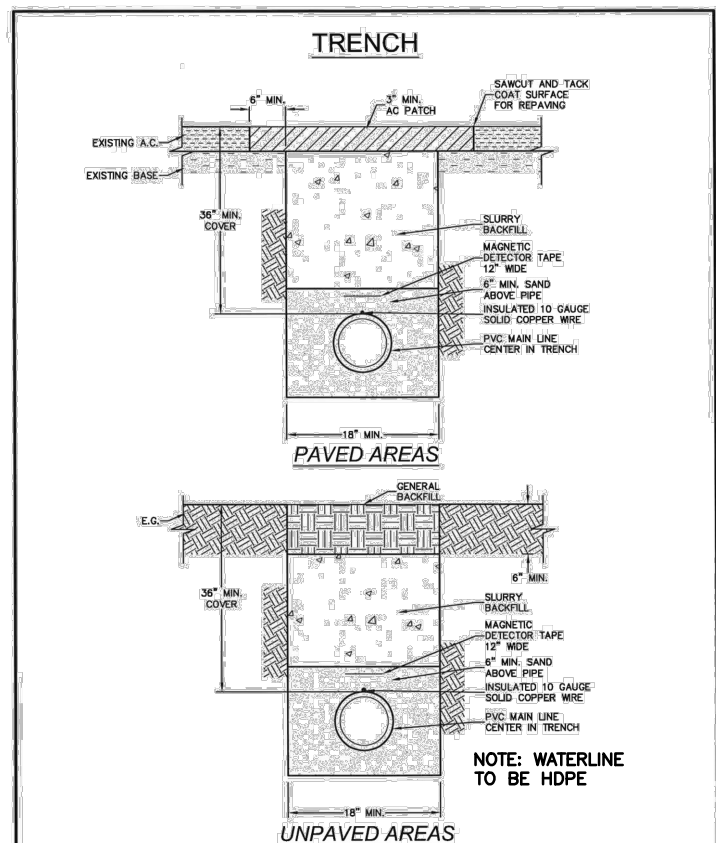


Drawing Prepared by: INYO COUNTY PUBLIC WORKS 168 N. Edwards, P.O. Drawer Q Independence, CA 93526 (760) 878-0201		LONE PINE DOG PARK LONE PINE, CA	
Drawn by: T. DEAN	Date: 1/20	Checked By: M. ERRANTE	Date: 1/20
Date: JANUARY 2020	Drawing Name: LP_DOG PARK.dwg	SHEET 5 OF 7	



1.5' X 2' METAL "KEEP GATE CLOSED" SIGN
 1.5' X 2' METAL "KEEP GATE CLOSED" SIGN
 1.5' X 2' METAL "KEEP GATE CLOSED" SIGN

SIGNS DETAIL
 NOT TO SCALE



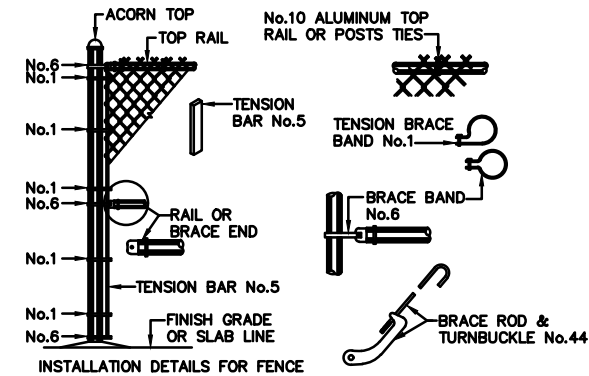
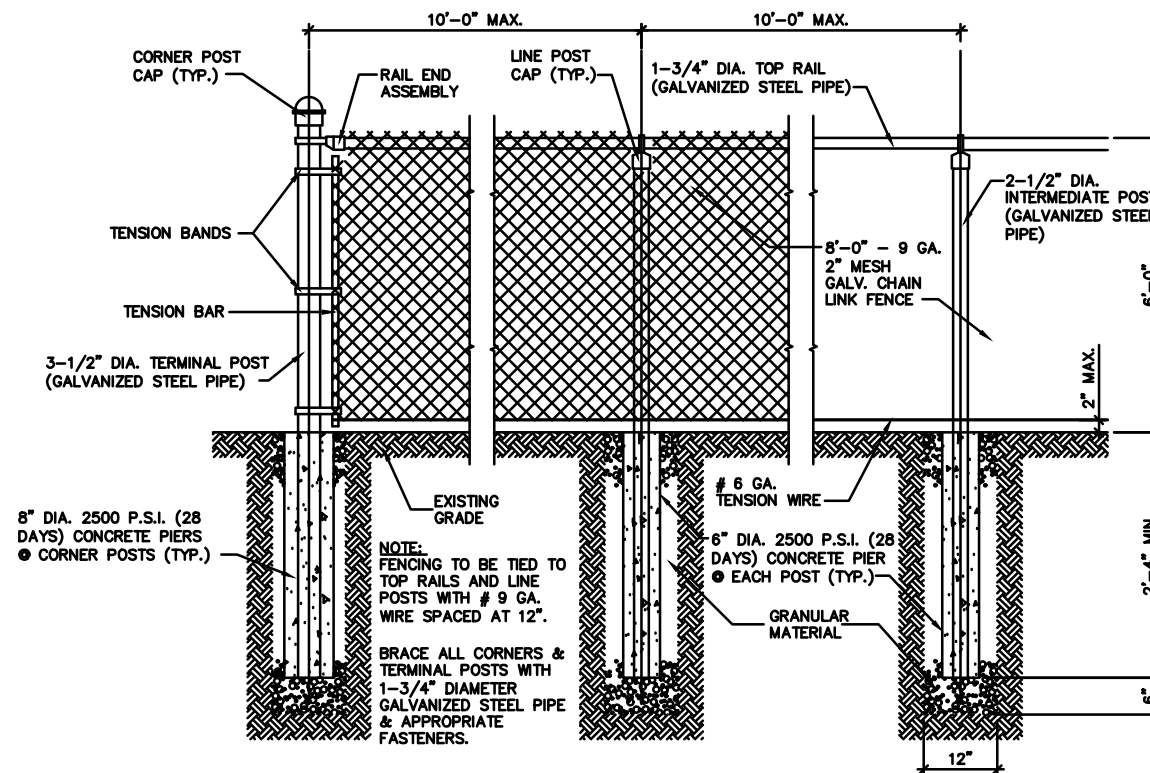
NOTE: WATERLINE TO BE HDPE

NOTES:
 1. AFFIX SOLID COPPER WIRE WITH TYE-WRAPPS EVERY 60FT ON ALL UNDERGROUND PIPING, SERVICE LATERALS, ETC. TEST ALL WIRE JUNCTIONS FOR CONTINUITY PER STD. W-117.

INYO COUNTY PUBLIC WORKS DEPT.
 DATE: SEPT 2015
 DRAWN BY: TO
 APPROVED BY: JA CLINT QUILTER - Director

TRENCH DETAIL

W-114

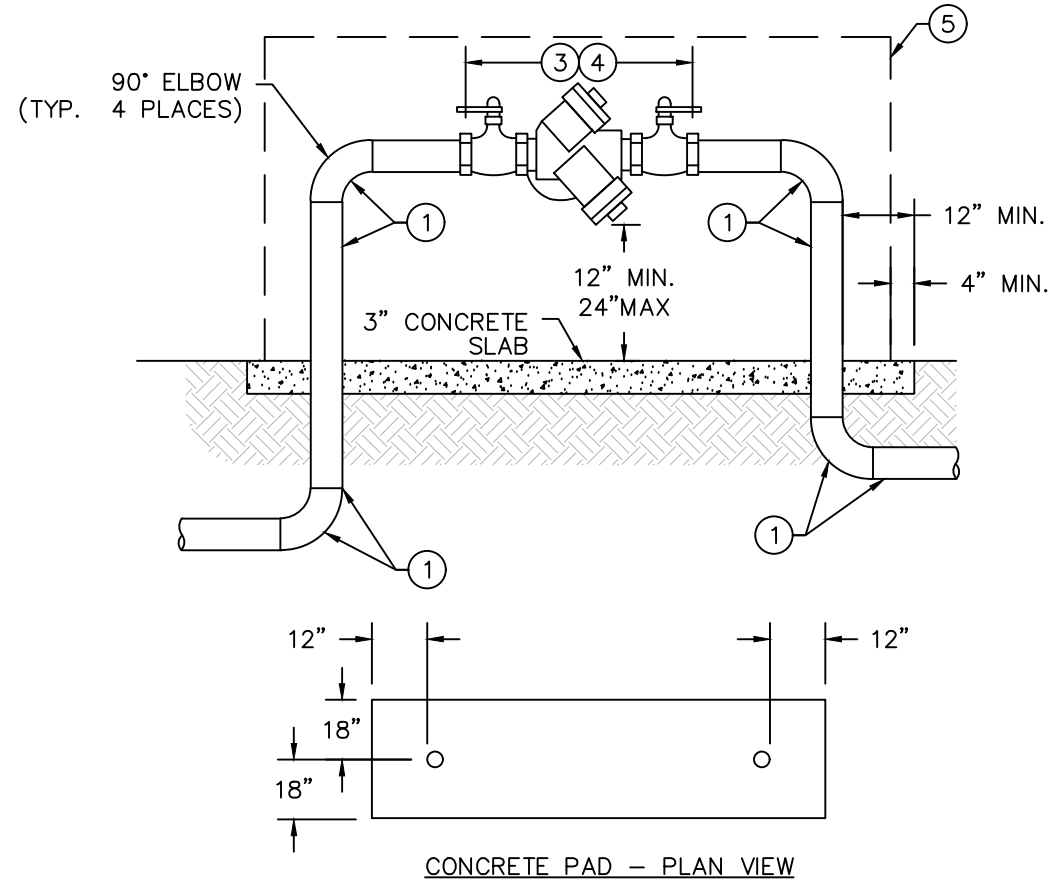


Drawing Prepared by:
 INYO COUNTY PUBLIC WORKS
 168 N. Edwards, P.O. Drawer Q
 Independence, CA 93526
 (760) 878-0201

LONE PINE DOG PARK
 LONE PINE, CA

Drawn by: T. DEAN	Date: 1/20	Checked By: M. ERRANTE	Date: 1/20	Date: JANUARY 2020	Drawing Name: LP_DOG PARK.dwg	SHEET 6 OF 7
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ASSEMBLY PAINTED WITH PRIMER AND TWO COATS OF RAL 6009 FIR GREEN

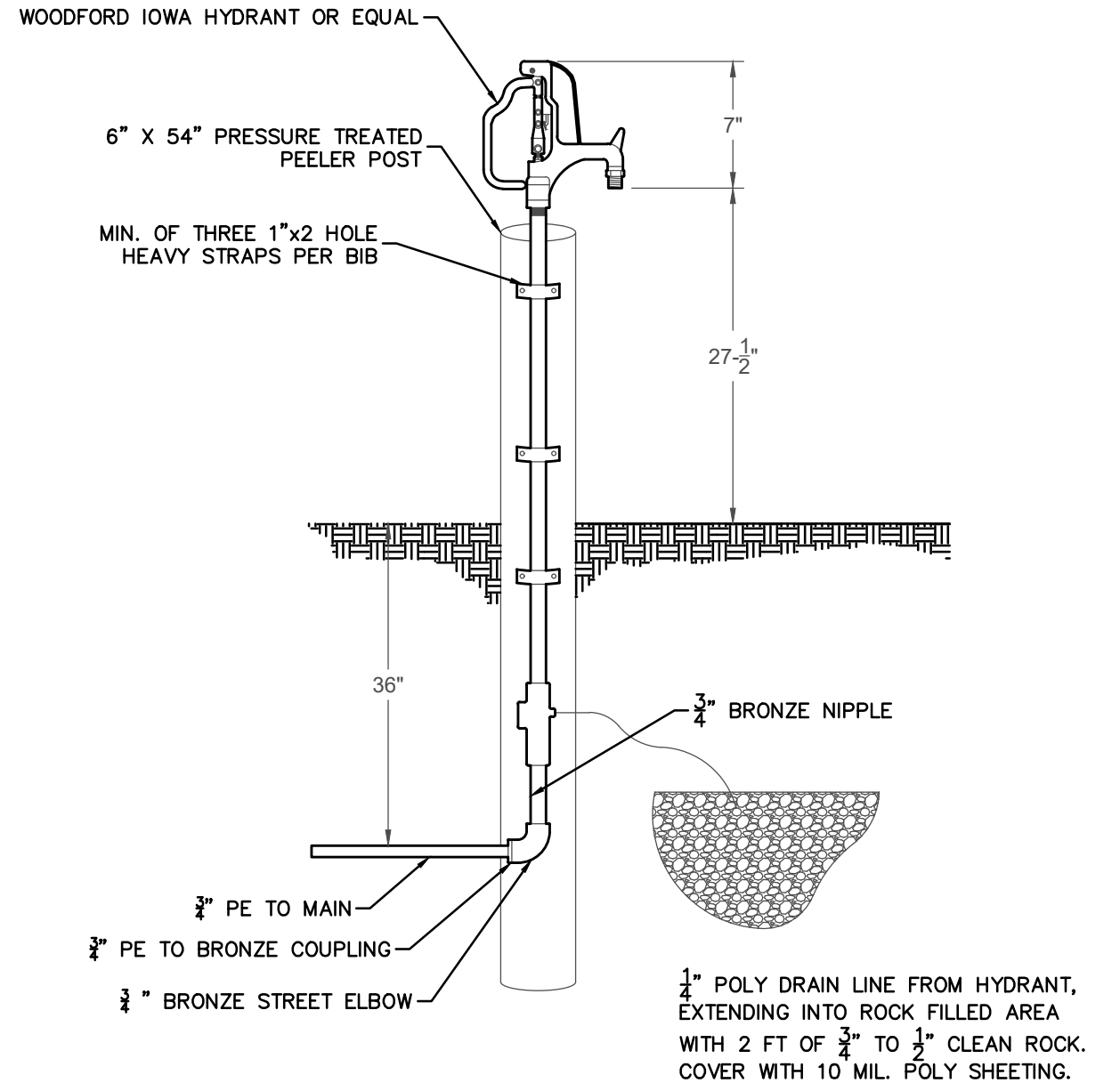


NOTES:

- ① ALL PIPE AND FITTINGS SHALL BE BRASS/BRONZE.
- ② NO CONNECTION SHALL BE INSTALLED BETWEEN THE "POINT OF CONNECTION" AND THE BACKFLOW ASSEMBLY.
- ③ ASSEMBLY SHALL BE ON THE LATEST U.S.C. F.C.C.C. & H.R. INSTITUTE LIST AND COMPLY WITH STATE WATER RESOURCES CONTROL BOARD.
- ④ BACKFLOW ASSEMBLY SHALL BE INSTALLED HORIZONTAL AND LEVEL, UNLESS ALTERNATIVE ORIENTATION APPROVED BY U.S.C. F.C.C.C. & H.R. AND THE STATE WATER RESOURCES CONTROL BOARD.
- ⑤ STRONG BOX VANDAL RESISTANT ENCLOSURE, SIZE AS NECESSARY. PAINTED BY THE MANUFACTURER RAL 6009 FIR GREEN.

BACKFLOW PREVENTER INSTALLATION DETAIL

NOT TO SCALE



FROST FREE YARD HYDRANT DETAIL

NOT TO SCALE

Drawing Prepared by: INYO COUNTY PUBLIC WORKS 168 N. Edwards, P.O. Drawer Q Independence, CA 93526 (760) 878-0201		LONE PINE DOG PARK LONE PINE, CA	
Drawn by: T. DEAN	Date: 1/20	Checked By: M. ERRANTE	Date: 1/20
Date: JANUARY 2020		Drawing Name: LP_DOG PARK.dwg	SHEET 7 OF 7

BID PACKAGE AND SPECIAL PROVISIONS



FOR CONSTRUCTION OF

LONE PINE DOG PARK PROJECT

Project No. RR 19-012

**FOR USE IN CONNECTION WITH INYO COUNTY
STANDARD SPECIFICATIONS, DATED OCTOBER 2015,
GENERAL PREVAILING WAGE RATES IN EFFECT
ON THE DATE THE WORK IS ACCOMPLISHED**

January 2020

Prepared By: Inyo County Public Works

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Public Contract Code Section 10162 Questionnaire
Public Contract Code Section 10232 Statement
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Small Business Enterprise Commitment (Construction Contracts)
Small Business Enterprise Final Report of Utilization of Small Business Enterprise

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Contract
Faithful Performance Bond
Labor and Materials Bond

SPECIAL PROVISIONS

PLANS

**NOTICE
INVITING BIDS
FOR**

LONE PINE DOG PARK PROJECT
Lone Pine, CA

COUNTY OF INYO
DEPARTMENT OF PUBLIC WORKS
NOTICE INVITING BIDS

The Inyo County Public Works Department is soliciting bids for:

LONE PINE DOG PARK PROJECT

Bid Packages, which include the Notice Inviting Bids, Bid Proposal Forms, Contract and Bond Forms, Special Provisions, and Plans, may only be obtained from the Inyo County (County) Public Works Department (Department) at 168 North Edwards, P. O. Drawer Q, Independence, CA 93526, telephone (760) 878-0201. A non-refundable price of \$15.00 will be charged for each set of Bid Packages requested. The Bid Packages are available for inspection at the Department during regular business hours. Checks are to be made out to "Inyo County Public Works Department." The Bid Package is also available at no charge at the County of Inyo website at www.inyocounty.us. Bidders who obtain Bid Packages over the internet are responsible for notifying Inyo County Public Works Department that they are plan holders. Bidders who fail to notify the Department that they are plan holders may not be notified should any Addenda be issued. If the Department issues any Addenda to the Bid Package that is not acknowledged, the Bid Proposal may be rejected. This project is subject to the State of California Department of Industrial Relations (DIR) prevailing wage labor rates.

Bids must be submitted in a sealed envelope clearly marked with the bidder's name and address, the word "BID", and the Project Title:

LONE PINE DOG PARK PROJECT

To be considered, **bids must be received by the Inyo County Clerk of the Board of Supervisors, 224 North Edwards Street (mailing address: P.O. Box N), Independence, California 93526 at or before 3:30 P.M. on [REDACTED], 2020** at which time they will be publicly opened and read aloud. No oral, telegraphic, telephonic, or fax proposals or modifications will be accepted.

General Work Description: This project consists of the removal and installation of chain link fencing including gates, installation of a 2" HDPE waterline, installation of a backflow preventer, installation of frost free yard hydrants, dog park signs and picnic benches and construction of a sidewalk including truncated domes (project located at 445 N. Main Street, Lone Pine).

All project work is more particularly described in the plans and special provisions. All of the work shall be in accordance with all applicable Federal, State, and local laws, codes, and regulations.

Technical questions related to project work, site conditions, or other related inquiries should be directed to Travis Dean of the Public Works Department at tdean@inyocounty.us (phone: 760-878-0203). Bids shall conform to and be responsive to the Contract Documents. Bids are required for the entire work described in the Contract Documents.

Each Bid must be submitted on the Bid Proposal Forms furnished as a part of the Bid Package. Each Bid must be accompanied by a Proposal Guarantee in the amount and form described in the Bid Package, in an amount not less than 10% of the amount of the bid, made payable to the order of the County of Inyo. The check or bond shall be given as security that the bidder will enter into the Contract with the County and furnish the required Faithful Performance Bond, Labor and Materials Payment Bond, Certificates and/or original endorsements of insurance, or other required documents. The check or bond may be retained by the County for sixty (60) days or until the Contract is fully executed by the successful bidder and the County, whichever first occurs.

The successful bidder shall be required to furnish a Faithful Performance Bond and a Labor and Materials Payment Bond on the forms provided in the Bid Package and in the amount of 100% of the Contract amount.

The successful bidder must be licensed as required by law, and consistent with the Contract Documents, at the time the contract is awarded, which license shall be a current Water Class A or California Class C36 – Plumbing Contractor license or a combination of all specialty classifications that will be required for complete performance of all of the work in accordance with the Contract Documents, and if applicable, a joint venture license as defined in the **Business and Professions Code, Section 7029**. Failure of the bidder to obtain proper and adequate licensing for an award of a contract shall constitute failure to execute the contract and shall result in the forfeiture of the security of the bidder.

In addition to the requirements set forth in this Notice Inviting Bids, all bids shall be subject to the requirements set forth in the Special Provisions, Standard Specifications of the Inyo County Public Works Department, dated October, 2015, Contract Documents and other applicable law.

The Contract is subject to the State Contract nondiscrimination and compliance requirements pursuant to **Government Code, Section 12990**, and other applicable law.

The Contract is also subject to and incorporates by reference the provisions of **Public Contract Code, Section 22300**, pursuant to which, the Contractor is permitted to substitute securities for earned retention or have them placed in escrow at the Contractor's expense, as also set forth in Section 1150.15 of the Standard Specifications.

Pursuant to **Section 1725.5 of the Labor Code**, the bidder is required to certify that they, and all subcontractors listed on the submitted Bid Form documents, are registered with the California Department of Industrial Relations.

Pursuant to **Section 1773 of the Labor Code**, the general prevailing wage rates in Inyo County have been determined by the Director of the State Department of Industrial Relations. These wage rates appear in the Department of Transportation publication entitled "General Prevailing Wage Rates," in effect at the time the project is advertised. Future effective wage rates, which

have been predetermined and are on file with the State Department of Industrial Relations, are referenced, but not printed, in said publication. Such rates of wages are on file with the State Department of Industrial Relations and the Public Works Department of the County of Inyo and are available to any interested party upon request.

Inyo County reserves the right at any stage of these proceedings to reject any or all Bids or to waive any immaterial defect in any Bid if it is deemed to be in the best interest of the County.

Each bidder must supply all the information required by the Contract Documents, Special Provisions and Standard Specifications.

County of Inyo
Department of Public Works

Michael Errante,
Director

Dated: January, 2020

BID PROPOSAL FORMS FOR

LONE PINE DOG PARK PROJECT Lone Pine, CA

ENCLOSURES:

Bid Proposal Form
Bid Bond
Cashier's or Certified Check Form
Designation of Subcontractors
Certification Regarding Equal Employment Opportunity
Labor Code Section 3700 Contractor's Labor Code Certification
Labor Code Section 1725.5 Contractor and Subcontractor Registration
Public Contract Code Section 7106 (Non-Collusion Affidavit)
Public Contract Code Section 10162 Questionnaire
Public Contract Code Statement (Section 10232)
Inyo County Ordinance No. 1156 (Contracting Preference)
Small Business Enterprise Commitment (Construction Contracts)
Small Business Enterprise Final Report of Utilization of Small Business Enterprise

BID PROPOSAL FORM

TO: COUNTY OF INYO
Attn.: Inyo County Clerk of Board of Supervisors
224 North Edwards Street, P.O. Box N
Independence, California 93526
(Herein called the "County")

FROM: _____

(Herein called "Bidder")

FOR: **LONE PINE DOG PARK PROJECT**
(Herein called "Project")

In submitting this Bid, Bidder understands and agrees that:

1. BID DEADLINE. Bids must be received no later than 3:30 P.M. on _____, 2020 by the Inyo County Assistant Board Clerk, 224 North Edwards Street (mailing address: P.O. Box N), Independence, CA 93526, at which time they will be publicly opened and read aloud. No oral, telegraphic, telephonic or fax proposals or modifications will be accepted.

2. BID AMOUNT TOTAL. The total amount of this Bid for provision of the services and materials for completion of the Project in accordance with the Contract Documents is set forth herein as:

**BID FORM
LONE PINE DOG PARK PROJECT
PROJECT NO. RR 19-012**

ABBREVIATIONS:

LS = LUMP SUM
SF = SQUARE FEET

LF = LINEAR FEET
EA = EACH

CY = CUBIC YARD
SY = SQUARE YARDS

ITEM NO.	DESCRIPTION	UNIT MEAS.	EST. QUAN.	ITEM PRICE	TOTAL DOLLARS
1	Mobilization	LS	1	\$	\$
2	6' High, 11 Gauge Chain Link Fence	LF	350	\$	\$
3	Remove Fence	LF	82	\$	\$
4	6' Wide, 6' Tall Chain Link Gate	EA	4	\$	\$
5	8' Wide, 6' Tall Chain Link Gate	EA	2	\$	\$
6	Minor Concrete	CY	150	\$	\$
7	2" High-Density Polyethylene (HDPE) Pipe	LF	565	\$	\$
8	Picnic Table	EA	4	\$	\$
9	Install New Backflow Preventer	EA	1	\$	\$
10	Frost Free Yard Hydrant	EA	2	\$	\$
11	Signs	EA	9	\$	\$
12	Truncated Domes	SF	15	\$	\$
TOTAL BID AMOUNT:					\$

TOTAL BID AMOUNT (IN NUMBERS) _____

TOTAL BID AMOUNT (IN WORDS) _____

No provision in this section is intended or shall be construed to alter the terms and conditions specified in the Contract Documents for payment of any amounts in the event the Project contract is awarded to Bidder pursuant to this Bid.

3. INCLUSION OF ALL COSTS. This Bid includes all costs for all labor, materials, tools, taxes, insurance, transportation, and other related supplies and services to perform all services and provide all materials as required by, and in accordance with, the Contract Documents for the Project.

4. CONTRACT DOCUMENTS. The Contract Documents shall constitute the Contract between the parties, which will come into full force and effect upon acceptance, approval, and execution by the Inyo County Board of Supervisors. The Contract Documents are complementary and are incorporated herein by reference and made a part hereof with like force and effect as if all of said documents were set forth in full herein. The Contract Documents include all documents defined as "Contract Documents" in the Standard Specifications of the Inyo County Public Works Department, dated October, 2015.

5. ACCEPTANCE. County reserves the right to reject any and all Bids, or part of any Bid, to postpone the scheduled Bid deadline date(s), to make an award in its own best interest, and to waive any irregularities or technicalities that do not significantly affect or alter the substance of an otherwise responsible Bid and that would not affect a Bidder's ability to perform the work adequately as specified. However, this Bid shall remain open and shall not be withdrawn for a period of sixty (60) calendar days after the date designated in the Notice Inviting Bids for publicly opening this Bid. If Bidder receives written notice of the award of the Project Contract to Bidder on or before the sixtieth day, Bidder shall execute the Contract and deliver to County the executed Contract and all of the bonds, certificates and/or endorsements of insurance coverage, and other required documents no later than fifteen (15) calendar days after the date on which Bidder receives such notice.

This solicitation in no way obligates County to award a Bid Contract described herein, nor will County assume any liability for the costs incurred in the preparation and transmittal of Bids in response to this solicitation. County reserves the right to not accept any Bid, to reject any or all Bids, to reject any part of any Bid proposal, to negotiate and modify any Bid, and to waive any defects or irregularities in any Bid at County's sole discretion. Furthermore, County shall have the sole discretion to award a Bid Contract as it may deem appropriate to best serve the interests of County. In this regard, County may consider demonstrated quality of work, responsiveness, comparable experience, professional qualifications, references, and proposed fees. Awards will not be based on cost alone. County does not guarantee a minimum or maximum dollar value for any Contract(s) resulting from this solicitation.

If the Contract Documents require or permit this Bid to include two or more Alternates, County reserves the right to award the Contract for that Alternate which County, in its sole discretion, determines at the time of award to be in County's best interest.

6. TIME OF COMPLETION. The Bidder further specifically agrees to complete all the work no later than the Time for Completion specified in the Contract Special Provisions.

7. ADDENDA. The Bidder acknowledges receipt of the following Addenda and has provided for all Addenda changes in this Bid.

(Fill in Addendum numbers and dates Addenda have been received.
If none have been received, enter "NONE".)

WARNING: IF AN ADDENDUM OR ADDENDA HAVE BEEN ISSUED BY THE COUNTY AND NOT NOTED ABOVE AS BEING RECEIVED BY THE BIDDER, THIS PROPOSAL MAY BE REJECTED.

8. BIDDER'S BUSINESS INFORMATION. Bidder provides the following information concerning its business:

Bidder's Name: _____

Address: _____

_____ Zip Code _____
(The above address will be used to send notices or requests for additional information.)

Telephone: () _____

Federal Identification No.: _____

Contractor's License No.: _____ State: _____

Classification: _____ Expiration Date: _____

Type of Business (check one):

Individual (), Partnership (), Joint Venture ()

Corporation (), Other (Specify): _____ ()

Owners, Officers, Partners, or Other Authorized Representatives:

IMPORTANT NOTICE: If bidder or other interested person is a corporation, state legal name of corporation above and list below, names of the president, secretary, treasurer, and chief executive officer/manager thereof; if a partnership, joint venture, or other business entity, state true name of firm above and list below, names of all partners, joint venturers, or for other entities, parties having authority to act on behalf of the entity, such as officers, owners, directors; if bidder or other interested person is an individual, state first, middle, and last names in full above and write "N/A" below.

9. PROPOSAL GUARANTEE. As security for the Bid, this Bid includes one of the following proposal guarantee instruments (the "Proposal Guarantee"), in the amount required by this section, as checked:

- (a) _____ Bid Bond from a corporate surety admitted to issue such bonds in the State of California; or

- (b) _____ Cashier's Check or Certified Check, made payable to the County of Inyo, attached to the form entitled Cashier's or Certified Check; or
- (c) _____ Cash, in legal tender of the United States of America, enclosed in a separate envelope marked "Cash Proposal Guarantee."

The Proposal Guarantee is in the amount of Ten Percent (10%) of the total amount of the Bid. If the Contract Documents require or permit this Bid to include two or more Alternates, the amount of the Proposal Guarantee must not be less than Ten Percent (10%) of the amount of the bid total submitted for the alternate having the highest total bid amount. Only one form of Proposal Guarantee may be submitted with each Bid.

Bidder hereby agrees that County shall be entitled to payment by forfeiture of the Proposal Guarantee if County awards the Project Contract to Bidder, but Bidder fails or refuses to execute the Contract and/or furnish all of the bonds, certificates and/or endorsements of insurance coverage, and other required documents no later than fifteen (15) calendar days after the date on which Bidder receives notice of the award from County.

10. BID PROTEST. In the event a dispute arises concerning the bid process prior to the award of the contract, the party wishing resolution of the dispute shall submit an appeal request in writing to the County Director of Purchasing. Bidder may appeal the recommended award or denial of award, provided the following stipulations are met:

1. Only a bidder who has actually submitted a Bid Proposal is eligible to submit an appeal request/bid protest against another bidder. Subcontractors are not eligible to submit bid protests. A bidder may not rely on the bid protest submitted by another bidder, but must timely pursue its own protest.
2. Appeal must be in writing. The appeal must contain a complete statement of the basis for the protest and all supporting documentation. Materials submitted after the Bid Protest Deadline will not be considered. The protest must refer to the specific portion or portions of the Contract Documents upon which the protest is based. The protest must include the name, address and telephone number of the person representing the protesting bidder if different from the protesting bidder.
3. A copy of the protest and all supporting documents must also be transmitted by fax or by e-mail, by or before the Bid Protest Deadline, to the protested bidder and any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest.
4. Must be submitted within ten (10) calendar days of the date of the recommended award or denial of award letters.
5. An appeal of a denial of award can only be brought on the following grounds:
 - a. Failure to follow the selection procedures and adhere to requirements specified in the Bid Package or any addenda or amendments.

- b. There has been a violation of conflict of interest as provided by California Government Code Section 87100 et seq.
 - c. A violation of State or Federal law.
6. Appeals will not be accepted for any other reasons than those stated above. All appeals must be sent to:

Clint Quilter, Director
County of Inyo
Purchasing Department
224 N. Edwards St.
Independence, CA 93526

County's Purchasing Director shall make a decision concerning the appeal, and notify the Proposer making the appeal, within a reasonable timeframe prior to the tentatively scheduled date for awarding the contract. The decision of County's Purchasing Director shall be deemed final.

11. ADDITIONAL REQUIRED DOCUMENTS. Bidder agrees that, in addition to the Proposal Guarantee, Bidder is required to submit, as a part of this Bid, the following forms properly completed, and signed as required, all of which accompany this Bid Proposal Form and are incorporated herein by this reference:

- (1) Designation of Subcontractors (Public Contract Code section 4100 et seq.)
- (2) Certification Regarding Equal Employment Opportunity (Government Code section 12900 et seq., sections 11135-11139.5)
- (3) Contractor's Labor Code Certification (Labor Code section 3700)
- (4) Contractor and Subcontractor Dept. of Industrial Relations (DIR) Registration (Labor Code section 1725.5)
- (5) Non-Collusion Affidavit (Public Contract Code Section 7106)
- (6) Public Contract Code Section 10162 Questionnaire
- (7) Public Contract Code Statement (Section 10232)
- (8) Small Business Enterprise Commitment (Construction Contracts)
- (9) Small Business Enterprise Final Report of Utilization of Small Business Enterprise

12. DEFINITIONS. The definition and meaning of the words used in this Bid Proposal Form are the same as set forth in **Section 1070, "Abbreviations, Symbols and Definitions,"** of the Standard Specifications of the Inyo County Public Works Department, dated October, 2015.

THE UNDERSIGNED HEREBY DECLARES, UNDER PENALTY OF PERJURY ACCORDING TO THE LAWS OF THE STATE OF CALIFORNIA, THAT THE STATEMENTS, DESIGNATIONS, CERTIFICATIONS, AND REPRESENTATIONS MADE IN THIS BID PROPOSAL, INCLUDING ALL ATTACHMENTS, ARE TRUE AND CORRECT AND HE OR SHE IS THE INDIVIDUAL, MANAGING PARTNER, CORPORATE OFFICER, OR OTHER REPRESENTATIVE, DULY AUTHORIZED BY LAW TO MAKE THIS BID ON BEHALF OF BIDDER, AND BY SIGNING BELOW, MAKES THIS BID ON BEHALF OF BIDDER ACCORDING TO ALL OF THE TERMS AND CONDITIONS SET FORTH OR INCORPORATED BY REFERENCE HEREIN.

(Signature of Authorized Person)

(Date)

(Printed Name)

(Printed Title)

INYO COUNTY PUBLIC WORKS DEPARTMENT

LONE PINE DOG PARK PROJECT

**BID BOND
(BID PROPOSAL GUARANTEE)**

(Not required if a certified or cashier's check or a cash deposit accompanies the bid as a proposal guarantee)

KNOW ALL MEN BY THESE PRESENTS: That we, _____

_____ as Principal, and
(Name of Bidder)

_____ (Name of Corporate Surety)

as Corporate Surety admitted to issue such bonds in the State of California, are held and firmly bound unto the County of Inyo, State of California, in the sum of _____ Dollars (\$ _____) for the payment whereof we hereby bind ourselves, our successors, heirs, executors, and administrators, jointly and severally, firmly by these presents.

The condition of the foregoing obligation is such that whereas the above bounded Principal is about to submit to the Board of Supervisors of the County of Inyo a bid for the construction of the **LONE PINE DOG PARK PROJECT**, in compliance with the Contract therefor:

Now, if the bid of the Principal shall be accepted and the Contract awarded to the Principal by said Board of Supervisors, and if the Principal shall fail or neglect to enter into the Contract therefor in accordance with the terms of the Principal's bid and the terms set forth in the Bid Package, or to furnish the required Faithful Performance and Labor and Materials Payment Bonds, Certificates of insurance, and other required documents, to the satisfaction of the Board of Supervisors of said County, no later than fifteen (15) calendar days after the Principal has received notice from the County that the Contract has been awarded to the Principal, then the sum guaranteed by this Bond is forfeited to the County of Inyo.

It is expressly agreed and understood that any errors, clerical, mathematical, or otherwise, in the bid shall not be or constitute a defense to a forfeiture of this Bond.

WITNESS our hands and seals this _____ day of _____, 20__ A.D.

Principal

(SEAL)

By: _____
(Title of Authorized Person)

(Address for Notices to be sent)

Surety

(SEAL)

By: _____
(Title of Authorized Person)

(Address for Notices to be sent)

NOTE:

THE SIGNATURES OF THE PRINCIPAL (BIDDER) AND THE SURETY MUST EACH BE ACKNOWLEDGED BEFORE A NOTARY PUBLIC (OR OTHER OFFICER AUTHORIZED UNDER CALIFORNIA LAW) AND THE ACKNOWLEDGMENTS MUST BE ATTACHED TO THIS BOND. The Bid Bond must be executed on this form by a corporate surety admitted to issue such bonds in the State of California. No substitutions will be accepted. If an attorney-in-fact signs for the surety, an acknowledged statement from the surety appointing and empowering the attorney-in-fact to execute such bonds in such amounts on behalf of the surety, must accompany the Bid Bond.

ADDRESS OF COUNTY FOR NOTICES TO BE SENT:

**County of Inyo (Attn.: Public Works Director)
224 North Edwards Street, P.O. Box N
Independence, California 93526**

LONE PINE DOG PARK PROJECT

**CASHIER'S OR CERTIFIED CHECK
(BID PROPOSAL GUARANTEE)**

(Not required if Bid Bond accompanies the bid as a proposal guarantee)

A cashier's or certified check in the amount required as a proposal guarantee for the Bid and made payable to the County of Inyo is attached below:

[]

ATTACH CHECK HERE

[]

Bidder (print name): _____

LONE PINE DOG PARK PROJECT

DESIGNATION OF SUBCONTRACTORS

In compliance with the provisions of the **Subletting and Subcontracting Fair Practices Act (Section 4100 et. seq. of the Public Contract Code of the State of California)**, the undersigned bidder has set forth below the full name, and the location of the place of business of each Subcontractor who will perform work or labor or render service to the Prime Contractor in or about the construction of the work or improvement, or a Subcontractor licensed by the State of California who, under subcontract to the Prime Contractor, specifically fabricates and installs a portion of the work or improvement according to detailed drawings contained in the Plans and Specifications to which the attached bid is responsive, and the portion of the work which will be done by each Subcontractor for each subcontract in excess of one-half of one percent of the Prime Contractor's total bid, or \$10,000.00, whichever is greater.

The Bidder understands that if he fails to specify a Subcontractor for any portion of the work to be performed under the Contract in excess of one-half of one percent of his bid, or \$10,000.00, whichever is greater, he shall be deemed to have agreed to perform such portion himself, and that he shall not be permitted to sublet or subcontract that portion of the work except in cases of public emergency or necessity, and then only after a finding, produced to writing as a public record of the Awarding Authority, setting forth the facts constituting the emergency or necessity. If no Subcontractors are to be employed on the project, enter the word "none".

ITEM NO.	DESCRIPTION OF WORK	% OF TOTAL CONTRACT	SUBCONTRACTOR'S LICENSE TYPE, NUMBER, EXPIRATION DATE	NAME, ADDRESS, PHONE NUMBER

Signature of Authorized Person)

(Title)

(Printed Name)

(Date)

**CERTIFICATION REGARDING EQUAL EMPLOYMENT
OPPORTUNITY**

(Government Code Section 12900 et seq., Sections 11135-11139.7)

LONE PINE DOG PARK PROJECT

During the performance of this Contract, the Contractor and its subcontractors shall not unlawfully deny the Contract's benefits to any person, nor shall any person be unlawfully subjected to discrimination under the contract and its performance on the basis of religion, color, ethnic group identification, sex, age, or disability. In addition, the Contractor and its subcontractors shall not discriminate unlawfully against any employee or applicant for employment because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, age, or sex. The Contractor shall insure that the evaluation and treatment of employees and applicants for employment are free from such discrimination.

The Contractor shall comply with the provisions of the Fair Employment and Housing Act (**Government Code, Section 12900 et seq.**), the regulations promulgated thereunder (**California Code of Regulations, Title 2, Section 7285.0 et seq.**), and the Provisions of **Article 9.5, Chapter 1, Part 1, Division 3, Title 2 of the Government Code (Government Code, Sections 11135-11139.7)**.

Contractor and its subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.

The Contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under the contract.

(Name and Title of Signer)

Signature

Date

Company Name _____

Business Address _____

CONTRACTOR'S LABOR CODE CERTIFICATION
(Labor Code Section 3700 et seq.)

LONE PINE DOG PARK PROJECT

I am aware of the provisions of Section 3700 and following of the Labor Code which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract.

(Name and Title of Signer)

Signature

Date

Company Name

Business Address

CONTRACTOR AND SUBCONTRACTOR REGISTRATION
With
CA Department of Industrial Relations (DIR)
(CA LABOR CODE SECTION 1725.5)

Bidder hereby certifies that they, and all subcontractors listed on the submitted Bid Form documents, are registered with the CA Department of Industrial Relations pursuant to requirements of CA Labor Code Section 1725.5 and will comply with all requirements as noted in the aforementioned CA Labor Code Section.

Signed Name

Date

Printed Name

CA DIR Registration No.

NON-COLLUSION AFFIDAVIT
(Public Contract Code Section 7106)
(Code of Civil Procedure Section 2015.5)

LONE PINE DOG PARK PROJECT

The undersigned declares:

I am the _____ of _____, the party making the foregoing bid. The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose. Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on

_____, at _____,
(Date) (City) (State)

(Name and Title of Signer)

Signature Date

Company Name _____

Business Address _____

PUBLIC CONTRACT CODE SECTION 10162 QUESTIONNAIRE

LONE PINE DOG PARK PROJECT

In accordance with Public Contract Code Section 10162, the Bidder shall complete, under penalty of perjury, the following questionnaire:

Has the Bidder, any officer of the Bidder, or any employee of the Bidder who has a proprietary interest in the Bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a federal, state, or local government project because of a violation of law or a safety regulation:

Yes _____ No _____

If the answer is yes, explain the circumstances in the following space.

By bidder's signature on the Bid Proposal Form, Bidder certifies, under penalty of perjury under the laws of the State of California, that the foregoing statements in accordance with Public Contract Code Section 10162 are true and correct.

PUBLIC CONTRACT CODE STATEMENT (SECTION 10232)

LONE PINE DOG PARK PROJECT

In accordance with **Public Contract Code Section 10232**, the Contractor hereby states under penalty of perjury, that no more than one final unappealable finding of contempt of court by a federal court has been issued against the Contractor within the immediately preceding two year period because of the Contractor's failure to comply with an order of a federal court which orders the Contractor to comply with an order of the National Labor Relations Board.

By Bidder's signature on the Bid Proposal Form, Bidder certifies, under penalty of perjury under the laws of the State of California, that the foregoing statements in accordance with **Public Contract Code Section 10232** are true and correct.

(Name and Title of Signer)

Signature

Date

Company Name _____

Business Address _____

**LOCAL BUSINESS PREFERENCES
INYO COUNTY ORDINANCE NO. 1156**

LONE PINE DOG PARK PROJECT

ORDINANCE NO. 1156

AN ORDINANCE OF THE BOARD OF SUPERVISORS OF THE COUNTY OF INYO, STATE OF CALIFORNIA, ADDING CHAPTER 6.06 TO THE INYO COUNTY CODE TO PROVIDE CONTRACTING PREFERENCES FOR LOCAL AND SMALL BUSINESSES

The Board of Supervisors of the County of Inyo ordains as follows:

SECTION 1. PURPOSE AND AUTHORITY

The purpose of this ordinance is to contribute to the economic and social well-being of all the citizens of the County by providing a contracting preference for local and small businesses. As a market participant, and pursuant to Public Contract Code § 2002, the County may award a purchasing preference to certain entities to vindicate the governmental purpose of encouraging County and regional economic development.

SECTION 2. ADDITION OF CHAPTER 6.06 TO INYO COUNTY CODE.

Chapter 6.06 is added to the Inyo County Code to read as follows:

Chapter 6.06

CONTRACTING PREFERENCES

Sections:

6.06.010	Findings.
6.06.020	Definitions.
6.06.030	General Provisions.
6.06.040	Local Business and Small Business Preference.
6.06.050	Small Business Subcontracting Preference.
6.06.060	Limit On Contracting Preference.

6.06.010 Findings

Businesses located in Inyo County contribute to the economic and social well-being of all the citizens of the County. Such businesses provide convenient services within the County and provide employment for County citizens. Further, the payroll paid by and income earned by local businesses tend to be largely expended within the County, which enhances the business environment in the County and the well-being of its citizens. It is in the public interest to encourage a vibrant business environment in the County. Providing modest purchasing preferences for County businesses furthers the goal of building a healthy economy in the County. Further, providing contracting preferences for all small businesses is allowed by State law, expands the types of contracts for which preferences may be given, and benefits local small businesses, also furthering the goal of building and maintaining a healthy local economy.

6.06.020 Definitions.

- A. A **Small Business** is a business which is certified by the State of California or the Small Business Administration as a small business.
- B. A **Local Business** is a business which:
1. Has its headquarters, distribution point or locally-owned franchise located in or having a street address within the County for at least six months immediately prior to the issuance of the request for competitive bids by the County; and
 2. Holds any required business license by a jurisdiction located in Inyo County; and
 3. Employs at least one full-time or two part-time employees whose primary residence is located within Inyo County, or if the business has no employees, shall be at least fifty percent owned by one or more persons whose primary residence is located within Inyo County.

4. Meets the conditions of one through three of this subsection, but within Mono or Inyo and Mono Counties, if no Inyo County local business submits a bid that is within eight percent of the lowest bid submitted.

C. A **Responsive Bid** is a bid which responds to the requirements of the request for bids and is submitted by a responsible bidder.

6.06.030 General Provisions.

A. The preferences provided in this chapter are intended to extend to the limit of the jurisdiction of Inyo County under California law. Such preferences do not apply where prohibited by Federal or State law. Such preferences do not apply where funding agencies prohibit such preferences as a condition of providing funding for the anticipated project. Where this Chapter provides preferences for multiple classes of entities, and one or more of those classes of entities are disallowed contracting preference by Federal or State law or by the funding agency, those disallowed entities will not be provided preferences, but the remaining classes of entities shall receive preferences.

B. Requests for bids or proposals issued by the County shall specify the applicable contracting preferences available pursuant to this Chapter.

6.06.040 Local Business and Small Business Preference.

Except as excluded by Section 6.06.030(A), for all contracts awarded by Inyo County, if the lowest responsive bid is submitted by a local business or a small business, that business shall be awarded the contract. If the lowest responsive bid is not submitted by a local business or a small business, the lowest responsive bid submitted by a local business that is within eight percent of the lowest responsive bid or by a small business that is within five percent of the lowest responsive bid shall be considered the low bid and that business shall be awarded the contract. To be eligible, a local business or a small business shall provide certification with its bid that it is such business as herein defined.

6.06.050 Small Business Subcontracting Preference.

For public works and road construction contracts awarded by Inyo County, where no entity qualifying under this Chapter for a contracting preference submits a responsive bid that is the lowest or within five percent of the lowest responsive bid, there shall be a preference given to bids in which at least ten percent of the monetary value of the work to be performed is subcontracted to a small business or businesses. If such bid is the lowest responsive bid, that contractor shall be awarded the contract. If such bid is not the lowest responsive bid, any such bid that is within five percent of the lowest responsive bid shall be considered the low bid, and that contractor shall be awarded the contract.

6.06.060 Limit On Contracting Preferences.

Contracting preferences under this Chapter shall not exceed \$10,000.00 for any one solicitation and award determination.

SECTION 3. SEVERABILITY

If any section, subsection, sentence, clause or phrase of this ordinance is for any reason held to be unconstitutional or invalid, such decision shall not affect the validity of the remaining portions of this ordinance. The Board of Supervisors hereby declares that it would have passed this ordinance and every section, subsection, sentence, clause or phrase not declared invalid or unconstitutional, without regard to whether any portion of this ordinance would be subsequently declared unconstitutional or invalid.

SECTION 4. EFFECTIVE DATE

This Ordinance shall take effect and be in full force and effect thirty (30) days after its adoption. Before the expiration of fifteen (15) days from the adoption hereof, this Ordinance shall be published as required by Government Code Section 25124. The Clerk of the Board is hereby instructed and ordered to so publish this Ordinance together with the names of the Board members voting for and against the same.

PASSED AND ADOPTED this 25th day of May, 2010, by the following vote:

AYES: Supervisors Arcularius, Cash, Brown, Fortney and Cervantes
NOES: -0-
ABSTAIN: -0-
ABSENT: -0-


Richard Cervantes, Chairperson
Inyo County Board of Supervisors

ATTEST: Kevin Carunchio
Clerk of the Board

By: 
Patricia Gunsolley, Assistant

s/Ordinance/ContractingProfSmBusiness

4/29/10

INSTRUCTIONS – Small Business Enterprise Commitment (CONSTRUCTION CONTRACTS)
(05/10)

ALL BIDDERS:

PLEASE NOTE: It is the bidder's responsibility to verify that the Small Business Enterprise (SBE) subcontractors are certified by the proper certifying authorities, and submit evidence of that certification with the bid. If a SBE prime contractor is not certified on the date of the bid opening, the SBE prime contractor will not qualify for the contracting preference. If the SBE subcontractor or subcontractors are not certified on the date of bid opening, that portion of that firm's participation will not count toward the minimum ten percent of the monetary value of the work needed to qualify for the contracting preference.

The form requires specific information regarding the construction contract: Total Contract Amount, Bid Opening Date, and Bidder's Name.

Indicate the appropriate bid item number (or numbers); Item of Work and description or services to be subcontracted or materials to be provided by the SBE; the SBE's business license information/expiration date, certification number and its expiration date; the SBE's contact information, including company and contact name, address, and telephone number; and the dollar amount expected to be paid to the SBE.

IMPORTANT: Identify **all** SBE firms participating in the project regardless of tier, including the prime contractor, if an SBE. Names of the First Tier SBE Subcontractors and their respective item(s) of work listed should be consistent, where applicable, with the names and items of work in the "List of Subcontractors" submitted with your bid. **Provide copies of the SBEs' quotes, and if applicable, a copy of joint venture agreements pursuant to the Subcontractors Listing Law and the Special Provisions.**

There is a column for the total SBE dollar amount. Enter the Total Claimed SBE Participation dollars and percentage amount of items of work submitted with your bid pursuant to the special provisions. (If 100% of item is not to be performed or furnished by the SBE, describe exact portion of time to be performed or furnished by the SBE.)

This form must be submitted with the bid if the bidder is attempting to qualify for the SBE contracting preference. If the bidder is not attempting to qualify for the SBE contracting preference the form does not need to be submitted.

FINAL REPORT – UTILIZATION OF SMALL BUSINESS ENTERPRISES (SBE), FIRST-TIER SUBCONTRACTORS

PROJECT: Lone Pine Dog Park Project		CONTRACT COMPLETION DATE					
PRIME CONTRACTOR		ESTIMATED CONTRACT AMOUNT					
BUSINESS ADDRESS							
BID ITEM NO.	SUBCONTRACTOR NAME, BUSINESS ADDRESS, AND PHONE	DESCRIPTION OF WORK PERFORMED	SBE CERT. NUMBER	CONTRACT PAYMENTS		DATE WORK COMPLETE	DATE OF FINAL PAYMENT
				NON-SBE	SBE		
				\$			
				\$			
				\$			
				\$			
				\$			
				\$			
				\$			
				\$			
TOTAL				\$			
(i) Original Commitment							
\$ _____ 2) I CERTIFY THAT THE ABOVE INFORMATION IS COMPLETE AND CORRECT CONTRACTOR REPRESENTATIVES SIGNATURE				BUSINESS PHONE NUMBER		DATE	
4) TO THE BEST OF MY KNOWLEDGE, THE ABOVE INFORMATION IS COMPLETE AND CORRECT RESIDENT ENGINEER'S SIGNATURE				BUSINESS PHONE NUMBER		DATE	

To be completed by the contractor and submitted to the Resident Engineer upon project completion

INSTRUCTIONS - FINAL REPORT – UTILIZATION OF SMALL BUSINESS ENTERPRISES (SBE), FIRST-TIER SUBCONTRACTORS

The form requires specific information regarding the construction project, including the prime contractor name and address, contract completion date, and estimated contract amount. The objective of the form is to describe who did what by bid item numbers and description, asking for specific dollar values of item work completed broken down by subcontractors who performed the work, SBE and non-SBE work forces. SBE prime contractors are required to show the date of work performed by their own forces along with the corresponding dollar value of work.

Indicate appropriate bid item number or numbers, a description of work performed or materials provided, and subcontractor name and address. For those firms who are SBE, enter the SBE certification number. The SBE shall provide their certification number to the contractor and notify the contractor in writing with the date of decertification if their status changes during the course of the project.

The form has two columns for the dollar value to be entered for the item work performed by the subcontractor. The non-SBE column is used to enter the dollar value of work performed by firms who are not certified SBEs. Enter the dollar value of work performed by firms who are SBEs in the SBE column.

If the prime contractor or a subcontractor performing work as a SBE on the project becomes decertified and still performs work after their decertification date, enter the total value performed by the contractor/subcontractor under the appropriate SBE identification column.

If the prime contractor or a subcontractor performing work as a non-SBE on the project becomes certified as a SBE, enter the dollar value of all work performed after certification as a SBE under the appropriate SBE identification column.

Enter the total of each column on the form.

**CONTRACT
AND
BOND FORMS
FOR**

LONE PINE DOG PARK PROJECT
Lone Pine, CA

ENCLOSURES:

Contract
Faithful Performance Bond
Labor and Material Payment Bond

**CONTRACT
BY AND BETWEEN
THE COUNTY OF INYO
and**

_____, **CONTRACTOR**
for the
LONE PINE DOG PARK PROJECT

THIS CONTRACT is awarded by the COUNTY OF INYO to CONTRACTOR on and made and entered into effective, _____, 20____, by and between the COUNTY OF INYO, a political subdivision of the State of California, (hereinafter referred to as "COUNTY"), and _____ (hereinafter referred to as "CONTRACTOR"), for the construction or removal of the **LONE PINE DOG PARK PROJECT** (hereinafter referred to as "PROJECT"), which parties agree, for and in consideration of the mutual promises, as follows:

1. SERVICES TO BE PERFORMED. CONTRACTOR shall furnish, at his/her own expense, all labor, materials, methods, processes, implements, tools, machinery, equipment, transportation, permits, services, utilities, and all other items, and related functions and otherwise shall perform all work necessary or appurtenant to construct the Project in accordance with the Special Provisions, which are incorporated herein by reference per section 4(c) of this Contract, within the Time for Completion set forth, as well as in all other in the Contract Documents, for:

Title: **LONE PINE DOG PARK PROJECT**

2. TIME OF COMPLETION. Project work shall begin within _____ calendar days after receipt of the Notice to Proceed (NTP) (or on the start of work date identified in the NTP) and shall continue until all requested services are completed. Said services shall be completed no later than the Time of Completion as noted in the Project's Special Provisions. Procedures for any extension of time shall be complied with as noted in the Project's Special Provisions.

3. PAYMENT/CONSIDERATION. For the performance of all such work, COUNTY shall pay to CONTRACTOR for said work the total amount of:
_____ dollars (\$ _____),
adjusted by such increases or decreases as authorized in accordance with the Contract Documents, and payable at such times and upon such conditions as otherwise set forth in the Contract Documents.

4. ALL PROVISIONS SET FORTH HEREIN. CONTRACTOR and COUNTY agree that this Contract shall include and consist of:

- a. All of the provisions set forth expressly herein;
- b. The Bid Proposal Form, the Faithful Performance Bond, and the Labor and Materials Payment Bond, all of which are incorporated herein and made a part hereof by this reference; and

c. All of the other Contract Documents, as described in **Section 5-1.02, "Definitions,"** of the Standard Specifications of the Inyo County Public Works Department, dated October, 2015, all of which are incorporated herein and made a part of this Contract by this reference, including without limitation, the Bid Package, the Standard Specifications of the Inyo County Public Works Department, dated October, 2015, and the Special Provisions concerning this Project including the Appendices, the Plans, any and all amendments or changes to any of the above-listed documents, including, without limitation, contract change orders, and any and all documents incorporated by reference into any of the above-listed documents.

5. STANDARD OF PERFORMANCE. Contractor represents that he/she is qualified and licensed to perform the work to be done as required in this Contract. County relies upon the representations of Contractor regarding professional and/or trade training, licensing, and ability to perform the services as a material inducement to enter into this Contract. Acceptance of work by the County does not operate to release Contractor from any responsibility to perform work to professional and/or trade standards. Contractor shall provide properly skilled professional and technical personnel to perform all services under this Contract. Contractor shall perform all services required by this Contract in a manner and according to the standards observed by a competent practitioner of the profession. All work products of whatsoever nature delivered to the County shall be prepared in a manner conforming to the standards of quality normally observed by a person practicing in Contractor's profession and/or trade.

6. INDEPENDENT CONTRACTOR. Nothing contained herein or any document executed in connection herewith, shall be construed to create an employer-employee, partnership or joint venture relationship between County and Contractor, nor to allow County to exercise discretion or control over the manner in which Contractor performs the work or services that are the subject matter of this Contract; provided, however, the work or services to be provided by Contractor shall be provided in a manner consistent with reaching the County's objectives in entering this Contract.

Contractor is an independent contractor, not an employee of County or any of its subsidiaries or affiliates. Contractor will not represent him/herself to be nor hold her/himself out as an employee of County. Contractor acknowledges that s/he shall not have the right or entitlement in or to any of the pension, retirement or other benefit programs now or hereafter available to County's employees. The consideration set forth in Paragraph 3 shall be the sole consideration due Contractor for the services rendered hereunder. It is understood that County will not withhold any amounts for payment of taxes from the Contractor's compensation hereunder. Any and all sums due under any applicable state, federal or municipal law or union or professional and/or trade guild regulations shall be Contractor's sole responsibility. Contractor shall indemnify and hold County harmless from any and all damages, claims and expenses arising out of or resulting from any claims asserted by any third party, including but not limited to a taxing authority, as a result of or in connection with payments due it from Contractor's compensation.

7. ASSIGNMENT AND SUBCONTRACTING. The parties recognize that a substantial inducement to County for entering into this Contract is the professional reputation, experience and competence of Contractor. Assignments of any and/or all rights, duties or obligations of the Contractor under this Contract will be permitted only with the express consent

of the County. Contractor shall not subcontract any portion of the work to be performed under this Contract without the written authorization of the County. If County consents to such subcontract, Contractor shall be fully responsible to County for all acts or omissions of the subcontractor. Nothing in this Contract shall create any contractual relationship between County and subcontractor, nor shall it create any obligation on the part of the County to pay any monies due to any such subcontractor, unless otherwise required by law.

8. CLAIMS RESOLUTION. Pursuant to **Section 9204 of the Public Contract Code**, any and all claims submitted by Contractor to County will follow the provisions as set forth in the Project's Special Provisions.

9. INSURANCE INDEMNIFICATION. Contractor shall hold harmless, defend and indemnify County and its officers, officials, employees and volunteers from and against all claims, damages, losses, and expenses, including attorney fees arising out of the performance of the work described herein, caused in whole or in part by any negligent act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, except where caused by the active negligence, sole negligence, or willful misconduct of the County.

10. INSURANCE. For the duration of this Agreement, Contractor shall procure and maintain insurance of the scope and amount specified in Attachment 3 and with the provisions specified in that attachment.

11. POLITICAL REFORM ACT. Contractor is not a designated employee within the meaning of the Political Reform Act because Contractor:

a. Will conduct research and arrive at conclusions with respect to his/her rendition of information, advice, recommendation or counsel independent of the control and direction of the County or of any County official, other than normal Contract monitoring; and

b. Possesses no authority with respect to any County decision beyond rendition of information, advice, recommendation or counsel [FPPC Reg. 18700(a)(2)].

12. COMPLIANCE WITH ALL LAWS.

Performance Standards: Contractor shall use the standard of care in its profession and/or trade to comply with all applicable federal, state and local laws, codes, ordinances and regulations that relate to the work or services to be provided pursuant to this Contract.

a. Safety Training:

i. Contractor shall provide such safety and other training as needed to assure work will be performed in a safe and healthful manner "in a language" that is understandable to employees receiving the training. The training shall in all respects be in compliance with CAL OSHA; and

ii. Contractor working with employees shall maintain a written Injury and Illness Prevention (IIP) Program, a copy of which must be maintained at each worksite or at a central worksite identified for the employees, if the Contractor has non-fixed worksites; and

iii. Contractor using subcontractors with the approval of the County to perform the work which is the subject of this Contract shall require each subcontractor working with employees to comply with the requirements of this section.

b. Child, Family and Spousal Support reporting Obligations:

i. Contractor shall comply with the state and federal child, family and spousal support reporting requirements and with all lawfully served wage and earnings assignment orders or notices of assignment relating to child, family and spousal support obligations.

c. Nondiscrimination:

i. Contractor shall not discriminate in employment practices or in the delivery of services on the basis of membership in a protected class which includes any class recognized by law and not limited to race, color, religion, sex (gender), sexual orientation, marital status, national origin (Including language use restrictions), ancestry, disability (mental and physical, including HIV and Aids), medical Conditions (cancer/genetic characteristics), age (40 and above) and request for family care leave.

ii. Contractor represents that it is in compliance with federal and state laws prohibiting discrimination in employment and agrees to stay in compliance with the Americans with Disabilities Act of 1990 (42 U.S.C. sections 12101, et. seq.), Age Discrimination in Employment Act of 1975 (42 U.S.C. 5101, et. seq.), Title VII (42 U.S.C. 2000, et. seq.), the California Fair Employment Housing Act (California Government Code sections 12900, et. seq.) and regulations and guidelines issued pursuant thereto.

13. LICENSES. Contractor represents and warrants to County that it has all licenses, permits, qualifications, insurance and approvals of whatsoever nature which are legally required of Contractor to practice its trade and/or profession. Contractor represents and warrants to County that Contractor shall, at its sole cost and expense, keep in effect or obtain at all times during the term of this Contract, any licenses, permits, insurance and approvals which are legally required of Contractor to practice its and/or profession.

14. PREVAILING WAGE. Pursuant to **Section 1720 et seq. of the Labor Code**, Contractor agrees to comply with the Department of Industrial Relations regulations, to which this Contract is subject, the prevailing wage per diem rates in Inyo County have been determined by the Director of the State Department of Industrial Relations. These wage rates appear in the Department publication entitled "General Prevailing Wage Rates," in effect at the time the project is advertised. Future effective wage rates, which have been predetermined and are on file with the State Department of Industrial Relations are referenced but not printed in said publication. Such rates of wages are also on file with the State Department of Industrial Relations and the offices of the Public Works Department of the County of Inyo and are available to any interested party upon request. Contractor agrees to comply with County and the Department of Industrial Relations regulations in submitting the certified payroll.

15. CONTROLLING LAW VENUE. This Contract is made in the County of Inyo, State of California. The parties specifically agree to submit to the jurisdiction of the Superior Court of California for the County of Inyo.

16. WRITTEN NOTIFICATION. Any notice, demand, request, consent, approval or communication that either party desires or is required to give to the other party shall be in writing and either served personally or sent prepaid, first class mail. Any such notice, demand, et cetera, shall be addressed to the other party at the address set forth herein below. Either party

may change its address by notifying the other party of the change of address. Notice shall be deemed communicated within 48 hours from the time of mailing if mailed as provided in this section.

If to County: County of Inyo
Public Works Department
Attn: _____
168 N. Edwards
PO Drawer Q
Independence, CA 93526

If to Contractor: _____

17. AMENDMENTS. This Contract may be modified or amended only by a written document executed by both Contractor and County and approved as to form by Inyo County Counsel.

18. WAIVER. No failure on the part of either party to exercise any right or remedy hereunder shall operate as a waiver of any other right or remedy that party may have hereunder.

19. TERMINATION. This Contract may be terminated for the reasons stated below:
a. Immediately for cause, if either party fails to perform its responsibilities under this Contract in a timely and professional manner and to the satisfaction of the other party or violates any of the terms or provisions of this Contract. If termination for cause is given by either party to the other and it is later determined that the other party was not in default or default was excusable, then the notice of termination shall be deemed to have been given without cause pursuant to paragraph "b" of this section; or
b. By either party without cause upon fifteen (15) days' written notice of termination. Upon termination, Contractor shall be entitled to compensation for services performed up to the effective date of termination; or
c. By County upon oral notice from the Board of Supervisors based on funding ending or being materially decreased during the term of this Contract.

20. TIME IS OF THE ESSENCE. Time is of the essence for every provision.

21. SEVERABILITY. If any provision of this Contract is held to be invalid, void or unenforceable, the remainder of the provision and/or provisions shall remain in full force and effect and shall not be affected, impaired or invalidated.

22. CONTRACT SUBJECT TO APPROVAL BY BOARD OF SUPERVISORS. It is understood and agreed by the parties that this Contract is subject to the review and approval by the Inyo County Board of Supervisors upon Notice and Public Hearing. In the event that the Board of Supervisors declines to enter into or approve said Contract, it is hereby agreed to that

there is, in fact, no binding agreement, either written or oral, between the parties herein.

23. CONTRACT SUBJECT TO MASTER LEASE. It is understood and agreed by the parties that this Contract and the Lone Pine Dog Park Project is subject to review and approval by the Los Angeles Department of Water and Power, as owner of the land on which the dog park will be located. Contractor's activities are further subject to any terms, conditions, and/or limitations set forth in the Lease between the County of Inyo and City of Los Angeles, Department of Water and Power, for 4.13 acres of land known as Lone Pine Park, or any subsequent leases that may be negotiated between the Los Angeles Department of Water and Power and Inyo County.

24. ATTACHMENTS. All attachments referred to are incorporated herein and made a part of this Contract.

25. EXECUTION. This Contract may be executed in several counterparts, each of which shall constitute one and the same instrument and shall become binding upon the parties. In approving this Contract, it shall not be necessary to produce or account for more than one such counterpart.

26. ENTIRE AGREEMENT. This Contract, including the Contract Documents and all other documents which are incorporated herein by reference, constitutes the complete and exclusive agreement between the County and Contractor. All prior written and oral communications, including correspondence, drafts, memoranda, and representations, are superseded in total by this Contract.

---o0o---

IN WITNESS WHEREOF, COUNTY and CONTRACTOR have each caused this Contract to be executed on its behalf by its duly authorized representative, effective as of the day and year first above written.

COUNTY

CONTRACTOR

COUNTY OF INYO

By: _____

By: _____

Name: _____

Name: _____

Title: _____

Title: _____

Dated: _____

Dated: _____

APPROVED AS TO FORM AND LEGALITY:

County Counsel

APPROVED AS TO ACCOUNTING FORM:

County Auditor

APPROVED AS TO INSURANCE REQUIREMENTS:

County Risk Manager

ATTACHMENT 1

PROJECT

**FAITHFUL PERFORMANCE BOND
(100% OF CONTRACT AMOUNT)**

KNOW ALL MEN BY THESE PRESENTS: That _____

_____ as Principal, hereinafter "Contractor,"
(Name of Contractor)

and _____
(Name of Corporate Surety)

as Corporate Surety, hereinafter called Surety, are held and firmly bound unto the County of Inyo as Obligee, hereinafter called County, in the amount of _____ dollars (\$ _____), for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assignees, jointly and severally, firmly by these presents.

WHEREAS, Contractor has, by written Contract, dated _____, 20____, entered into an Contract with the County for the Construction of the _____ **PROJECT** (hereinafter referred to as "Project"), to be constructed in accordance with the terms and conditions set forth in the Contract for the Project, which contract is by reference incorporated herein and is hereinafter referred to as the "Contract."

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the County.

Whenever Contractor shall be, and is declared by County to be, in default under the Contract, the County having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly either:

- 1. Complete the Contract in accordance with its terms and conditions; or,

2. Obtain a Bid or Bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible Bidder, or if the County elects, upon determination by the County and the Surety jointly of the lowest responsible Bidder, arrange for a Contract between such Bidder and County, and make available as work progresses (even though there should be a default or a succession of defaults under the Contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the Contract price", as used in this paragraph, shall mean the total amount payable by County to Contractor under the Contract and any amendments thereto, less the amount properly paid by County to Contractor.

Any suit under this Bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due, or the date on which any warranty or guarantee period expires, whichever is later.

No right of action shall accrue on this Bond to or for the use of any person or corporation other than the County named herein.

---o0o---

Signed and sealed this _____ day of _____, 20 _____.

(Name of Corporate Surety)

By: _____
(Signature)

(SEAL)

(Title of Authorized Person)

(Address for Notices to be Sent)

(Name of Contractor)

By: _____
(Signature)

(SEAL)

(Title of Authorized Person)

(Address for Notices to be Sent)

NOTE: THE SIGNATURES OF THE CONTRACTOR AND THE SURETY MUST EACH BE ACKNOWLEDGED BEFORE A NOTARY PUBLIC (OR OTHER OFFICER AUTHORIZED UNDER CALIFORNIA LAW) AND THE ACKNOWLEDGMENTS MUST BE ATTACHED TO THIS BOND.

The Faithful Performance Bond must be executed by a corporate surety on this form. No substitutions will be accepted. If an attorney-in-fact signs for the surety, an acknowledged statement from the surety appointing and empowering the attorney-in-fact to execute such bonds in such amounts on behalf of the surety must accompany the Faithful Performance Bond.

ADDRESS OF COUNTY FOR NOTICES TO BE SENT:

County of Inyo
224 North Edwards Street, P.O. Box N
Independence, California 93526

ATTACHMENT 2

PROJECT

LABOR AND MATERIALS PAYMENT BOND
(100% OF CONTRACT AMOUNT)

KNOW ALL MEN BY THESE PRESENTS, that _____
(Name of Contractor)

_____ as Principal, hereinafter "CONTRACTOR,"

and _____
(Name of Corporate Surety)

as Corporate Surety, hereinafter called SURETY, are held and firmly bound unto the County of Inyo as Obligee, hereinafter called COUNTY, for the use and benefit of claimants as hereinafter defined in the amount of _____ dollars (\$ _____) for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assignees, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written contract dated _____, 20 _____, entered into an Contract with the County for the construction of the _____ PROJECT (hereinafter referred to as "PROJECT"), to be constructed in accordance with the terms and conditions set forth in the contract for the PROJECT, which contract is by reference incorporated herein, and is hereinafter referred to as the "CONTRACT."

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly make payment to all claimants as hereinafter defined, for all labor and materials used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise, it shall remain in full force and effect, subject, however, to the following conditions:

1. A claimant is defined as one having a direct contract with the Contractor, or with a Subcontractor of the Contractor, for labor, materials, or both, used or reasonably required for use in the performance of the Contract. Labor and materials is construed to include, but not limited to, that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.
2. The above named Contractor and Surety hereby jointly agree with the County that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) calendar days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this Bond for the benefit of such claimant, prosecute the suit to final judgment for such

sum or sums as may be justly due claimant, and have execution thereon. The County shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:

a) Unless claimant, other than one having a direct contract with the Contractor, shall have given written notice to any two of the following: the Contractor, the County, or the Surety above named, within ninety (90) calendar days after such claimant did or performed the last of the work or labor, or furnished the last of the material for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in any envelope addressed to the Contractor, County, or Surety, at the address below, or at any place where an office is regularly maintained for the transaction of their business. Such notice may also be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

b) After the expiration of one (1) year following the date on which County accepted the work done under the Contract. However, if any limitation embodied in this Bond is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

c) Other than in a State Court of competent jurisdiction in and for the County or other political subdivision of the state in which the Project, or any part thereof, is situated, and not elsewhere.

4. The amount of this Bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed or recorded against said Project, whether or not claim for the amount of such lien be presented under and against this Bond.

---o0o---

Signed and sealed this _____ day of _____, 20 ____.

(Name of Contractor)

By: _____
(Signature)

(SEAL)

(Title of Authorized Person)

(Address for Notices to be Sent)

(Name of Corporate Surety)

By: _____
(Signature)

(SEAL)

(Title of Authorized Person)

(Address for Notices to be Sent)

NOTE:

THE SIGNATURES OF THE CONTRACTOR AND THE SURETY MUST BE ACKNOWLEDGED BEFORE A NOTARY PUBLIC (OR OTHER OFFICER AUTHORIZED UNDER CALIFORNIA LAW).

The Labor and Materials Payment Bond must be executed by a corporate surety on this form. No substitutions will be accepted. If an attorney-in-fact signs for the surety, an acknowledged statement from the surety appointing and empowering the attorney-in-fact to execute such bonds in such amounts on behalf of the surety, must accompany the Labor and Materials Payment Bond.

ADDRESS OF COUNTY FOR NOTICES TO BE SENT TO:

**County of Inyo
224 N. Edwards, P.O. Box N
Independence, California 93526**

ATTACHMENT 3

AGREEMENT BETWEEN THE COUNTY OF INYO AND

FOR THE _____ PROJECT

TERM:
FROM: _____ TO: _____

SEE ATTACHED INSURANCE PROVISIONS

SPECIAL PROVISIONS

FOR

LONE PINE DOG PARK PROJECT

Lone Pine, CA

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COUNTY OF INYO
DEPARTMENT OF PUBLIC WORKS

SPECIFICATIONS APPROVAL

LONE PINE DOG PARK PROJECT
Lone Pine, CA

These Special Provisions have been prepared by the Inyo County Public Works Department under the direction of the undersigned and are approved for the work contemplated herein.

Director of Public Works

Specifications Approval Date

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**SPECIAL PROVISIONS
LONE PINE DOG PARK PROJECT
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I. INTRODUCTION / GENERAL:

The Lone Pine Dog Park Project (Project), a public works project of Inyo County, is to be constructed and completed in accordance with these Special Provisions, the Project Plans, and, insofar as they are referenced herein, the Standard Specifications of the Inyo County Public Works Department dated October, 2015 (Standard Specifications). The Special Provisions, the Project Plans, and the sections of the Standard Specifications referenced herein, constitute a portion of the "Contract Documents" (as that term is defined in section 1070.04 of the Standard Specifications) governing the project and shall therefore be binding upon and observed by the person/entity with whom the County of Inyo enters into contract for construction of the Project.

Copies of the Project Plans and the Standard Specifications may be obtained from the Inyo County Public Works Department in Independence, California.

Unless indicated otherwise, all references in this document to sections are to those in the Inyo County Standard Specifications October 2015 or to other sections in these Special Provisions. In case of any irreconcilable conflict between the requirements of the Inyo County Standard Specifications October 2015 referenced herein or the Caltrans Standard Specifications and these Special Provisions, these Special Provisions shall prevail and be observed.

II. PROJECT DESCRIPTION:

This project consists of the removal and installation of chain link fencing including gates, installation of a 2" HDPE waterline, installation of a backflow preventer, installation of frost free yard hydrants, dog park signs and picnic benches and construction of a sidewalk including truncated domes (project located at 445 N. Main Street, Lone Pine).

III. CONTRACT AWARD AND EXECUTION - SECTION 3:

3-1.04 CONTRACT AWARD

Section 3-1.04 of the Standard Specifications shall be amended as follows:

Whenever possible, the award to the lowest bidder, if made, will be made no later than thirty (30) calendar days after the opening of bid proposals. However, failure of the County to make award within thirty (30) calendar days after the opening of the bid proposals shall not relieve the Contractor of its requirement to deliver an executed contract and bonds, and any other required documents, within 15 days of Notification of Award, as further described in Section 3-1.18: Contract Execution.

3-1.05 CONTRACT BONDS (PUB CONT CODE §§ 10221 AND 10222)

The successful bidder must furnish 2 bonds:

1. Payment bond to secure the claim payments of laborers, workers, mechanics, or materialmen providing goods, labor, or services under the Contract. This bond must be equal to at least 100 percent of the Contract amount.
2. Performance bond to guarantee the faithful performance of the Contract. This bond must be equal to at least 100 percent of the Contract amount.

The bond forms are in the Bid Book.

3-1.06 CONTRACTOR LICENSE

For a federal-aid contract, the Contractor must be properly licensed as a contractor from contract award through Contract acceptance (Pub Cont Code § 10164).

For a non-federal-aid contract:

1. The Contractor must be properly licensed as a contractor from bid opening through Contract acceptance (Bus & Prof Code § 7028.15)
2. Joint venture bidders must obtain a joint venture license before contract award (Bus & Prof Code § 7029.1)

3-1.07 INSURANCE POLICIES

The successful bidder must submit:

1. Copy of its commercial general liability policy and its excess policy or binder until such time as a policy is available, including the declarations page, applicable endorsements, riders, and other modifications in effect at the time of contract execution. Standard ISO form no. CG 0001 or similar exclusions are allowed if not inconsistent with section 7-1.06. Allowance of additional exclusions is at the discretion of the Department.
2. Certificate of insurance showing all other required coverages. Certificates of insurance, as evidence of required insurance for the auto liability and any other required policy, shall set forth deductible amounts applicable to each policy and all exclusions that are added by endorsement to each policy. The evidence of insurance shall provide that no cancellation, lapse, or reduction of coverage will occur without 10 days prior written notice to the Department.
3. A declaration under the penalty of perjury by a CPA certifying the accountant has applied GAAP guidelines confirming the successful bidder has sufficient funds and resources to cover any selfinsured retentions if the self-insured retention is over \$50,000.

If the successful bidder uses any form of self-insurance for workers compensation in lieu of an insurance policy, it shall submit a certificate of consent to self-insure under Labor Code § 3700.

3-1.08 SMALL BUSINESS ENTERPRISE PARTICIPATION

Section 3-1.08 is amended as follows.

This project is subject to Inyo County Ordinance No. 1156, An Ordinance of the Board of Supervisors of the County of Inyo, State of California, Adding Chapter 6.06 to the Inyo County Code to Provide Contacting Preferences for Local and Small Businesses, which is included in the bid package.

The bidder must:

- 1) Take necessary and reasonable steps to ensure that small business enterprises (SBEs) have opportunity to participate in the contract.
- 2) Make work available to SBEs and select work parts consistent with available SBE subcontractors and suppliers.

To qualify for the SBE contracting preference as described in Inyo County Ordinance No. 1156 (Ordinance No. 1156), Section 6.06.040, the bidder must show that he/she is a SBE as described in Ordinance No. 1156 Section 6.06.020.

To qualify for the SBE subcontracting preference as described in Ordinance No. 1156, Section 6.06.050, the bidder must show that the subcontractor(s) proposed for work on the project is/are a SBE(s) as described in Ordinance No. 1156 Section 6.06.020.

It is the bidders' responsibility to verify that the SBE(s) is certified as a small business enterprise at the date of bid opening.

SBE CONTRACTING PREFERENCE COMMITMENT SUBMITTAL:

If the bidder is claiming the SBE contracting preference, the bidder must submit SBE information on the "Small Business Enterprise Commitment (Construction Contracts)," form included in the Bid Package. If the bidder is not claiming the SBE contracting preference, remove the form from the Bid Package before submitting your bid.

The bidder must Submit written confirmation from each SBE subcontractor stating that it is participating in the contract. Include confirmation with the SBE Commitment form. A copy of a SBE subcontractor's quote will serve as written confirmation that the SBE is participating in the contract.

SUBCONTRACTOR AND SBE RECORDS:

The Contractor shall maintain records showing the name and business address of each first-tier subcontractor. The records shall also show the name and business address of every SBE subcontractor, SBE vendor of materials and SBE trucking company, regardless of tier. The records shall show the date of payment and the total dollar figure paid to all of these firms. SBE prime contractors shall also show the date of work performed by their own forces along with the corresponding dollar value of the work.

Upon completion of the contract, a summary of these records shall be prepared on "Final Report – Utilization of Small Business Enterprises - (SBE), First-Tier Subcontractors," certified correct by the Contractor or his authorized representative, and submitted to the Engineer. The form shall be furnished to the Engineer within 90 days from the date of contract acceptance.

3-1.18 CONTRACT EXECUTION

The successful bidder must sign the Contract form.

Deliver two (2) fully executed (except for the County's signature) to the Office Engineer:

1. Signed Contract form
2. Contract bonds
3. Documents identified in section 3-1.07
4. Payee Data Record
5. Small Business (SB) Participation Report form

The Office Engineer must receive these documents before the 10th business day after the bidder receives the contract.

The bidder's security may be forfeited for failure to execute the contract within the time specified (Pub Cont Code §§ 10181, 10182, and 10183).

A copy of the Contract form is included in your bid book.

IV. LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC – SECTION 7:

Section 7 of the Standard Specifications are amended to read as follows:

7-1.02K (2) WAGES

The general prevailing wage rates, determined by the Department of Industrial Relations, for Inyo County, are available at the County of Inyo address or the California DIR web site at <http://www.dir.ca.gov>. Changes are available at the same locations. These wage rates are not included in the Contract Documents. All labor will be paid at not less than these minimum wage rates.

7-1.02K (3) Certified Payroll Records (Labor Code §1776)

Contractor must keep accurate payroll records, and submit a copy of your certified payroll records weekly, including those of subcontractors to the following:

1. Inyo County Department of Public Works
2. Division of Labor Standards Enforcement of the Department of Industrial Relations
3. Division of Apprenticeship Standards of the Department of Industrial Relations

Include in the certified payroll:

1. Each employee's:
 - 1.1. Full name
 - 1.2. Address

- 1.3. Social security number
- 1.4. Work classification
- 1.5. Straight time and overtime hours worked each day and week
- 1.6. Actual wages paid for each day to each:
 - 1.6.1. Journeyman
 - 1.6.2. Apprentice
 - 1.6.3. Worker
 - 1.6.4. Other employee you employ for the work
- 1.7. Pay rate
- 1.8. Itemized deductions made
- 1.9. Check number issued

2. Apprentices and the apprentice-to-journeyman ratio
3. A Statement of Compliance signed under penalty of perjury that declares:
 - a) The information contained in the payroll record is true, correct, and complete
 - b) The employer has complied with the requirements of sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project
 - c) The wage rates paid are at least those required by the Contract

7-1.05 INDEMNIFICATION

Contractor shall hold harmless, defend, and indemnify the County of Inyo and its officers, officials, employees, and volunteers from and against all claims, damages, losses, and expenses including attorney fees and litigation costs, arising out of the performance of the work described herein, caused in whole or in part by any negligent act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, except where caused by the active negligence, sole negligence, or willful misconduct of the County.

V. PROSECUTION AND PROGRESS – SECTION 8

Amended to read as follows:

8-1.05 TIME

The Contractor shall complete all designated portions of the work required to be provided pursuant to the contract no later than **Forty-Five (45) Calendar days** from and including the Starting Date, plus such additional days, if any, which are expressly granted as extensions of time by Contract Change Orders signed and issued by the County. Such total number of days shall be referred to herein as the “Time for Completion.”

Failure of the Contractor to perform any covenant or condition contained in the Contract Documents within the time period specified shall constitute material breach of this Contract entitling the County to terminate the Contract unless the Contractor applies for, and receives, an extension of time in accordance with the procedures set forth in Section 1017.09 SS, “EXTENSION OF TIME.”

8-1.10 LIQUIDATED DAMAGES

In accordance with Government Code Section 53069.85, the Contractor shall pay to the County of Inyo, liquidated damages in the amounts of:

\$500.00 per day for each and every calendar day delay in finishing work in excess of the Time for Completion specified.

The County shall be entitled to deduct the amounts of liquidated damages from any payment otherwise due to the Contractor.

VI. CLAIMS RESOLUTION

PUBLIC CONTRACT CODE SECTION 9204

(a) The Legislature finds and declares that it is in the best interests of the state and its citizens to ensure that all construction business performed on a public works project in the state that is complete and not in dispute is paid in full and in a timely manner.

(b) Notwithstanding any other law, including, but not limited to, Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2, Chapter 10 (commencing with Section 19100) of Part 2, and Article 1.5 (commencing with Section 20104) of Chapter 1 of Part 3, this section shall apply to any claim by a contractor in connection with a public works project.

(c) For purposes of this section:

(1) "Claim" means a separate demand by a contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:

(A) A time extension, including, without limitation, for relief from damages or penalties for delay assessed by a public entity under a contract for a public works project.

(B) Payment by the public entity of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public works project and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled.

(C) Payment of an amount that is disputed by the public entity.

(2) "Contractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who has entered into a direct contract with a public entity for a public works project.

(3) (A) "Public entity" means, without limitation, except as provided in subparagraph (B), a state agency, department, office, division, bureau, board, or commission, the California State University, the University of California, a city, including a charter city, county, including a charter county, city and county, including a charter city and county, district, special district, public authority, political subdivision, public corporation, or nonprofit transit corporation wholly owned by a public agency and formed to carry out the purposes of the public agency.

(B) "Public entity" shall not include the following:

(i) The Department of Water Resources as to any project under the jurisdiction of that department.

- (ii) The Department of Transportation as to any project under the jurisdiction of that department.
- (iii) The Department of Parks and Recreation as to any project under the jurisdiction of that department.
- (iv) The Department of Corrections and Rehabilitation with respect to any project under its jurisdiction pursuant to Chapter 11 (commencing with Section 7000) of Title 7 of Part 3 of the Penal Code.
- (v) The Military Department as to any project under the jurisdiction of that department.
- (vi) The Department of General Services as to all other projects.
- (vii) The High-Speed Rail Authority.

(4) "Public works project" means the erection, construction, alteration, repair, or improvement of any public structure, building, road, or other public improvement of any kind.

(5) "Subcontractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who either is in direct contract with a contractor or is a lower tier subcontractor.

(d) (1) (A) Upon receipt of a claim pursuant to this section, the public entity to which the claim applies shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the claimant a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, a public entity and a contractor may, by mutual agreement, extend the time period provided in this subdivision.

(B) The claimant shall furnish reasonable documentation to support the claim.

(C) If the public entity needs approval from its governing body to provide the claimant a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the public entity shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the claimant a written statement identifying the disputed portion and the undisputed portion.

(D) Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. If the public entity fails to issue a written statement, paragraph (3) shall apply.

(2) (A) If the claimant disputes the public entity's written response, or if the public entity fails to respond to a claim issued pursuant to this section within the time prescribed, the claimant may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the public entity shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(B) Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the public entity shall provide the claimant a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. Any disputed portion of the claim, as identified by the contractor in writing, shall be submitted to nonbinding mediation, with the public entity and the claimant sharing the associated costs equally. The public entity and claimant shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside this section.

(C) For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

(D) Unless otherwise agreed to by the public entity and the contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

(E) This section does not preclude a public entity from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this section does not resolve the parties' dispute.

(3) Failure by the public entity to respond to a claim from a contractor within the time periods described in this subdivision or to otherwise meet the time requirements of this section shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the public entity's failure to have responded to a claim, or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the claimant.

(4) Amounts not paid in a timely manner as required by this section shall bear interest at 7 percent per annum.

(5) If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a public entity because privity of contract does not exist, the contractor may present to the public entity a claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that the contractor present a claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the claim be presented to the public entity shall furnish reasonable documentation to support the claim. Within 45 days of receipt of this written request, the contractor shall notify the subcontractor in writing as to whether the contractor presented the claim to the public entity and, if the original contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.

(e) The text of this section or a summary of it shall be set forth in the plans or specifications for any public works project that may give rise to a claim under this section.

(f) A waiver of the rights granted by this section is void and contrary to public policy, provided, however, that (1) upon receipt of a claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable; and (2) a public entity may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of this section, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in this section.

(g) This section applies to contracts entered into on or after January 1, 2017.

(h) Nothing in this section shall impose liability upon a public entity that makes loans or grants available through a competitive application process, for the failure of an awardee to meet its contractual obligations.

(i) This section shall remain in effect only until January 1, 2020, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2020, deletes or extends that date.

VII. SPECIFICATIONS

PART 1: GENERAL

1.01 FENCING

The contractor shall furnish all materials, labor, and equipment to install 6' high, chain link fencing per Caltrans Revised Standard Plan A85 and Caltrans Revised Standard Specification dated 2015. The exceptions being that all fencing posts shall be 3" in diameter, all corner posts shall be 4" in diameters and gate posts shall be 4.5" in diameter. The payment shall be per linear foot of fencing installed.

1.02 HIGH-DENSITY POLYETHYLENE PIPE (HDPE)

Pipe Requirements: HDPE Pipe shall meet the requirements of ASTM D2737. Pipe dimensions shall meet Copper Tubing Size (CTS) standards.

Material Properties: Tubing material shall be high-density polyethylene conforming to the minimum requirements of cell classification 445574C/E as defined and described in ASTM D3350. The resin shall have a material designation code of PE4710 by the Plastic Pipe Institute.

1.03 PORTLAND CEMENT CONCRETE. Portland cement concrete shall conform to the provisions in **Section 90, "Concrete,"** of the Caltrans Standard Specifications and these special provisions.

The Department maintains a list of sources of fine and coarse aggregate that have been approved for use with a reduced amount of supplementary cementitious material in the total amount of cementitious material to be used. A source of aggregate will be considered for addition to the approved list if the producer of the aggregate submits to the Transportation Laboratory certified test results from a qualified testing laboratory that verify the aggregate complies with the requirements. Before the testing starts, the aggregate test shall be registered with the Department. A registration number can be obtained by calling (916) 227-7228. The registration number shall be used as the identification for the aggregate sample in correspondence with the Department. Upon request, a split of the tested sample shall be provided to the Department. Approval of aggregate will depend upon compliance with the specifications, based on the certified test results submitted, together with any replicate testing the Department may elect to perform. Approval will expire 3 years from the date the most recent registered and evaluated sample was collected from the aggregate source.

Qualified testing laboratories shall conform to the following requirements:

1. Laboratories performing ASTM Designation: C 1293 shall participate in the Cement and Concrete Reference Laboratory (CCRL) Concrete Proficiency Sample Program and shall have received a score of 3 or better on each test of the previous 2 sets of concrete samples.
2. Laboratories performing ASTM Designation: C 1260 shall participate in the Cement and Concrete Reference Laboratory (CCRL) Pozzolan Proficiency Sample Program and

shall have received a score of 3 or better on the shrinkage and soundness tests of the previous 2 sets of pozzolan samples.

Aggregates on the list shall conform to one of the following requirements:

1. When the aggregate is tested in conformance with the requirements in California Test 554 and ASTM Designation: C 1293, the average expansion at one year shall be less than or equal to 0.040 percent; or
2. When the aggregate is tested in conformance with the requirements in California Test 554 and ASTM Designation: C 1260, the average of the expansion at 16 days shall be less than or equal to 0.15 percent.

If the aggregates used in the concrete are on the Caltrans list, the minimum amount of supplementary cementitious material shall conform to the following:

1. If fly ash or natural pozzolan conforming to the provisions in Section **90-1.02B(3), "Supplementary Cementitious Materials,"** of the Caltrans Standard Specifications is used, the minimum amount of supplementary cementitious material shall be 15 percent by weight of the total cementitious material; or
2. If silica fume conforming to the provisions in **90-1.02B(3), "Supplementary Cementitious Materials,"** of the Caltrans Standard Specifications is used, the minimum amount of supplementary cementitious material shall be 7 percent by weight of the total cementitious material.

The limitation on tricalcium silicate (C₃S) content in Type II cement specified in Section **90-1.02B(2), "Cement,"** of the Caltrans Standard Specifications shall not apply.

1.04 SANITARY FROST FREE YARD HYDRANT. Sanitary Frost free yard hydrant shall contain the following features;

- a. Conform with ASSE Standard 1052.
- b. NSF 61 certified.
- c. IAPMO listed.
- d. Fully frost proof, with shut-off valve below frost line.
- e. Heavy cast iron head with ¾" brass discharge connection.
- f. Heavy, galvanized steel, corrosion resistant, 1" stand-pipe.
- g. Galvanized carbon steel connecting rod. Brass operating rod.
- h. Rated to 125/150 psi, adjustable.

1.05 TRUNCATED DOMES. Curb ramp detectable warning surface shall consist of raised truncated domes constructed or installed on curb ramps in conformance with the details shown on the plans and these special provisions. At the option of the Contractor, the detectable warning surface shall be prefabricated, cast-in-place, or stamped into the surface of the curb ramp. The color of the detectable warning surface shall be yellow conforming

to Federal Standard 595B, Color No. 33538.

Prefabricated detectable warning surface shall be in conformance with the requirements established by the Department of General Services, Division of State Architect and be attached in conformance with the manufacturer's recommendations.

Cast-in-place and stamped detectable warning surfaces and curbs shall be painted in conformance with the provisions in Section 59-6, "**Painting Concrete**" of the Caltrans Standard Specifications. The finished surfaces of the detectable warning surface shall be free from blemishes.

Prior to constructing the cast-in-place or stamping the detectable warning surface, the Contractor shall demonstrate the ability to produce a detectable warning surface conforming to the details shown on the plans and these special provisions by constructing a 24" x 24" test panel.

The manufacturer shall provide a written 5-year warranty for prefabricated detectable warning surfaces, guaranteeing replacement when there is defect in the dome shape, color fastness, sound-on-cane acoustic quality, resilience, or attachment. The warranty period shall begin upon acceptance of the contract.

- 1.06 **SIGNS.** Signs shall be constructed of 1.6mm (0.063") flat sheet tension leveled, sign grade aluminum alloy 5052-H38, conforming to the requirements of ASTM B209M, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- 1.07 **SIGN POSTS.** Wood posts shall be pressure treated after fabrication in conformance with the provisions in Section 57-2.01B(3), "Preservative Treatment" of the Standard Specifications and AWWA Use Category System: UC4A, Commodity Specification A or B.
- 1.08 **PICNIC TABLES.** Picnic tables shall be approximately 6 feet long, 30 inches tall and 5 feet wide. Frame shall be constructed of galvanized steel tubing. Seats and table top shall be constructed of pressure treated pine wood.
- 1.09 **BACKFLOW PREVENTER.** 2" Reduced Pressure Principle Backflow preventer shall be on the latest U.S.C., F.C.C.C. and H.R. Institute List and comply with State Water Resources Control Board Regulations

After installation, the backflow prevention assembly must be tested by a certified backflow prevention tester and a test report must be submitted to the County.

Backflow Preventer to be NSF 61 certified.

1.10 WATER VALVES.

- A. Description: All water valves are to be Ball Valve Curb Stops, as described herein.
- B. Standards: Ball Valve Curb Stops shall be NSF 61 and NSF 372 certified, and designed in accordance with the latest revisions of AWWA C800 Standard for underground Service Valves and Fittings, as modified herein.
- C. Material: Ball Valve Curb Stop materials shall conform to the following requirements:
 - 1. Material of the body and ball shall be “No Lead” meeting ASTM B584 UNS copper allow C89833 or C89520 as specified in the latest revision of AWWA C800, Section 4.
 - 2. The ball shall be coated with a nontoxic, non-water soluble, tenacious, self-lubricating film, Teflon or equal, that can withstand ambient temperature changes within a range of 32 degrees to 80 degrees Fahrenheit, and possesses suitable bonding and wearing qualities.
 - 3. The stem seals shall be made of high-grade rubber suitable for potable water.
 - 4. The valve seats shall be molded NBR or Buna-N rubber in compliance with ASTM D2000 or an approved equal.
- D. Workmanship: Stops shall be of high quality and all castings shall be free from defects of any kind. Completed valves shall be free from metal chips.
- E. Stop Design: Stops shall be designed in accordance with the following requirements:
 - 1. Outlet ends and coupling nuts shall comply with AWWA C800 for flared connection with Type “K” copper. Each unit shall be furnished with two coupling nuts.
 - 2. The stops shall be of straight-through/full port design. The size of the port shall not be less than the nominal size of the ball valve stop.
 - 3. Rotation of the tee head shall be counterclockwise (left) one-quarter turn to open.
 - 4. Rotation of the tee shall be limited by a positive check at each end of the one-quarter turn.
 - 5. The tee head and stop shall be of adequate thickness, height, width and strength to withstand a torque at the fully open or full closed position with a torque of 120 ft-lbs.
 - 6. The tee head shall be in alignment with the flow of passage thru the curb stop.

7. The operating torque with the ball valve stop closed, with 150 psi on one side and atmospheric pressure on the other shall be not more than 25 ft-lbs.
8. The pressure class for the ball valve stop shall be “high-pressure” as defined in AWWA C800, and shall be capable of withstanding a hydrostatic test pressure of 300 psi.
9. The seat shall be designed such that it remains drop tight, intact and show no distortion after being subjected to 110 psi while the ball is in the 15 degree, 30 degree, 45 degree, 60 degree and 75 degree positions from fully closed for a period of ten minutes in each position.
10. Valve body shall be clearly and permanently marked either casting or stamping to indicate a low lead casting.

F. Tests by Manufacturer:

1. Hydrostatic Test: A hydrostatic pressure of 300 psi shall be applied to each ball valve in the open position.
2. Leakage Test: A hydrostatic pressure of 150 psi shall be applied to each ball valve stop in the closed position. The ball valve shall show no leakage in either the open or closed position test.
3. In lieu of the hydrostatic test of 300 psi and leakage test of 150 psi, the manufacturer may substitute an air under water test to a pressure of 125 psi for each of the required tests. The ball valves shall show no leakage for either test.
4. A chemical analysis of the copper alloy shall be made.

END OF SECTION

PLANS

FOR

LONE PINE DOG PARK PROJECT

Lone Pine, California



County of Inyo



Public Works

DEPARTMENTAL - ACTION REQUIRED

MEETING: March 3, 2020

FROM: Debbe Ditmar

SUBJECT: Award contract for Trash Disposal and Recycling Services to Preferred Septic and Disposal of Bishop, CA for the period of March 1, 2020 through February 28, 2023.

RECOMMENDED ACTION:

Request Board ratify and approve the contract between the County of Inyo and Preferred Septic and Disposal, Inc. for the provision of Trash Disposal and Recycling Services in an amount not to exceed \$180,000.00 for the period of March 1, 2020 through February 28, 2023, contingent upon the Board's approval of future budgets, and authorize the Chairperson to sign, contingent upon all appropriate signatures being obtained.

SUMMARY/JUSTIFICATION:

On February 14, 2020 bids were received for Trash Disposal and Recycling Services for Inyo County Facilities. The term of this contract is March 1, 2020 through February 28, 2023. Bids were based on the price of trash receptacle type, pickup service schedules, and recycling service costs based on each facilities needs.

Bishop Waste and Preferred Septic and Disposal are the two companies that submitted bids. Both submitted bids quoted identical pricing per location based on the minimum charges for waste hauling in Inyo County, including a 5% discount both companies offered the County for early payment. The Public Works Department decided to pick a company at random by the flip of a coin. With the result of this method, the Public Works Department recommends your Board award the contract for Trash Disposal and Recycling Services to Preferred Septic and Disposal of Bishop, California.

BACKGROUND/HISTORY OF BOARD ACTIONS:

ALTERNATIVES AND CONSEQUENCES OF NEGATIVE ACTION:

If you choose not to award the contract to Preferred Septic and Disposal, we would have to go back out to bid which would take several more weeks. This is not recommended as we would be without trash and recycling services during this time, as our current contract ends as of February 28, 2020.

OTHER AGENCY INVOLVEMENT:

- *County Counsel for the legal approval of the contract.
- *Auditor's Office for the processing of all contract payments.
- *Risk Management for approval of insurance requirements.
- *Building and Maintenance Fiscal- contract oversight and accounts payable for all contract service invoices.

FINANCING:

This will be budgeted and financed through Building and Maintenance Budget 011100 Object Code 5265 Professional Services.

ATTACHMENTS:

1. Preferred Septic_ Contract
2. Bid Tabulation Form
3. Waste Hauling Minimum Charges 2020

APPROVALS:

Debbe Ditmar	Created/Initiated - 2/14/2020
Darcy Ellis	Approved - 2/18/2020
Debbe Ditmar	Approved - 2/25/2020
Michael Errante	Approved - 2/25/2020
Breanne Nelums	Approved - 2/25/2020
Marshall Rudolph	Approved - 2/25/2020
Amy Shepherd	Approved - 2/25/2020
Aaron Holmberg	Approved - 2/26/2020
Michael Errante	Final Approval - 2/26/2020

AGREEMENT BETWEEN COUNTY OF INYO
AND _____
FOR THE PROVISION OF _____ SERVICES

INTRODUCTION

WHEREAS, the County of Inyo (hereinafter referred to as "County") has the need for the _____ services of _____ of _____ hereinafter referred to as "Contractor"), and in consideration of the mutual promises, covenants, terms, and conditions hereinafter contained, the parties hereby agree as follows:

TERMS AND CONDITIONS

1. SCOPE OF WORK.

The Contractor shall furnish to the County, those services and work set forth in Attachment **A**, attached hereto and by reference incorporated herein.

Services and work provided by the Contractor at the County's request under this Agreement will be performed in a manner consistent with the requirements and standards established by applicable federal, state, and County laws, ordinances, regulations, and resolutions. Such laws, ordinances, regulations, and resolutions include, but are not limited to, those which are referred to in this Agreement.

2. TERM.

The term of this Agreement shall be from _____ to _____ unless sooner terminated as provided below.

3. CONSIDERATION.

A. Compensation. County shall pay to Contractor the sum total of _____ Dollars and _____ cents (\$ _____) for performance of all of the services and completion of all of the work described in Attachment **A**.

B. Travel and Per Diem. Contractor will not be paid or reimbursed for travel expenses or per diem which Contractor incurs in providing services and work under this Agreement.

C. No Additional Consideration. Except as expressly provided in this Agreement, Contractor shall not be entitled to, nor receive, from County, any additional consideration, compensation, salary, wages, or other type of remuneration for services rendered under this Agreement. Specifically, Contractor shall not be entitled, by virtue of this Agreement, to consideration in the form of overtime, health insurance benefits, retirement benefits, disability retirement benefits, sick leave, vacation time, paid holidays, or other paid leaves of absence of any type or kind whatsoever.

D. Limit Upon Amount Payable Under Agreement. The total sum of all payments made by the County to Contractor for all services and work to be performed under this Agreement shall not exceed _____ Dollars and _____ cents (\$ _____) (hereinafter referred to as "contract limit"). County expressly reserves the right to deny any payment or reimbursement requested by Contractor for services or work performed which is in excess of the contract limit.

E. Billing and Payment. Contractor shall submit to the County, upon completion of all services and work set forth in Attachment **A**, an itemized statement of all services and work performed by Contractor pursuant to this Agreement. This statement will identify the date on which the services were performed and describe the nature of the services and work which was performed on each day. Upon receipt of the statement by the fifth (5th) day of the month, County shall make payment to Contractor on the last day of the month.

F. Federal and State Taxes.

(1) Except as provided in subparagraph (2) below, County will not withhold any federal or state income taxes or social security from any payments made by County to Contractor under the terms and conditions of this Agreement.

(2) County will withhold California State income taxes from payments made under this Agreement to non-California resident independent contractors when it is anticipated that total annual payments to Contractor under this Agreement will exceed one thousand four hundred ninety-nine dollars (\$1,499.00).

(3) Except as set forth above, County has no obligation to withhold any taxes or payments from sums paid by County to Contractor under this Agreement. Payment of all taxes and other assessments on such sums is the sole responsibility of Contractor. County has no responsibility or liability for payment of Contractor's taxes or assessments.

(4) The total amounts paid by County to Contractor, and taxes withheld from payments to non-California residents, if any, will be reported annually to the Internal Revenue Service and the California State Franchise Tax Board. To facilitate this reporting, Contractor shall complete and submit to the County an Internal Revenue Service (IRS) Form W-9 upon executing this Agreement.

4. WORK SCHEDULE.

Contractor's obligation is to perform, in a timely manner, those services and work identified in Attachment **A**. It is understood by Contractor that the performance of these services and work will require a varied schedule. Contractor will arrange his/her own schedule, but will coordinate with County to ensure that all services and work requested by County under this Agreement will be performed within the time frame set forth by County.

5. REQUIRED LICENSES, CERTIFICATES, AND PERMITS.

A. Any licenses, certificates, or permits required by the federal, state, county, or municipal governments for contractor to provide the services and work described in Attachment **A** must be procured by Contractor and be valid at the time Contractor enters into this Agreement or as otherwise may be required. Further, during the term of this Agreement, Contractor must maintain such licenses, certificates, and permits in full force and effect. Licenses, certificates, and permits may include, but are not limited to, driver's licenses, professional licenses or certificates, and business licenses. Such licenses, certificates, and permits will be procured and maintained in force by Contractor at no expense to the County. Contractor will provide County, upon execution of this Agreement, with evidence of current and valid licenses, certificates and permits which are required to perform the services identified in Attachment **A**. Where there is a dispute between Contractor and County as to what licenses, certificates, and permits are required to perform the services identified in Attachment **A**, County reserves the right to make such determinations for purposes of this Agreement.

B. Contractor warrants that it is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in covered transactions by any federal department or agency. Contractor also warrants that it is not suspended or debarred from receiving federal funds as listed in the List of Parties Excluded from Federal Procurement or Non-procurement Programs issued by the General Services Administration available at: <http://www.sam.gov>.

6. OFFICE SPACE, SUPPLIES, EQUIPMENT, ETC.

Contractor shall provide such office space, supplies, equipment, vehicles, reference materials, and telephone service as is necessary for Contractor to provide the services identified in Attachment **A** to this Agreement. County is not obligated to reimburse or pay Contractor, for any expense or cost incurred by Contractor in procuring or maintaining such items. Responsibility for the costs and expenses incurred by Contractor in providing and maintaining such items is the sole responsibility and obligation of Contractor.

7. COUNTY PROPERTY.

A. Personal Property of County. Any personal property such as, but not limited to, protective or safety devices, badges, identification cards, keys, etc. provided to Contractor by County pursuant to this Agreement are, and at the termination of this Agreement remain, the sole and exclusive property of County. Contractor will use reasonable care to protect, safeguard and maintain such items while they are in Contractor's possession. Contractor will be financially responsible for any loss or damage to such items, partial or total, which is the result of Contractor's negligence.

B. Products of Contractor's Work and Services. Any and all compositions, publications, plans, designs, specifications, blueprints, maps, formulas, processes, photographs, slides, video tapes, computer programs, computer disks, computer tapes, memory chips, soundtracks, audio recordings, films, audio-visual presentations, exhibits, reports, studies, works of art, inventions, patents, trademarks, copyrights, or intellectual properties of any kind which are created, produced, assembled, compiled by, or are the result, product, or manifestation of, Contractor's services or work under this Agreement are, and at the termination of this Agreement remain, the sole and exclusive property of the County. At the termination of the Agreement, Contractor will convey possession and title to all such properties to County.

8. INSURANCE.

For the duration of this Agreement Contractor shall procure and maintain insurance of the scope and amount specified in Attachment **B** and with the provisions specified in that attachment.

9. STATUS OF CONTRACTOR.

All acts of Contractor, its agents, officers, and employees, relating to the performance of this Agreement, shall be performed as independent contractors, and not as agents, officers, or employees of County. Contractor, by virtue of this Agreement, has no authority to bind or incur any obligation on behalf of County. Except as expressly provided in Attachment A, Contractor has no authority or responsibility to exercise any rights or power vested in the County. No agent, officer, or employee of the County is to be considered an employee of Contractor. It is understood by both Contractor and County that this Agreement shall not under any circumstances be construed or considered to create an employer-employee relationship or a joint venture. As an independent contractor:

A. Contractor shall determine the method, details, and means of performing the work and services to be provided by Contractor under this Agreement.

B. Contractor shall be responsible to County only for the requirements and results specified in this Agreement, and except as expressly provided in this Agreement, shall not be subjected to County's control with respect to the physical action or activities of Contractor in fulfillment of this Agreement.

C. Contractor, its agents, officers, and employees are, and at all times during the term of this Agreement shall, represent and conduct themselves as independent contractors, and not as employees of County.

10. DEFENSE AND INDEMNIFICATION.

Contractor shall hold harmless, defend and indemnify County and its officers, officials, employees and volunteers from and against any and all liability, loss, damage, expense, costs (including without limitation costs and fees of litigation) of every nature arising out of or in connection with Contractor's performance of work hereunder or its failure to comply with any of its obligations contained in the agreement, except such loss or damages which was caused by the sole negligence or willful misconduct of the County.

11. RECORDS AND AUDIT.

A. Records. Contractor shall prepare and maintain all records required by the various provisions of this Agreement, federal, state, and municipal law, ordinances, regulations, and directions. Contractor shall maintain these records for a minimum of four (4) years from the termination or completion of

this Agreement. Contractor may fulfill its obligation to maintain records as required by this paragraph by substitute photographs, microphotographs, or other authentic reproduction of such records.

B. Inspections and Audits. Any authorized representative of County shall have access to any books, documents, papers, records, including, but not limited to, financial records of Contractor, which County determines to be pertinent to this Agreement, for the purposes of making audit, evaluation, examination, excerpts, and transcripts during the period such records are to be maintained by Contractor. Further, County has the right, at all reasonable times, to audit, inspect, or otherwise evaluate the work performed or being performed under this Agreement.

12. NONDISCRIMINATION.

During the performance of this Agreement, Contractor, its agents, officers, and employees shall not unlawfully discriminate in violation of any federal, state, or local law, against any employee, or applicant for employment, or person receiving services under this Agreement, because of race, religion, color, national origin, ancestry, physical handicap, medical condition, marital status, age, or sex. Contractor and its agents, officers, and employees shall comply with the provisions of the Fair Employment and Housing Act (Government Code section 12900, et seq.), and the applicable regulations promulgated thereunder in the California Code of Regulations. Contractor shall also abide by the Federal Civil Rights Act of 1964 (P.L. 88-352) and all amendments thereto, and all administrative rules and regulations issued pursuant to said act.

13. ASSIGNMENT.

This is an agreement for the services of Contractor. County has relied upon the skills, knowledge, experience, and training of Contractor as an inducement to enter into this Agreement. Contractor shall not assign or subcontract this Agreement, or any part of it, without the express written consent of County. Further, Contractor shall not assign any monies due or to become due under this Agreement without the prior written consent of County.

14. DEFAULT.

If the Contractor abandons the work, or fails to proceed with the work and services requested by County in a timely manner, or fails in any way as required to conduct the work and services as required by County, County may declare the Contractor in default and terminate this Agreement upon five (5) days written notice to Contractor. Upon such termination by default, County will pay to Contractor all amounts owing to Contractor for services and work satisfactorily performed to the date of termination.

15. WAIVER OF DEFAULT.

Waiver of any default by either party to this Agreement shall not be deemed to be waiver of any subsequent default. Waiver or breach of any provision of this Agreement shall not be deemed to be a waiver of any other or subsequent breach, and shall not be construed to be a modification of the terms of this Agreement unless this Agreement is modified as provided in paragraph twenty one (21) below.

16. CONFIDENTIALITY.

Contractor further agrees to comply with the various provisions of the federal, state, and county laws, regulations, and ordinances providing that information and records kept, maintained, or accessible by Contractor in the course of providing services and work under this Agreement, shall be privileged, restricted, or confidential. Contractor agrees to keep confidential all such information and records. Disclosure of such confidential, privileged, or protected information shall be made by Contractor only with the express written consent of the County. Any disclosure of confidential information by Contractor without the County's written consent is solely and exclusively the legal responsibility of Contractor in all respects.

Notwithstanding anything in the Agreement to the contrary, names of persons receiving public social services are confidential and are to be protected from unauthorized disclosure in accordance with Title 45, Code of Federal Regulations Section 205.50, the Health Insurance Portability and Accountability Act of 1996, and Sections 10850 and 14100.2 of the Welfare and Institutions Code, and regulations adopted pursuant

thereto. For the purpose of this Agreement, all information, records, and data elements pertaining to beneficiaries shall be protected by the provider from unauthorized disclosure.

17. CONFLICTS.

Contractor agrees that it has no interest, and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance of the work and services under this Agreement.

18. POST AGREEMENT COVENANT.

Contractor agrees not to use any confidential, protected, or privileged information which is gained from the County in the course of providing services and work under this Agreement, for any personal benefit, gain, or enhancement. Further, Contractor agrees for a period of two years after the termination of this Agreement, not to seek or accept any employment with any entity, association, corporation, or person who, during the term of this Agreement, has had an adverse or conflicting interest with the County, or who has been an adverse party in litigation with the County, and concerning such, Contractor by virtue of this Agreement has gained access to the County's confidential, privileged, protected, or proprietary information.

19. SEVERABILITY.

If any portion of this Agreement or application thereof to any person or circumstance shall be declared invalid by a court of competent jurisdiction, or if it is found in contravention of any federal, state, or county statute, ordinance, or regulation, the remaining provisions of this Agreement, or the application thereof, shall not be invalidated thereby, and shall remain in full force and effect to the extent that the provisions of this Agreement are severable.

20. FUNDING LIMITATION.

The ability of County to enter this Agreement is based upon available funding from various sources. In the event that such funding fails, is reduced, or is modified, from one or more sources, County has the option to cancel, reduce, or modify this Agreement, or any of its terms within ten (10) days of its notifying Contractor of the cancellation, reduction, or modification of available funding. Any reduction or modification of this Agreement made pursuant to this provision must comply with the requirements of paragraph twenty-one (21) (Amendment).

21. AMENDMENT.

This Agreement may be modified, amended, changed, added to, or subtracted from, by the mutual consent of the parties hereto, if such amendment or change is in written form and executed with the same formalities as this Agreement, and attached to the original Agreement to maintain continuity.

22. NOTICE.

Any notice, communication, amendments, additions, or deletions to this Agreement, including change of address of either party during the terms of this Agreement, which Contractor or County shall be required, or may desire, to make, shall be in writing and may be personally served, or sent by prepaid first class mail to, the respective parties as follows:

County of Inyo

_____ Department
Address
City and State

Contractor:

_____ Name
Address
City and State

23. ENTIRE AGREEMENT.

This Agreement contains the entire agreement of the parties, and no representations, inducements, promises, or agreements otherwise between the parties not embodied herein or incorporated herein by reference, shall be of any force or effect. Further, no term or provision hereof may be changed, waived, discharged, or terminated, unless the same be in writing executed by the parties hereto.

#

AGREEMENT BETWEEN COUNTY OF INYO
AND _____
FOR THE PROVISION OF _____ SERVICES

IN WITNESS THEREOF, THE PARTIES HERETO HAVE SET THEIR HANDS AND SEALS THIS
____ DAY _____, _____.

COUNTY OF INYO

CONTRACTOR

By: _____

By: _____

Type or Print Name

Type or Print Name

Dated: _____

Dated: _____

APPROVED AS TO FORM AND LEGALITY:

County Counsel

APPROVED AS TO ACCOUNTING FORM:

County Auditor

APPROVED AS TO PERSONNEL REQUIREMENTS:

Personnel Services

APPROVED AS TO INSURANCE REQUIREMENTS:

County Risk Manager

ATTACHMENT A

AGREEMENT BETWEEN COUNTY OF INYO

AND _____
FOR THE PROVISION OF _____ SERVICES

TERM:

FROM: _____ TO: _____

SCOPE OF WORK:

ATTACHMENT B

AGREEMENT BETWEEN COUNTY OF INYO

AND _____
FOR THE PROVISION OF _____ SERVICES

TERM:

FROM: _____ TO: _____

SEE ATTACHED INSURANCE PROVISIONS

Attachment A

3. BID PROPOSAL FORM

Trash Service

Dumpster Location (Bishop)	Dumpster	Quantity	Frequency	Monthly Price
Bishop Library 210 Academy	96 Gal rolling cart	1	1/week	<u>31.93</u>
County Services Building 207 West South Street	3 yrd. LOCKING	1	1/week	<u>147.98</u>
Airport Terminal 703 North Airport Road	3 yrd.	1	1/week	<u>147.98</u>
•ESTA Parking Lot	2 yrd	1	1/week	<u>98.89</u>
Health and Human Services 162 Grove Street	3 yrd. LOCKING	1	1/week	<u>147.98</u>
WIC 568 West Line Street	96 Gal. rolling cart	1	1/week	<u>31.93</u>
Bishop Senior Center 506 Park Avenue	3 yrd.	1	2/week	<u>258.49</u>
Bishop Administration 163 May Street	3 yrd. LOCKING	1	1/week	<u>147.98</u>
Agriculture Storage Bldg. 218 Wye Road	96 Gal. rolling cart	1	1/week	<u>31.93</u>
Wellness Building 586 Central Street	2 yrd	1	1/week	<u>98.89</u>
	96 Gal. rolling cart	1	1/week	<u>31.93</u>
Search and Rescue Airport Road	2 yrd.	1	1/week	<u>98.89</u>
One Stop/Probation 912 North Main Street	3 yrd.	1	1/week	<u>147.98</u>
Progress House 536 North Second Street	3 yrd.	1	1/week	<u>147.98</u>
Bishop District 1 & 2 (Road) 3236 West Line Street	2 yrd.	1	1/week	<u>98.89</u>
Bishop Road Shop 701 South Main Street	2 yrd.	1	1/week	<u>98.89</u>

Attachment A

<u>Dumpster Location (Big Pine)</u>	<u>Size of Dumpster</u>	<u>Quantity</u>	<u>Frequency</u>	<u>Monthly Price</u>
Big Pine District 3 (Road) 160 Dewey Street	3 yrd.	1	1/week	<u>147.98</u>
Big Pine Town Hall 180 Dewey Street	3 yrd. LOCKING	1	1/week	<u>147.98</u>
Animal Shelter 1001 County Road	3 yrd	1	1/week	<u>147.98</u>

<u>Dumpster Location (Independence)</u>	<u>Size of Dumpster</u>	<u>Quantity</u>	<u>Frequency</u>	<u>Monthly Price</u>
Courthouse Complex Annex Building 168 North Edwards Street	3 yrd.	2	1/week	<u>295.96</u>
Independence Legion Hall 201 South Edwards Street	3 yrd.	1	1/week	<u>147.98</u>
Eastern California Museum 155 North Grant Street	96 Gal. rolling cart	2	1/week	<u>54.15</u>
Jail and Sheriff Administration 550 South Clay Street	3 yrd.	4	2/week	<u>1,033.96</u>
Juvenile Detention Facility 201 Mazourka Canyon Road	2 yrd.	1	1/week	<u>98.89</u>
Building and Maintenance Shop 136 South Jackson Street	3 yrd	1	1/week	<u>147.98</u>
Water Department 135 South Jackson	3 yrd.	1	1/week	<u>147.98</u>
Independence Administration 224 North Edwards Street	96 Gal. rolling cart	1	1/week	<u>31.93</u>
Mazourka Road Shop 750 South Clay Street	3 yrd.	1	1/week	<u>147.98</u>
Independence Airport 800 North Edwards Street	2 yrd	1	1/week	<u>98.89</u>

<u>Dumpster Location (Lone Pine)</u>	<u>Dumpster Size</u>	<u>Quantity</u>	<u>Frequency</u>	<u>Monthly Price</u>
Health and Human Services 380 North Mount Whitney	96 Gal. rolling cart	1	1/week	<u>31.93</u>
Lone Pine Library 210 Bush Street	96 Gal. rolling cart	1	1/week	<u>31.93</u>

Attachment A

Community Mental Health 310 North Jackson Street	2 yrd	1	1/week	<u>98.89</u>
Statham Hall 183 Jackson Street	3 yrd.	1	1/week	<u>147.98</u>
Lone Pine Road Shop 160 North Lone Pine Avenue	3 yrd.	1	1/week	<u>147.98</u>
Lone Pine Sheriff Sub Station 726 North Main Street	3 yrd.	1	1/week	<u>147.98</u>
Lone Pine Airport 1452 South Main Street	3 yrd	1	1/week	<u>147.98</u>

TOTAL MONTHLY PRICE FOR TRASH SERVICES (ALL LOCATIONS) \$ 5,172.85

TOTAL ANNUAL PRICE FOR TRASH SERVICES (ALL LOCATIONS) \$ 62,074.20

NOTE: Inyo County reserves the right to revise the above noted trash container sizes, quantities, and/or frequency as needed during the service agreement duration. Service provider will be compensated accordingly.

RECYCLING SERVICE

Location (Bishop Area)	Size/Quantity	Frequency	Monthly Price
Bishop Library 210 Academy	3 yrd (1) OCC	1/mo.	\$ <u>0</u>
County Services Building 207 West South Street	64 Gal. (1)	1/mo.	\$ <u>0</u>
Health and Human Services 162 Grove Street	64 Gal. (1)	2/mo.	\$ <u>0</u>
Bishop Senior Center 506 Park Avenue	3 yrd (1)	1/mo.	\$ <u>0</u>
Bishop Administration 163 May Street	96 Gal. (1)	2/mo.	\$ <u>0</u>
One Stop/Probation 912 North Main Street	64 Gal. (1)	2/mo.	\$ <u>0</u>

Attachment A

<u>Location (Indepen. Area)</u>	<u>Size/Quantity</u>	<u>Frequency</u>	<u>Monthly Price</u>
Courthouse Complex / Annex Building 168 North Edwards Street	3 yrd Cardboard (1) 64 Gal. (1)	1/wk 1/mo.	\$ <u>0</u> \$ <u>0</u>
Independence Legion Hall 201 South Edwards Street	64 Gal. (1)	1/mo.	\$ <u>0</u>
Eastern California Museum 155 North Grant Street	96 Gal. (1)	1/mo.	\$ <u>0</u>
Independence Administration 224 North Edwards Street	64 Gal. (1)	1/mo.	\$ <u>0</u>
Mazourka Road Shop 750 South Clay Street	64 Gal. (1)	1/mo.	\$ <u>0</u>
Independence Airport 800 N. Edwards Street	64 Gal. (1)	1/mo.	\$ <u>0</u>

<u>Location (Lone Pine Area)</u>	<u>Size/Quantity</u>	<u>Frequency</u>	<u>Monthly Price</u>
Statham Hall 183 Jackson Street	64 Gal. (1)	1/mo.	\$ <u>0</u>
Lone Pine Sheriff Sub Station 726 North Main Street	64 Gal. (1)	1/mo.	\$ <u>0</u>

TOTAL MONTHLY RECYCLING PRICE \$ 0
(ALL LOCATIONS)

TOTAL ANNUAL RECYCLING PRICE \$ 0
(ALL LOCATIONS)

Attachment A

Preferred Septic and Disposal, Inc.

1280 N. Main St. Suite I

Bishop, Ca. 93514

760-873-5699

2/6/2020

Thank you for accepting the attached bid from Preferred Septic and Disposal for the Trash Disposal and Recycling Services for designated County Facilities.

Preferred Septic and Disposal has been doing refuse removal in Inyo County for 18 years. In that time have had no complaints to the County, or to us for that matter. We are a small locally owned business that believes in giving back to our community. We donate to over 30 organizations annually and the list keeps on growing. Our employees also believe in supporting our area and donate their time to numerous events whether it be in attendance or cooking for a large crowd

The bid attached is the price prior to the discount the County will receive if they either pay in advance or within 30 days of invoicing from Preferred. We suggest annual payment to get the best discounted rate. With the 5% discount rate the County would save a minimum of \$3,103.71 or a monthly rate of \$258.64. We also believe by offering the recycling at no charge that it is a great benefit to our community and the County.

Thank you for the opportunity,

Dale Comontofski

Attachment B

Insurance Requirements for Waste Hauler Agreements

Contractor shall procure and maintain for the duration of the Contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the Contractor's performance under the Contract. The cost of such insurance shall be borne by the Contractor.

If the Contractor maintains broader coverage and/or higher limits than the minimums shown above, Inyo County requires and shall be entitled to the broader coverage and/or the higher limits maintained by the contractor. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to Inyo County.

County reserves the right to review any and all of the required insurance policies and/or endorsements, but has no obligation to do so. Failure to demand evidence of full compliance with the insurance requirements set forth in this Contract or failure to identify any insurance deficiency shall not relieve Contractor from, nor be construed or deemed a waiver of, its obligation to maintain the required insurance at all times during the term of this Contract.

MINIMUM SCOPE AND LIMIT OF INSURANCE

Coverage shall be at least as broad as:

1. **Commercial General Liability (CGL):**

Insurance Services Office Form CG 00 01 covering CGL on an "occurrence" basis, including products and completed operations, property damage, bodily injury and personal & advertising injury with limits no less than **\$2,000,000** per occurrence.

If Contractor maintains higher limits than the specified minimum limits, County requires and shall be entitled to coverage for the higher limits maintained by Contractor. Any deductible or self-insured retention shall be shown on the Certificate of Insurance. If the deductible or self-insured retention exceeds \$25,000 it must be approved in advance by County. Contractor is responsible for any deductible or self-insured retention and shall fund it upon County's written request, regardless of whether Contractor has a claim against the insurance or is named as a party in any action involving the County.

County of Inyo, its Board, officials, agents, volunteers, and employees shall be additional insureds for liability arising out performance under Contract (Insurance Services Office endorsement CG 20 11 or equivalent). The insurance provided to the additional insureds shall be primary to, and non-contributory with, any insurance or self-insurance program maintained by them. The policy shall be endorsed to include a waiver of the insurer's right to subrogate against County. The policy shall cover inter-insured suits between County and Contractor and include a "separation of insureds" or "severability" clause which treats each insured separately. Required Evidence of Insurance (1): Copy of the additional insured endorsement or policy language granting additional insured

Attachment B

Insurance Requirements for Waste Hauler Agreements

status, Copy of the endorsement or policy language indicating that Insurance is primary and non-contributory; and Certificate of Insurance specifically referencing contractor term.

2. Automobile Liability

Automobile liability with limits no less than **\$5,000,000** combined single limit per accident. Insurance shall apply to all owned autos (including dump trucks). If Contractor currently owns no autos, Contractor agrees to obtain such insurance should any autos be acquired during the term of this Contract or any extensions of the term. Insurance shall apply to hired and non-owned autos. Required Evidence of Insurance (2): Certificate of Insurance

3. Workers' Compensation

Workers' Compensation Insurance as required by the State of California, with **Statutory** Limits, and Employer's Liability Insurance with limits of no less than **\$1,000,000** per accident for bodily injury per employee or disease per policy. The policy shall be endorsed to include a written waiver of the insurer's right to subrogate against County. This provision may be waived if Contractor has no employees and provides a letter on Contractor letterhead certifying it has no employees. If Contractor currently has no employees, Contractor agrees to obtain the above-specified Workers Compensation and Employers Liability insurance should any employees be engaged during the term of this Contract or any extensions of the term. Required Evidence of Insurance (3): Subrogation waiver endorsement, and Certificate of Insurance.

OTHER INSURANCE PROVISIONS

The insurance policies are to contain, or be endorsed to contain, the following 12 provisions:

Self-Insured Retentions

Self-insured retentions must be declared to and approved by Inyo County. At the option of Inyo County, either: the Contractor shall obtain coverage to reduce or eliminate such self-insured retentions as respects Inyo County, its officers, officials, employees, and volunteers; or the Contractor shall provide a financial guarantee satisfactory to Inyo County guaranteeing payment of losses and related investigations, claim administration, and defense expenses. The policy language shall provide, or be endorsed to provide, that the self-insured retention may be satisfied by either the named insured or Inyo County.

Additional Insured Status

"Inyo County, its officers, officials, employees, and volunteers" are to be covered as additional insureds on the CGL policy with respect to liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts, or equipment furnished in connection with such work or operations. Address for endorsements and certification is: Inyo County, PO Box N, Independence, CA 93526.

Attachment B

Insurance Requirements for Waste Hauler Agreements

Primary Coverage

For any claims related to this Contract, the Contractor's insurance coverage shall be primary insurance coverage at least as broad as ISO CG 20 01 04 13 as respects Inyo County, its officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by Inyo County, its officers, officials, employees, or volunteers shall be excess of the Contractor's insurance and shall not contribute with it.

Notice of Cancellation

Each insurance policy required above shall provide that coverage shall not be canceled, except with notice to Inyo County.

Waiver of Subrogation

Contractor hereby grants to Inyo County a waiver of any right to subrogation which any insurer of said Contractor may acquire against Inyo County by virtue of the payment of any loss under such insurance. Contractor agrees to obtain any endorsement that may be necessary to affect this waiver of subrogation, but this provision applies regardless of whether or not Inyo County has received a waiver of subrogation endorsement from the insurer.

Claims-Made Policies

If General Liability coverage is written on a claims-made form: (1) The retroactive date must be shown and must be before the date of the Contract or the beginning of Contract work; (2) Insurance must be maintained and evidence of insurance must be provided for at least five years after completion of the Contract work; (3) If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a retroactive date prior to the contract effective date, the Contractor must purchase an extended period coverage for a minimum of five years after completion of contract work; and (4) a copy of the claims reporting requirements must be submitted to Inyo County for review.

Acceptability of Insurers

Insurance is to be placed with insurers authorized to conduct business in the state with a current A.M. Best's rating of no less than A: VII, unless otherwise acceptable to Inyo County.

Verification of Coverage

Contractor shall furnish Inyo County with original Certificates of Insurance including all required amendatory endorsements (or copies of the applicable policy language effecting coverage required by this clause) and a copy of the Declarations and Endorsement Page of the CGL policy listing all policy endorsements to Inyo County before work begins. However, failure to obtain the required documents prior to the work beginning shall not waive the Contractor's obligation to provide them. Inyo County reserves the right to require complete, certified copies of all required insurance policies, including endorsements, required by these specifications, at any time. Please provide copy of policy declarations to facilitate coverage verification.

COUNTY OF INYO BID TABULATION

Project Title & Bid No. Trash Disposal and Recycling Services Ser
designated County facilities
 Bid Opening Date: February 17, 2020 Location: County Admin Center

	BIDDER NAME	Base Bid	Bid Additive A	Bid Additive B	Bid Additive C	Total Base Bid and Additives	Bond
1.	Preferred Sepsis					62,074. ²⁰	Annual
2.	Madera Disposal Systems Inc					62,074. ²⁰	Annual
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

Opened By: Monica Tullia
 Present: Deborah Dittmar
Jacob Trausch



MINIMUM CHARGES FOR WASTE HAULING SERVICES
 AREAS A & B
 INYO COUNTY
 Effective January 1, 2020

COMMERCIAL BIN SERVICE – AREA A & B

<u>Size</u>	<u>1/xWeek</u>	<u>2/xWeek</u>	<u>3/xWeek</u>	<u>4/xWeek</u>	<u>5/xWeek</u>	<u>6/xWeek</u>	<u>Ex P/U</u>	<u>Delivery</u>
2-yard	\$98.89	\$172.42	\$248.65	\$328.53	\$406.74	\$486.63	\$51.10	\$37.32
3-yard	\$147.98	\$258.49	\$373.14	\$492.97	\$610.11	\$729.93	\$76.47	\$37.32
4-yard	\$188.61	\$329.19	\$467.28	\$608.70	\$750.13	\$888.72	\$97.04	\$37.32
6-yard	\$282.99	\$493.79	\$701.09	\$913.06	\$1,125.18	\$1,332.98	\$145.61	\$37.32

RESIDENTIAL CURBSIDE CART SERVICE – AREAS A & B

<u>96 Gallon</u>	<u>Monthly Ra</u>	<u>Each Extra Cart</u>
1 Cart	\$ 31.93	\$ 22.22

<u>64 Gallon</u>	<u>Monthly Rate only 1 cart per household</u>
1 Cart	\$ 28.71

**RESIDENTIAL CURBSIDE SERVICE (CUSTOMER OWNED CONTAINER) –
 AREA B – Cartago, Alabama Hills, Olancho, Darwin, Keeler**

30-40 Gallon Container (Per month)

<u>1 &/or 2 cans</u>	<u>3-cans</u>	<u>4-cans</u>	<u>5-cans</u>	<u>6-cans</u>
\$ 47.72	\$ 65.41	\$ 86.70	\$ 106.21	\$ 125.70

ROLL OFF BIN SERVICE

<u>Size</u>	<u>Area</u>	<u>Full Rate Per</u>	<u>Compactor Roll-Off</u>
20 yard	Bishop	\$283.08	\$353.85
	Big Pine	\$353.85	\$424.63
	Independence	\$438.77	\$509.55
	Lone Pine	\$509.55	\$580.32
	Olancho	\$622.78	\$693.55
	Round Valley	\$353.85	\$424.63
	Starlite	\$353.85	\$424.63
30 yard	Bishop	\$452.93	\$523.70
	Big Pine	\$523.70	\$594.47
	Independence	\$608.63	\$679.39
	Lone Pine	\$679.39	\$750.16
	Olancho	\$792.63	\$863.40
	Round Valley	\$452.93	\$523.70
	Starlite	\$452.93	\$523.70

*For first 14-day use period. Service includes: delivery, rental & service (landfill fees additional). Full Rate applies after first 14-day period.

These are the minimum allowable rates to be charged.
 Hauler may offer a discount of up to 5% to all commercial customers paying in advance or within 30 days of invoice.
 All commercial contract proposals must clearly delineate rates both before and after any discount is applied.

Special collection services not specified above shall be negotiated between the customer and the franchised waste hauler.



County of Inyo



Health & Human Services - Social Services

DEPARTMENTAL - ACTION REQUIRED

MEETING: March 3, 2020

FROM: Tyler Davis

SUBJECT: UC Davis Training Contract

RECOMMENDED ACTION:

Request Board ratify and approve the contract between the County of Inyo and the Regents of the University of California, on behalf of its Davis Campus University Extension, for training services in an amount not to exceed \$127,500.00 for the period of July 1, 2020 through June 30, 2021, contingent upon the Board's adoption of the Fiscal Year 2020-21 budget; and authorize the Chairperson to sign.

SUMMARY/JUSTIFICATION:

Inyo County is part of a training consortium made up of approximately forty small and medium sized counties. The consortium pools State Social Services training funds and has a long-standing relationship with UC Davis Extension to develop and provide targeted training to address the needs of Social Services employees in those counties. UC Davis maintains the evidence-based practice research, as well as the most current federal and state laws and regulations to ensure their training programs are relevant, high quality, and up to date. The vast majority of these trainings are provided on-site at one of our local facilities, thus reducing travel cost and time away from the office for employees. This year's contract will provide 30 units (days) of on-site training throughout the fiscal year. This will provide for continued training related to not only our technical Social Services program needs, but also related to professional employee development, management and supervision development and project management, as well as increase our training opportunities for local resource families, formerly referred to as foster parents. We coordinate and mutually share training, when feasible, with Mono County Social Services, as well as invite other Inyo County departments to any relevant training.

BACKGROUND/HISTORY OF BOARD ACTIONS:

ALTERNATIVES AND CONSEQUENCES OF NEGATIVE ACTION:

The alternative would be not to enter into this training arrangement, which supplies on-site training at no cost to the County General Fund. This contract allows our associates in other programs to receive on-going, specialized training without additional cost to those budgets.

OTHER AGENCY INVOLVEMENT:

We routinely invite others to the trainings where appropriate: Additional Health and Human Services staff, community partners, and other County departments (past trainings have included staff from Probation, Public Works and Child Support).

FINANCING:

State and Federal funding and Social Services Realignment. This expense will be budgeted in Social Services (055800) in Professional Services (5265). No County General Funds.

ATTACHMENTS:

1. Regents of the University of California Agreement

APPROVALS:

Tyler Davis	Created/Initiated - 2/21/2020
Darcy Ellis	Approved - 2/21/2020
Marilyn Mann	Approved - 2/21/2020
Melissa Best-Baker	Approved - 2/24/2020
Marshall Rudolph	Approved - 2/24/2020
Amy Shepherd	Approved - 2/24/2020
Marilyn Mann	Final Approval - 2/24/2020



Agreement # GENT-2020-11
C000114077

Training Services Agreement

This Agreement is made this ____ day of _____, _____ by and between The Regents of the University of California ("University"), on behalf of its Davis campus UC Davis Continuing and Professional Education and INYO COUNTY ("User").

RECITALS

WHEREAS, University is a public education institution accredited by the Western Association of Schools and Colleges, and has developed a training program ("Program,") and

WHEREAS, User wishes to obtain major skills training courses for User's personnel who provide related services in fulfillment of their goals and objectives (Exhibit B, if attached);

NOW, THEREFORE, the parties agree as follows:

1. University shall present Program as set forth in Exhibit A.
 - a. Limit on attendance. No more than 30 persons per course session may attend without the prior written approval of the University.
 - b. Reschedule/cancel of class. If User reschedules or cancels any training class within 10 calendar days of start date, User shall pay for all expenses incurred up to the date on which University receives notice of the reschedule or cancellation.
2. Term. The term of this agreement shall be from July 1, 2020 through June 30, 2021. All courses must be completed by June 30, 2021.
3. Termination. Either party may terminate this agreement by giving thirty (30) days' written notice to the other party.
4. Alteration, Amendment. No alteration of the terms of this agreement shall be valid or binding upon either party unless made in writing and signed by both parties. This agreement may be amended at any time by mutual agreement of the parties, expressed in writing and signed by both parties.

5. Fee & Payment. User shall pay University as set forth in Exhibit A. University will invoice User in arrears no more often than monthly for training completed. User shall pay University within thirty days (30) of User's receipt of University invoice. Failure to pay within thirty days may be deemed a material breach of this agreement and good cause for termination.
6. Indemnification. Each party shall defend, indemnify and hold the other party, its officers, employees and agents harmless from and against any and all liability, loss, expense including reasonable attorneys' fees, or claims for injury or damages arising out of the performance of this Agreement but only in proportion to and to the extent such liability, loss, expense, attorneys' fees, or claims for injury or damages are caused by or result from the negligent or intentional acts or omissions of the indemnifying party, its officers, agents, or employees.
7. Insurance. University is self-insured under California law. University shall maintain this program of self-insurance throughout the term of this Agreement with retentions as follows:
 - a. General Liability (and professional liability) coverage with a per occurrence limit of a minimum of one million dollars (\$1,000,000).
 - b. Auto Liability including non-owned automobiles, with a minimums as follows:
 - 1) Bodily injury
 - a) Per person \$1,000,000
 - b) Per accident \$1,000,000
 - 2) Property damage \$1,000,000
 - c. Workers Compensation insurance in accordance with California state law.
 - d. Employer's Liability coverage in the amount of one million dollars (\$1,000,000).

If requested by User in writing University shall provide, upon receipt of a fully-executed Agreement, a Certificate of Self-Insurance naming User, its officers, agents, and employees, individually and collectively as additional insured (except for Worker's Compensation Insurance) for services provided under this Agreement.

Coverage shall apply as primary insurance and any other insurance or self-insurance maintained by the User, its officers, agents, and employees should be excess only. This insurance shall not be canceled or changed without a minimum of thirty (30) days advance, written notice given to User.

8. Confidentiality of information about individuals. University agrees to safeguard names and addresses of individuals received through the performance of this agreement in accordance with Welfare and Institution Code Section 10850.
9. Use of University name. User shall not use the name of the University in any form or manner in advertisements, reports or other information released to the public without the prior written approval of University.

10. Relationship of parties. It is expressly understood and agreed that this agreement is not intended and shall not be construed to create the relationship of agent, servant, employee, partnership, joint venture or association between the parties.
11. Notice addresses. All notices under this agreement shall be effective only if made in writing and delivered by personal service or by mail and addressed as follows. Either party may, by written notice to the other, change its own mailing address.

University:

Financial Services
UC Davis Continuing and
Professional Education
1333 Research Park Drive
Davis, CA 95618

User:

Inyo County
Department of Health & Human Services
920 N. Main Street
Bishop, CA 93514

Additional University:

Center for Human Services
UC Davis Continuing and
Professional Education
1333 Research Park Drive
Davis, CA 95618

Additional County:

(If Applicable)

12. Force majeure. In the event that performance by a party is rendered impossible by reason of strikes, lockouts, labor disputes, acts of God, governmental restrictions, regulations or other causes beyond the reasonable control of that party, performance shall be excused for a period commensurate with the period of impossibility.

University is a land-grant institution with a mission of teaching, research, public service and patient care, and it is required to recover the full cost of providing services to non-University entities such as User, and as a non-profit entity, makes no profit. Therefore, University does not have reserves from which to pay for expenditures made on behalf of User for which it is not reimbursed. In the event of a force majeure, User shall be responsible for payment of all expenses incurred to the point at which University gives or receives notice of the impossibility. If the impossibility becomes permanent, University will make best efforts to cancel or mitigate all outstanding financial commitments, and User shall be responsible for the cost of any remaining obligations.

13. Assignment. This Agreement shall be binding upon the successors and assigns of the parties. Neither party may assign the Agreement without the prior written permission of the other party.

14. Nondiscrimination. University agrees not to discriminate in the provision of service under this agreement on the basis of race; color; religion; marital status; national origin; ancestry; sex; sexual orientation; physical or mental handicap; medical condition; political affiliation; status as a Vietnam-era veteran or disabled veteran; or, within the limits imposed by law or University regulations, because of age or citizenship. University is an affirmative action/equal opportunity employer.
15. Conflict of Interest. The parties to this Agreement have read and are aware of the provisions of Government Code section 1090 et seq. and section 87100 relating to conflict of interest of public officers and employees. University represents that it is unaware of any financial or economic interest of any public officer or employee of User relating to this Agreement. It is further understood and agreed that if such a financial interest does exist at the inception of this Agreement, User may immediately terminate this Agreement by giving written notice.
16. Waiver of Rights. No delay or failure of either party in exercising any right, and no partial or single exercise of any right, shall be deemed to constitute a waiver of that right or any other right.
17. Headings. The headings and captions contained in this Agreement are for convenience only, and shall be of no force or effect in construing and interpreting the provisions of this Agreement.
18. Severability of Terms. In the event of any conflict between any provisions of this agreement and any applicable law, rule or regulation, this agreement shall be modified only to the extent necessary to eliminate the conflict and the rest of the agreement shall remain unchanged and in full force and effect.
19. Governing law. The laws of the State of California shall govern this agreement.
20. Integrated agreement. This agreement constitutes the entire understanding between the parties respecting the subject matter contained herein and supersedes any and all prior oral or written agreements regarding such subject matter.

Signature page follows:

IN WITNESS WHEREOF, this agreement has been executed as of the date first set forth above.

THE REGENTS OF THE
UNIVERSITY OF CALIFORNIA

INYO COUNTY

By:  _____

By: _____

Name: Susan Catron, MPPA, EdD
UC Davis Continuing and
Professional Education

Name:

Date: 2/20/2020 _____

Date: _____

FEIN: 94-6036494

EXHIBIT A

TRAINING PROGRAM

1. 30.00 Unit(s) of training in the subject areas selected by the agency from the UC Davis Continuing and Professional Education curriculum.

2. University will provide the following:
 - a. Needs assessment, curriculum planning and implementation.
 - b. Instructional and student services.
 - c. Instructional materials.
 - d. Evaluation and feedback.
 - e. Continuing education credit.
 - f. Off-site training site and audio-visual equipment when on-site facility and equipment are not available. (Extra training units may be charged.)
 - g. Food and non-alcoholic beverages when requested by the User in writing. (Extra training units may be charged.)
 - h. Any other items when requested by the User in writing and approved by University. (Extra training units may be charged.)

3. User will provide the following:
 - a. Training facility and audio-visual equipment.
 - b. On-site coordination of training.

Total cost of training under this agreement is \$127,500.00



County of Inyo



Clerk of the Board

DEPARTMENTAL - ACTION REQUIRED

MEETING: March 3, 2020

FROM: Assistant Clerk of the Board

SUBJECT: Appointment to Inyo Fish & Wildlife Commission

RECOMMENDED ACTION:

Request Board appoint Mr. Toby Dickinson to the Inyo Fish and Wildlife Commission, to an unexpired four-year term ending October 6, 2021. (*Notice of Vacancy resulted in letter of interest only from Mr. Dickinson.*)

SUMMARY/JUSTIFICATION:

Mr. Larry McIntosh, a long-time member of the Inyo Fish & Wildlife Commission, announced his resignation in early February, leaving a vacant unexpired four-year term on the commission not ending until October 6, 2021.

Per your Board's policy, the vacancy was publicly noticed and one Letter of Interest, from Mr. Toby Dickinson, was received prior to the application deadline. Your Board had already appointed Mr. Dickinson to the alternate position on the commission just before Mr. McIntosh announced his retirement. Mr. Dickinson is now requesting to be appointed to the regular-member term.

BACKGROUND/HISTORY OF BOARD ACTIONS:

This will be the 7th appointment to the Inyo Fish & Wildlife Commission in two years, as the result of a revolving door of resignations, term expirations, and alternate members being appointed to newly vacant regular-member terms (and creating subsequent vacancies in the alternate position):

- **April 2, 2019** - Resignation letter received from member Garrett McMurtrie, effective immediately
- **April 4, 2019** - Notice of Vacancy published for regular-member term ending October 6, 2021 vacated by Mr. McMurtrie
- **April 5, 2019** - Letter of interest received for the term ending October 6, 2021, from Mr. John Frederickson, then-alternate for the commission
- **May 7, 2019** - Mr. John Frederickson is appointed to the regular-member position, creating a vacancy in the alternate position
- **September 4, 2019** - Member Joe Pecschi submits a letter of resignation, effective November 1 (the vacancy that will result cannot be advertised any sooner than October 17, per the Board's appointment policy)
- **September 5, 2019** - Notice of Vacancy published for the two four-year terms set to expire October 6, 2019 (occupied by Mr. Doug Brown and Mr. Steve Ivey) and the vacant alternate position (empty since May)
- **September 10, 2019** - Letter of Interest received for the alternate position from Mr. Allsup
- **September 11, 2019** - Letter of interest requesting re-appointment received from Mr. Brown to his

regular-member term

- **September 16, 2019** - Recruitment period ends
- **September 21, 2019** - Recruitment re-opened for remaining vacancy
- **September 24, 2019** - Letter of interest requesting re-appointment received from Mr. Ivey for the second regular-member term
- **September 26, 2019** - Letter of interest received for the second regular-member term from Mr. Toby Dickinson
- **October 15, 2019** - Members Doug Brown and Steve Ivey are re-appointed to four-year terms ending October 6, 2023; Mr. Warren Allsup is appointed to complete the alternate-member term that expires October 6, 2021
- **October 17, 2019** - Notice of Vacancy published for four-year regular-member term ending October 6, 2021 and to be vacated by Mr. Pecsí on November 1
- **October 21, 2019** - Letter of interest requesting appointment to regular-member four-year term received from Mr. Allsup
- **October 23, 2019** - Letter of interest for vacant four-year term received from Mr. Dickinson
- **November 13, 2019** - Letter of interest for vacant four-year term received from Mr. Daniel McIntosh
- **December 17, 2019** - Mr. Allsup is appointed to the four-year term, creating a vacancy in the alternate position
- **December 21, 2019** - Notice of Vacancy published for newly vacated alternate position
- **December 29, 2019** - Letter of interest for the alternate position is received from Mr. Dickinson
- **January 21, 2020** - Toby Dickinson is appointed to the alternate position
- **February 1, 2020** - Member Larry McIntosh informs the commission secretary he is resigning effective immediately
- **February 4, 2020** - Notice of Vacancy published for Mr. McIntosh's position
- **February 8, 2020** - Mr. Dickinson submits Letter of Interest for the vacancy
- **February 25, 2020** - Recruitment period ends

ALTERNATIVES AND CONSEQUENCES OF NEGATIVE ACTION:

Appointing to Mr. Dickinson to the vacant regular-member term will create another vacancy on the Inyo Fish & Wildlife Commission, this time in the alternate position that he was very recently appointed to fill. Your Board can make the appointment and direct staff to advertise for the resulting vacancy; or direct staff to re-open the recruitment for the regular-member term.

OTHER AGENCY INVOLVEMENT:

FINANCING:

ATTACHMENTS:

1. Letter of Interest - Toby Dickinson
2. Notice of Vacancy

APPROVALS:

Darcy Ellis
Darcy Ellis

Created/Initiated - 2/26/2020
Final Approval - 2/26/2020

Darcy Ellis

From: Toby Dickinson <tdickinson1@suddenlink.net>
Sent: Saturday, February 8, 2020 11:16 AM
To: Darcy Ellis
Subject: Appointment as regular-member to the Fish and Wildlife Commission

Inyo County Board of Supervisors
Independence, CA

I am very interested in being appointed a full time member of our Fish and Wildlife Commission. The recent resignation from the Board has obviously created the need for the alternate to move into the full time position. You have previously received my letters requesting an appointment and I have outlined my qualification. As the alternate I would appreciate the appointment.

Toby Dickinson

PROOF OF PUBLICATION

(2015.5 C.C.P.)

This space is for County Clerk's Filing Stamp

STATE OF CALIFORNIA,
COUNTY OF INYO

I am a citizen of the United States
and a resident of the County aforesaid.
I am over the age of eighteen years,
And not a party to or interested in the
above-entitled matter. I am the principal
clerk of the printer of the
The Inyo Register

Proof of Publication of Public Notice

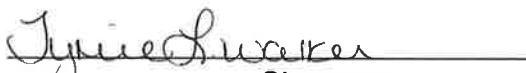
County of Inyo

The Inyo Register has been adjudged a newspaper of general circulation by the Superior Court of the County of Inyo, State of California, under date of Oct. 5, 1953, Case Number 5414; that the notice, of which the annexed is a printed copy (set in type not smaller than non-pareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof, on the following date, to with:

February 6th
In the year of **2020**

I certify (or declare) under penalty of perjury
that the foregoing is true and correct.

Dated at Bishop, California, on this
6th Day of February, 2020


Signature

**NOTICE OF VACANCY
INYO FISH & WILDLIFE
COMMISSION**

NOTICE IS HEREBY GIVEN
that the Inyo County Board of Supervisors is accepting applications to fill one (1) vacancy on the Inyo Fish & Wildlife Commission: one unexpired four-year term for a regular member ending October 6, 2021.

If you are interested in serving on the Inyo Fish & Wildlife Commission, please submit your request for appointment to the Clerk of the Board of Supervisors at P.O. Drawer N, Independence, CA 93526 or delis@inyocounty.us. In order for your request for appointment to be considered, it must be received on or before 5:00 p.m. February 25, 2020. (IR 02.06.2020 #20062)



County of Inyo



Health & Human Services - Health/Prevention

DEPARTMENTAL - ACTION REQUIRED

MEETING: March 3, 2020

FROM: Anna Scott

SUBJECT: Public hearing on a proposed ordinance, waiving of further reading, and scheduling of enactment

RECOMMENDED ACTION:

Request Board: A) conduct a public hearing on a proposed ordinance titled, "An Ordinance of the Board of Supervisors of the County of Inyo, State of California Amending the Inyo County Code to Add Chapter 5.45 to the Inyo County Code Regarding the Regulation of Tobacco Product Sales and Requiring the Licensure of Tobacco Retailers;" and B) waive further reading of said ordinance and schedule enactment for 11:00 am on March 10, 2020 in the Board of Supervisors Chamber, County Administrative Center, Independence.

SUMMARY/JUSTIFICATION:

Despite state and federal efforts to limit youth access to tobacco, tobacco and vape use among Inyo County's high schoolers is more than three times the state average. Most Inyo County students report that obtaining tobacco products is "very easy." For this reason, Inyo County Health and Human Services is recommending a ban on flavored vaping products and recommending minimum packaging and pricing requirements for tobacco products sold in Inyo County.

E-cigarette (or "vaping") companies target their marketing toward youth with candy-like flavors. Once they're hooked on the vaping products, many youth move on to tobacco. Additionally, studies have shown that making tobacco more expensive by not selling small packages of one or two can prevent youth from picking up the habit. Inyo County Health and Human Services is recommending a three-pronged approach: 1) a flavored e-cigarette or "vape" ban; 2) a requirement that all little cigars be sold in packs of 20 and cigars be sold in packs of 5 (except cigars that cost more than \$5 each); and 3) a requirement for minimum pricing of \$8 per pack for cigarettes and little cigars and \$5 per cigar.

In order to implement and enforce this new ban, Inyo County Health and Human Services is recommending that your Board adopt a Tobacco Retail License ordinance, which will establish a structure for regulating tobacco products in the unincorporated areas of Inyo County. In addition to limiting youth access to tobacco products, this ordinance, while not mirroring other local ordinances, will help bring more regional consistency to tobacco regulation, in light of recently enacted flavored tobacco bans in the County of Mono and The Town of Mammoth Lakes.

BACKGROUND/HISTORY OF BOARD ACTIONS:

ALTERNATIVES AND CONSEQUENCES OF NEGATIVE ACTION:

The Board could: 1) choose not to amend the Code; 2) Revise the proposed ordinance and introduce it as revised; 3) Give other direction to staff; or 4) Take no action.

OTHER AGENCY INVOLVEMENT:

CAO/Code Enforcement, Mono County Public Health, City of Bishop, Town of Mammoth Lakes, Inyo Mono Tobacco Coalition

FINANCING:

Outreach and education for retailers regarding the proposed ordinance will be paid out of the Tobacco budget 640317 under salaries and benefits.

ATTACHMENTS:

1. Tobacco Retail License Ordinance
2. Tobacco Retail License - Exhibit A

APPROVALS:

Rhiannon Baker	Created/Initiated - 2/5/2020
Darcy Ellis	Approved - 2/5/2020
Rhiannon Baker	Approved - 2/24/2020
Melissa Best-Baker	Approved - 2/24/2020
Marilyn Mann	Approved - 2/24/2020
Marshall Rudolph	Approved - 2/24/2020
Amy Shepherd	Approved - 2/24/2020
Marilyn Mann	Final Approval - 2/24/2020

ORDINANCE NO. 20-XXX

**AN ORDINANCE OF THE BOARD OF SUPERVISORS OF THE COUNTY OF INYO,
STATE OF CALIFORNIA AMENDING THE INYO COUNTY CODE TO ADD
CHAPTER 5.45 TO THE INYO COUNTY CODE REGARDING THE REGULATION
OF TOBACCO PRODUCT SALES AND REQUIRING THE LICENSURE OF
TOBACCO RETAILERS**

WHEREAS, approximately 480,000 people die in the United States from smoking-related diseases and exposure to secondhand smoke every year, making tobacco use the nation's leading cause of preventable death; and

WHEREAS, over 200 cases of E-cigarette or Vaping Associated Lung Injury have been reported in California during the current outbreak; and

WHEREAS, despite the state's efforts to limit youth access to tobacco, data from the Center for Disease Control and Prevention's National Youth Tobacco Purchase Survey shows that youth tobacco use increased by more than 23% from 2013 to 2019; and

WHEREAS, the National Youth Tobacco Survey found that 72% of high school students and 60% of middle school students have used flavored e-cigarettes and that youth reported product flavoring as one of the top reasons for using e-cigarettes; and

WHEREAS, in Inyo County, approximately 33% of 9th and 11th graders report using electronic smoking devices in the last 30 days; and

WHEREAS, although federal and state law ban the sale of individual cigarettes, neither federal nor California state laws restrict the sale of individual little cigars and cigars; and

WHEREAS, many retailers sell little cigars and cigars individually, making them more affordable and appealing to youth; and

WHEREAS, minimum price markups and related laws in other states have been shown to be effective at increasing the price of cigarettes but may remain vulnerable to price manipulation by the tobacco industry without attention to coupons and discounts; and

WHEREAS, banning the sale of flavored e-cigarettes and setting minimum packaging and pricing standards will assist in stemming this troubling increase in tobacco use among youth, as making a product more difficult to obtain will tend to discourage its use; and

WHEREAS, studies show that communities with strong tobacco retailer licensing ordinances experience declines in youth sales rates after the ordinances were enacted, with an average decrease of 28% in the youth sales rate; and

WHEREAS, requiring tobacco retailers to obtain a tobacco retailer license will not unduly burden legitimate business activities of retailers who sell tobacco products to adults but will

allow the County to regulate the operation of lawful businesses to discourage violations of federal, state, and local tobacco control and youth tobacco access laws; and

WHEREAS, the County of Inyo desires to add Chapter 5.45 to the Inyo County Code to create a Tobacco retail licensure system and to regulate the sales of certain tobacco products.

NOW, THEREFORE, the Board of Supervisors of Inyo County ordains as follows:

SECTION ONE. INYO COUNTY CODE AMENDED.

The Inyo County Code is hereby amended to include a new chapter, numbered as Chapter 5.45, and entitled "Tobacco Retail License and Regulation of Tobacco Product Sales." The contents and subsections of Chapter 5.45 are attached hereto as Exhibit A.

SECTION TWO. SEVERABILITY.

If any section, subsection, sentence, clause, or phrase of this Ordinance is for any reason held to be invalid or unconstitutional by a decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Ordinance. The Board hereby declares that it would have passed this Ordinance and each and every section, subsection, sentence, clause, or phrase not declared invalid or unconstitutional without regard to whether any portion of this Ordinance would be subsequently declared invalid or unconstitutional.

SECTION THREE. EFFECTIVE DATE.

This ordinance shall take effect and be in full force and effect six (6) months after its adoption. Before the expiration of fifteen (15) days from the adoption hereof, this ordinance shall be published as required by Government Code Section 25124. The Clerk of the Board is hereby instructed and ordered to so publish this ordinance together with the names of the Board members voting for or against the same.

PASSED AND ADOPTED this ____ day of _____, 2020, by the following vote:

AYES: _____
NOES: _____
ABSTAIN: _____
ABSENT: _____

MATT KINGSLEY, Chairperson
Inyo County Board of Supervisors

ATTEST: Clint Quilter
Clerk of the Board

By: _____
Darcy Ellis, Assistant
Assistant Clerk of the Board

Exhibit A

5.45.010 DEFINITIONS

The following words and phrases, whenever used in this Chapter, shall have the meanings defined in this section:

- i) “Arm’s length transaction” means a sale in good faith and for valuable consideration that reflects the fair market value between two informed and willing parties, neither of which is under any compulsion to participate in the transaction. A sale between relatives, related companies or partners, or a sale for which a significant purpose is avoiding the effect of the violations of this Chapter is not an arm’s length transaction.
- ii) “Cigar” means any roll of tobacco other than a cigarette wrapped entirely or in part in tobacco or any substance containing tobacco and weighing more than three pounds per thousand.
- iii) “Cigarette” means: (1) any roll of tobacco wrapped in paper or in any substance not containing tobacco; and (2) any roll of tobacco wrapped in any substance containing tobacco which, because of its appearance, the type of tobacco used in the filler, or its packaging and labeling, is likely to be offered to, or purchased by, consumers as a cigarette described herein.
- iv) “Consumer” means a Person who purchases a Tobacco Product for consumption and not for Sale to another.
- v) “Coupon” means any voucher, rebate, card, paper, note, form, statement, ticket, image, or other issue, whether in paper, digital, or other form, used for commercial purposes to obtain an article, product, service, or accommodation without charge or at a discounted price.
- vi) “Department” means Inyo County Administrator’s Office and any agency or person designated by the department to enforce or administer the provisions of this Chapter.
- vii) “Electronic smoking device” means any device that may be used to deliver any aerosolized or vaporized substance to the person inhaling from the device, including, but not limited to, an e-cigarette, e-cigar, e-pipe, vape pen, or e-hookah. “Electronic smoking device” includes any component, part, or accessory of the device, and also includes any substance that may be aerosolized or vaporized by such device, whether or not the substance contains nicotine. “Electronic smoking device” does not include drugs, devices, or combination products authorized for sale by the U.S. Food and Drug Administration, as those terms are defined in the Federal Food, Drug, and Cosmetic Act.
- viii) “Flavored electronic smoking device” means any electronic smoking device that contains a taste or smell, other than the taste or smell of tobacco, that is distinguishable by an ordinary consumer either prior to, or during the use of the electronic smoking device, including, but not limited to, any taste or smell relating to fruit, menthol, mint, wintergreen, chocolate, cocoa, vanilla, honey, or any candy, dessert, alcoholic beverage, herb, or spice.
- ix) “Flavored tobacco product” means any tobacco product that contains a taste or smell, other than the taste or smell of tobacco, that is distinguishable by an ordinary consumer either prior to, or during the consumption of, a tobacco product, including, but not limited to, any taste or smell relating to fruit, menthol, mint, wintergreen, chocolate, cocoa, vanilla, honey, or any candy, dessert, alcoholic beverage, herb, or spice.
- x) “Full Retail Price” means the price listed for a tobacco product on its packaging or on any related shelving, advertising, or display where the tobacco product is sold or offered for sale, plus all applicable taxes and fees if such taxes and fees are not included in the listed price.

- xi) "Labeling" means written, printed, or graphic matter upon any Tobacco Product or any of its Packaging, or accompanying such Tobacco Product.
- xii) "Little Cigar" means any roll of tobacco other than a cigarette wrapped entirely or in part in tobacco or any substance containing tobacco and weighing no more than three pounds per thousand. "Little Cigar" includes, but is not limited to, tobacco products known or labeled as small cigar, little cigar, or cigarillo.
- xiii) "Manufacturer" means any person, including any repacker or relabeler, who manufactures, fabricates, assembles, processes, or labels a tobacco product; or imports a finished tobacco product for sale or distribution into the United States.
- xiv) "Moveable place of business" means any form of business that is operated out of a kiosk, truck, van, automobile or other type of vehicle or transportable shelter and not a fixed address store front or other permanent type of structure authorized for sales transactions.
- xv) "Package" or "Packaging" means a pack, box, carton, or container of any kind or, if no other container, any wrapping (including cellophane) in which a tobacco product is sold or offered for sale to a consumer.
- xvi) "Person" means any natural person, partnership, cooperative association, corporation, personal representative, receiver, trustee, assignee, or any other legal entity.
- xvii) "Proprietor" means a Person with an ownership or managerial interest in a business. An ownership interest shall be deemed to exist when a person has a ten percent (10%) or greater interest in the stock, assets, or income of a business other than the sole interest of security for debt. A managerial interest shall be deemed to exist when a person can or does have or share ultimate control over the day-to-day operations of a business.
- xviii) "Sale" or "Sell" means any transfer, exchange, barter, gift, offer for sale, or distribution for a commercial purpose, in any manner or by any means whatsoever.
- xix) "Self-Service Display" means the open display or storage of tobacco products in a manner that is physically accessible in any way to the general public without the assistance of the retailer or employee of the retailer and a direct person-to-person transfer between the purchaser and the retailer or employee of the retailer. A vending machine is a form of self-service display.
- xx) "Tobacco Product" means: 1) any product containing, made, or derived from tobacco or nicotine that is intended for human consumption or is likely to be consumed, whether inhaled, absorbed, or ingested by any other means, including, but not limited to, a cigarette, a cigar, pipe tobacco, chewing tobacco, snuff, or snus; and 2) any electronic smoking device as defined in this Chapter and any substances that may be aerosolized or vaporized by such device, whether or not the substance contains nicotine; or any component, part, accessory of (1) or (2), whether or not any of these contains tobacco or nicotine, including but not limited to, filters, rolling papers, blunt or hemp wraps, hookahs, and pipes. "Tobacco Product" does not include drugs, devices, or combination products authorized for sale by the United States Food and Drug Administration, as those terms are defined in the Federal Food, Drug and Cosmetic Act.
- xxi) "Tobacco Retailer" means any Person who sells, offers for sale, or does or offers to exchange for any form of consideration, tobacco products. "Tobacco Retailing" shall mean the doing of any of these things. This definition is without regard to the quantity of tobacco products sold, offered for sale, exchanged, or offered for exchange.

5.45.020 GENERAL REQUIREMENTS AND PROHIBITIONS.

- i) **TOBACCO RETAILER’S LICENSE REQUIRED.** It shall be unlawful for any person to act as a tobacco retailer in the County of Inyo without first obtaining and maintaining a valid tobacco retailer’s license pursuant to this Chapter for each location at which tobacco retailing is to occur. Tobacco retailing without a valid tobacco retailer’s license is a nuisance as a matter of law.
- ii) **LAWFUL BUSINESS OPERATION.** In the course of tobacco retailing or in the operation of the business or maintenance of the location for which a license is issued, it shall be a violation of this Chapter for a licensee, or any of the licensee’s agents or employees, to violate any local, state, or federal law applicable to tobacco products or tobacco retailing.
- iii) **DISPLAY OF LICENSE.** Each tobacco retailer license shall be prominently displayed in a publicly visible location at the licensed location.
- iv) **POSITIVE IDENTIFICATION REQUIRED.** No person engaged in tobacco retailing shall sell a tobacco product to another person without first verifying by means of government-issued photographic identification that the recipient is at least 21 years of age. Verification is not required for a person over the age of 30. That the person appeared to be 30 years of age or older does not constitute a defense to a violation of this subsection.
- v) **SELF-SERVICE DISPLAYS PROHIBITED.** Tobacco retailing by means of a self-service display is prohibited.
- vi) **ON-SITE SALES.** All sales of tobacco products to consumers shall be conducted in-person at the licensed location. It shall be a violation of this Chapter for any tobacco retailer or any of the tobacco retailer’s agents or employees to deliver tobacco products or to knowingly or recklessly sell tobacco products to any person that intends to deliver the tobacco product to a consumer in Inyo County. For purposes of this subsection, “deliver” means the commercial transfer of tobacco products to a consumer at a location not licensed pursuant to this Chapter.

5.45.030 SALE OF FLAVORED ELECTRONIC SMOKING DEVICES PROHIBITED.

- i) It shall be a violation of this Chapter for any tobacco retailer or any of the tobacco retailer’s agents or employees to sell or offer for sale, or to possess with intent to sell or offer for sale, any flavored electronic smoking device.
- ii) There shall be a rebuttable presumption that a tobacco retailer in possession of four or more flavored electronic smoking devices, including, but not limited to, individual flavored electronic smoking devices, packages of flavored electronic smoking devices, or any combination thereof, possesses such flavored electronic smoking devices with intent to sell or offer for sale.
- iii) A public statement or claim made or disseminated by the manufacturer of an electronic smoking device, or by any person authorized or permitted by the manufacturer to make or disseminate public statements concerning such electronic smoking device, that such electronic smoking device has or produces a taste or smell other than tobacco, shall constitute presumptive evidence that the electronic smoking device is a flavored electronic smoking device.

5.45.040 TOBACCO PRODUCT PRICING AND PACKAGING.

- i) **PACKAGING AND LABELING.** No tobacco retailer shall sell any tobacco product to any consumer unless such product: (1) is sold in the original manufacturer's packaging intended for sale to consumers; and (2) conforms to all applicable federal labeling requirements.
- ii) **DISPLAY OF PRICE.** The price of each tobacco product offered for sale shall be clearly and conspicuously displayed to indicate the price of the product.
- iii) **PROHIBITION OF TOBACCO COUPONS AND DISCOUNTS.** No tobacco retailer shall:
 - (1) Honor or redeem, or offer to honor or redeem, a coupon to allow a consumer to purchase a tobacco product for less than the full retail price;
 - (2) Sell any tobacco product to a consumer through a multiple-package discount or otherwise provide any such product to a consumer for less than the full retail price in consideration for the purchase of any tobacco product or any other item; or
 - (3) Provide any free or discounted item to a consumer in consideration for the purchase of any tobacco product.
- iv) **MINIMUM PACKAGE SIZE FOR LITTLE CIGARS AND CIGARS.** No tobacco retailer shall sell to a consumer:
 - (1) Any little cigar unless it is sold in a package of at least twenty little cigars; or
 - (2) Any cigar unless it is sold in a package of at least six cigars; provided, however, that this subsection shall not apply to a cigar that has a price of at least \$5.00 per cigar, including all applicable taxes and fees.
- v) **MINIMUM PRICES FOR CIGARETTES, LITTLE CIGARS, AND CIGARS.** No tobacco retailer shall sell to a consumer:
 - (1) Cigarettes at a price that is less than \$8.00 per package of 20 cigarettes, including all applicable taxes and fees;
 - (2) Little cigars at a price that is less than \$8.00 per package of little cigars, including all applicable taxes and fees; or
 - (3) Cigars at a price that is less than \$5.00 per cigar, including all applicable taxes and fees.
 - (4) The minimum prices established in this section may be adjusted by ordinance.

5.45.050 APPLICATION PROCEDURE.

- i) An application for a tobacco retailer's license shall be submitted in the name of each proprietor proposing to conduct retail tobacco sales and shall be signed by each proprietor or an authorized agent thereof.
- ii) It is the responsibility of each proprietor to be informed regarding all laws applicable to tobacco retailing, including those laws affecting the issuance of a tobacco retailer's license. No proprietor may rely on the issuance of a license as a determination by the County of Inyo that the proprietor has complied with all laws applicable to tobacco retailing. A license issued contrary to this Chapter, contrary to any other law, or on the basis of false or misleading information supplied by a proprietor shall be revoked pursuant to this Chapter. Nothing in this Chapter shall be construed to vest in any person obtaining and maintaining a tobacco retailer's license any status or right to act as a tobacco retailer in contravention of any provision of law.
- iii) All applications shall be submitted on a form supplied by the Inyo County Department of Health and Human Services and shall contain the following information:

- (1) The name, address, and telephone number of each proprietor of the business seeking a license.
 - (2) The business name, address, and telephone number of the single fixed location for which a license is sought.
 - (3) A single name and mailing address authorized by each proprietor to receive all communications and notices (the “authorized address”) required by, authorized by, or convenient to the enforcement of this Chapter. If an authorized address is not supplied, each proprietor shall be understood to consent to the provision of notice at the business address specified in subparagraph (2) above.
 - (4) Proof that the location for which a tobacco retailer’s license is sought has been issued a valid state license for the sale of tobacco products, if the tobacco retailer sells products that require such license.
 - (5) Whether or not any proprietor or any agent of the proprietor has admitted violating, or has been found to have violated, this Chapter and, if so, the dates and locations of all such violations within the previous five years.
 - (6) Such other information as the Department deems necessary for the administration or enforcement of this Chapter as specified on the application form required by this section.
 - (7) A licensed tobacco retailer shall inform the Department in writing of any change in the information submitted on an application for a tobacco retailer’s license within ten (10) business days of a change.
- iv) No license may be issued to authorize tobacco retailing at other than a fixed location. No tobacco retail license will be issued to a moveable place of business.
 - v) All information specified in an application pursuant to this section shall be subject to disclosure under the California Public Records Act (California Government Code section 6250 et seq.) or any other applicable law.

5.45.060 ISSUANCE OF LICENSE.

Upon the receipt of a complete application for a tobacco retailer’s license and the license fee required by this Chapter, the Department shall approve or deny the application for a license, or it may delay action for a reasonable period of time to complete any investigation of the application or the applicant deemed necessary. The Department may deny an application for a tobacco retailer’s license based on any of the following:

- i) The information presented in the application is inaccurate or false. Intentionally supplying inaccurate or false information shall be a violation of this Chapter;
- ii) The application seeks authorization for tobacco retailing at a location for which this Chapter prohibits a license to be issued;
- iii) The application seeks authorization for tobacco retailing for a proprietor to whom this Chapter prohibits a license to be issued; and/or
- iv) The application seeks authorization for tobacco retailing that is prohibited under this Chapter, that is unlawful under this Chapter, or that is unlawful under any other law.

Upon the Department's approval of a license application, the applicant shall pay the required fee within 30 days. If the required fee is not paid in full within 30 days, the application shall be deemed abandoned and the Department's approval shall be of no force or effect.

A tobacco retailer's license may not be transferred from one person to another or from one location to another. A new tobacco retailer's license is required whenever a tobacco retailing location has a change in proprietor(s).

5.45.070 LICENSE RENEWAL AND EXPIRATION.

- i) RENEWAL OF LICENSE. The term of a tobacco retailer license is one year. Each tobacco retailer shall apply for the renewal of their tobacco retailer's license and submit the license fee no later than 30 days prior to expiration of the term.
- ii) EXPIRATION OF LICENSE. A tobacco retailer's license that is not timely renewed shall expire at the end of its term.

5.45.090 FEE FOR LICENSE.

The fee to issue or to renew a tobacco retailer's license shall be established from time to time by resolution of the Board of Supervisors of the County of Inyo. The fee shall be adjusted by resolution of the Board of Supervisors and shall not exceed the actual cost of the regulatory program authorized by this Chapter.

5.45.100 COMPLIANCE MONITORING.

- i) Compliance with this Chapter shall be monitored by the Department. In addition, the County of Inyo may designate additional persons to monitor compliance with this Chapter.
- ii) As a condition of receiving a license, a tobacco retailer grants Inyo County the right to inspect its premises to ensure compliance with this Chapter during any time that the tobacco retailer is open for business.

5.45.110 SUSPENSION OR REVOCATION OF LICENSE.

- i) A tobacco retailer's license shall be suspended or revoked in the following circumstances:
 - (1) Upon a finding by the Department of a first violation of this Chapter within any five-year period, the license shall be suspended for 30 days.
 - (2) Upon a finding by the Department of a second violation of this Chapter within any five-year period, the license shall be suspended for 90 days.
 - (3) Upon a finding by the Department of a third violation of this Chapter within any five-year period, the license shall be suspended for 1 year.
 - (4) Upon a finding by the Department of four or more violations of this Chapter within any five-year period, the license shall be revoked indefinitely and the tobacco retailer shall be forever barred from obtaining a license pursuant to this Chapter in Inyo County.
 - (5) Upon a finding by the Department that the suspension of the tobacco retailer's license would serve the interests of justice, the license shall be suspended for a reasonable period of time, to be determined at the discretion of the Department.

- ii) A finding of a violation shall be set out in writing by the Department. A copy of the written violation shall be served on the tobacco retailer at or before the date that the license suspension or revocation occurs, along with any evidence supporting the Department's determination that a violation occurred.
- iii) A decision of the Department to suspend or revoke a license is appealable per the procedures set forth in Inyo County Code Chapter 22.12.050(C). Any appeal must be received within 15 days following service of the written violation.

5.45.120 TOBACCO RETAILING WITHOUT A VALID LICENSE.

- i) In addition to any other penalty authorized by law, if the Department determines that any person has engaged in tobacco retailing at a location without a valid tobacco retailer's license, the person shall be ineligible to apply for, or to be issued, a tobacco retailer's license as follows:
 - (1) After a first violation of this section at a location within any five-year (5) period, no new license may issue for the person or the location (unless ownership of the business at the location has been transferred in an arm's length transaction), until thirty (30) days have passed from the date of the violation.
 - (2) After a second violation of this section at a location within any five-year (5) period, no new license may issue for the person or the location (unless ownership of the business at the location has been transferred in an arm's length transaction), until ninety (90) days have passed from the date of the violation.
 - (3) After of a third or subsequent violation of this section at a location within any five-year (5) period, no new license may issue for the person or the location (unless ownership of the business at the location has been transferred in an arm's length transaction), until five (5) years have passed from the date of the violation.
- ii) Tobacco products offered for sale or exchange in violation of this section are subject to seizure by the Department and shall be forfeited after the licensee and any other owner of the tobacco products seized is given reasonable notice and an opportunity to demonstrate that the tobacco products were not offered for sale or exchange in violation of this Chapter. The decision by the Department may be appealed pursuant to the procedures set forth in Inyo County Code Chapter 22.12.050(C). Forfeited tobacco products shall be destroyed and electronic smoking devices shall be properly disposed of according to appropriate hazardous waste regulations, after all internal appeals have been exhausted and the time in which to seek judicial review pursuant to California Code of Civil Procedure section 1094.6 or other applicable law has expired without the filing of a lawsuit or, if such a suit is filed, after judgment in that suit becomes final.
- iii) For the purposes of the civil remedies provided in this Chapter:
 - (1) Each day on which a tobacco product is offered for sale in violation of this Chapter shall constitute a separate violation of this Chapter; and
 - (2) Each individual retail tobacco product that is distributed, sold, or offered for sale in violation of this Chapter shall constitute a separate violation of this Chapter.

5.45.130 ADDITIONAL REMEDIES.

- i) The remedies provided by this Chapter are cumulative and in addition to any other remedies available at law or in equity.
- ii) Violations of this Chapter are subject to a civil action brought by the county counsel punishable by a civil fine not less than two hundred fifty dollars (\$250) and not exceeding one thousand dollars (\$1,000) per violation.
- iii) Violations of this Chapter may, in the discretion of the county counsel be prosecuted as infractions or misdemeanors when the interests of justice so require.
- iv) Violations of this Chapter are hereby declared to be public nuisances.

5.45.140 CONSTRUCTION.

This Chapter does not intend and shall not be interpreted to regulate any conduct where the regulation of such conduct has been preempted by the United States or the State of California.