

PROJECT MANUAL FOR

Cardiac Rehab Clinic – Bldg 2 Alta View Hospital

9660 S 1300 E
Sandy, UT 84094

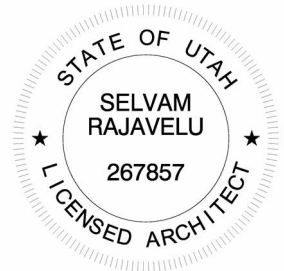
for

INTERMOUNTAIN HEALTHCARE

Construction Documents

November 07, 2025

R. Selvam



NJRA Architects, Inc. 5223 South Ascension Way, Suite 350. Murray, Utah 84123 Telephone: (801) 364-9259

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SECTION 00 2213

SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

- A. The Supplementary Instructions to Bidders herein describe, contain changes and additions to Section 00 0100 - AIA A701 Instructions to Bidders (included by reference - copies may be obtained from the Architect's office for the cost of reproduction). Where any part of the Instructions to Bidders is modified by these Supplementary instructions, the unaltered provisions shall remain in effect.

3.1.5 COPIES

Add the following:

The title or cover sheet to the drawings and the index to the Project Manual contains a list of all documents which comprise a full set of bid documents for this project. Any Contractor, Subcontractor, vendor or any other person participating in or bidding on this project shall be responsible for the information contained in any and all sheets of drawings and all sections of the specifications. If any person, party or entity elects to submit bids for any portion, or all, of this project, that person, party or entity shall be responsible for any and all information contained in these drawings and specifications, including, but not limited to, any subsequent addendums or clarifications that may be issued.

3.3 SUBSTITUTIONS

Amend 3.3.2 to read:

No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least 7 days prior to the date for receipt of Bids. Such requests...

3.4 ADDENDA

Amend 3.4.3 to read:

No addenda will be issued later than 24 hours prior to the date for receipt of Bids except an addendum may be issued no later than 12 hours prior to the date for receipt of bids for the purpose of cancellation or postponement of receipt of bids. It is the responsibility of the Bidder to disseminate telephone addendum information to sub-bidders.

4.2 BID SECURITY

Delete this article in its entirety. Bid bonds will not be required for this project.

4.3 SUBMISSION OF BIDS

Amend 4.3.4 to read:

Bids shall be hand delivered in sealed envelope or emailed to the Owner at the address noted in the Invitation to Bid. Bids submitted orally, or by telephone or facsimile will not be considered.

SECTION 00 4373

SCHEDULE OF VALUES**NAME OF BIDDER:** _____**DATE:** _____

DIV	TITLE	AMOUNT	\$/SQ. FT	COMMENTS
01	General Conditions	\$ _____	\$ _____	
02	Demolition	\$ _____	\$ _____	
02	Saw cut slab	\$ _____	\$ _____	
03	Concrete	\$ _____	\$ _____	
04	Masonry	\$ _____	\$ _____	
05	Steel	\$ _____	\$ _____	
06	Woods and Plastics	\$ _____	\$ _____	
07	Thermal and Moisture Protection	\$ _____	\$ _____	
08	Openings	\$ _____	\$ _____	
09	Finishes	\$ _____	\$ _____	
10	Specialties	\$ _____	\$ _____	
12	Furnishings	\$ _____	\$ _____	
21	Fire Suppression	\$ _____	\$ _____	
22	Plumbing	\$ _____	\$ _____	
23	HVAC	\$ _____	\$ _____	
26	Electrical	\$ _____	\$ _____	
31	Earthwork	\$ _____	\$ _____	
32	Landscape	\$ _____	\$ _____	
33	Utilities	\$ _____	\$ _____	
	SUBTOTAL	\$ _____	\$ _____	
	OVERHEAD AND PROFIT	\$ _____	\$ _____	
	TOTAL COST	\$ _____	\$ _____	

END OF SECTION

SECTION 00 5200

OWNER/CONTRACTOR AGREEMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Intermountain Healthcare's '**CONTRACTOR AGREEMENT**' (**Stipulated Sum**) for Construction between the Owner and General Contractor' where the basis of payment is a STIPULATED SUM, will *presumably* be used on this project. An electronic copy may be obtained from Intermountain Healthcare's Project Manager.

SECTION 00 6000

BONDS, CERTIFICATES AND OWNER DOCUMENTS**PART 1 - GENERAL****1.1 SUMMARY**

- A. The following documents are incorporated by reference; copies may be obtained from Intermountain Healthcare or the Architect for the cost of reproduction, if necessary. Electronic copies of the Intermountain Healthcare Documents can be obtained by contacting the Intermountain Healthcare Project Manager.

1. Intermountain Healthcare Document – '**Application and Certificate for Payment**'
2. Intermountain Healthcare Document – '**Application and Certificate for Payment – Continuation Sheet**'
3. Intermountain Healthcare Document – '**Change Order**' (CO)
4. Intermountain Healthcare Document – '**Proposed Change Order**' (PCO)
5. Intermountain Healthcare Document – '**A/E Supplement Instructions**' (ASI)
6. Intermountain Healthcare Document – '**Proposal Request**' (PR)
7. Intermountain Healthcare Document – '**Construction Change Directive**' (CCD)
8. Intermountain Healthcare Document – '**Request For Information**' (RFI)
9. AIA Document G704 – '**Certificate of Substantial Completion**'
10. AIA Document G707 – '**Consent of Surety to Final Payment**' (if required)
11. AIA Document G707A – '**Consent of Surety to Reduction in or Partial Release of Retainage**' (if required)
12. AIA Document A312 – '**Payment Bond**' (if required)
13. AIA Document A312 – '**Performance Bond**' (if required)

APPLICATION AND CERTIFICATION FOR PAYMENT

To Owner: IHC Health Services, Inc. Owner Project #: Owner Project # Application #: 1
 36 South State Street
 Salt Lake City, UT 84111 Application Date: 12/1/2018

From Contractor: Contractor Name Via A/E: Architect Name Period To: 12/31/2018
 Address Address
 City, State, Zip City, State, Zip Contract Invoice #: 1

Contract Date: 12/17/2016

Project Name: Project Name

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
 The Continuation Sheet is attached.

1. Original Contract Sum.....	\$	100.00	
2. Total Contract Change By Change Orders.....	\$	-	
3. Current Contract Sum.....	\$	100.00	
4. Total Completed & Stored To Date.....	\$	75.00	75.00%
5. Retention:			
5.1 This Period Retention.....	\$	1.25	
5.2 Previously Withheld Retention	\$	2.50	
5.3 Total Retention Withheld.....	\$	3.75	5.00%
5.4 Previously Released Retention.....	\$	-	
5.5 This Period Retention Released.....	\$	-	
5.6 Total Retention Released.....	\$	-	0.00%
5.7 Current Total Retention Withheld.....	\$	3.75	100.00%
6. Total Earned Less Retainage.....	\$	71.25	
7. Less Previous Certificates For Payments.....	\$	-	0.00%
8. Current Payment Due..... ³	\$	23.75	23.75%
9. Balance To Finish, Plus Retention.....	\$	76.25	76.25%

Change Order Summary	Amount
Total Changes Approved in Previous Months By Owner	\$ -
Total Approved Changes This Month	\$ -
Total Contract Change By Change Orders	\$ -

CONTRACTOR³: Contractor Name

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

By: ³ John Doe Date: 12/31/2018

State of: _____
 Subscribed and sworn to before me this _____ day of _____
 Notary Public: _____
 My Commission Expires: _____

A/E's CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based upon on-site observations and the data comprising the application, the A/E certifies to the Owner that to the best of the A/E's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the Amount Certified.

Amount Certified..... **\$23.75**

A/E:

By: _____ Date: _____

This Certificate is not negotiable. The amount certified is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

Approved by FD&C PM^{1,2}:

(Signature) (Date)

¹ For major capital projects, FD&C Project Manager to sign. ² Intermountain's "Monthly Pay Application Checklist" must be submitted by PM with For geographical area managed projects, geographical area Contractor's Application & Certification for Payment before processing. Project Manager to sign.

³ Contractor has verified the work associated with the "Current Payment Due" and has attached all relevant invoices and backup information with this application & certification for payment.

CONTINUATION SHEET

Application and Certification for Payment,

Containing Contractor's signed certification is attached.

Project Name: Project Name

Owner Project #: Owner Project #

Application #: 1

Application Date: 12/1/2018

Period To: 12/31/2018

Contractor Invoice #: 1

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Item No.	Description of Work	Original Contract Sum (CM/GC Pre-Construction Fee; Contract Buyouts)	Total Contract Change By Change Orders	Current Contract Sum (C + D)	Work Completed		Materials Presently Stored This Period (Not in F or G)	Total Completed and Stored Through This Period (F + G + H)	% (I / E)	Balance To Finish (E - I)	This Period Retention (G + H * 5%)	Total Retention Withheld (I * 5%)	This Period Retention Released	Total Retention Released	Current Payment Due ³ (G + H - L + N)
					From Previous Applications	This Period In Place									
00001	Enter Description of Work	\$ 100.00	\$ -	\$ 100.00	\$ 50.00	\$ 25.00	\$ -	\$ 75.00	75%	\$ 25.00	\$ 1.25	\$ 3.75	\$ -	\$ -	\$ 23.75
00002		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00003		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00004		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00005		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00006		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00007		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00008		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00009		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00010		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00011		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00012		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00013		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00014		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00015		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00016		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00017		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00018		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00019		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00020		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00021		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00022		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00023		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00024		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00025		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00026		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00027		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00028		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
00029		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Intermountain Project Grand Totals		\$ 100.00	\$ -	\$ 100.00	\$ 50.00	\$ 25.00	\$ -	\$ 75.00	75%	\$ 25.00	\$ 1.25	\$ 3.75	\$ -	\$ -	\$ 23.75

A/E SUPPLEMENTAL INSTRUCTIONS

ASI # 001

Project Name:	Project Name Address Address	A/E:	Architect
Bid Package:	1.0X	Date:	Date Issued
Owner:	IHC Health Services, Inc.	ASI Page Count:	XX
Intermountain Project #:	Project ID #	ASI Prepared By:	Name
FD&C PM:	PM Name	Contractor:	Contractor
ASI Description:	Description		

Reason For Change (Required):

- ☐ A/E Error
 ☐ A/E Omission
 ☐ A/E Request
 ☐ GC Request
 ☐ Owner/FD&C Request
 ☐ Functional Request
☐ Unknown Condition

The Work shall be executed in accordance with the following supplemental instructions, which interpret the Contract Documents or order minor changes in the Work without change in Construction Costs, Contract Sum and/or Contract Time.

If the Contractor believes that a change in Construction Costs, Contract Sum, and/or Contract Time is warranted, the Contractor shall submit written notice in the form of a Proposed Change Order (PCO) substantiating such claim to the A/E. The claim shall be made in accordance with the provisions of the Contract Documents. The Owner's authorization is required prior to proceeding with any Work which will incur additional cost and/or time.

DETAILED DESCRIPTION:

Text

ATTACHMENTS:

Text

Approved by FD&C¹:

(Signature)

(Date)

¹ For major capital projects, FD&C Project Manager to sign.
 For local facility managed projects, local facility Project Manager to sign.

CONSTRUCTION CHANGE DIRECTIVE**CCD # 001**

Project Name:	Project Name Address Address	A/E:	Architect
Bid Package:	1.0X	Date:	Date Issued
Owner:	IHC Health Services, Inc.	CCD Page Count:	XX
Intermountain Project #:	Project ID #	CCD Prepared By:	Name
FD&C PM:	PM Name	Contractor:	Contractor
CCD Subject:	Subject		

Reason For Change (Required):

- ☐ A/E Error ☐ A/E Omission ☐ A/E Request ☐ GC Request ☐ Owner/FD&C Request ☐ Functional Request
☐ Unknown Condition

ESTIMATED CHANGE IN CONSTRUCTION COSTS, CONTRACT SUM, OR CONTRACT TIME:

\$

In order to expedite the work and avoid or minimize delays in the work which may affect the contract sum and/or contract time, the Contract Documents are hereby amended as described below. Proceed with this work promptly. Submit final costs for work involved and change in Contract Time (if any as a Proposed Change Order), for inclusion in a subsequent Change Order, per the General Conditions.

All work shall be in accordance with the terms, stipulations and conditions of the original Contract Documents.

DESCRIBE BRIEFLY ANY PROPOSED CHANGES:

Text

ATTACHMENTS:

Text

Approved by FD&C PM¹:

(Signature)

(Date)

Approved by FD&C Exec. Director²:

(Signature)

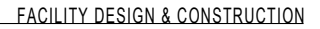
(Date)

¹ For major capital projects, FD&C Project Manager to sign.

For local facility managed projects, local facility Project Manager to sign.

² For major capital projects, FD&C Design & Construction Exec. Director to sign when the charge exceeds \$200,000 as outlined in "Construction Change Order Procedure".

For local facility managed projects, System Construction Director to sign when the charge exceeds \$25,000 as outlined in "Approval Authority Capital Expenditures Policy".



CO # 001

This Change Order is not valid until signed by the Owner, A/E and Contractor.

CO Description:	Description

PCO #	Description	Reason for Change	Amount
xxx	Enter Description	Enter Reason for Change from PCO Form	\$
Total This Change Order:			\$

CO Details:

The Original Contract Sum was	\$
The net change by previously authorized Change Orders was	\$
The Contract Sum prior to this Change Order was	\$
The Contract Sum will be increased (decreased) by this Change Order	\$
The new Contract Sum including this Change Order, will be	\$
The Contract Time will be increased (decreased) by	Enter Calendar Days or 0
The date of Substantial Completion as of this Change Order therefore is	Enter Date

Contractor:

Contractor Firm
Contractor Rep. Name - Title

Architect:

Architect Firm
Architect Rep. Name - Title

Intermountain Healthcare:

IHC Health Services, Inc.
Clay Ashdown/Adam Jensen¹

Signature

Date

Signature

Date

VP, Financial Strategy, Growth and Development/
Executive Director, Design and Construction

Date

FD&C Director²

Date

FD&C Project Manager³

Date

¹ Executive Director, Design and Construction to sign when Change Order amount is \$100,000 or less, otherwise, VP, Financial Strategy, Growth and Development is required to sign per the "Contract Policy" and "Approval Authority Expenditures Policy".

² For major capital projects, Executive Director, Design & Construction to sign if Change Order is more than \$100,000. For local facility managed projects, System Construction Director to sign.

³ For major capital projects, FD&C Project Manager to sign. For local facility managed projects, local Facility Project Manager to sign.

FUNCTIONAL CHANGE REQUEST

FCR # 001

Project Name:	Project Name Address Address	A/E:	Architect
Bid Package:	1.0X	Date:	Date Issued
Owner:	IHC Health Services, Inc.	PR Page Count:	XX
Intermountain Project #:	Project ID #	PR Prepared By:	Name
FD&C PM:	PM Name	Contractor:	Contractor
Request Description:	Description		

Please submit a fully itemized list of Construction Costs, with supporting documentation, for any changes in the Construction Costs, Contract Sum, and/or Contract Time incidental to the proposed modifications to the Contract Documents.

This form must be signed & approved by the FD&C PM prior to Contractor proceeding with pricing.

THIS IS NOT A CHANGE ORDER, A CONSTRUCTION CHANGE DIRECTIVE OR A NOTICE TO PROCEED WITH THE WORK DESCRIBED IN THE PROPOSED MODIFICATIONS.

REASON FOR REQUEST:

Text

BUSINESS CASE JUSTIFICATION:

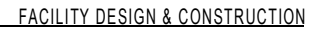
Text

Requester: _____
(Signature) (Printed Name and Title) (Date)

Operations Management Approval: _____
(Signature) (Printed Name and Title) (Date)

Approved by FD&C PM¹: _____
(Signature) (Date)

¹ For major capital projects, FD&C Project Manager to sign.
For local facility managed projects, local facility Project Manager to sign.

PCO # 001

		A/E is responsible for \$ _____ . Agreed to if PCO is signed.
Item	Subcontractor	Description Amount
-	-	Enter Description \$
		PCO Subtotal \$
		Subcontractor Default Insurance (SDI) (<u>Insert</u> %) \$
		General Liability Insurance Fee (<u>Insert</u> %) \$
		Contractors Fee (<u>Insert</u> %) \$
		Total Cost of this PCO Request \$

Contractor:

Contractor Firm
Contractor Rep. Name - Title

Architect:

Architect Firm
Architect Rep. Name - Title

Intermountain Healthcare:

IHC Health Services, Inc.
Owners' Rep. – PM Name

Signature

Date

Signature

Date

PM Signature¹

Date

FD&C Exec. Director Signature²

Date

¹ For major capital projects, FD&C Project Manager to sign.*

For local facility managed projects, local facility Project Manager to sign.*

² For major capital projects, FD&C Design & Construction Exec. Director to sign when the charge exceeds \$200,000 as outlined in "Construction Change Order Procedure".

For local facility managed projects, System Construction Director to sign when the charge exceeds \$25,000 as outlined in "Approval Authority Capital Expenditures".

*** PM signatures are required for all PCO's *prior* to work commencing.**

PROPOSED CHANGE ORDER

PCO # 001

Project Name:	Project Name Address Address	Contractor:	Contractor
Bid Package:	1.0X	PCO Issue Date:	Date Issued
Owner:	IHC Health Services, Inc.	PCO Page Count:	XX
Intermountain Project #:	Project ID #	PCO Prepared By:	Name
FD&C PM:	PM Name	A/E:	Architect

*Once this document is executed the Contractor is authorized to proceed with the work described below and to include this PCO in a Change Order for A/E and Owner approval.

PCO Description: **Description**

Reference: **Reference ASI, RFI, PR, CCD change document this PCO is in response to.**

Reason For Change (Required):

- ☐ *A/E Error
 ☐ *A/E Omission
 ☐ A/E Request
 ☐ GC Request
 ☐ Owner/FD&C Request
 ☐ Functional Request
☐ Unknown Condition
☐ **Facility

*If A/E Error or A/E Omission is checked, the Contractor is to provide pricing delta (bid cost vs. C.O. cost) to determine A/E responsibility.

**If Facility is checked, the Facility and FD&C PM are to determine the Facility's cost responsibility, including design fees and the Facility representative is to initial the PCO or provide email acknowledgement of financial commitment and attach to PCO. FD&C PM to coordinate with Capital Finance on facility reimbursement once PCO is signed.

PCO Details:

*A/E is responsible for \$ _____. Agreed to if PCO is signed.
 **Facility is responsible for \$ _____. Agreed to if PCO is signed.

Item	Subcontractor	Description	Amount
-	-	Enter Description	\$
PCO Subtotal			\$
Contractors Fee (5%) per the contract			\$
Total Cost of this PCO Request			\$

Contractor:

Contractor Firm

Contractor Rep. Name - Title

Architect:

Architect Firm

Architect Rep. Name - Title

Intermountain Healthcare:

IHC Health Services, Inc.

Owners' Rep. – PM Name

Signature_____
Date_____
Signature_____
Date_____
FD&C Project Manager¹_____
Date_____
FD&C Director²_____
Date

¹ For major capital projects, FD&C Project Manager to sign.*

For local facility managed projects, local facility Project Manager to sign.*

² For major capital projects, Executive Director, Design & Construction to sign when the charge exceeds \$200,000 as outlined in the "Construction Change Order Procedure".

For local facility managed projects, System Construction Director to sign when the charge exceeds \$25,000 as outlined in the "Approval Authority Capital Expenditures Policy".

*** PM signatures are required for all PCO's *prior* to work commencing.**

PERSONNEL OVERTIME APPROVAL FORM

Project Name:	Project Name Address City, State, Zip
Owner:	IHC Health Services, Inc.
Intermountain Project #:	
FD&C PM:	
Contractor:	
Employee or position:	
Job Title:	
Salaried Employee:	<input type="checkbox"/> (Check box if yes)
Hourly Rate:	
Invoice Period:	

Contractor requests Owner's approval of employee overtime for the Project as originally specified in the Contract. The proposed overtime and the reasons for the request are specified below. The proposed overtime will be deemed approved by Owner at the time this request form is duly executed on behalf of Owner in the space provided below.

OVERTIME JUSTIFICATION:

Contractor:
Contractor Firm
Contractor Rep. Name - Title

Owner:
IHC Health Services, Inc.
FD&C Project Manager

Signature Date

Signature Date

PERSONNEL STAFFING CHANGE REQUEST FORM

Project Name:**Project Name**
Address
City, State, Zip**A/E or Contractor:****Owner:****IHC Health Services, Inc.****Intermountain
Project #:****FD&C PM:****Date Issued:****Contract:****Contract Date:**

A/E or Contractor (as applicable) requests Owner's approval of certain changes to the Personnel Staffing Plan for the Project as originally specified in A/E or Contractor's proposal attached to the Contract. The proposed staffing changes and the reasons for the request are specified below. The proposed staffing changes will be deemed approved by Owner at the time this request form is duly executed on behalf of Owner in the space provided below.

REASON FOR CHANGE:

Include with this request: (1) The staffing plan from original project proposal encompassing complete project team. (2) An updated staffing plan with noted additions/deletions. (3) A current staff resume of proposed staff indicating relevant health care related experience along with the time commitment on the project, staff labor rates and change justification.

A/E or Contractor:**A/E or Contractor Firm**
A/E or Contractor Rep. Name - Title**Owner:****IHC Health Services, Inc.**
Clay Ashdown_____
Signature_____
Date_____
VP, Financial Strategy, Growth and
Development_____
Date_____
Exec. Director, Design & Construction
/ System Construction Director_____
Date_____
FD&C Project Manager_____
Date

PROPOSAL REQUEST

PR # 001

Project Name:	Project Name Address Address	A/E:	Architect
Bid Package:	1.0X	Date:	Date Issued
Owner:	IHC Health Services, Inc.	PR Page Count:	XX
Intermountain Project #:	Project ID #	PR Prepared By:	Name
FD&C PM:	PM Name	Contractor:	Contractor
PR Description:	Description		

Reason For Change (Required):

- ☐ A/E Error
 ☐ A/E Omission
 ☐ A/E Request
 ☐ GC Request
 ☐ Owner/FD&C Request
 ☐ Functional Request
☐ Unknown Condition

Please submit a fully itemized list of Construction Costs, with supporting documentation, for any changes in the Construction Costs, Contract Sum, and/or Contract Time incidental to the proposed modifications to the Contract Documents.

THIS IS NOT A CHANGE ORDER, A CONSTRUCTION CHANGE DIRECTIVE OR A NOTICE TO PROCEED WITH THE WORK DESCRIBED IN THE PROPOSED MODIFICATIONS.

DESCRIPTION:

Text

ATTACHMENTS:

Text

Requested by: _____
 (Signature) (Printed Name and Title) (Date)

Approved by FD&C PM¹: _____
 (Signature) (Date)

¹ For major capital projects, FD&C Project Manager to sign.
 For local facility managed projects, local facility Project Manager to sign.

UTILITIES SHUTDOWN REQUEST (Utilities & Emergency Egress, Etc.)

Project Name:	Project Name Address Address	Contractor:	Contractor Contact Name Phone Number
Owner:	IHC Health Services, Inc.	Contractor(s)/ Subcontractor(s) Performing Work:	Contractor Contact Name Phone Number
FD&C PM:	PM Name		
Start of Impairment:	Date Time	End of Impairment:	Date Time

IMPAIRMENT REQUIREMENTS

The Utilities Shutdown Request **MUST** be approved by Facility Management 3 working days (min.) before work begins.

Facility Management **MUST** be notified when work is ready to begin and when work is complete.

Facility Management and Contractor(s) will reactivate system(s) at approved times and **MUST** be notified if impairments need to be extended.

SECTION 1 – IMPAIRED INFORMATION TO BE COMPLETED BY CONTRACTOR

AREA(S) AFFECTED (Building, Floor, Area/Department, Users, Devices, etc.)

Text

TYPE OF SHUTDOWN (CHECK ALL THAT APPLY)

<input type="checkbox"/> Electrical	<input type="checkbox"/> Emergency Power* <input type="checkbox"/> Main Switch Gear* <input type="checkbox"/> Individual Panel	<input type="checkbox"/> Single Breaker <input type="checkbox"/> Fire Alarm System* <input type="checkbox"/> _____
<input type="checkbox"/> Plumbing	<input type="checkbox"/> Sewer Stock <input type="checkbox"/> Vent <input type="checkbox"/> Hot Water Domestic	<input type="checkbox"/> Cold Water Domestic <input type="checkbox"/> Steam Line <input type="checkbox"/> _____
<input type="checkbox"/> Sprinkler	<input type="checkbox"/> Riser* <input type="checkbox"/> Individual Heat <input type="checkbox"/> Horizontal Mains/Areas	<input type="checkbox"/> Valves* <input type="checkbox"/> _____
<input type="checkbox"/> Medical Gas	<input type="checkbox"/> Compressed Air <input type="checkbox"/> Oxygen <input type="checkbox"/> Nitrous Oxide	<input type="checkbox"/> Vacuum <input type="checkbox"/> Special Mix Gas <input type="checkbox"/> Zone Valve Boxes

☐ **Mechanical**
☐ Chilled Water
☐ Steam
☐ Glycol

☐ Hot Water
☐ Compressor
☐ Condenser

☐ VAV's
☐ Electrical Disconnects
☐ _____

* Requires Fire Alarm & Security Coordination

FACILITY PERMITS
☐ ****Above Ceiling**
☐ ****Hot Work**
☐ ****Infection Control Risk Control (ICRA)**
☐ ****Other** _____

** Completed forms must be attached

PERCENT OF IMPAIRMENT (For partial impairment, attach a list showing the area, smoke head, fire suppression system etc. that will be impaired)

Text

REASON FOR IMPAIRMENT

Text

COMMENTS

Text

ATTACHMENTS

1. *3_Pre-Construction GC Detailed Shutdown Plan_Template.xlsx*
2. *Facility Site Area Floor Plan*

SECTION 2 – TO BE COMPLETED BY FACILITY MANAGEMENT

1. Will fire alarm be taken off line for any amount of time? Yes _____ No _____
If Yes, Facility Management must review and sign. _____
2. Will this impairment extend more than 4 hours? Yes _____ No _____
If Yes, a fire watch must be implemented, Intermountain Healthcare Safety Officer and Insurance Provider must be notified.
3. Department Managers of impaired areas notified:
Facility Management: _____ Date: _____
FD&C Project Manager: _____ Date: _____

REQUEST FOR INFORMATION

RFI # 001

Project Name:	Project Name Address Address	Contractor:	Contractor
Bid Package:	1.0X	Date:	Date Issued
Owner:	IHC Health Services, Inc.	RFI Page Count:	XX
Intermountain Project #:	Project ID #	RFI Prepared By:	Name
FD&C PM:	PM Name	Architect:	Architect
RFI Description:	Description		
Cross Reference:	ASI #, Drawing Info, etc.	RFI Response Date Requested:	Date

☐ **Contractor Attestation (Required checkbox):** The undersigned Contractor has reviewed the Contract Documents and is unable to locate this requested information within the Contract Documents. This RFI requests information, direction, or clarification for this specific item.

Contractor Signature: Signature **Date:** Date

QUESTION:

Text

RESPONSE:

Text

A/E Response By:	Name	Date:	Date
A/E PM Acknowledgement:	Name	Date:	Date

Above Ceiling Work Permit

****Standards Referenced: NFPA 101 2012; NFPA 30 2012; NFPA 45 2011; NFPA 99 2012**

Facility Name:
Requestor Name:
Company/Dept:
Contact Phone:

Permit No.:
Project No.:
Work/PO No.:

Start Date: Start Time:
End Date: End Time:

Exact Location of Work:

Description of Work:

Will ANY penetrations be made in walls, roof, floor or ceilings? ☐ Yes ☐ No

Will wiring or data cabling be installed or modified? ☐ Yes ☐ No

Type of Wiring

☐ Communication
☐ Door Control
☐ Low or High Voltage Electrical
☐ Fiber Optic
☐ Fire Alarm

☐ HVAC
☐ Security
☐ Telephone
☐ Television
☐ Other -

Will fixtures, appliances, duct work or equipment be installed? ☐ Yes ☐ No

How will the work be supported?

☐ Fastened to deck or structure
☐ Fastened to wall
☐ Existing cable tray
☐ Existing pipe rack or conduit rack

☐ New cable tray
☐ New pipe rack or conduit rack
☐ Other -

Intermountain Point of Contact: POC Phone:
Print Name Clearly

Site Pre-Inspection

Intermountain Representative: Requestor:
Print Name Clearly Print Name Clearly

Notes or Observations (if any):

Site Post-Inspection

Intermountain Representative: Requestor:
Print Name Clearly Print Name Clearly

☐ No unsealed penetrations observed ☐ All installations properly supported

Notes or Observations (if any):

Intermountain Review and Approval of Work

Intermountain Representative: Date:
Signature

Why do we have to do this?

Because more people die of smoke inhalation in fires than die of fires in fires.
Because 6% of all TJC findings at Intermountain are penetrations in smoke or fire barriers.

Hot Work Permit



Facility Name:

Requestor Name:

Company/Dept:

Contact Phone:

Permit No.:

Project No.:

Start Date:

End Date:

Work / PO No.:

Start Time:

End Time:

Exact Location of Work:

Description of Work:

Heat Sources

☐ Gas Torch ☐ Grinder ☐ Arc Welder ☐ Drill ☐ Chemical
☐ Other -

Will work require disabling fire detection or suppression systems? ☐ Yes ☐ No

Will systems be disabled longer than 4 hours in any 24 hours? ☐ Yes ☐ No

Will work generate smoke, odors or fumes? ☐ Yes ☐ No

Establishing The Work Area

<input type="checkbox"/> 35' space clear of combustibles	<input type="checkbox"/> Appropriate fire extinguishers on hand
<input type="checkbox"/> Fire blankets or protective mats in place	<input type="checkbox"/> Confined space permit on hand or not needed
<input type="checkbox"/> Space is well-ventilated	<input type="checkbox"/> Atmosphere tested non-explosive
<input type="checkbox"/> Signage and barricades in place	<input type="checkbox"/> Welding shields are in place as needed
<input type="checkbox"/> Safety observer on hand	<input type="checkbox"/> Fire watch arranged for
<input type="checkbox"/> Other precautions: <input type="text"/>	

Intermountain Point of Contact: POC Phone:

Emergency Phone Number:

Upon Conclusion of Work

Name of Fire Watch Personnel: Supervisor:

☐ Fire watch was kept for 60 minutes after hot work was complete

☐ No sign of smoke or fire was detected during fire watch

Notes or Observations (if any):

Intermountain Review and Approval of Work

Intermountain Point of Contact: Date:

Why do we have to do this?

Because more people die of smoke inhalation in fires than die of fires in fires.

Because 6% of all TJC findings at Intermountain are penetrations in smoke or fire barriers.

Infection Control Risk Assessment 2.0

Matrix of Precautions for Construction, Renovation and Operations

ICRA 2.0 Infection Control Risk Assessment and Permit	Project Name:		
	ICRA Number:		Requested by
Location of Work Activity		Project Start Date	
Company Performing Work		Est. Completion Date	
Contractor Superintendent		Phone	
Contractor Project Manager		Phone	
Intermountain Project Manager		Phone	
Industrial Hygiene		Phone	
Infection Preventionist		Phone	

1. Type of Activity	
	<p>Type A: Inspection and non-invasive activities. Includes but is not limited to:</p> <ul style="list-style-type: none"> Removal of ceiling tile for visual inspection-limited to 1 tile per 50 square feet with limited exposure time. Limited building system maintenance (e.g., pneumatic tube station, HVAC system, fire suppression system, electrical and carpentry work to include painting without sanding) that does not create dust or debris. Clean plumbing activity limited in nature.
	<p>Type B: Small-scale, short duration activities that create minimal dust and debris. Includes but is not limited to:</p> <ul style="list-style-type: none"> Work conducted above the ceiling (e.g., prolonged inspection or repair of firewalls and barriers, installation of conduit and/or cabling, and access to mechanical and/or electrical chase spaces). Fan shutdown/startup. Installation of electrical devices or new flooring that produces minimal dust and debris. The removal of drywall where minimal dust and debris is created. Controlled sanding activities (e.g., wet or dry sanding) that produce minimal dust and debris.
	<p>Type C: Large-scale, longer duration activities that create a moderate amount of dust and debris. Includes but is not limited to:</p> <ul style="list-style-type: none"> Removal of preexisting floor covering, walls, casework or other building components. New drywall placement. Renovation work in a single room. Non-existing cable pathway or invasive electrical work above ceilings. The removal of drywall where a moderate amount of dust and debris is created. Dry sanding where a moderate amount of dust and debris is created. Work creating significant vibration and/or noise.
	<p>Type D: Major demolition and construction activities. Includes but is not limited to:</p> <ul style="list-style-type: none"> Removal or replacement of building system component(s). Removal/installation of drywall partitions. Invasive large-scale new building construction. Renovation work in two or more rooms.

2. Patient Risk Area			
Low Risk	Medium Risk	High Risk	Highest Risk
Non-patient care areas such as:	Patient care support areas such as:	Patient care areas such as:	Procedural, invasive, sterile support and highly compromised patient care areas such as:
<ul style="list-style-type: none"> Public hallways and gathering areas not on clinical units. Office areas not on clinical units. Breakrooms not on clinical units. Bathrooms or locker rooms not on clinical units. Mechanical rooms not on clinical units. EVS closets not on clinical units. 	<ul style="list-style-type: none"> Waiting areas. Clinical engineering. Materials management. Sterile processing department - dirty side. Kitchen, cafeteria, gift shop, coffee shop, and food kiosks. Outpatient exam rooms (no procedures) 	<ul style="list-style-type: none"> Outpatient procedure rooms All acute care units Emergency department Employee health Pharmacy - general work zone Medication rooms and clean utility rooms Imaging suites: diagnostic imaging Laboratory. 	<ul style="list-style-type: none"> All transplant and intensive care units. All oncology units. OR theaters and restricted areas. Procedural suites. Pharmacy compounding. Sterile processing department - clean side. Transfusion services. Dedicated isolation wards/units. Imaging suites: invasive imaging.

3. Class of Precautions				
	Activity Type			
Patient Risk	Type A	TYPE B	TYPE C	TYPE D
Low	I	II	II	III*
Medium	I	II	III*	IV
High	I	III	IV	V
Highest	III	IV	V	V

Infection control permit and approval will be required when Class of Precautions III (Type C) and all Class of Precautions IV or V are necessary.

Environmental conditions that could affect human health, such as sewage, mold, asbestos, gray water and black water will require Class of Precautions IV for LOW and MEDIUM Risk Groups and Class of Precautions V for HIGH and HIGHEST Risk Groups.

*Type C [Medium Risk groups] and Type D [Low Risk Groups] work areas [Class III precautions] that cannot be sealed and completely isolated from occupied patient care spaces should be elevated to include negative air exhaust requirements as listed in Class IV Precautions.

4. Surrounding Area					
Unit	Below:	Above:	Lateral:	Behind:	In Front:
Risk group					
Contact					
Phone					
Controls	<input type="checkbox"/> Noise <input type="checkbox"/> Vibration <input type="checkbox"/> Dust <input type="checkbox"/> Ventilation <input type="checkbox"/> Pressurization	<input type="checkbox"/> Noise <input type="checkbox"/> Vibration <input type="checkbox"/> Dust <input type="checkbox"/> Ventilation <input type="checkbox"/> Pressurization	<input type="checkbox"/> Noise <input type="checkbox"/> Vibration <input type="checkbox"/> Dust <input type="checkbox"/> Ventilation <input type="checkbox"/> Pressurization	<input type="checkbox"/> Noise <input type="checkbox"/> Vibration <input type="checkbox"/> Dust <input type="checkbox"/> Ventilation <input type="checkbox"/> Pressurization	<input type="checkbox"/> Noise <input type="checkbox"/> Vibration <input type="checkbox"/> Dust <input type="checkbox"/> Ventilation <input type="checkbox"/> Pressurization
Systems impacted:	<input type="checkbox"/> Data <input type="checkbox"/> Mechanical <input type="checkbox"/> Med Gas <input type="checkbox"/> Hot/Cold Water <input type="checkbox"/> Other	<input type="checkbox"/> Data <input type="checkbox"/> Mechanical <input type="checkbox"/> Med Gas <input type="checkbox"/> Hot/Cold Water <input type="checkbox"/> Other	<input type="checkbox"/> Data <input type="checkbox"/> Mechanical <input type="checkbox"/> Med Gas <input type="checkbox"/> Hot/Cold Water <input type="checkbox"/> Other	<input type="checkbox"/> Data <input type="checkbox"/> Mechanical <input type="checkbox"/> Med Gas <input type="checkbox"/> Hot/Cold Water <input type="checkbox"/> Other	<input type="checkbox"/> Data <input type="checkbox"/> Mechanical <input type="checkbox"/> Med Gas <input type="checkbox"/> Hot/Cold Water <input type="checkbox"/> Other

Were there discoveries in surrounding areas that would serve as cause to increase the class of precautions and necessitate additional controls? If so, please summarize.

5a. Required Infection Control Precautions by Class | Before and During Work Activity

Class of Precautions	Mitigation Activities (Performed Before and During Work Activity)
Class I	<p>Perform noninvasive work activity as to not block or interrupt patient care.</p> <p>Perform noninvasive work activities in areas that are not directly occupied with patients.</p> <p>Perform noninvasive work activity in a manner that does not create dust.</p> <p>Immediately replace any displaced ceiling tile before leaving the area and/or at end of noninvasive work activity.</p>
Class II	<p>Perform only limited dust work and/or activities designed for basic facilities and engineering work.</p> <p>Perform limited dust and invasive work following standing precautions procedures approved by the organization.</p> <p>This Class of Precautions must never be used for construction or renovation activities.</p>
Class III	<p>Provide active means to prevent airborne dust dispersion into the occupied areas.</p> <p>Means for controlling minimal dust dispersion may include hand-held HEPA vacuum devices, polyethylene plastic containment, or isolation of work area by closing room door.</p> <p>Remove or isolate return air diffusers to avoid dust from entering the HVAC system.</p> <p>Remove or isolate the supply air diffusers to avoid positive pressurization of the space.</p> <p>If work area is contained, then it must be neutrally to negatively pressurized at all times.</p> <p>Seal all doors with tape that will not leave residue.</p> <p>Contain all trash and debris in the work area.</p> <p>Nonporous/smooth and cleanable containers (with a hard lid) must be used to transport trash and debris from the construction areas. These containers must be damp-wiped cleaned and free of visible dust/debris before leaving the contained work area.</p> <p>Install an adhesive (dust collection) mat at entrance of contained work area based on facility policy.</p> <p>Adhesive mats must be changed routinely and when visibly soiled.</p> <p>Maintain clean surroundings when area is not contained by damp mopping or HEPA vacuuming surfaces.</p>
Class IV	<p>Construct and complete critical barriers meeting NFPA 241 requirements including: Barriers must extend to the ceiling or, if ceiling tile is removed, to the deck above, and all penetrations through the barrier shall meet the appropriate fire rating requirements.</p> <p>All (plastic or hard) barrier construction activities must be completed in a manner that prevents dust release. Plastic barriers must be effectively affixed to ground and ceiling and secure from movement or damage. Apply tape that will not leave a residue to seal gaps between barriers, ceiling or floor.</p> <p>Seal all penetrations in containment barriers, including floors and ceiling, using approved materials (UL schedule firestop if applicable for barrier type).</p> <p>Containment units or environmental containment units (ECUs) approved for Class IV precautions in small areas totally contained by the unit and that has HEPA-filtered exhaust air.</p> <p>Remove or isolate return air diffusers to avoid dust entering the HVAC system.</p> <p>Remove or isolate the supply air diffusers to avoid positive pressurization of the space.</p> <p>Negative airflow pattern must be maintained from the entry point to the anteroom and into the construction area. The airflow must cascade from outside to inside the construction area. The entire construction area must remain negatively pressurized.</p> <p>Maintain negative pressurization of the entire workspace by use of HEPA exhaust air systems directed outdoors. Exhaust discharged directly to the outdoors that is 25 feet or greater from entrances, air intakes and windows does not require HEPA-filtered air.</p> <p>If exhaust is directed indoors, then the system must be HEPA filtered.</p> <p>Prior to start of work, HEPA filtration must be verified by particulate measurement and must not alter or change airflow/pressure relationships in other areas.</p> <p>Exhaust into shared or recirculating HVAC systems, or other shared exhaust systems (e.g., bathroom exhaust) is not acceptable.</p>

	<p>Install device on exterior of work containment to continually monitor negative pressurization. To assure proper pressure is continuously maintained, it is recommended that the device(s) have a visual pressure indicator.</p> <p>Contain all trash and debris in the work area.</p> <p>Nonporous/smooth and cleanable containers (with a hard lid) must be used to transport trash and debris from the construction areas. These containers must be damp-wiped cleaned and free of visible dust/debris before leaving the contained work area.</p> <p>Worker clothing must be clean and free of visible dust before leaving the work area. HEPA vacuuming of clothing or use of cover suits is acceptable.</p> <p>Workers must wear shoe covers prior to entry into the work area. Shoe covers must be changed prior to exiting the anteroom to the occupied space (non-work area). Damaged shoe covers must be immediately changed.</p> <p>Install an adhesive (dust collection) mat at entrance of contained work area based on facility policy.</p> <p>Adhesive mats must be changed routinely and when visibly soiled.</p> <p>Consider collection of particulate data during work to monitor and ensure that contaminants do not enter the occupied spaces. Routine collection of particulate samples may be used to verify HEPA filtration efficiencies.</p>
Class V	<p>Construct and complete critical barriers meeting NFPA 241 requirements including: Barriers must extend to the ceiling, or if ceiling tile is removed, to the deck above, and all penetrations through the barrier shall meet the appropriate fire rating requirements.</p> <p>All (plastic or hard) barrier construction activities must be completed in a manner that prevents dust release. Plastic barriers must be effectively affixed to ground and ceiling and secure from movement or damage. Apply tape that will not leave a residue to seal gaps between barriers, ceiling or floor.</p> <p>Seal all penetrations in containment barriers, anteroom barriers, including floors and ceiling using approved materials (UL schedule firestop if applicable for barrier type).</p> <p>Construct anteroom large enough for equipment staging, cart cleaning, workers. The anteroom must be constructed adjacent to entrance of construction work area.</p> <p>Workers will be required to wear disposable coveralls during demolition activities. Disposable coveralls must be removed before leaving the work area anteroom.</p> <p>Remove or isolate return air diffusers to avoid dust entering the HVAC system.</p> <p>Remove or isolate the supply air diffusers to avoid positive pressurization of the space.</p> <p>Negative airflow pattern must be maintained from the entry point to the anteroom and into the construction area. The airflow must cascade from outside to inside the construction area. The entire construction area must remain negatively pressurized.</p> <p>Maintain negative pressurization of the entire workspace using HEPA exhaust air systems directed outdoors. Exhaust discharged directly to the outdoors that is 25 feet or greater from entrances, air intakes and windows does not require HEPA-filtered air.</p> <p>If exhaust is directed indoors, then the system must be HEPA filtered.</p> <p>Prior to start of work, HEPA filtration must be verified by particulate measurement and must not alter or change airflow/pressure relationships in other areas.</p> <p>Exhaust into shared or recirculating HVAC systems, or other shared exhaust systems (bathroom exhaust) is <u>not acceptable</u>.</p> <p>Install device on exterior of work containment to continually monitor negative pressurization. To assure proper pressure is continuously maintained, it is recommended that the device(s) have a visual pressure indicator.</p> <p>Contain all trash and debris in the work area.</p> <p>Nonporous/smooth and cleanable containers (with a hard lid) must be used to transport trash and debris from the construction areas. These containers must be damp-wiped cleaned and free of visible dust/debris before leaving the contained work area.</p> <p>Worker clothing must be clean and free of visible dust before leaving the work area anteroom.</p> <p>Workers must wear shoe covers prior to entry into the work area. Shoe covers must be changed prior to exiting the anteroom to the occupied space (non-work area). Damaged shoe covers must be immediately changed.</p> <p>Install an adhesive (dust collection) mat at entrance of contained work area based on facility policy. Adhesive mats must be changed routinely and when visibly soiled.</p> <p>Consider collection of particulate data during work to monitor and ensure that contaminants do not enter the occupied spaces. Routine collection of particulate samples may be used to verify HEPA filtration efficiencies.</p>

5b. Additional details (Controls, Specifications/Materials, Verification method/frequency)

Recommended Noise & Vibration Mitigation Strategies

- Use diamond drills instead of powder-actuated fasteners.
- Schedule noise-making periods with adjacent spaces.
- Use beam clamps instead of shot.
- Prefab where possible.
- Use tin snips to cut metal studs instead of using a chop saw.
- Install metal decking with vent tabs, then use cellular floor deck hangers.
- Consider compression style fittings instead of soldering, brazing or welding.
- Wet core drill instead of dry core or percussion.
- Instead of jackhammering concrete, use wet diamond saws.
- Use HEPA vacuums instead of standard wet/dry vacuums.
- Use mechanical joining system sprinkler fittings instead of threaded.
- Where fumes are tolerated, use chemical adhesive remover (flooring glue) instead of mechanical.
- To remove flooring, consider abrasive blasting instead of using a floor scraper.
- Use electric sheers instead of reciprocating saw for ductwork cutting.
- Install exterior man/material lifts.

Recommended Ventilation & Pressurization Mitigation Strategies

- HEPA to exterior.
- Install temporary ductwork.
- Utilize temporary HVAC equipment.
- Vacate the area.
- Install temporary partitions.
- Use carbon filtration to filter odors.

Recommended Impact to Other Systems Mitigation Strategies

- Schedule outages.
- Provide temporary systems.
- Back-feed electricity or medical gases.

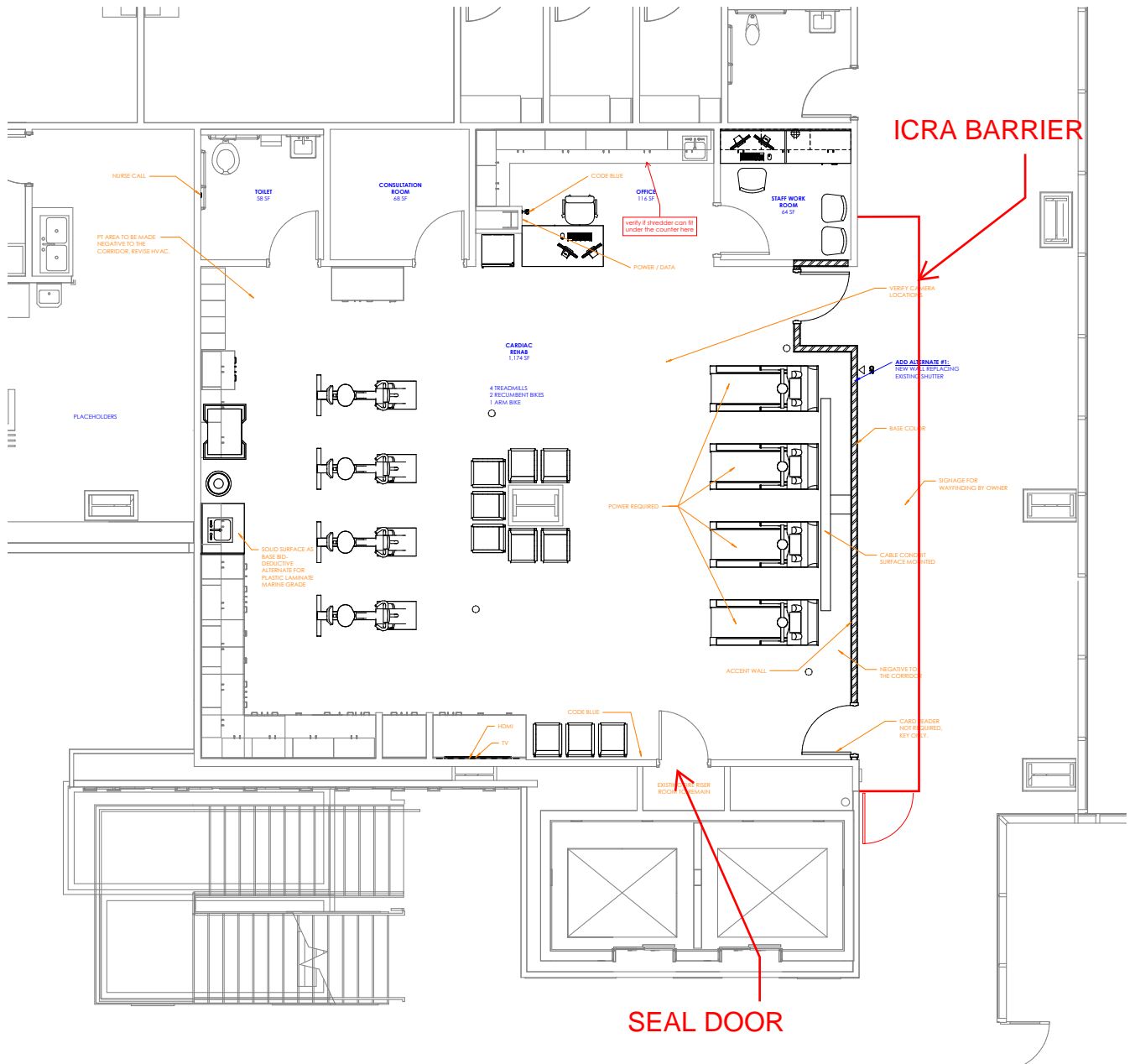
6. Minimum Required Infection Control Precautions | Upon Completion of Work Activity

Class of Precautions	Mitigation Activities (Performed upon Completion of Work Activity)
Classes I, II and III	<p>Cleaning:</p> <ol style="list-style-type: none"> 1. Clean work areas including all environmental surfaces, high horizontal surfaces and flooring materials. 2. Check all supply and return air registers for dust accumulation on upper surfaces as well as air diffuser surfaces. <p>HVAC Systems:</p> <ol style="list-style-type: none"> 1. Remove isolation of HVAC system in areas where work is being performed. Verify that HVAC systems are clean and operational. 2. <u>Verify the HVAC systems meet original airflow and air exchange design specifications.</u>
Classes III, IV and V	<p>Class III (Type C Activities only), IV, and V precautions require inspection and documentation for downgraded ICRA precautions.</p> <p>Construction areas must be inspected by an infection preventionist or designee and engineering representative for discontinuation or downgrading of ICRA precautions.</p> <p>Work Area Cleaning:</p> <ol style="list-style-type: none"> 1. Clean work areas including all environmental surfaces, high horizontal surfaces and flooring materials. 2. Check all supply and return air registers for dust accumulation on upper surfaces as well as air diffuser surfaces. <p>Removal of Critical Barriers:</p> <ol style="list-style-type: none"> 1. Critical barriers must remain in place during all work involving drywall removal, creation of dust and activities beyond simple touch-up work. The barrier may NOT be removed until a work area cleaning has been performed. 2. All (plastic or hard) barrier removal activities must be completed in a manner that prevents dust release. Use the following precautions when removing hard barriers: <ol style="list-style-type: none"> i. Carefully remove screws and painter tape. ii. If dust will be generated during screw removal, use hand-held HEPA vacuum. iii. Drywall cutting is prohibited during removal process. iv. Clean all stud tracks with HEPA vacuum before removing outer hard barrier. v. Use a plastic barrier to enclose area if dust could be generated. <p>Negative Air Requirements:</p> <ol style="list-style-type: none"> 1. The use of negative air must be designed to remove contaminants from the work area. 2. Negative air devices must remain operational at all times and in place for a period after completion of dust creating activities to remove contaminants from the work area and before removal of critical barriers. <p>HVAC systems:</p> <ol style="list-style-type: none"> 1. Upon removal of critical barriers, remove isolation of HVAC system in areas where work is being performed. 2. Verify that HVAC systems are clean and operational. 3. <u>Verify the HVAC systems meets original airflow and air exchange design specifications.</u>

Permit Approval

Please note that the IP signature below is approval of the work activity as described, assessed, and documented here. **Should the scope of work change or upon the discovery of additional toxic or biological substances, STOP WORK and seek additional approval and guidance before proceeding.**

Infection Preventionist
Signature



SECTION 00 6276.13

TAX EXEMPTION CERTIFICATE

PART 1 - GENERAL

1.1 SUMMARY

- A. Construction materials purchased by or on behalf of **Intermountain Healthcare** *may be* exempt from Utah sales and use taxes. Tax Exempt **Form TC-721** must be used by vendors when purchasing construction materials for **Intermountain Healthcare** projects. A copy of Form TC-721, with the Owner's pertinent tax information, follows this cover page.



Utah State Tax Commission • 210 N 1950 W • Salt Lake City, UT 84137

Exemption Certificate
(Sales, Use, Tourism and Motor Vehicle Rental Tax)**TC-721**

Rev. 11/18

Name of business or institution claiming exemption (purchaser) IHC Health Services, Inc.		Telephone number 801.442.2000	
Street address 36 South State Street, Suite 2200	City Salt Lake City	State UT	ZIP Code 84111
Authorized signature 	Name (please print) Brian Deppe	Title Corporate Tax Director	
Name of Seller or Supplier:		Date	
Sales Tax License Number: 11990296-013-STC		Required for all exemptions marked with an asterisk (*)	

The signer of this certificate MUST check the box showing the basis for which the exemption is being claimed.

DO NOT SEND THIS CERTIFICATE TO THE TAX COMMISSION**Keep it with your records in case of an audit.**

For purchases by government, Native American tribes and public schools, use form TC-721G.

*** ☐ Resale or Re-lease**

I certify I am a dealer in tangible personal property or services that are for resale or re-lease. If I use or consume any tangible personal property or services I purchase tax free for resale, or if my sales are of food, beverages, dairy products and similar confections dispensed from vending machines (see Rule R865-19S-74), I will report and pay sales tax directly to the Tax Commission on my next sales and use tax return.

*** ☒ Religious or Charitable Institution**

I certify the tangible personal property or services purchased will be used or consumed for essential religious or charitable purposes. **This exemption can only be used on purchases totaling \$1,000 or more, unless the sale is pursuant to a contract between the seller and purchaser.**

☐ Construction Materials Purchased for Religious and Charitable Organizations

I certify the construction materials are purchased on behalf of a religious or charitable organization and that they will be installed or converted into real property owned by the religious or charitable organization.

Name of religious or charitable organization: _____

Name of project: _____

*** ☐ Fuels, Gas, Electricity**

I certify all natural gas, electricity, coal, coke, and other fuel purchased will be used for industrial use only and not for residential or commercial purposes.

*** ☐ Machinery and Equipment and Normal Operating Repair or Replacement Parts Used in a Manufacturing Facility, Mining Activity, Web Search Portal or Medical Laboratory**

I certify the machinery and equipment, normal operating repair or replacement parts, or materials (except office equipment or office supplies) are for use in a Utah manufacturing facility described in SIC Codes 2000-3999 or a NAICS code within NAICS Sector 31-33; in a qualifying scrap recycling operation; in a co-generation facility placed in service on or after May 1, 2006; in the operation of a Web search portal by a new or expanding business described in NAICS Code 518112; in a medical laboratory described in NAICS Code 621511; or in a business described in NAICS 212, Mining (except Oil and Gas), or NAICS 213113, Support Activities for Coal Mining, NAICS 213114, Support Activities for Metal Mining, or NAICS 213115, Support Activities for Nonmetallic Minerals (except Fuels) Mining. For a definition of exempt mining equipment, see Utah Code §59-12-104(14).

*** ☐ Machinery and Equipment and Normal Operating Repair or Replacement Parts Used in an Electronic Payment Service**

I certify the machinery and equipment and normal operating repair or replacement parts have an economic life of three years or more and are for use in the operation of an electronic payment service described in NAICS Code 522320.

*** ☐ Machinery or Equipment Used by Payers of Admissions or User Fees**

I certify that: (1) the machinery or equipment has an economic life of three or more years and will be used by payers of admissions or user fees (Utah Code §59-12-103(1)(f)); (2) the buyer is in the amusement, gambling or recreation industry (NAICS Subsector 713); and (3) at least 51 percent of the buyer's sales revenue for the previous calendar quarter came from admissions or user fees.

*** ☐ Refinery Machinery, Equipment and Normal Repair or Replacement Parts**

I certify the machinery, equipment, normal operating repair parts, catalysts, chemicals, reagents, solutions or supplies are for the use of a refiner who owns, leases, controls or supervises a refinery (see Utah Code §63M-4-701) located in Utah.

*** ☐ Pollution Control Facility**

I certify our company has been granted a "Certification of Pollution Control Facilities" as provided for by Utah Code §§19-12-101 - 19-12-305 by either the Air Quality Board or the Water Quality Board. I further certify each item of tangible personal property purchased under this exemption is qualifying.

*** ☐ Municipal Energy**

I certify the natural gas or electricity purchased: is for resale; is prohibited from taxation by federal law, the U.S. Constitution, or the Utah Constitution; is for use in compounding or producing taxable energy; is subject to tax under the Motor and Special Fuel Tax Act; is used for a purpose other than as a fuel; is used by an entity exempted by municipal ordinance; or is for use outside a municipality imposing a municipal energy sales and use tax. The normal sales tax exemptions under Utah Code §59-12-104 do not apply to the Municipal Energy Sales and Use Tax.

*** ☐ Short-term Lodging Consumables**

I certify the tangible personal property is consumable items purchased by a lodging provider as described in Utah Code §59-12-103(1)(i).

*** ☐ Direct Mail**

I certify I will report and pay the sales tax for direct mail purchases on my next Utah *Sales and Use Tax Return*.

*** ☐ Commercial Airlines**

I certify the food and beverages purchased are by a commercial airline for in-flight consumption; or, any parts or equipment purchased are for use in aircraft operated by common carriers in interstate or foreign commerce.

*** ☐ Commercials, Films, Audio and Video Tapes**

I certify that purchases of commercials, films, prerecorded video tapes, prerecorded audio program tapes or records are for sale or distribution to motion picture exhibitors, or commercial television or radio broadcasters. If I subsequently resell items to any other customer, or use or consume any of these items, I will report any tax liability directly to the Tax Commission.

*** ☐ Alternative Energy**

I certify the tangible personal property meets the requirements of Utah Code §59-12-104 and is leased or purchased by or for an alternative energy electricity production facility, a waste energy production facility, or a facility that produces fuel from alternative energy.

*** ☐ Locomotive Fuel**

I certify this fuel will be used by a railroad in a locomotive engine.

*** ☐ Research and Development of Alternative Energy Technology**

I certify the tangible personal property purchased will be used in research and development of alternative energy technology.

*** ☐ Life Science Research and Development Facility**

I certify that: (1) the machinery, equipment and normal operating repair or replacement parts purchased have an economic life of three or more years for use in performing qualified research in Utah; or (2) construction materials purchased are for use in the construction of a new or expanding life science research and development facility in Utah.

*** ☐ Mailing Lists**

I certify the printed mailing lists or electronic databases are used to send printed material that is delivered by U.S. mail or other delivery service to a mass audience where the cost of the printed material is not billed directly to the recipients.

*** ☐ Semiconductor Fabricating, Processing or Research and Development Material**

I certify the fabricating, processing, or research and development materials purchased are for use in research or development, manufacturing, or fabricating of semiconductors.

*** ☐ Telecommunications Equipment, Machinery or Software**

I certify these purchases or leases of equipment, machinery, or software, by or on behalf of a telephone service provider, have a useful economic life of one or more years and will be used to enable or facilitate telecommunications; to provide 911 service; to maintain or repair telecommunications equipment; to switch or route telecommunications service; or for sending, receiving, or transporting telecommunications service.

*** ☐ Ski Resort**

I certify the snow-making equipment, ski slope grooming equipment or passenger rope-ways purchased are to be paid directly with funds from the ski resort noted on the front of this form.

*** ☐ Aircraft Maintenance, Repair and Overhaul Provider**

I certify these sales are to or by an aircraft maintenance, repair and overhaul provider for the use in the maintenance, repair, overhaul or refurbishment in Utah of a fixed-wing, turbine-powered aircraft that is registered or licensed in a state or country outside Utah.

☐ Leasebacks

I certify the tangible personal property leased satisfies the following conditions: (1) the property is part of a sale-leaseback transaction; (2) sales or use tax was paid on the initial purchase of the property; and, (3) the leased property will be capitalized and the lease payments will be accounted for as payments made under a financing arrangement.

☐ Film, Television, Radio

I certify that purchases, leases or rentals of machinery or equipment will be used by a motion picture or video production company for the production of media for commercial distribution.

☐ Prosthetic Devices

I certify the prosthetic device(s) is prescribed by a licensed physician for human use to replace a missing body part, to prevent or correct a physical deformity, or support a weak body part. This is also exempt if purchased by a hospital or medical facility. (Sales of corrective eyeglasses and contact lenses are taxable.)

☐ Out-of-State Construction Materials

I certify this tangible personal property, of which I am taking possession in Utah, will be taken out-of-state and will become part of real property located in a state that does not have sales tax, is taxed at a lower rate, or does not allow credit for tax paid to Utah. I will report the tax on my next Utah return at the lower of the Utah rate where the tangible personal property was purchased or the rate of the location where the tangible personal property is converted to real property in the other state if the other state allows a credit for tax paid to Utah.

☐ Agricultural Producer

I certify the items purchased will be used primarily and directly in a commercial farming operation and qualify for the Utah sales and use tax exemption. **This exemption does not apply to vehicles required to be registered.**

☐ Tourism/Motor Vehicle Rental

I certify the motor vehicle being leased or rented will be temporarily used to replace a motor vehicle that is being repaired pursuant to a repair or an insurance agreement; the lease will exceed 30 days; the motor vehicle being leased or rented is registered for a gross laden weight of 12,001 pounds or more; or, the motor vehicle is being rented or leased as a personal household goods moving van. This exemption applies only to the tourism tax (up to 7 percent) and the short-term motor vehicle rental tax (Transportation Corridor Funding – 2.5 percent) – not to the state, local, transit, zoo, hospital, highways, county option or resort sales tax.

☐ Textbooks for Higher Education

I certify that textbooks purchased are required for a higher education course, for which I am enrolled at an institution of higher education, and qualify for this exemption. An institution of higher education means: the University of Utah, Utah State University, Utah State University Eastern, Weber State University, Southern Utah University, Snow College, Dixie State University, Utah Valley University, Salt Lake Community College, or the Utah System of Technical Colleges.

*** Purchaser must provide sales tax license number in the header on page 1.**

NOTE TO PURCHASER: You must notify the seller of cancellation, modification, or limitation of the exemption you have claimed.

Questions? Email taxmaster@utah.gov, or call 801-297-2200 or 1-800-662-4335.

SECTION 00 6276.13

TAX EXEMPTION CERTIFICATE

PART 1 - GENERAL

1.1 SUMMARY

- A. Construction materials purchased by or on behalf of **Intermountain Healthcare** *may be* exempt from Utah sales and use taxes. Tax Exempt **Form TC-721** must be used by vendors when purchasing construction materials for **Intermountain Healthcare** projects. A copy of Form TC-721, with the Owner's pertinent tax information, follows this cover page.

GENERAL CONDITIONS

- | | |
|---|---|
| 1. General Provisions | 8. Payments and Completion |
| 2. Intermountain | 9. Tests and Inspections, Substantial and Final Completion, Uncovering, Correction of Work, and Guaranty Period |
| 3. A/E | 10. Insurance and Bonds |
| 4. Contractor | 11. Miscellaneous Provisions |
| 5. Subcontractors | 12. Termination or Suspension of the Contract |
| 6. Protection of Persons and Property | |
| 7. Modifications, Request for Information, Proposed Change Orders, and Claims Process | |

1. GENERAL PROVISIONS.

1.1 Basic Definitions.

“Adverse Weather”: Weather conditions that are seasonably abnormal and could not reasonably have been anticipated.

“A/E”: Generally, the licensed architect (or architecture firm) or engineer (or engineering firm) for the Project. For Contracts where the design professional is an interior designer, landscape subconsultant or other design professional, “A/E” will be deemed to refer to that design professional. If the type of design professional is not subject to professional licensure requirements, the professional must meet the prevailing standards in the State in which the Project is located for the applicable practice. When Intermountain elects not to engage an A/E for a Project, Intermountain will be considered the A/E for the Project.

“A/E’s Agreement”: Unless the context requires otherwise, the agreement executed by A/E and Intermountain for the Project.

“Addenda”: Written or graphic instruments issued before the opening of Bids, which clarify, correct or change the bidding documents or the Contract Documents.

“ASI”: A Supplemental Instruction issued by A/E to Contractor, which may result in clarifications or minor changes in the Work, but which does not affect the Contract Time or the Contract Sum.

“Bid”: The offer of the bidder submitted on the prescribed form setting forth the proposed stipulated sum for the Work to be performed.

“Bonds”: The bid bond, payment and performance bonds, and other instruments of security.

“Change Order”: A written instrument signed by Intermountain and Contractor, stating their agreement for changes to the Contract as specified on the required Intermountain change order form.

“Claim”: A dispute, demand, assertion or other matter arising in connection with the Contract or the Project submitted by Contractor or a Subcontractor at any tier in accordance with these General Conditions. A requested amendment, requested Change Order, or a Construction Change Directive (CCD) is not a Claim unless agreement cannot be reached in accordance with the procedures in these General Conditions.

“Construction Change Directive” or “CCD”: A written order signed by Intermountain, directing a change in the Work, and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. Intermountain may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions; even if it may impact the Contract Sum and Contract Time.

“Contract”: The Contract Documents form the Contract for Construction.

“Contract Documents”: The documents identified as such in the Contractor’s Agreement.

“Contract Sum”: The amount stated in the Contractor’s Agreement payable by Intermountain to Contractor for performance of the Work under the Contract Documents.

“Contract Time”: The Contract Time means the period of time for Contractor’s Substantial Completion of the Work to be established as set forth in the Contractor’s Agreement.

“Contractor”: The person or entity identified as the “Contractor” in the Contractor’s Agreement.

“Contractor’s Agreement”: The “Contractor’s Agreement” means the Construction Manager/General Contractor Agreement or the General Contractor Agreement for a Stipulated Sum, as applicable, executed by Contractor and Intermountain for the Project.

“Contractor’s Direct Costs”: Actual costs incurred by the Contractor for labor, materials, equipment, insurance, bonds, Subcontractors and on-site supervision. They do not include labor costs for project managers or other off-site administration.

“Day” or “Days”: Calendar day unless otherwise specified.

“Defective”: Work that does not conform to the Contract Documents or does not meet the requirements of any inspection, referenced standard, code, test or approval referred to in the Contract Documents or by applicable law, or has been damaged.

“Director”: Intermountain’s Executive Director of Design & Construction unless the context requires otherwise. Director may include a designee selected by the Director for a specific function.

“Drawings”: The construction drawings identified in the Contractor’s Agreement.

“Inspection” (or any derivative): A review of the Project, including but not limited to a visual review of the Work to ascertain if the Work is in accordance with the Contract Documents, including all applicable building codes and construction standards.

Intermountain: IHC Health Services, Inc., operating through its Department of Facility Design and Construction. Unless the context requires otherwise, Intermountain is the “Owner” as that term is commonly referred to in the construction industry.

“Intermountain Representative” or “Owner’s Representative”: The person identified as such in the Contract Documents.

“Intermountain’s Digital Information System”: The digital information system or other electronic project management system designated by Intermountain for the Project.

“Invitation to Bid”: Intermountain’s solicitation or request to a contractor to provide a Bid.

“Modification”: (1) Change Order, (2) Construction Change Directive, or (3) ASI.

“Notice to Proceed”: A document prepared by Intermountain authorizing Contractor to commence Work on the Project. It is deemed issued upon delivery to Contractor or upon being sent by Intermountain to the address for Contractor’s specified in the Bid or Proposal.

“Partial Use”: Placing a portion of the Work in service for the purpose for which it is intended (or a related purpose) before reaching Substantial Completion for all the Work. Partial Use does not constitute “substantial completion.”

“Product Data”: Illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by Contractor to illustrate materials or equipment for some portion of the Work.

“Project”: Generally identified and defined in the Contractor’s Agreement and Contract Documents. It includes all of the Work to be performed under the Contract Documents.

“Project Manual” (for construction): The volume of assembled Specifications for the Work, which may include the bidding/proposal requirements, sample forms, and General or Supplementary Conditions of the Contract.

“Proposal”: A/E’s or Contractor’s response to Intermountain’s Request for Proposal.

“Proposal Request” or “PR”: A written request submitted to Contractor for a proposal to resolve an issue as part of the Change Order or Contract Modification process.

“Proposed Change Order” or “PCO”: An informal request by Contractor to Intermountain Representative to commence the Contract Modification Process. It will not be considered a “Claim.” The PCO may be related to any potential or actual delay, disruption, unforeseen condition or materials or any other matter for which Contractor intends to seek additional monies or time.

“Record Drawings”: Record drawings, compiled by the A/E based upon redline “as-built” construction drawings and/or other information provided by Contractor, for each completed phase or portion of the Project for which a certificate of occupancy is issued, or for the final, completed Project (as applicable), in both AutoCAD (.dwg) and REVIT (.rvt) format (or other format as reasonable requested by Intermountain).

“Request for Information” or “RFI”: A request by Contractor to A/E for information, direction or clarification regarding the Contract Documents, plans or specifications.

“Request for Proposal” or “RFP”: Intermountain’s solicitation for Contractor Proposals.

“Sales Tax” and/or “Use Tax”: Unless the context requires otherwise, the sales tax or use tax collected or to be collected by any Federal or State Tax Commission as well as by any special district, local government or political subdivision.

“Samples”: Physical examples, which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

“Shop Drawings”: Drawings, diagrams, schedules and other data specially prepared for the Work by Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

“Specifications”: The portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards, installation and workmanship for the Work, and for performance of related systems and services.

“Subcontractor”: Any person or entity that has a direct contract with Contractor, including any trade contractor or specialty contractor, and/or with any other Subcontractor at any tier to provide labor or materials for the Work.

“Subcontractor’s Direct Costs”: Actual costs incurred by a Subcontractor for labor, materials, equipment, insurance, bonds, lower-tier Subcontractors and supervision.

“Substantial Completion”: Completion of the Work or designated portion thereof in accordance with the Contract Documents to a point sufficient to allow Intermountain to occupy and use the Work for its intended purposes, including without limitation all systems shall be fully functional and operate as designed, and the A/E’s certification that Contractor has achieved Substantial Completion of the Work. The date of Substantial Completion is the date certified as such by the A/E in accordance with the Contract Documents.

“Work”: All labor, materials, tools, equipment, construction and services required by the Contract Documents.

1.2 Correlation and Intent of Contract Documents.

- 1.2.1 The intent of the Contract Documents is to require Contractor to provide all labor, materials, equipment, construction, and services necessary for the proper execution and completion of the Work. The Contract Documents are complementary and what is required by any one will be as

binding as if required by all. Contractor will perform the Work in accordance with the requirements expressly set forth in or reasonably inferable from the Contract Documents.

- 1.2.2 The organization of the Contract Documents is not intended to control Contractor in dividing the Work among Subcontractors or to establish the extent of the Work to be performed by any trade.
- 1.2.3 Words used in the Contract Documents that have well known technical or trade meanings are used therein in accordance with such recognized meanings.
- 1.2.4 In the interest of brevity, the Contract Documents may omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

1.3 Ownership and Use of Contract Documents. The Drawings, the Project Manual, and copies thereof are the property of Intermountain. Contractor will not use these documents on any other project. Contractor may retain one copy of the Drawings and the Project Manual as a contract record set and will return or destroy all remaining copies following final completion of the Work.

1.4 Public Statements Regarding Project. Contractor will not make any statements or provide any information to the media about the Project without the prior written consent of Intermountain. If Contractor receives any requests for information from media, Contractor will refer such requests to Intermountain.

1.5 Ownership and Use of Renderings and Photographs. Renderings representing the Work are the property of Intermountain. All photographs of the Work, whether taken during performance of the Work or at completion, are the property of Intermountain. Intermountain reserves all rights including copyrights to renderings and photographs of the Work. No renderings or photographs will be used or distributed without written consent of Intermountain.

1.6 Confidentiality / Property Rights.

- 1.6.1 All Drawings, Specifications and other documents prepared by A/E are and will remain the property of Intermountain, and Intermountain will retain all common law, statutory and other reserved rights with respect thereto. These documents were prepared and are intended for use as an integrated set for the Project which is the subject of the Contractor's Agreement and constitute works made for hire. Contractor will not modify or use Contract Documents on any other project without the prior written consent of Intermountain. Intermountain may withhold its consent in its absolute discretion. Any non-permissive use or modification, by Contractor, Contractor's Subcontractors at any tier or anyone for whose acts Contractor is liable, will be at Contractor's sole risk. Contractor will hold harmless and indemnify Intermountain from and against any and all claims, actions, suits, costs, damages, loss, expenses and attorney fees arising out of such non-permissive use or modification by Contractor. Contractor and Subcontractors are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by A/E or Intermountain appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this license will bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by A/E or Intermountain. Submittals or distributions necessary to meet official regulatory requirements or for other purposes relating to completion of the Project are not to be construed as a publication in derogation of Intermountain's copyright or other reserved rights.
- 1.6.2 In addition, Contractor will ensure that Contractor, Subcontractors, and the employees, agents and representatives of Contractor and its Subcontractors maintain in strict confidence, and will use and disclose only as authorized by Intermountain all Confidential Information of Intermountain that Contractor receives in connection with the performance of the Contract. Notwithstanding the foregoing, Contractor may use and disclose any information to the extent required by an order of any court or authority having jurisdiction, but only after it has notified Intermountain and Intermountain has had an opportunity to obtain reasonable protection for such information in connection with such disclosure. For purposes of the Contract, "Confidential Information" means:

- 1.6.3 The name or address of any affiliate, customer or contractor of Intermountain or any information concerning the transactions of any such person with Intermountain;
- 1.6.4 Any information relating to contracts, agreements, business plans, budgets or other financial information of Intermountain to the extent such information has not been made available to the public by Intermountain; and
- 1.6.5 Any other information that is marked or noted as confidential by Intermountain at the time of its disclosure.

1.7 Comply with Intellectual Property Rights of Others. Contractor represents and warrants that no Work (with its means, methods, goods, and services attendant thereto), provided to Intermountain will infringe or violate any right of any third party and that Intermountain may use and exploit such Work, means, methods, goods, and services without liability or obligation to any person or entity (specifically and without limitation, such Work, means, methods, goods, and services will not violate rights under any patent, copyright, trademark, or other intellectual property right or application for the same).

1.8 Intermountain's Digital Information System. In performing services, Contractor will access information, make submissions to Intermountain, provide notices to Intermountain, and provide and track items for the Project electronically in, and will otherwise use for purposes associated with the Project, Intermountain's Digital Information System, all as directed by Intermountain. Contractor will ensure that Contractor, Subcontractors, and the employees, agents and representatives of Contractor and its Subcontractors comply with the applicable terms and conditions of all third-party software and programs used by the parties related to the Project, including, without limitation, any electronic project management system, whether such terms are provided by Intermountain or otherwise provided or made available by the third-party provider. Contractor will hold harmless and indemnify Intermountain from and against any and all claims, actions, suits, costs, damages, loss, expenses and attorney fees arising out of its, its Subcontractors' or their employees', agents', and representatives' use of such third-party software or failure to comply with such terms.

2. INTERMOUNTAIN.

2.1 Information and Services Required of Intermountain.

- 2.1.1 Intermountain Representative. Intermountain will designate an Intermountain Representative authorized to act in Intermountain's behalf with respect to the Project. Intermountain or such authorized representative will furnish to Contractor information or services Intermountain is required to furnish under the Contract Documents within a reasonable time in order to avoid a delay in the orderly and sequential progress of the Work.
- 2.1.2 Specialists and Inspectors. Intermountain reserves the right (but without obligation to provide building inspection services. This may include 'routine' and 'special' inspections. Intermountain may assign an inspector or specialist to note deviations from, or necessary adjustments to, the Contract Documents or to report deficiencies or defects in the Work. The inspector or specialist's activities in no way relieve Contractor of the responsibilities set forth in the Contract Documents.
- 2.1.3 Inspections. Intermountain and its representatives will have the right to inspect any portion of the Work wherever located at any time; provided that in no event will Intermountain be deemed to have assumed any obligation or liability whatsoever as a result of any such observation.
- 2.1.4 Surveys and Legal Description. Intermountain will furnish surveys describing the property lines and benchmarks for grading. Contractor will review this information, including the surveys and any provided geotechnical studies, and compare such information with observable physical conditions and the Contract Documents.
- 2.1.5 Prompt Information and Services. Upon receipt of a written request from Contractor, Intermountain will furnish information or services under Intermountain's control with reasonable promptness to avoid delay in the orderly progress of the Work.

- 2.1.6 Copies of Drawings and Project Manuals (for Construction). Unless otherwise provided in the Contract Documents, Contractor will be furnished electronic copies of Drawings and Project Manuals for Contractor's use in connection with the execution of the Work for the Project. Contractor will be responsible for making any further needed copies of the Construction Documents, subject to the copyright requirements.

2.2 Construction by Intermountain or By Separate Contractors.

2.2.1 Intermountain's Right to Perform Construction and to Award Separate Contracts.

- a. *In General*. Intermountain reserves the right to perform construction or operations related to the Project with Intermountain's own forces, and to award separate contracts related to the Project or other construction or operations on the site.
- b. *Coordination and Revisions*. Intermountain will provide for coordination of the activities of Intermountain's own forces and of each separate contractor with the Work of Contractor, who will cooperate with them. Contractor will promptly notify in writing if any such independent action will in any way compromise Contractor's ability to meet Contractor's responsibilities under the Contract. Contractor will participate with other separate contractors and Intermountain in reviewing their construction schedules when directed to do so. Contractor will make any revisions to the construction schedule and Contract Sum deemed necessary after a joint review and agreement by Intermountain. The construction schedules will then constitute the schedules to be used by Contractor, separate contractors and Intermountain until subsequently revised.

2.2.2 Mutual Responsibility.

- a. *Contractor Coordination*. Contractor will afford Intermountain and separate contractor(s) a reasonable opportunity for delivery and storage of their materials and equipment and performance of their activities and will connect and coordinate Contractor's construction and operations with theirs where applicable.
- b. *Reporting Problems to Intermountain*. If part of Contractor's Work depends on work by Intermountain or a separate contractor, Contractor will, before proceeding with that portion of the Work, inspect and promptly report in writing to Intermountain apparent discrepancies or defects in workmanship that would render it unsuitable for proper execution, performance, or results. Failure of Contractor to so inspect and make this report will constitute an acceptance and acknowledgment that Intermountain's or separate contractors completed or partially completed construction is fit and proper to receive Contractor's Work, except as to defects in workmanship not then reasonably discoverable.
- c. *Costs*. Costs caused by delays or by improperly timed activities or Defective construction will be borne by the responsible party in accordance with the procedures and provisions of the Contract Documents.
- d. *Contractor Remedial Work*. Contractor will promptly remedy damage caused by Contractor or any Subcontractor to completed or partially completed work of Intermountain or of separate contractors or to the property of Intermountain or separate contractors and subcontractors.
- e. *Intermountain's Right to Clean Up*. If a dispute arises among Contractor and separate contractors as to the responsibility under their separate contracts for maintaining the Project free from waste materials and rubbish, Intermountain may clean the Project, allocate the cost among those responsible as Intermountain and A/E determine to be just, and withhold such cost from any amounts due or to become due to Contractor.

3. A/E.

3.1 A/E's Administration of the Contract.

- 3.1.1 In General. A/E assists Intermountain with the administration of the Contract as described in the Contract Documents.
- 3.1.2 Site Visits. Site visits or inspections by A/E, Intermountain or any Intermountain representative will in no way limit or affect Contractor's responsibility to comply with all the requirements and the overall design concept of the Contract Documents as well as all applicable laws, statutes, ordinances, resolutions, codes, rules, regulations, orders and decrees. A/E will promptly submit to Intermountain a written report subsequent to each site visit.
- 3.1.3 Communications Facilitating Contract Administration. Except as authorized by Intermountain or as otherwise provided in the Contract Documents, including these General Conditions, A/E and Contractor will communicate through the Intermountain Representative on issues regarding the timing of the Work, cost of the Work, and scope of the Work. Contractor will comply with communication policies agreed upon at any pre-construction meeting with Intermountain. Communications by and with A/E sub-consultants will be through A/E. Communications by and with Subcontractors will be through Contractor. Communications by and with separate contractors will be through Intermountain.
- 3.1.4 A/E May Reject Work, Order Inspection, Tests. A/E will have the authority to reject Work which, based upon A/E's knowledge or what may be reasonably inferred from A/E's site observations and review of data, does not conform to the Contract Documents or is damaged or rendered unsuitable. Whenever A/E considers it necessary or advisable for implementation of the intent of the Contract Documents, A/E will have the authority to require additional inspections or testing of the Work in accordance with the provisions of the Contract Documents, whether or not such Work is fabricated, installed or completed. However, neither this authority of A/E nor a decision made in good faith either to exercise or not to exercise such authority will give rise to a duty or responsibility of A/E to Contractor, Subcontractors, their agents or employees or other persons performing portions of the Work, including separate contractors.
- 3.1.5 A/E Review Contractor's Submittals.
 - a. Contractor will submit shop drawings, product data, and samples and other submittals required by the Contract Documents to A/E as required by the approved submittal schedule.
 - b. A/E will review and approve or take other appropriate action upon Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the purpose of checking for conformance with the information and design concepts expressed in the Contract Documents. A/E action taken on a submittal will not constitute a Modification of the Contract.
 - c. A/E's action will be taken no later than fifteen (15) Days following A/E's receipt of the submittal, unless agreed to otherwise by Contractor and Intermountain.
 - d. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities or for substantiating

instructions for installation or performance of equipment or systems, all of which remain the responsibility of Contractor as required by the Contract Documents.

- e. A/E's review of Contractor's submittals will not relieve Contractor of the obligations under the Contract Documents.
- f. A/E's review will not constitute approval of safety precautions or, unless otherwise specifically stated by A/E, of any construction means, methods, techniques, sequences or procedures.
- g. A/E's approval of a specific item will not indicate approval of an assembly of which the item is a component.
- h. When professional certification of performance characteristics of materials, systems or equipment is required by the Contract Documents, A/E will be entitled to rely upon such certifications to establish that the materials systems or equipment will meet the performance criteria required by the Contract Documents.

3.2 Ownership and Use of A/E's Drawings, Specifications and Other Documents. All Drawings, Specifications and other documents prepared by A/E are and will remain the property of Intermountain, and Intermountain will retain all common law, statutory and other reserved rights with respect thereto. These documents were prepared and are intended for use as an integrated set for the Project which is the subject of the Contractor's Agreement and constitute works made for hire. Contractor will not modify or use Contract Documents on any other project without the prior written consent of Intermountain. Intermountain may withhold its consent in its absolute discretion. Any non-permissive use or modification, by Contractor, Contractor's Subcontractors at any tier or anyone for whose acts Contractor is liable, will be at Contractor's sole risk. Contractor will hold harmless and indemnify Intermountain from and against any and all claims, actions, suits, costs, damages, loss, expenses and attorney fees arising out of such non-permissive use or modification by Contractor. Contractor and Subcontractors are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by A/E or Intermountain appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this license will bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by A/E or Intermountain. Submittals or distributions necessary to meet official regulatory requirements or for other purposes relating to completion of the Project are not to be construed as a publication in derogation of Intermountain's copyright or other reserved rights.

4. CONTRACTOR. Contractor's duties include the professional services of a business, administrative and management consultant to Intermountain; including all budget, scheduling, quality, safety and all other services related to assuring compliance with the Contract Documents.

4.1 Review of Contract Documents and Field Conditions by Contractor. By executing the Contractor's Agreement, Contractor represents that it has visited the Project site, familiarized itself with the local conditions under which the Work is to be performed, and correlated its own observations with the requirements of the Contract Documents.

4.1.1 Reviewing Contract Documents, Information, Reporting Errors, Inconsistencies or Omissions.

- a. Contractor will carefully study and compare the Contract Documents with each other and with information available relating to the Project or furnished by Intermountain before commencing and during performance of each portion of the Work and will at once report to Intermountain and A/E any errors, inconsistencies or omissions it discovers. If Contractor performs any construction activity without such notice to Intermountain and A/E and before the resolution of the error, inconsistency or omission, Contractor will assume responsibility for such performance and will bear the attributable costs for correction.

- b. Contractor will give Intermountain and/or A/E notice of any additional drawings, specifications, or instructions required to define the Work in greater detail, or to permit the proper progress of the Work, sufficiently in advance of the need for information so as not to delay the Work.
- c. It is not Contractor's responsibility to ascertain that the Contract Documents are in accordance with requirements of applicable laws, statutes, ordinances, building codes, rules and regulations. However, if Contractor observes that portions of the Contract Documents are at variance with those requirements, Contractor will immediately notify Intermountain and/or A/E in writing. Contractor will not proceed unless Intermountain and/or A/E effects Modifications to the Contract Documents required for compliance with such requirements. Contractor will be fully responsible for any work knowingly performed contrary to such requirements and will fully indemnify Intermountain against loss and bear all costs and penalties arising therefrom.

4.1.2 Field Conditions.

- a. Contractor will take field measurements and verify field conditions and will carefully compare such field measurements and conditions and other information known to Contractor, or information which a Contractor of ordinary skill and expertise for the type of Work involved would have known, before commencing activities. Errors, inconsistencies or omissions discovered will be reported to Intermountain and A/E at once. If Contractor performs any construction activity without such notice to Intermountain and A/E and before the resolution of the error, inconsistency or omission, Contractor will not be entitled to any compensation for additional costs attributable to correction or otherwise to Contractor resulting from field measurements or conditions different from those anticipated by Contractor which would have been avoided had Contractor taken field measurements and verified field conditions before ordering the materials or commencing construction activities.
- b. If site conditions indicated in the Contract Documents or other information provided by Intermountain or A/E to Contractor differ materially from those Contractor encounters in performance of the Work, Contractor will immediately notify Intermountain and/or A/E in writing of such differing site conditions.

4.1.3 Perform in Accordance with Contract Documents and Submittals. Contractor will perform the Work in accordance with the Contract Documents and submittals approved in accordance with the Contract Documents. Should Contractor or any of its Subcontractors become aware of any question regarding the meaning or intent of any part of the Contract Documents before commencing that portion of the Work about which there is a question, Contractor will request an interpretation or clarification from Intermountain and/or A/E before proceeding. Contractor proceeds at its own risk if it proceeds with the Work without first making such a request and receiving an interpretation or clarification from Intermountain and/or A/E.

4.1.4 Performance to Produce the Complete System and Intended Results. Performance by Contractor will be required to the extent consistent with the Contract Documents and reasonably inferable from the Contract Documents as being necessary to allow the system to function within its intended use.

4.1.5 Intent and Hierarchy. The Contract Documents should be read as a whole and wherever possible, the provisions should be construed in order that all provisions are operable. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by Contractor. The Contract Documents are complimentary, and what is required by one Document or provisions thereof will be as binding as if required by all the Documents or provisions thereof. In case of an irreconcilable conflict between provisions within a Contract Document or between Contract Documents, the following priorities will govern as listed below:

- a. A particular Modification will govern over all Contract Document provisions or Modifications issued before this particular Modification.
- b. A particular Addendum will govern over all other Contract Document provisions issued before

this particular Addendum. Subsequent Addenda will govern over all prior Addenda.

- c. The Supplementary Conditions will govern over the General Conditions.
 - d. The Agreement and these General Conditions will govern over all other Contract Documents except for the Supplementary Conditions, Addenda, Modifications.
 - e. The drawings and specifications will not govern over any of the documents listed above. The specifications take precedence over the drawings.
 - f. Within the Drawings, larger scale drawings take precedence over smaller scale drawings, figured dimensions over scaled dimensions, and noted materials over graphic indications.
 - g. In case of a conflict or ambiguity within the same level of hierarchy of described documents, Intermountain reserves the right to select the most stringent requirement unless the preponderance of the contract indicates the less stringent requirement.
- 4.1.6 Dividing Work and Contractor Representation. Organization of the specifications into divisions, sections and articles, and arrangement of Drawings, will not control Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade. Contractor represents that the Subcontractors, Sub-subcontractors, manufacturers and suppliers engaged or to be engaged by it are and will be familiar with the requirements for performance by them of their obligations. Where the Contract Documents require Contractor to provide professional services for architecture or engineering, Contractor will cause such services to be performed by appropriately licensed professionals.
- 4.1.7 Planning and Priority. Contractor will plan and schedule its work to facilitate the Project and will maintain a work schedule to place proper priority to sequence work to complete the project timely.
- 4.1.8 Prior to Contractor taking control over any area in any existing facility or on any project site, Contractor will provide prior written notice to Intermountain with sufficient time (no less than 30 Days) to allow Intermountain's Asset Recovery Team to remove, secure, and otherwise address existing materials, furniture, fixtures, equipment, and other assets located thereon.

4.2 Supervision and Construction Procedures.

- 4.2.1 Supervision and Control.
- a. Contractor will utilize its best skill, efforts, and judgment to provide efficient business administration and supervision, to furnish at all times an adequate supply of workers and materials, and to perform the Work in an expeditious and economical manner consistent with the interests of Intermountain.
 - b. Contractor will supervise and direct the Work. Contractor will be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work.
 - c. All loss, damage, liability, or cost of correcting Defective work arising from the use of any construction means, methods, techniques, sequences or procedures will be borne by Contractor, notwithstanding that such construction means, methods, techniques, sequences or procedures are referred to, indicated or implied by the Contract Documents, unless Contractor has given timely notice to Intermountain and A/E in writing that such means, methods, techniques, sequences or procedures are not safe or suitable, and Intermountain has then instructed Contractor in writing to proceed at Intermountain's risk.
- 4.2.2 Responsibility. Contractor will be responsible to Intermountain for acts and omissions of Contractor's employees, Subcontractors, and their agents and employees, and other persons performing portions of the Work under a contract with Contractor or on behalf of Contractor.

4.2.3 Not Relieved of Obligations. Contractor will not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of Intermountain or its agents in Intermountain's administration of the Contract, or by tests, inspections or approvals by Intermountain, A/E, or their consultants, or as required or performed by persons other than Contractor or for those that Contractor is liable.

4.2.4 Inspections and Approvals.

- a. Contractor is responsible for requesting inspections for various stages and portions of the Work required under the Contract Documents in a timely manner.
- b. Contractor will be responsible for inspection of portions of the Work already completed to determine that such portions are in proper condition to receive subsequent portions of the Work.
- c. If any of the Work is required to be inspected or approved by the terms of the Contract Documents by any public authority, Contractor will timely request such inspection or approval to be performed in accordance with Article 9. Except as provided in Article 9, work will not proceed without any required inspection and the associated authorization to proceed. Contractor will promptly notify Intermountain if the inspector fails to appear at the site.

4.3 Labor and Materials.

4.3.1 Payment by Contractor. Except to the extent it is otherwise stated in the Contract Documents, Contractor will provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities, supplies, consumables and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

4.3.2 Discipline and Competence. Contractor will enforce strict discipline and good order among Contractor's employees, Subcontractors, agents, representatives and other persons performing under the Contract Documents. Contractor will not permit employment of unfit persons or persons not skilled in tasks assigned to them.

4.3.3 Phased Construction / Accommodations for Facilities to Stay Operational. Contractor and all Subcontractors will direct and perform the Work, phase and coordinate all construction and related activities and timing, in a manner to preserve ongoing patient care and safety to all and to accommodate in every instance Intermountain's ongoing business operations such that facilities stay fully functioning, operational, and in compliance with applicable laws and regulations at all times.

4.4 Taxes and Other Payments to Government. Intermountain will pay all taxes and assessments on the real property comprising the Project site. Contractor will pay all applicable sales, consumer, use, payroll, workers compensation, unemployment, old age pension, surtax, and employment-related and similar taxes related to performance of the Work or portions thereof provided by Contractor which are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect, and will comply with the laws and regulations regarding the payment of Sales and/or Use Tax and any applicable exemptions.

4.5 Permits, Fees, Notices, Labor and Materials.

4.5.1 Permits and Fees.

- a. Intermountain will obtain and pay for all zoning and use permits and permanent easements necessary for completion of the Work.
- b. Contractor will obtain and pay for the building permit, and all other permits, governmental fees, licenses and inspections necessary for the proper execution and completion of the Work.
- c. Contractor will secure any certificates of inspection and of occupancy required by authorities having jurisdiction over the Work. Contractor will deliver these certificates to A/E before issuance of the Certificate of Substantial Completion by A/E.

- 4.5.2 Compliance with Law, Public Authorities, Notices. Contractor will comply with all applicable federal, state and local laws, statutes, ordinances, resolutions, rules, regulations, codes, and lawful orders of public authorities.
- 4.5.3 Correlation of Contract Documents and Enactments.
- a. It is not Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, resolutions, building codes, and rules and regulations. Notwithstanding this, if Contractor observes, or if such is readily observable to a Contractor of ordinary skill and expertise for the type of Work involved, that a portion of the Contract Documents is at variance therewith, Contractor will promptly notify A/E and Intermountain in writing, and necessary changes will be accomplished by appropriate Modification.
 - b. Contractor will coordinate and supervise the work performed by Subcontractors so that the Work is carried out without conflict between trades and so that no trade, at any time, causes delay to the general progress of the Work. Contractor and all Subcontractors will at all times afford each trade, any separate contractor, or Intermountain, reasonable opportunity for the installation of Work and the storage of materials.
 - c. Contractor is fully responsible for the Project and all materials and work connected therewith until Intermountain has accepted the Work in writing. Contractor will replace or repair at its own expense any materials or work damaged or stolen, regardless of whether it has received payment for such work or materials from Intermountain.
 - d. Contractor will remedy all damage or loss to any property caused in whole or in part by Contractor, any Subcontractor, or by anyone for whose acts any of them may be liable.
 - e. Intermountain may elect to purchase materials required for the Work. In that event, Contractor will comply with the procedures set forth in the Contract Documents relating to such materials.
- 4.5.4 Failure to Give Notice. If Contractor, or any Subcontractor thereof performs Work without complying with the requirements of this Article 4.5 hereinabove, Contractor will assume appropriate responsibility for such Work and will bear the appropriate amount of the attributable costs.
- 4.5.5 Intermountain-Purchased Materials and Equipment.
- a. In addition to Contractor's other obligations with respect to separate Intermountain provided work or materials, Contractor's obligations and duties with respect to Intermountain-purchased materials, equipment, and work include:
 - (i) Scheduling: The Contractor shall furnish Intermountain with a schedule of dates on which the Contractor requires delivery of Intermountain-purchased materials. Intermountain will arrange for the materials to be delivered to the construction site or picked up by Contractor on or before the specified dates. If delivery or pick up dates are changed, rescheduled, or otherwise varied from the original schedule, the Contractor shall notify Intermountain in writing of delivery or pick up date rescheduling and the Contractor shall coordinate the delivery or pick up of the Intermountain-purchased materials or equipment directly with the supplier.
 - (ii) Equipment / Vehicles: If Intermountain buys equipment or vehicles for Contractor's use on the Project, Contractor will (in addition to all other obligations herein relative to such equipment or vehicles) be fully and solely responsible for such equipment and vehicles as well as the use and use consequences thereof for any and all purposes (including without limitation to protect, secure, inspect, upkeep and make repairs, and insure such equipment and vehicles as well as to monitor, guide, direct, oversee, protect, and control the use and use consequences of such equipment and vehicles) until completion of the Project and Contractor's return of such equipment and/or vehicles to Intermountain.

- (iii) **Pre-Installation Inspection:** The Contractor shall be responsible for receiving, inspecting and storing all Intermountain- purchased materials and equipment until the materials or equipment are needed for installation or use by the Contractor. Regardless of any inspection performed by Intermountain of the Intermountain-purchased materials or equipment, the Contractor shall be responsible for inspecting the Intermountain-purchased materials and equipment to determine suitability, quality and conformance with specifications before installation or use or at such other times as the Contractor may desire in order to avoid interruptions and delays in the progress of the Project. The Contractor shall reject any material which does not meet specifications or which appears to have any defect which may make the material unsuitable for use in the Project. The Contractor shall notify Intermountain and the manufacturer or supplier of all defects and assist Intermountain in arranging for the repair, replacement or correction of the defective condition. The Contractor shall not be entitled to an extension of any deadline or completion date which results from failure to discover defects which the Contractor should have discovered through an inspection.
- (iv) **Defective Materials:** The Contractor acknowledges that use of improper or defective material may result in costs and damages to Intermountain in excess of the value of the materials; that after use in the Project it may be difficult or impossible to inspect the material to determine the cause of any failure; and that in the event of the failure of material there may be a question as to the cause of the failure. Because the Contractor's employees will be the last to handle and inspect material prior to incorporation into the Project, the Contractor will be liable to Intermountain for damages resulting from failure of Intermountain- purchased materials during the Contractor's warranty period specified herein from any cause whatsoever unless the Contractor provides clear and convincing proof that (1) the entire loss from a failure is covered by a valid manufacturer's or supplier's warranty, or (2) the Contractor could not have prevented the failure by complying with the requirements of this Section concerning Intermountain-purchased materials.
- (v) **Claims:** The Contractor agrees to assist Intermountain to present claims to manufacturers and suppliers for defects in Intermountain-purchased materials. Where there is any question as to the division of liability between the Contractor and a manufacturer or vendor, the Contractor shall provide all relevant information in the Contractor's possession which may aid Intermountain in determining the division of responsibility. Intermountain shall have final approval of any proposed adjustment or settlement of warranty claims.
- (vi) **Implied Warranties:** The benefit of contractual and implied warranties with respect to Intermountain-purchased materials and equipment shall run to Intermountain and not to the Contractor.
- (vii) **Unloading:** Except as otherwise provided herein, the Contractor shall be responsible for unloading all Intermountain- purchased materials and equipment and for verifying delivery amounts to Intermountain.
- (viii) **Custody and Security:** The Contractor shall secure and protect Intermountain-purchased materials and equipment from loss, deterioration, damage, theft, vandalism or destruction. If any Intermountain-purchased materials or equipment are damaged, stolen, or lost, Contractor will timely replace such at Contractor's sole cost and expense. In such event, Contractor will not be entitled to any modification in Contract Time or Contract Sum.
- (ix) **Reports:** At Intermountain's request, the Contractor shall furnish reports to the Intermountain Representative demonstrating the Contractor's compliance with this Section.
- (x) **Retained Ownership:** All materials and equipment purchased by Intermountain which remain after completion of the Project shall be the property of Intermountain. If

Intermountain does not wish to retain or dispose of surplus Intermountain-purchased materials or equipment, the Contractor shall remove and dispose of them.

- b. None of the foregoing duties of the Contractor with respect to Intermountain-purchased materials shall prevent Intermountain from exercising any prerogative of ownership of the materials or equipment.

4.6 Superintendent. Contractor will employ a competent superintendent and necessary assistants who will be in attendance at the Project site at all times during performance of the Work. The superintendent will represent Contractor, and communications given to the superintendent will be as binding as if given to Contractor. Important communications will be confirmed in writing. Other communications will be similarly confirmed on written request in each case.

4.7 Time and Contractor's Construction Schedules.

4.7.1 Progress and Completion.

- a. *Time Is of The Essence; Complete Within Contract Time.* Time is of the essence. By executing the Contractor's Agreement, Contractor confirms that the Contract Time is adequate to perform the Work. Contractor will proceed expeditiously with adequate forces to achieve Substantial Completion within the Contract Time.
- b. *Notice to Proceed and Insurance.* Contractor will not prematurely commence operations on the site or elsewhere before the issuance of a Notice to Proceed by Intermountain and in no event before the effective date of insurance required by Article 10 to be furnished by Contractor. In addition and without limitation of the foregoing, Contractor will not proceed with further Work or services after performing preconstruction services until Contractor receives a subsequent Notice to Proceed.

4.7.2 Schedule Preparation. Contractor, promptly after being awarded the Contract, will prepare and submit for Intermountain's and A/E's review a reasonably detailed CPM schedule for the Work. The schedule will indicate the order, sequence, and interdependence of all items known to be necessary to complete the Work including construction, procurement, fabrication, and delivery of materials and equipment, submittals and approvals of samples, shop drawings, procedures, or other documents. Work items of Intermountain, other Contractors, utilities and other third parties that may affect or be affected by Contractor will be included. If Intermountain is required, by the Contract Documents, to furnish any materials, equipment, or the like, to be incorporated into the Work by Contractor, Contractor will submit, with the first schedule submittal, a letter clearly indicating the dates that such items are required at the Project site. The critical path should be identified, including the critical paths for interim completion dates and milestones. The CPM schedule will be developed using Primavera, MS Project, or Suretrack unless otherwise authorized by Intermountain Representative. Contractor's schedule will be updated at least once per month and submitted with each pay request. Contractor will maintain an original baseline schedule and will provide Intermountain monthly written reports indicating Contractor's compliance or noncompliance with the original schedule.

4.7.3 Initial Contract Time. Unless otherwise specified in the bidding documents, the initial Contract Time is the time identified in the Contractor's Agreement.

4.7.4 Interim Completion Dates and Milestones. The schedule must include contractually specified interim completion dates and milestones. The milestone completion dates indicated are considered essential to the satisfactory performance of this Contract and to the coordination of all Work on the Project. The milestone dates listed are not intended to be a complete listing of all Work under this Contract or of interfaces with other Project contractors.

- 4.7.5 Schedule Content Requirements. The schedule will indicate an early completion date for the Project that is no later than the Project's required completion date. The schedule, including all activity duration's will be given in calendar days. The Schedule will also indicate all of the following:
- a. Interfaces with the work of outside contractors (e.g., utilities, power and with any separate Contractor);
 - b. Description of activity including activity number/numbers;
 - c. Estimated duration time for each activity;
 - d. Early start, late start, early finish, late finish date, and predecessor/successors including stop-start relationships with lead and lag time for each activity;
 - e. Float time available to each path of activities;
 - f. Actual start date for each activity begun;
 - g. Actual finish date for each activity completed;
 - h. The percentage complete of each activity in progress or completed;
 - i. Identification of all critical path activities;
 - j. The critical path for the Project, with this path of activities being clearly and easily recognizable on the time-scaled network diagram. The path(s) with the least amount of float time must be identified. Unless otherwise authorized by Intermountain Representative, no more than 40% of all activities may be identified as critical path items. The relationship between non-critical activities and activities on the critical path will be clearly shown on the network diagram;
 - k. Unless otherwise authorized by Intermountain Representative, all activities on the schedule representing construction on the site may not have duration longer than fourteen (14) Days. Construction items that require more than fourteen (14) Days to complete must be broken into identifiable activities on the schedule with durations less than fourteen (14) Days. The sum of these activities represents the total length required to complete that construction item; and
 - l. Additional requirements as specified in the Supplemental General Conditions.
- 4.7.6 Intermountain's Right to Take Exceptions. Intermountain reserves the right to take reasonable exception to activity duration, activity placement, construction logic or time frame for any element of the Work to be scheduled.
- 4.7.7 Float Time. Float time is defined as the amount of time between the earliest start date and the latest start date or between the earliest finish date and the latest finish date of a chain of activities on the Schedule. By a proposal request or modification delivered to Contractor, Intermountain has the right to use the float time for non-critical path activities until Contractor has reallocated such time on a newly submitted schedule.
- 4.7.8 Initial Schedule Submission. No progress payments will be approved until Contractor has submitted a Project detailed CPM schedule for the entire project.
- 4.7.9 Updates. Before any approval of a pay request, Intermountain, A/E and Contractor will review Contractor's schedule compared to the Work completed. Intermountain approves the amount of Work completed as supported by the schedule of values and as verified by the determination of Work completed. If necessary, Contractor will then update and submit to Intermountain the schedule with the pay request; all of which in accordance with Intermountain's approval. All updates will be provided in electronic and hard copy formats. At each scheduled meeting with Intermountain Representative, Contractor will provide at minimum a "three week look ahead" with long lead items identified.

- 4.7.10 Schedule of Submittals. Contractor will prepare and keep current, for A/E's and Intermountain's review, a schedule of submittals required under the Contract Documents which is coordinated with Contractor's construction schedule and allows A/E a reasonable time to review the submittals. This submittal schedule is to be included as part of the construction schedule. Submittals requiring expedited review must be clearly identified as such in the schedule of submittals.
- 4.7.11 Schedule Recovery. If the Work represented by the critical path falls behind by more than seven (7) Days, the project schedule will be redone within fourteen (14) Days showing how Contractor will recover the time. A narrative that addresses the changes in the schedule from the previously submitted schedule will be submitted along with the schedule in both hard copy (appropriate report formats to be determined by Intermountain Representative) and electronic copy. Contractor will comply with the most recent schedules.
- 4.7.12 Schedule Changes and Modifications.
- a. *Contract Time Change Requires Modification*. The Contract Time may only be shortened or extended by a Modification fully executed by Intermountain.
 - b. *Contractor Changing Activity Durations*. Should Contractor, after approval of the complete detailed construction schedule, desire to change his plan of construction, he will submit his requested revisions to Intermountain and A/E along with a written statement of the revisions including a description of the sequence and duration changes for rescheduling the work, methods of maintaining adherence to intermediate milestones and the contract completion date and the reasons for the revisions. If the requested changes are acceptable to Intermountain, which acceptance will not be unreasonably withheld, they will be incorporated into the Schedule in the next reporting period. If after submitting a request for change in the Contract Schedule, Intermountain does not agree with the request, Intermountain will schedule a meeting with Contractor to discuss the differences.
 - c. *Changes in Contract Time*. The critical path schedule as the term is used in the provisions herein will be based on the current version of Contractor's schedule for the Project and accepted by Intermountain just before the commencement of the modification, asserted delay, suspension or interruption. If Contractor believes it is entitled to an extension of Contract Time under the Contract Documents, Contractor will submit a PCO in accordance with Article 7.2 to A/E and Intermountain Representative accompanied by an analysis of the requested time adjustment.
- 4.7.13 Extensions of Time.
- a. If Substantial Completion of the Project is delayed because of any of the following causes, then the Contract Time will be extended by Modification for a period of time equal to such delay:
 - (i) Labor strikes or lock-outs;
 - (ii) Unusual delay in transportation;
 - (iii) Unforeseen governmental requests or requirements;
 - (iv) A Change in the Work resulting from an instruction by Intermountain or A/E to Contractor subject to the conditions set forth in Section 7.1.5;
 - (v) Unforeseen Subsurface Condition subject to the conditions set forth in Section 7.1.6; or
 - (vi) Any other event or circumstance caused by the willful or negligent act or omission of Intermountain or A/E subject to the conditions set forth in Section 7.1.6.
 - b. Contractor will not be entitled to any compensation for delay described in Section 4.7.13, Paragraph a, subparagraphs (i), (ii), and (iii).

- c. In no event will any time extension or cost adjustment be given on account of delay which reasonably should have been anticipated by the Contractor or in circumstances where performance of the Work is, was, or would have been, delayed by any other cause for which the Contractor is not entitled to an extension.
- d. Adverse Weather delays. Completion time will not be extended for normal bad weather or any weather that is reasonably foreseeable at the time of entering into the contract. The time for completion as stated in the contract documents includes due allowance for calendar days on which Work cannot be performed due to weather conditions. The Contractor acknowledges that it may lose days due to weather conditions. Notwithstanding, the Contract Time may be extended (but at no cost to Intermountain) if all of the following are established by the Contractor:
 - (i) That the weather prevented Work from occurring that is on the critical path for the project based upon a critical path schedule previously submitted to Intermountain and to the extent accepted by Intermountain;
 - (ii) There are no concurrent delays attributed to the Contractor;
 - (iii) The Contractor took all reasonable steps to alleviate the impact of the weather and took reasonable attempts to prevent the delay and despite such reasonable actions of Contractor, the weather impacted the critical path as described above; and
 - (iv) One of the following occurred:
 - 1. The weather was catastrophic, such as a tornado, hurricane, severe wind storm, severe hail storm; or
 - 2. Based on the full history of information published from the closest station as indicated from the Western Regional Climate Center (Desert Research Institute 2215 Raggio Parkway Reno, Nevada 89512, and as may be described on the website at <http://www.wrcc.dri.edu/summary/>), one or more of the following occurred:
 - a. For any day between November 1 and March 31, the minimum temperature fell below the average minimum temperature plus the extreme low temperature recorded for the month divided by 2.
 - b. For any day between November 1 and March 31, the maximum temperature fell below the monthly average for the minimum temperature.
 - c. The daily precipitation exceeded 75% of the historical one day maximum for the month.
 - d. The snowfall for the month exceeded 175% of the historical average snow fall for the month.

Contractor will not be entitled to any compensation for Adverse Weather.

4.7.14 Time Extension Request. Unless a shorter time period is set forth herein or in other Contract Documents, any time extension will be requested by Contractor within twenty-one (21) Days after Contractor knew or should have known about the delay and will be supported by the critical path schedule analysis.

4.7.15 Delay in Completion of the Work.

- a. *Prior to Substantial Completion.* For each Day after the expiration of the Contract Time that Contractor has not achieved Substantial Completion, Contractor will pay Intermountain the amount set forth in the Agreement as liquidated damages for Intermountain's loss of use of the Project and the added administrative expense to Intermountain to administer the Project during the period of delay. In addition, Contractor will reimburse Intermountain for any additional Consultant's fees, attorney fees, expert fees, consultant fees, copy costs, and other expenses incurred by Intermountain as a result of the delay. The parties have agreed on this liquidated damages provision because actual damages which will result from a delay in Substantial

Completion cannot readily be ascertained at the time of execution of the Agreement and the parties wish to fix such damages as a their reasonable estimate of such actual damages, and not as a penalty. Intermountain may deduct any liquidated damages or reimbursable expenses from any money due or to become due to Contractor. If the amount of liquidated damages and reimbursable expenses exceeds any amounts due to Contractor, Contractor will pay the difference to Intermountain within ten (10) Days after receipt of a written request from Intermountain for payment

- b. *After Substantial Completion.* For each Day that Contractor exceeds the time allowed for completion of the remaining items set forth in the Certificate of Substantial Completion, Contractor will pay to Intermountain as liquidated damages for additional administrative expenses the amount set forth in the Agreement. In addition, Contractor will reimburse Intermountain for any additional Consultant's fees, attorney fees, expert fees, consultant fees, copy costs, and other expenses incurred by Intermountain as a result of the delay in completing such items.
- c. *No Waiver of Intermountain's Rights.* Permitting Contractor to continue any part of the Work after the time fixed for completion or beyond any authorized extension thereof, will in no way operate as a waiver or estoppel on the part of Intermountain of any of its rights under the Contract Documents, including the right to liquidated damages or any other remedies or compensation.

4.8 Documents and Samples at the Site; Certifying "As-Built". Contractor will maintain at the site for Intermountain, one record copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked weekly to record changes and selections made during construction, as well as approved Shop Drawings, Product Data, Samples and similar submittals. These items will be available to A/E and will be delivered to A/E for submittal to Intermountain upon completion of the Work, or upon completion of any phase of the Work as agreed to by the parties, signed by Contractor, certifying that they show complete and exact "as-built" conditions and location, stating sizes, kind of materials, vital piping, conduit locations and similar matters. All notes of encountered or changed conditions will be included.

4.9 Shop Drawings, Product Data and Samples.

- 4.9.1 Not Contract Documents. Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The submittal will demonstrate, for those portions of the Work for which the submittal is required, the way Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents.
- 4.9.2 Promptness. Contractor will review, approve and submit to A/E, Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work, or the activities of Intermountain or separate contractors.
- 4.9.3 Not Perform Until A/E Approves. Contractor will perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved in writing by A/E. Such Work will be in accordance with the approved submittals.
- 4.9.4 Representations by Contractor. By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, Contractor represents that Contractor has determined and verified materials, field measurements and field construction criteria related thereto, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

- 4.9.5 Contractor's Liability. Contractor will not be relieved of responsibility for deviations from the requirements of the Contract Documents by A/E's approval of Shop Drawings, Product Data, Samples or similar submittals unless Contractor has specifically informed A/E in writing of such deviation at the time of the submittal and A/E has given written approval to the specific deviation. Contractor will not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by A/E's review and comment.
- 4.9.6 Direct Specific Attention to Revisions. Contractor will direct specific attention in writing to all revisions on resubmitted Shop Drawings, Product Data, Samples or similar submittals, except those requested by A/E and indicated on previous submittals.
- 4.9.7 Informational Submittals. Informational submittals upon which A/E is not expected to take responsive action may be so identified in the Contract Documents.
- 4.9.8 Reliance on Professional Certification. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, Intermountain and A/E will be entitled to rely upon the accuracy and completeness of such calculations and certifications. If a professional stamp is required, the professional will be licensed in the State in which the Project is located unless otherwise approved by Intermountain in writing. Likewise, Contractor is entitled to rely upon the accuracy and completeness of the calculations made by A/E in developing the Contract Documents, unless a Contractor of ordinary skill and expertise for the type of Work involved would know that such is inaccurate or incomplete and therefore must immediately notify Intermountain in writing.

4.10 Use of Project Site.

- 4.10.1 In General.
- a. Intermountain may, in Intermountain's discretion, permit Contractor to occupy or otherwise use portions of the Project site or, if applicable and available, other Intermountain property within the vicinity of the Project, for general office, staging, or other purposes as more particularly provided in the Project Specifications. As used herein, the term "Project site" or "site" will be deemed to refer to any other Intermountain property used by Contractor in connection with the Project, in addition to the actual Project site. Intermountain may, in its discretion, require Contractor to enter into a separate license agreement, on Intermountain's standard form, with respect to Contractor's occupancy or other use of Intermountain space at the actual Project site or within other Intermountain property.
 - b. Contractor will confine operations at the site to areas permitted by the Contract Documents, law, ordinances, resolutions, rules and regulations, and permits and will not unreasonably encumber the site with materials or equipment. Contractor will take all reasonable means to secure the site, protect the site and protect the Work from any damage. The site will be left free and clear of refuse, equipment, materials, etc. and the site will not be subject to spilled liquids and chemicals, toxic or otherwise. Should such an incident occur while Contractor has control of the site, Contractor will be responsible to clean, repair, or restore the site and pay all associated costs, fines and penalties. Contractor will indemnify and hold Intermountain harmless from and against any and all loss, cost, damage, injury or expense, including claims for death or injury to person or damage to property, and including without limitation attorney's fees and court costs, to the extent arising out of or in connection with use of the site by Contractor or its contractors, employees, or invitees. Notwithstanding the foregoing, Contractor is not responsible for any damage to the site or the Work to the extent caused by Intermountain or Intermountain's agents.
 - c. Contractor recognizes that the Project site and the surrounding area is frequently visited by the public and is important to Intermountain's image and function and will maintain the premises

free from debris and waste materials resulting from Construction. At the completion of Construction, Contractor will promptly remove construction equipment, tools, surplus materials, waste materials and debris.

- 4.10.2 Access to Neighboring Properties. Contractor will not, except as provided in the Contract Documents or with Intermountain's advance written consent when necessary to perform the Work, interfere with access to properties neighboring the Project site by the owners of such properties and their respective tenants, agents, invitees and guests.

4.11 Access to Work. Contractor will provide Intermountain and A/E access to the Work in preparation and progress, wherever located.

4.12 Royalties and Patents. Contractor will pay all royalties and license fees. Contractor will defend suits or claims for infringement of patent rights and will hold Intermountain and A/E harmless from loss on account thereof, but will not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents. However, if Contractor has reason to believe that the required design, process or product is an infringement of a patent, Contractor will be responsible for such loss unless such information is promptly furnished to Intermountain in writing.

4.13 Indemnification.

- 4.13.1 To the fullest extent permitted by law, Contractor will indemnify and hold harmless Intermountain and its affiliates, subsidiaries, officers, employees, agents, authorized volunteers (hereinafter the above listing of entities and persons is referred to as "**indemnitees**") from and against every kind and character of claims, liabilities, damages, losses, settlements, and expenses, including but not limited to attorneys' fees, consultant fees, expert fees, and other costs and expenses, and including without limitation those events covered under the blanket Contractual Liability Coverage required under the Contract Documents, arising out of or resulting from performance of the Work, including without limitation the work of all the Subcontractors and their employees, except to the extent that such liability arises out of the negligence of Intermountain, its representatives, agents, and employees. This indemnity includes, without limitation, indemnification of Intermountain from all losses or injury to Intermountain's property, except to the extent that such loss or injury arises out of the negligence of Intermountain, its representatives, agents, and employees. This indemnity applies, without limitation, to include Claims occurring both during performance of the Work and/or subsequent to completion of the Work. In the event that any Claim is caused in part by a party indemnified hereunder, that party will bear the cost of such Claim to the extent it was the cause thereof. In the event that a claimant asserts a Claim for recovery against any party indemnified hereunder, the party indemnified hereunder may tender the defense of such Claim to Contractor. If Contractor rejects such tender of defense and it is later determined that the negligence of the party indemnified hereunder did not cause all of the Claim, Contractor will reimburse the party indemnified hereunder for all costs and expenses incurred by that party in defending against the Claim. Contractor will not be liable hereunder to indemnify any party for damages resulting from the sole negligence of that party. Notwithstanding, Intermountain will have the right, at its option, to participate in the defense of any such action without relieving Contractor of any obligation hereunder.

- 4.13.2 In addition to the foregoing, Contractor will be liable to defend Intermountain in any lawsuit filed by any Subcontractor relating to the Project. Where liens have been filed against Intermountain's property, Contractor (and/or its bonding company which has issued bonds for the Project) will obtain lien releases and record them in the appropriate county and/or local jurisdiction and provide Intermountain with a title free and clear from any liens of Subcontractors. In the event that Contractor and/or its bonding company are unable to obtain a lien release, Intermountain in its absolute discretion may require Contractor to provide a bond around the lien or a bond to discharge the lien, at Contractor's sole expense.

- 4.13.3 In addition to the foregoing, Contractor will indemnify and hold Intermountain harmless from any claim of any other contractor resulting from the performance, nonperformance or delay in performance of the Work by Contractor.
- 4.13.4 The indemnification obligation under this Article 4.13 will not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for Contractor or Subcontractor under workers' or workmen's compensation acts, disability benefits acts or other employee benefit acts.
- 4.13.5 Intermountain and Contractor waive all rights against each other for damages to the Work during construction to the extent covered by the applicable Builder's Risk Policy, except such rights as they may have to the proceeds of such insurance as set forth in the Contract. Contractor will require similar waivers from its Subcontractors, subconsultants, and agents, at any tier.

4.14 Additional Services/Work. It is understood and agreed by the parties hereto that no money will be paid to Contractor for additional labor or materials furnished unless a new contract in writing or a Modification hereof in accordance with the General Conditions and the Contract Documents for such additional labor or materials has been executed. Intermountain specifically reserves the right to modify or amend the Contract and the total sum due hereunder, either by enlarging or restricting the scope of the Work.

4.15 Building Information Modeling. Contractor will perform, throughout the Project, as requested by Intermountain and/or as otherwise required to execute the Project, building information modeling ("BIM") services and coordination among trades. Such BIM services are included in Contractor's Work and services and shall be provided by Contractor and Subcontractors without additional fee or charge to Intermountain. Contractor will provide BIM services using software acceptable to Intermountain.

5. SUBCONTRACTORS.

5.1 Award of Subcontracts and Other Contracts for Portions of the Work.

- 5.1.1 Approval Required.
 - a. Listing of Subcontractors will be as stated in the Contract Documents, including but not limited to the "Intermountain Subcontractors List Form".
 - b. Contractor will not contract with a proposed person or entity to whom Intermountain has made a reasonable and timely objection. Contractor will not be required to contract with anyone to whom Contractor has made reasonable objection.
- 5.1.2 Business and Licensing Requirements. All Subcontractors used by Contractor will comply with all applicable business and licensing requirements.
- 5.1.3 Subsequent Changes. After the bid opening, Contractor may change its listed Subcontractors only in accordance with the Contract Documents and with written approval of the Director.
 - a. Intermountain will pay the additional costs for an Intermountain requested change in Subcontractor if all of the following are met:
 - (i) If Intermountain in writing requests the change of a Subcontractor;
 - (ii) The original Subcontractor is a responsible Subcontractor that meets the requirements of the Contract Documents; and
 - (iii) The original Subcontractor did not withdraw as a Subcontractor on the project.
 - b. In all other circumstances, Contractor will pay the additional cost for a change in a Subcontractor.
- 5.1.4 Bonding of Subcontractors. Subcontractors as identified by Intermountain in the procurement documents, may be required to submit performance and payment bonds to cover the full extent of their portion of the Work. This provision does not in any way limit the right of Contractor to have Subcontractors at any tier be required to have a performance and/or payment bond.

5.1.5 Unrelated Subcontractors / Contractor Self-Performed Work.

- a. Contractor will procure bids for subcontract work from at least three (3) qualified bidders unless Intermountain waives such requirement in writing. Except as provided in the following section, Contractor will enter into contracts with Subcontractors not owned, related to or controlled by Contractor to perform all portions of the Work. Subcontracts will contain payment provisions consistent with the Contract Documents and will not be awarded on the basis of cost plus a fee without the prior written consent of Intermountain.
- b. If Contractor wishes to self-perform any portion of the Work or subcontract such portion of the Work to an entity owned or controlled by or related to Contractor, Contractor will:
 - 1) Advise Intermountain at least thirty (30) Days in advance of bid opening that Contractor wishes to self-perform such Work or subcontract it to an entity owned, controlled by or related to Contractor and request Intermountain's written approval thereof;
 - 2) Submit to Intermountain Contractor's or such related entity's bid at least seventy-two (72) hours prior to bid opening;
 - 3) Procure bids for such subcontract Work from at least three qualified bidders unless Intermountain waives such requirement in writing; and
 - 4) Abide by Intermountain's determination as to whether Contractor or another subcontractor will be used to perform such Work.
- c. If Intermountain both approves Contractor to self-perform Work and approves Contractor proceeding without obtaining bids from other Contractors, then Contractor's overhead and profit on Work performed by Contractor's crews will not be more than the percentage fee, if any, stated in the Contractor's Agreement or such fee as agreed by Intermountain and Contractor by a written Modification executed prior to Contractor's commencing the applicable self-performed Work.

5.2 Subcontractual Relations.

- 5.2.1 Comply with Contract Documents. By appropriate enforceable agreement, and to the extent it can be practically applied, Contractor will require each Subcontractor to be bound to Contractor by the terms of the Contract Documents, and to assume toward Contractor all the obligations and responsibilities which Contractor, by these Documents, assumes towards Intermountain and A/E.
- 5.2.2 Rights. Each Subcontractor agreement will preserve and protect the rights of Intermountain and A/E under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and will allow to the Subcontractor, unless specifically provided otherwise in the Subcontractor agreement, the benefit of all rights and remedies against Contractor that Contractor, by the Contract Documents, has against Intermountain.
- 5.2.3 Sub-Subcontractors. Contractor will require each Subcontractor to enter into similar agreements with its Subcontractors which complies with the requirements of Paragraphs 5.2.1 and 5.2.2 hereinabove.
- 5.2.4 Document Copies. Contractor will make available to each proposed Subcontractor, before execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound. Subcontractors will similarly make copies of applicable portions of the Contract Documents available to their respective proposed Subcontractors.

5.3 Contingent Assignment of Subcontracts. Each subcontract agreement for a Subcontractor, at any tier for a portion of the Work, is hereby assigned by Contractor to Intermountain provided that the assignment is effective only after termination of the Contract by Intermountain for cause pursuant to Article 12.2 or

stoppage of the Work by Intermountain pursuant to Article 12.5, and only for those subcontract agreements which Intermountain accepts by notifying the Subcontractor in writing. The subcontract will be equitably adjusted to meet the new conditions of the work.

6. PROTECTION OF PERSONS AND PROPERTY.

6.1 Safety of Persons and Property.

- 6.1.1 Contractor Responsibility. Contractor will be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. Contractor will take all reasonable precautions for the safety of, and will provide reasonable protection to prevent damage, injury or loss to:
- a. Employees on the Work and other persons who may be affected thereby;
 - b. The Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of Contractor or a Subcontractor; and
 - c. Other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
- 6.1.2 Safety Program, Precautions. Contractor will institute a safety program at the start of construction to minimize accidents. This program will continue to the final completion of the Project and conform to applicable laws and regulations including the Utah Occupational Safety and Health Rules and Regulations as published by the Utah Industrial Commission - UOSH Division. Contractor will post signs, erect barriers, and provide those items necessary to implement the safety program. As soon as Contractor proceeds with the Work, Contractor will have all workers and all visitors on the site wear safety hard hats, as well as all other appropriate safety apparel such as safety glasses and shoes, and obey all safety rules and regulations and statutes. Contractor will post a sign in a conspicuous location indicating the necessity of wearing hard hats and Contractor will loan such hats to visitors.
- 6.1.3 Compliance with Safety Laws. Contractor will give notices and comply with applicable laws, ordinances, rules, codes, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.
- 6.1.4 Erect and Maintain Safeguards. Contractor will erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including effective fences, posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.
- 6.1.5 Utmost Care. When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, Contractor will exercise utmost care and carry on such activities under supervision of properly qualified personnel.
- 6.1.6 Prompt Remedy. Contractor will promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Paragraph 6.1.1 of these General Conditions caused in whole or in part by Contractor, a Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which Contractor is responsible under this Paragraph 6.1.1, except to the extent such damage or loss is directly due to errors in the Contract Documents or caused by agents or employees of A/E or Intermountain. The foregoing obligations of Contractor are in addition to Contractor's obligations under the Contract Documents.
- 6.1.7 Safety Designee. Contractor will designate a responsible member of Contractor's organization at the site whose duty will be the prevention of accidents, damage, injury or loss. This person will be Contractor's superintendent unless otherwise designated by Contractor in writing to Intermountain and A/E.

- 6.1.8 Load Safety. Contractor will not load or permit any part of the construction or site to be loaded so as to endanger its safety.
- 6.1.9 Off-Site Responsibility. In addition to its other obligations under this Article 6, Contractor will, at its sole cost and expense, promptly repair any damage or disturbance to walls, utilities, streets, ways, sidewalks, curbs and the property of Intermountain and third parties (including municipalities and other governmental agencies) resulting from the performance of the Work, whether by it or by its Subcontractors at any tier. Contractor will not cause materials, including soil and debris, to be placed or left on streets or ways.
- 6.1.10 Emergencies. In an emergency affecting safety of persons or property, Contractor will act, at Contractor's discretion, to prevent threatened damage, injury or loss. Contractor will promptly notify Intermountain Representative of the action taken.

6.2 Hazardous Materials. In the event Contractor encounters on the site material reasonably believed to be asbestos or polychlorinated biphenyl (PCB) or any other hazardous waste or substance which may endanger the health of those persons performing the Work or being on the site, Contractor will immediately stop Work in the area affected and immediately report the condition to Intermountain Representative and A/E by phone with a follow-up document in writing. The Work in the affected area will be resumed when written direction is provided by Intermountain Representative. Except to the extent provided otherwise in the Contract Documents or if the presence of hazardous materials is due to the fault of Contractor, Contractor will not be required to perform without Contractor's consent, any Work relating to asbestos, polychlorinated biphenyl (PCB) or any other hazardous waste or substance. Intermountain will procure a licensed abatement contractor qualified to remove the hazardous material. The abatement contractor will submit notification of demolition to the Utah Division of Air Quality. Abatement contractor will pay the notification fee. A copy of the hazardous material survey report will be available to all persons who have access to the construction site.

6.3 Historical and Archeological Considerations. In the event Contractor knows or should have known of any cultural, historical or archeological material that is either recognized as an item to be protected under Federal, State, or local law or regulation, or is an item of obvious value to Intermountain, Contractor will cease any work that would interfere with such discovery and immediately report the condition to Intermountain Representative and A/E by phone with a follow-up document in writing. Work will resume based upon the direction of Intermountain Representative. Contractor cooperation with any Intermountain recognized archaeologist or other cultural/historical expert is required.

6.4 Contractor Liability. If Contractor fails in any of its obligations in Articles 6.1 through 6.3 above, Contractor will be liable to any damages to Intermountain or any third party resulting from such noncompliance. Contractor will also be liable for any mitigation or restoration effort resulting from such noncompliance. To the extent all the following is met, Contractor may treat the discovery of such material similarly to an unforeseen condition:

- 6.4.1 The discovery of such material is reasonably unforeseeable given the site conditions that Contractor should have been aware;
- 6.4.2 The presence of such material was not identified in any part of the Contract Documents;
- 6.4.3 Contractor has undertaken all proper action to mitigate any impact of such discovery on the critical path or monies related to the Project;
- 6.4.4 The discovery affects the critical path or contract price from that which was contemplated by the Contract Documents; and
- 6.4.5 The requirements of 7.1.5 and the Contract documents are met.

7. MODIFICATIONS, REQUEST FOR INFORMATION, PROPOSED CHANGE ORDER, AND CLAIMS PROCESS.

7.1 Modifications: In General.

- 7.1.1 Types of Modifications and Limitations. Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or ASI, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents. Contractor must have a written Modification executed by Intermountain under this Article 7 before proceeding with any Work sought to be an extra.
- 7.1.2 By Whom Issued. A Change Order or Construction Change Directive will be issued by Intermountain Representative. An ASI is issued by A/E. A/E will prepare Change Orders and Construction Change Directives with specific documentation and data for Intermountain's approval and execution in accordance with the Contract Documents, and may issue ASIs not involving an adjustment in the Contract Sum or an extension of the Contract Time which are not inconsistent with the intent of the Contract Documents.
- 7.1.3 Contractor to Proceed Unless Otherwise Stated. Changes in the Work will be performed under applicable provisions of the Contract Documents, and Contractor will proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or ASI.
- 7.1.4 Adjusting Unit Prices. If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are so changed in a PCO or Construction Change Directive that application of such unit prices to quantities of Work proposed will cause a substantial inequity to Intermountain or Contractor, the applicable unit prices may be equitably adjusted.
- 7.1.5 Changes in the Work Resulting From An Instruction by Intermountain or A/E to Contractor.
- a. If Intermountain or A/E gives Contractor an instruction that modifies the requirements of the Contract Documents or delays Substantial Completion, Contractor may be entitled to an adjustment in the Contract Sum and/or the Contract Time. If compliance with the instruction affects the cost to Contractor to perform the Work, the Contract Sum will be adjusted to reflect the reasonable increase or decrease in cost subject to the conditions set forth in Section 7.1.5, subparagraphs b through g. If compliance with the instruction delays Substantial Completion, the Contract Time will be extended for a period of time commensurate with such delay subject to the conditions set forth in Section 7.1.5, subparagraphs b through g and Section 4.7.13.
 - b. If Contractor receives an instruction from Intermountain or A/E that Contractor considers to be a Change in the Work, Contractor, before complying with the instruction, will notify A/E in writing that Contractor considers such instruction to constitute a Change in the Work. If A/E agrees that compliance with the instruction will constitute a Change in the Work, Contractor will furnish a proposal for a Modification in accordance with Section 7.1.5 subparagraphs c and d. within ten (10) Days.
 - c. If Contractor claims that it is entitled to an adjustment in the Contract Sum (including without limitation costs related to a time extension) as a result of an instruction by Intermountain or A/E, Contractor will furnish a proposal for a Change Order containing a price breakdown itemized as required by Intermountain. The breakdown will provide sufficient detail to allow Intermountain to determine any increase or decrease in Direct Costs as a result of compliance with the instruction. Any amount claimed for subcontracts will be supported by a similar price breakdown and will itemize the Subcontractor's profit and overhead charges. Profit and overhead will be subject to the markup limits for additional work, changes, or other Modification set forth in the Contractor's Agreement. Amounts due Intermountain as a result of a credit change will be the actual net decrease in the Contractor's Direct Costs to perform the Work as a result of the

Change in the Work. Overhead and profit for the Modification will be calculated based on the net increase or decrease in Contractor's Direct Costs resulting from the Change in the Work.

- d. If Contractor claims that it is entitled to an adjustment in the Contract Time as a result of an instruction from Intermountain or A/E, Contractor will include in its proposal justification to support Contractor's claim that compliance with the instruction will delay Substantial Completion.
- e. Upon receipt of Contractor's proposal for Modification, A/E and Intermountain will determine whether to proceed with the Change in the Work. If A/E and Intermountain determine to proceed with the Change in the Work, they will execute a Change Order, a Construction Change Directive or a Field Change as appropriate.
- f. Contractor agrees that if it complies with an instruction from Intermountain or A/E without first giving written notice to A/E as provided in Section 7.15, subparagraph b, and receiving a Change Order, Construction Change Directive or Field Change, Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time as a result of the instruction and waives any claim therefor.
- g. If Contractor is instructed to perform work which it claims constitutes a Change in the Work but which Intermountain and A/E do not agree constitutes a Change in the Work, Contractor will comply with the instruction. Contractor may submit its claim for adjustment to the Contract Sum, the Contract Time, or both as a dispute pursuant to Section 7.7 within twenty-one (21) Days after compliance with the instruction. Contractor agrees that if it fails to submit its claim for resolution pursuant to Section 7.7 within twenty-one (21) Days after compliance with the instruction, then Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time as a result of the instruction and waives any claim therefor.
- h. Contractor agrees that it is responsible for submitting accurate cost and pricing data to support its Change Order Proposals. Intermountain will have the right to examine the Contractor's records to verify the accuracy and appropriateness of the pricing data used to price change order proposals.

7.1.6 Change in the Work Resulting From An Event or Circumstance.

- a. If an event or circumstance other than an instruction from Intermountain or A/E affects the cost to Contractor of performing the Work or delays Substantial Completion, Contractor may be entitled to an adjustment in the Contract Sum and/or the Contract Time. If the circumstance or event affects the cost to Contractor to perform the Work and is caused by a willful or negligent act or omission of Intermountain or A/E or an Unforeseen Subsurface Condition, the Contract Sum will be adjusted to reflect the reasonable increase or decrease in Contractor's cost to perform the Work resulting from the event or circumstance, subject to the conditions set forth in Section 7.1.6, subparagraphs b through f. If the event or circumstance delays Substantial Completion and is described in Section 4.7.13, the Contract Time will be extended for a period of time commensurate with such delay subject to the conditions set forth in such section. If the circumstance or event delays Substantial Completion and is caused by a willful or negligent act or omission of Intermountain or A/E or an Unforeseen Subsurface Condition, then Contractor will be compensated for costs incident to the delay in accordance with Section 7.1.6, subparagraphs b through g and Section 4.7.13.
- b. Contractor will not be entitled to any adjustment to the Contract Sum or other damages from Intermountain as a result of any event or circumstance unless the event or circumstance results from a willful or negligent act or omission of Intermountain or A/E.

- c. If a Change in the Work results from any event or circumstance caused by the willful or negligent act or omission of Intermountain or A/E or an Unforeseen Subsurface Condition, Contractor will give Intermountain Written Notice of such event or circumstance within twenty-four (24) hours after commencement of the event or circumstance so that Intermountain can take such action as is necessary to mitigate the effect of the event or circumstance. Contractor will not be entitled to any adjustment in either the Contract Time or the Contract Sum based on any damages or delays resulting from such event or circumstance during a period more than twenty-four (24) hours prior to Contractor giving such Written Notice to Intermountain.
- d. Contractor will submit in writing any claims for an adjustment in the Contract Time and/or the Contract Sum resulting from an event or circumstance within the time limits set forth below. In the event that Contractor fails to submit its claim in writing within the time limits set forth below, then Contractor agrees it will not be entitled to any adjustment in the Contract Time or the Contract Sum or to any other damages from Intermountain due to the circumstance or event and waives any claim therefor.
 - (i) Claims for an adjustment in the Contract Time due to Adverse Weather will be made within twenty-one (21) Days of the first Day of the occurrence of the Adverse Weather event in which the delay occurred.
 - (ii) Claims for an adjustment in the Contract Time and/or the Contract Sum due to any other circumstance or event will be submitted within seven (7) Days after the occurrence of the circumstance or event.
- e. If Contractor claims that it is entitled to an adjustment in the Contract Sum (including without limitation costs related to a time extension) because of an event or circumstance resulting from the willful or negligent act or omission of Intermountain or A/E or an Unforeseen Subsurface Condition, Contractor will furnish a proposal for a Change Order containing a price breakdown as described in Section 7.1.5, subparagraph c. Any amount claimed for increased labor costs as a result of the event or circumstance must be supported by a certified payroll. Any claim for rented equipment or additional material costs must be supported by invoices.
- f. If Contractor claims that it is entitled to an adjustment in the Contract Time as a result of an event or circumstance, Contractor will include with its claim copies of daily logs, letters, shipping orders, delivery tickets, Project schedules, and other supporting information necessary to justify Contractor's claim that the event or circumstance delayed Substantial Completion.
- g. Within thirty (30) Days after receipt of Contractor's claim, A/E will either deny the claim or recommend approval to Intermountain. If Intermountain approves the claim, the adjustment in the Contract Time and/or Contract Sum will be reflected in a Change Order pursuant to Section 7.4 or a Construction Change Directive pursuant to Section 7.5. If Intermountain or A/E denies Contractor's claim, Contractor may submit its claim as a dispute pursuant to Section 7.7 within twenty-one (21) Days of receipt of the denial of the claim. If Contractor fails to submit its claim for resolution pursuant to Section 7.7 within the twenty-one (21) Day time period, then Contractor agrees it is not entitled to any adjustment in the Contract Time and/or Contract Sum or any other damages as a result of the event or circumstance and waives any claim therefor.

7.2 Contractor Initiated Requests.

- 7.2.1 The Request for Information, RFI, Process and Time to File. Contractor may file an RFI with A/E regarding any concern which will assist Contractor in the proper completion of the Work including, but not limited to issues related to the Contract Documents, plans and specifications. The RFI will be

filed with A/E in a timely manner so as not to prejudice Intermountain as to the quality, time or money related to the Work.

7.2.2 **Proposed Change Order.** Unless a shorter time period is set forth herein or in other Contract Documents, within twenty-one (21) Days after Contractor knows or should have known of a situation or concern where Contractor is going to request additional monies or time, Contractor must file a PCO with Intermountain Representative, or Contractor will be deemed to waive any right to claim additional monies or time related to such situation or concern. The PCO will include all available documentation supporting the PCO available to Contractor at the time of filing and Contractor will thereafter diligently pursue the supplementation(s) of such documentation and promptly deliver such supplementation(s) to Intermountain Representative.

- a. ***Intermountain Representative Response.*** One of the following may occur after a PCO is filed with Intermountain Representative:
- (i) Intermountain Representative, after considering any input by A/E, may reach an agreement with Contractor and issue a Change Order.
 - (ii) Intermountain, after considering any input by A/E, may issue a Construction Change Directive.
 - (iii) If Intermountain Representative, after considering any input by A/E, disagrees with Contractor's PCO, Intermountain representative may seek additional information or verification from Contractor, A/E or other sources, may negotiate with Contractor, may issue a Change Order upon such later agreement, may retract the PR, or may issue a Construction Change Directive. A/E must continually work with Intermountain in providing data, documentation and efforts to resolve the issues related to the PR.

7.3 Proposal Request Initiated by Intermountain. Intermountain may file a Proposal Request with Contractor seeking information, data and/or pricing relating to a change in the Contract Time and or monies owing for particular scope changes or other modifications to the Contract Documents. The PR will provide a time limit for Contractor to file a response with A/E and Intermountain Representative. If a proposal is not timely provided by Contractor, Intermountain may calculate the Change Order under Article 7.4.2 below. Upon such timely receipt of the proposal, one of the following will occur:

- 7.3.1 **If Agreement, Change Order Issued.** Intermountain Representative, after considering any input by A/E, may reach an agreement with Contractor and issue a Change Order.
- 7.3.2 **If Disagreement.** If Intermountain Representative disagrees with Contractor's proposal, after considering any input from A/E, Intermountain representative may seek additional information or verification from Contractor or other sources, may negotiate with Contractor, may issue a Change Order upon such later agreement, may retract the PR, or may issue a Construction Change Directive. If a Construction Change Directive is issued which identifies Intermountain representative's position in regard to the subject contract sum and/or time adjustment, Contractor must initiate the Claim resolution process provided for herein within twenty-one (21) Days of Contractor's receipt of the Construction Change Directive, or Contractor will be deemed to waive any such request for additional time or money as a result of the issuance of the Construction Change Directive. Such waiver will entitle Intermountain to convert the Construction Change Directive into a Change Order, whether or not executed by Contractor. If the Construction Change Directive leaves open the determination of additional time or money related to the directed change, then the time period for initiating the Claim resolution process will not accrue until such time as Intermountain has conveyed to Contractor a position as to the time and money owing as a result of the directed change.

7.4 Evaluation of Proposal for Issuing Change Orders.

- 7.4.1 **Adjusting Sum Based Upon Agreement.** If the Change Order provides for an adjustment to the Contract Sum, the adjustment will be based on the mutual agreement of Contractor and

Intermountain, including any terms mandated by unit price agreements or other terms of the Contract Documents.

- 7.4.2 Intermountain Resolution of Sum and Standards in the Absence of an Agreement Under Paragraph 7.4.1. In the absence of an agreement under Paragraph 7.4.1 above, the adjustment will be based on an itemized accounting of costs and savings supported by appropriate data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Paragraph will be limited to the following:
- a. All direct and indirect costs of labor; including workers compensation insurance, social security and other federal and state payroll based taxes, and payroll based fringe benefits paid by Contractor so long as they are reasonable and no higher than that charged to other clients;
 - b. Costs of materials, on-site temporary facilities, supplies and equipment (except hand tools) required for or incorporated into the work;
 - c. Rental costs of machinery, equipment, tools (except hand tools), and on-site temporary facilities, whether rented from Contractor or others;
 - d. Costs of permits and other fees, sales, use or similar taxes related to the Work (with no markup);
 - e. Additional costs of field supervision and field office personnel directly attributable to the change; and
 - f. Overhead and profit by the markup limits in the Agreement for additional services or modifications which is not a penalty but a reasonable calculation agreed upon at the time of execution of the Agreement, and provided therein due to the fact that the actual amount due for this overhead and profit cannot easily be ascertained at the time of such execution. The markups set forth in the Agreement are to cover additional payment and performance bond premiums, insurance premiums, home office and on-site overhead and profit. Overhead and profit includes, but is not limited to Contractor's Project Manager and Cost Estimator. Each request for pricing will stand on its own and not be combined with other requests for pricing in determining the allowed markup. A particular request for pricing will include all items reasonably related together and determinable at the time of the request. If several unrelated requests for pricing are grouped together in a single Change Order, each request for pricing will be considered separately for purposes of calculating the markup.
- 7.4.3 Credits. The amount of credit to be allowed by Contractor to Intermountain for a deletion or change which results in a net decrease in the Contract Sum will be actual net cost as confirmed to Intermountain based upon corroboration by an appropriate source.

7.5 Construction Change Directives.

- 7.5.1 When Used and Contractor's Right to Challenge. A Construction Change Directive may be issued by Intermountain Representative in the case of a need for the Work to commence. If the Construction Change Directive leaves open the determination of additional time or money related to the directed change, then the Construction Change Directive will indicate the timeframe(s) in which further information is to be provided to resolve the matter. At any time that Intermountain and Contractor agree upon the time and money related to a Construction Change Directive, a Change Order will be executed by the parties. Additionally, the Construction Change Directive may be converted to a Change Order under Paragraph 7.2.2 or Article 7.3 above.
- 7.5.2 Proceed with Work and Notify Intermountain about Adjustment Method. Upon receipt of a Construction Change Directive, Contractor will promptly proceed with the change in the Work involved.
- 7.5.3 Interim Payments by Intermountain. Pending the final determination of the total cost of the Construction Change Directive, Intermountain will pay any undisputed amount to Contractor.

7.6 A/E's Supplemental Instruction (Commonly referred to as an "ASI"). A/E may at any time that is consistent with maintaining the quality, safety, time, budget and function of the Work, issue to Contractor a supplemental instruction ("ASI") after approval from Intermountain Representative is obtained. Contractor must file with Intermountain Representative a PCO under Paragraph 7.2.2 above, within twenty-one (21) Days of Contractor's receipt of the ASI, or the Contractor will be deemed to have waived any right to additional time or monies as a result of such ASI.

7.7 Resolution of Disputes. If a dispute arises between the Parties regarding the Contract Documents which is not resolved by agreement between the parties, before a party may proceed with judicial action, the dispute must be submitted in writing to Intermountain's Vice President of Financial Strategy, Growth and Development, at 36 South State Street, Salt Lake City, Utah 84111. Upon receipt of such written submission, Intermountain will schedule within seven (7) Days an initial conference or meeting, and if necessary within an additional ten (10) Days thereafter a further conference or meeting, as set forth in the escalation process herein below.

7.7.1 Escalation Process. The Parties will arrange in-person meetings or telephone conferences at mutually convenient times and places, according to the levels and time schedules set forth below. The Parties will use reasonable and good faith efforts in this escalation process to respond promptly and to resolve the dispute. Such meetings or conferences will constitute settlement negotiations and any settlement proposal made pursuant to such meetings or conferences will not be admissible as evidence of liability.

Levels and Representatives

Allotted Time Period from Notice
or from Previous Level

Level 1

Contractor's Director level employee,
and Intermountain's Director

7 Days

Level 2

Vice President or higher level executive

10 Days

7.7.2 Judicial Action. In the event that the parties do not resolve their dispute pursuant to the escalation process, either party may commence legal action to resolve the dispute. Any such action must be commenced within six (6) months from the first day of the initial Level 1 conference/meeting or be time barred. Submission of the dispute under the escalation process as outlined above is a condition precedent to the right to commence legal action to resolve any dispute. In the event that either party commences legal action to adjudicate any dispute without first submitting the dispute under the escalation process, the other party will be entitled to obtain an order dismissing the litigation without prejudice and awarding such other party any costs and attorney fees incurred by that party in obtaining the dismissal, including without limitation copy costs, and expert and consultant fees and expenses. Any such legal action must be brought exclusively in the state courts of the State of Utah or in the federal courts of the United States which are located in Salt Lake County, Utah. The Parties hereto hereby agree to submit to the exclusive jurisdiction and venue of such courts for the purposes hereof.

7.7.3 Continuation of Performance During Proceedings. Pending final resolution of a dispute hereunder, Contractor will proceed diligently with the performance of its obligations under the Contract Documents.

7.8 Payment of Claim.

- 7.8.1 When a standalone component of a Claim has received a final determination, and is no longer subject to review or appeal, that amount will be paid in accordance with the payment provisions of the Contract Documents or judicial order.
- 7.8.2 When the entire Claim has received a final determination, and is no longer subject to review or appeal, the full amount will be paid within thirty-one (31) Days of the date of the final determination unless the work or services has not been completed, in which case the amount will be paid in accordance with the payment provisions of the Contract Documents to the point that the work or services is completed.
- 7.8.3 The final determination date is the earlier of the date upon which the claimant accepted the settlement in writing with an executed customary release document and waived its rights of appeal, or the expiration of the appeal period, with no appeal filed, or the determination made resulting from the final appeal.
- 7.8.4 Any final determination where Intermountain is to pay additional monies to Contractor will not be delayed by any appeal or request for judicial review by another party brought into the process by Intermountain as being liable to Intermountain.
- 7.8.5 Notwithstanding any other provision of the Contract Documents, payment of all or part of a Claim is subject to any set-off, claims or counterclaims of Intermountain.
- 7.8.6 Payment to Contractor for a Subcontractor issue (Claim) deemed filed by Contractor, will be paid by Contractor to the Subcontractor in accordance with the contract between Contractor and the Subcontractor.
- 7.8.7 The execution of a customary release document related to any payment may be required as a condition of making the payment.

7.9 Allocation of Costs of Claim Resolution Process.

- 7.9.1 Except for attorneys' fees and expert fees, and unless otherwise agreed to by the parties to the Claim, the costs of resolving the Claim will be allocated among the parties on the same proportionate basis as the determination of financial responsibility for the Claim. The costs of resolving the Claim that are subject to allocation include the claimant's filing fee, the costs of any person(s) evaluating the Claim, the costs of making any required record of the process, and any additional testing or inspection procured to investigate and/or evaluate the Claim.
- 7.9.2 The prevailing party in any Claim, judicial action or other proceeding is entitled to recover its reasonable attorneys' fees, expert and other fees, and costs incurred in the proceeding, in addition to any other relief to which that party may be entitled.

7.10 Alternative Procedures. To the extent otherwise permitted by law, if all parties to a Claim agree in writing, a protocol for resolving a Claim may be used that differs from the process described in this Article 7.

8. PAYMENTS AND COMPLETION.

8.1 Schedule of Values. With the first Application for Payment, Contractor will submit to A/E and Intermountain Representative a schedule of values allocated to all the various portions of the Work. The Schedule of Values will be submitted on the form approved and provided by Intermountain. A/E will make recommendations to Intermountain Representative regarding the Schedule of Values including any suggested modifications. When approved, including any approved modifications, by Intermountain Representative, it will be the basis for future Contractor Applications for Payments. Contractor will not be entitled to payment until receipt and acceptance of the Schedule of Values.

8.2 Applications for Payment.

- 8.2.1 In General. The following general requirements will be met:

- a. Not more than once a month, Contractor will submit to A/E an itemized Application for Payment for Work completed in accordance with the schedule of values and that reflects retainage as provided for in the Contractor's Agreement. Contractor's Applications for Payment will include conditional or final lien waivers (as applicable), in the forms attached to Contractor's Agreement for itself and from each Subcontractor requesting payment, covering all payments requested in the Application for Payment. The Application for Payment will be on a form provided by Intermountain.
 - b. Such application will be supported by such data substantiating Contractor's right to payment as Intermountain or A/E may require. This data may include, but is not limited to, copies of requisitions from Subcontractors.
 - c. Such applications may include requests for payment pursuant to approved Change Orders or Construction Change Directives.
 - d. Such applications may not include requests for payment for portions of the Work performed by a Subcontractor when Contractor does not intend to pay to a Subcontractor because of a dispute or other reason.
 - e. In executing the Application for Payment, Contractor will attest that Subcontractors involved with prior applications for payment have been paid, unless Contractor provides a detailed explanation why such payment may not have occurred. Intermountain reserves the right to require Contractor to submit a payment waiver from one or more Subcontractors.
- 8.2.2 Payment for Material and Equipment. Unless otherwise provided in the Contract Documents, payments will be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by Intermountain and A/E, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site will be conditioned upon compliance by Contractor with procedures satisfactory to Intermountain to establish Intermountain's title to such materials and equipment or otherwise protect Intermountain's interest, and will include applicable insurance, storage and transportation to the site for such materials and equipment stored on or off the site. Intermountain may require copies of invoices or other suitable documentation.
- 8.2.3 Warranty of Title. Contractor warrants that title to all Work covered by an Application for Payment will pass to Intermountain no later than the time for payment. Contractor further warrants that upon submittal of an Application for Payment, all Work for which Certificates for Payment have been previously issued and payments received from Intermountain will, to the best of Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of Contractor, Subcontractors, or other persons or entities making a claim by reason of having provided labor, materials and/or equipment relating to the Work.
- 8.2.4 Retainage and Holdback by Intermountain.
- a. *Holdback by Intermountain.* Notwithstanding anything to the contrary contained in the Contract Documents, Intermountain may, as a result of the Claim resolution process, withhold any payment to Contractor hereunder if and for so long as Contractor fails to perform any of its obligations hereunder or otherwise is in default under any of the Contract Documents.
 - b. *Intermountain's Right to Withhold and Use Funds.* Intermountain may withhold from payment to Contractor such amount as, in Intermountain's judgment, may be necessary to pay just claims against Contractor or Subcontractors at any tier for labor and services rendered and materials furnished in and about the Work. Intermountain may apply such withheld amounts for the payment of such claims in Intermountain's discretion. In so doing, Intermountain will be deemed the agent of Contractor and payment so made by Intermountain will be considered as payment made under the Contract by Intermountain to Contractor. Intermountain will not be liable to

Contractor for any such payment properly made. Such withholdings and payments may be made without prior approval of Contractor and may also be made before any determination as a result of any dispute, Claim or litigation. However, Contractor will be notified before any such withholding and will be given an opportunity to inform Intermountain as to any reason why the withholding will not occur.

- c. *Statutory Retainage.* Notwithstanding and in addition, retainage in the amount of 5% will be withheld from each payment to Contractor for any Work under the Contract. The retainage, including any additional retainage imposed and the release of any retainage, will be in accordance with Intermountain policies, including restrictions of retainage regarding Subcontractors and the distribution of interest earned on the retention proceeds. After Contractor achieves Substantial Completion and submits its payment request for retained funds and provides statutory Conditional Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, Intermountain will pay any unpaid statutory retention, less any offsets or withholdings for specific deficiencies or disputes, within forty-five (45) Days. Notwithstanding the foregoing, Intermountain may (but is not obligated to), in its sole discretion, release from time to time any portion of retention funds for early completing subcontractors and/or otherwise reduce the overall retention funds withheld.
- d. *Intermountain Not Responsible for Contractor's Retention Requirements.* Intermountain will not be responsible for enforcing Contractor's obligations under Utah law in fulfilling the retention law requirements with Subcontractors at any tier.

- 8.2.5 Reimbursement to Intermountain. Notwithstanding any other provision of the Contract, Contractor will reimburse Intermountain for the portion of any expenses paid by Intermountain to Contractor, which is attributable to Contractor's breach of its duties under the Contract, including the breach of any duty by any Subcontractor or supplier at any tier or anyone for whom Contractor may be liable.

8.3 Certificates for Payment.

- 8.3.1 Issued by A/E. A/E will within ten (10) Days after receipt of Contractor's Application for Payment, either issue to Intermountain a Certificate for Payment, with a copy to Contractor, for such amount as A/E determines due, or notify Contractor and Intermountain in writing of A/E's reasons for withholding certification in whole or in part as provided in Paragraph 8.4.1. If A/E fails to act within this ten (10) Day period, Contractor may file the Application for Payment directly with Intermountain Representative and Intermountain will thereafter have thirty-one (31) Days from the date of Intermountain's receipt to resolve the amount to be paid and to pay the undisputed amount. The accuracy of Contractor's Applications for Payment will be Contractor's responsibility, not A/E's.
- 8.3.2 A/E's Representations. A/E's issuance of a Certificate for Payment will constitute a representation to Intermountain that to the best of A/E's knowledge, information and belief, based upon A/E's observations at the site, the data comprising the Application for Payment, and what is reasonably inferable from the observations and data, that the Work has progressed to the point indicated in the Application for Payment and that the quality of the work is in accordance with the Contract Documents. The foregoing representations are subject to minor deviations from the Contract Documents correctable before completion and to specific qualifications expressed by A/E. The issuance of a Certificate for Payment will further constitute a representation that Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that A/E has (a) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (b) reviewed construction means, methods, techniques, sequences or procedures, (c) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by Intermountain to substantiate Contractor's right to payment, (d) ascertained how or for what purpose Contractor used money previously paid on account of Contract Sum, or (e) any duty to make such inquiries.

- 8.3.3 Contractor Respond to Financial Responsibility and Related Requests, Waivers, Releases, Bonds. Contractor will respond immediately to any inquiry in writing by Intermountain as to any concern of financial responsibility and Intermountain reserves the right to request any waivers, releases or bonds from Contractor in regard to any rights of Subcontractors (including suppliers) at any tier or any third-party before any payment by Intermountain to Contractor.

8.4 Decisions to Withhold Certification.

- 8.4.1 When Withheld. A/E may decide not to certify payment and may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect Intermountain, if in A/E's judgment the representations to Intermountain required in Paragraph 8.3.2 above cannot be made. If A/E is unable to certify payment in the amount of the Application, A/E will notify Contractor and Intermountain as provided in Paragraph above. If Contractor and A/E cannot agree on a revised amount, A/E will promptly issue a Certificate for Payment for the amount to which A/E makes such representations to Intermountain. A/E may also decide not to certify payment or, because of subsequently discovered evidence or observations, may nullify the whole or part of a Certificate for Payment previously issued, to such extent as may be necessary in A/E's opinion to protect Intermountain from loss because of:
- a. Defective Work not remedied;
 - b. Third party claims filed or reasonable evidence indicating probable filing of such claims;
 - c. Failure of Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
 - d. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
 - e. Damage to Intermountain or another contractor;
 - f. Reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
 - g. Failure to carry out the Work in accordance with the Contract Documents.
- 8.4.2 Certification Issued When Reasons for Withholding Removed. When the reasons stated in Paragraph 8.4.1 for withholding certification are removed, certification will be made for such related amounts.
- 8.4.3 Continue Work Even If Contractor Disputes A/E's Determination. If Contractor disputes any determination by A/E or the result of the Claim resolution process with regard to any Certification of Payment, Contractor nevertheless will expeditiously continue to prosecute the Work.
- 8.4.4 Intermountain Not in Breach. Intermountain will not be deemed to be in breach of this Contract by reason of the withholding of any payment pursuant to any provision of the Contract Documents provided Intermountain's action or such withholding is consistent with the results of the dispute resolution process.

8.5 Progress Payments.

- 8.5.1 In General, Interest on Late Payments.
- a. Except as provided in Paragraph 8.3.1, Intermountain will pay any undisputed amount within thirty-one (31) Days of satisfaction of the following requirements: (i) Contractor has submitted the application for payment; (ii) A/E has issued to Intermountain a Certificate recommending payment; (iii) Contractor has obtained conditional or unconditional waiver and release documents executed by all of Subcontractors performing work and/or providing materials covered by the Contractor's payment request; and (iv) Contractor has provided all "as-built" drawings to A/E sufficient for A/E to compile and provide a final set of Record Drawings for each

completed phase and for all portions of the Project for which a certificate of occupancy is issued. In no event will Intermountain be required to pay any disputed amount.

- b. Except as otherwise provided by law, if any payment is made more than sixty (60) Days after receipt by Intermountain of the applicable invoice (with any required supporting documentation), the late payment will bear interest from the due date until payment is made at the rate of five percent (5%) per annum.

8.5.2 Contractor and Subcontractor Responsibility. Contractor will promptly pay each Subcontractor, upon receipt of payment from Intermountain, out of the amount paid to Contractor on account of such Subcontractor's portion of the Work, the amount to which this Subcontractor is entitled. Contractor will, by appropriate agreement with each Subcontractor, require each Subcontractor to make payment to its Subcontractors in a similar manner.

8.5.3 Information Furnished by A/E Or Intermountain to Subcontractor. A/E or Intermountain will, on request, furnish to the Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by Contractor and action taken thereon by A/E and Intermountain on account of portions of the Work done by such Subcontractor.

8.5.4 Intermountain and A/E Not Liable. Neither Intermountain nor A/E will have an obligation to pay, monitor or enforce the payment of money to a Subcontractor, except to the extent as may otherwise be required by law.

8.5.5 Certificate, Payment or Use Not Acceptance of Improper Work. A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by Intermountain will not constitute acceptance of Work that is not in accordance with the Contract Documents.

8.6 Payment upon Substantial Completion. Upon Substantial Completion of the Work or designated portion thereof and upon application by Contractor and certification by A/E, Intermountain will make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof as provided in the Contract Documents. To the extent allowed by law, Intermountain may retain up to 200% of the fair market value of the work that has not been completed in accordance with the Contract Documents.

8.7 Partial Occupancy or Use

8.7.1 In General. Intermountain may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with Contractor, and authorized by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is Substantially Complete, provided Intermountain and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of the warranties required by the Contract Documents. When Contractor considers a portion to be substantially complete, Contractor will prepare and submit a list to A/E as previously provided for herein. Consent of Contractor to partial occupancy or use will not be unreasonably withheld. Contractor will have continuing responsibility to protect the unoccupied portions of the site and the Work during such partial occupancy and will be responsible for damage except to the extent caused solely by Intermountain during such partial occupancy or use.

The stage of progress of the Work will be determined by written agreement between Intermountain and Contractor.

8.7.2 Inspection. Immediately before such partial occupancy or use, Intermountain, Contractor and A/E will jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

- 8.7.3 Record Drawings. Contractor will provide all “as-built” drawings to A/E and A/E will then provide to Intermountain within forty-five (45) Days of any partial occupancy a final set of Record Drawings for the occupied phase or portion of the Project.
- 8.7.4 Not Constitute Acceptance. Except to the extent it is agreed upon in writing by Intermountain, partial occupancy or use of a portion or portion of the Work will not constitute acceptance of Work not complying with the requirement of the Contract Documents.

8.8 Final Payment.

- 8.8.1 Certificate for Payment. A/E’s final Certificate for Payment will constitute a further representation that the conditions listed in Paragraph 8.8.2 as precedent to Contractor’s being entitled to final payment have been fulfilled.
- 8.8.2 Conditions for Final Payment. Neither final payment nor any remaining retained percentage will become due until Contractor submits to A/E the following to the extent required by Intermountain Representative:
- a. A final payment request;
 - b. Waiver and release upon final payment documents executed by all of the Subcontractors performing work and/or providing materials covered by the Contractor’s final payment request;
 - c. An executed Substantial Completion form, which includes remaining Project items to be completed, Final Certificate of Occupancy from the applicable municipality, fire clearance(s) from Fire Marshal, Approval(s) from applicable State Dept. of Health, and any other permits/approvals for occupancy of Project as required by authorities with jurisdiction over the Project;
 - d. Evidence satisfactory to Intermountain that all required utilities are installed, commissioned, and operating consistent with the Specifications;
 - e. Confirmation of completion of any review or, if applicable, audit of Contractor’s Payment Applications and reconciliation, as required by Intermountain;
 - f. All manufacturers’ and other guaranties and warranties, properly signed and endorsed to Intermountain, that are required by the Contract Documents that extend for a period beyond one year after substantial completion. (Delivery of such guaranties and warranties will not relieve Contractor for any obligation assumed under any other provision of the Contract Documents.);
 - g. An affidavit that payrolls, bills for material and equipment, and other indebtedness connected with the Work for which Intermountain’s property might be responsible or encumbered (less amounts withheld by Intermountain) have been paid or otherwise satisfied;
 - h. A current or additional certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least thirty (30) Days prior written notice, by certified mail, return receipt requested, has been given to Intermountain;
 - i. A written statement that Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents;
 - j. If requested by surety in a timely manner or by Intermountain, consent of surety, to final payment;
 - k. Up to date “as-built” Drawings certified by Contractor as accurate and complete, Specifications, Addenda, Change Orders and other Modifications maintained at the site; the warranties, instructions, operation and maintenance manuals, and training videos required to be furnished by the Contract Documents;
 - l. Other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the

extent and in such form as may be designated by Intermountain. If a Subcontractor refuses to furnish a release or waiver required by Intermountain, Intermountain may require consent of surety to the final payment. If such liens, claims, security interests or encumbrances remain unsatisfied after payments are made, Contractor will refund to Intermountain all money that Intermountain may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees; and

- m. A written statement demonstrating how Contractor will distribute interest earned on retention to Subcontractors as required by Section 13.8.5, U.C.A.

In addition, A/E must declare to Intermountain in writing that the Work is complete and provide a final set of Record Drawings. If the aggregate of previous payments made by Intermountain exceeds the amount due Contractor, Contractor will reimburse the difference to Intermountain within ten (10) Days of Intermountain's request.

- 8.8.3 Waiver of Claims: Final Payment. The making of final payment will not constitute a waiver of Claims or other rights by Intermountain.
- 8.8.4 Waiver by Accepting Final Payment. Acceptance of final payment by Contractor or a Subcontractor will constitute a waiver of Claims by that payee except those Claims previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.
- 8.8.5 Time of Repose and Waiver. In addition and notwithstanding, claims and invoices for work, equipment, services, or materials that are not submitted to Intermountain within one (1) year of Substantial Completion of the Project are completely void and unenforceable as against Intermountain. Contractor and all Subcontractors hereby waive all rights and claims against Intermountain attendant such claims and invoices, and Contractor will contractually obligate each Subcontractor to waive all rights and claims against Intermountain attendant such claims and invoices. This provision imposes an absolute cut off on the timing for submitting such claims and invoices; this provision does not lengthen any timing requirements in the Contract Documents.

9. TESTS AND INSPECTIONS, SUBSTANTIAL AND FINAL COMPLETION, UNCOVERING, CORRECTION OF WORK, AND GUARANTY PERIOD.

9.1 Tests and Inspections.

- 9.1.1 In General. Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations, resolutions or orders of public authorities having jurisdiction will be made at an appropriate time. Unless otherwise specifically set forth in the Contract Documents or agreed to by Intermountain in writing, Intermountain will contract for such tests, inspections and approvals with an independent entity, or with the appropriate public authority, and Intermountain will bear all related costs of tests, inspections and approvals except as provided below. If any of the Work is required to be inspected or approved by the terms of the Contract Documents or by any public authority, Contractor will, at least two working days before the time of the desired inspection, and following the procedures established by Intermountain, request such inspection or approval to be performed. Contractor will give A/E timely notice of when and where tests and inspections are to be made so that A/E may observe such procedures.
- 9.1.2 Failure of An Inspector to Appear. Work will not proceed without any required inspection and the associated authorization by Intermountain to proceed unless the following procedures and requirements have been met:
 - a. The inspection or approval was requested in a timely manner as provided in Paragraph 9.1.1;
 - b. Contractor received written confirmation from the inspection entity that the inspection was scheduled;

- c. Contractor has contacted or attempted to contact the inspector to confirm that the inspector is unable to perform the inspection as scheduled;
 - d. If the inspector has confirmed that it is unable to perform the inspection as scheduled or if Contractor is unable to contact the inspector, Contractor will attempt to contact Intermountain Representative for instruction; and Contractor has documented the condition of the work before being covered through photos or other means.
- 9.1.3 Nonconforming Work. If such procedures for testing, inspection or approval under Paragraph 9.1.1 reveal failure of portions of the Work to comply with the requirements established by the Contract Documents, Contractor will bear all costs made necessary by such failure including those of repeated procedures and compensation for Intermountain's expenses, including the cost of retesting for verification of compliance if necessary, until Intermountain accepts the Work in question as complying with the requirements of the Contract Documents.
- 9.1.4 Certificates. Required certificates of testing, inspection or approval will, unless otherwise required by the Contract Documents, be secured by Contractor and promptly delivered to A/E.
- 9.1.5 A/E Observing. If A/E is to observe tests, inspections or approvals required by the Contract Documents, A/E will do so with reasonable promptness and, where practicable, at the normal place of testing.
- 9.1.6 Promptness. Tests, inspections and arrangements for approvals conducted pursuant to the Contract Documents will be made promptly to avoid unreasonable delay in the Work.

9.2 Inspections: Substantial and Final.

- 9.2.1 Substantial Completion Inspection. Before requesting a substantial completion inspection, Contractor will prepare a comprehensive initial punchlist, including unresolved items from prior inspections, for review by Intermountain and A/E to determine if the Project is ready for a substantial completion inspection. If Intermountain determines that the initial punchlist indicates that the Project is not substantially complete, the initial punchlist will be returned to Contractor with written comments. If Intermountain determines that the initial punchlist indicates that the Project may be substantially complete, A/E will promptly organize and perform a Substantial Completion inspection in the presence of Intermountain and all appropriate authorities.
- a. If A/E reasonably determines that the initial punchlist prepared by Contractor substantially understates the amount of the Work remaining to be completed and the Project is not substantially complete, A/E will report this promptly to Intermountain, and upon concurrence of Intermountain, Contractor will be assessed the costs of the inspection and punchlist preparation incurred by A/E and Intermountain.
 - b. When the Work or designated portion thereof is Substantially Complete, A/E will prepare a Certificate of Substantial Completion which will establish the date of Substantial Completion; will establish responsibilities of Intermountain and Contractor for security, maintenance, heat, utilities, damage to the work and insurance; and will fix the time within which Contractor will finish all items on the punchlist accompanying the Certificate. The Certificate of Substantial Completion will require approval by Intermountain Representative. If there is a punchlist, Contractor will proceed promptly to complete and correct items on the list. Failure to include an item on the punchlist does not alter the responsibility of Contractor to complete all Work in accordance with the Contract Documents.
 - c. Warranties required by the Contract Documents will commence on the date of Substantial Completion of the Work or designated portion thereof except to the extent as provided otherwise in the Contract Documents or if such warranty is related to an item where the work is not complete. Such warranty documents will state the length of the warranty, which must comply with the Contract Documents.

- d. The Certificate of Substantial Completion will be submitted by A/E to Intermountain and Contractor for their written acceptance of responsibilities assigned to them in such Certificate.
 - e. Except to the extent Intermountain Representative otherwise approves in advance and in writing, Contractor will submit the following documents in order to achieve Substantial Completion: written warranties, guarantees, operation and maintenance manuals, and all complete “as-built” Drawings. Contractor must also provide or obtain any required approvals for occupancy, and deliver “as-built” drawings to A/E sufficient to enable A/E to compile and provide a final set of Record Drawings for each completed phase and for each area for which a certificate of occupancy is issued within forty-five (45) Days of such issuance. Contractor is responsible for the guaranty of all Work, whether performed by it or by its Subcontractors at any tier.
- 9.2.2 Final Completion Inspection. Before requesting a final inspection, Contractor will verify all punchlist items are corrected/completed. Once all punchlist items are corrected/completed Contractor will notify Intermountain and request a final inspection. Intermountain will notify A/E and perform a final inspection. Two final inspections may be allowed due to required weather changes required to complete some items. When all punchlist items are completed a final pay request will be provided by Contractor, authorized by A/E and processed by Intermountain.

9.3 Uncovering of Work.

- 9.3.1 Uncover Uninspected Work. Except as provided in Paragraph 9.3.3, if a portion of the Work is covered before an Inspector’s approval to proceed, it must, be uncovered for the Inspector’s inspection and be replaced at Contractor’s expense without change in the Contract Time.
- 9.3.2 Observation before Covering. Except as provided in Paragraph 9.3.3, if Intermountain or A/E has requested in writing to observe conditions before any Work being covered or if such observation is specified in the Contract Documents, and the Work is covered without such observation, Contractor will be required to uncover and appropriately replace the Work at Contractor’s expense without change in the Contract Time. If Contractor requests an inspection and Intermountain or A/E, including any inspector of each, does not appear, Contractor will immediately notify Intermountain of such lack of appearance, but will not cover the Work without such inspection.
- 9.3.3 When an Inspector Fails to Appear Or A/E Or Intermountain Did Not Make Prior Request. If Work is performed by Contractor without an inspection as provided in Paragraph 9.1.2 or if a portion of the Work has been covered which A/E or Intermountain has not specifically requested to observe before its being covered or such observation is not specified by the Contract Documents, A/E or Intermountain may request to see such Work and it will be uncovered by Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement, will, by appropriate Change Order, be charged to Intermountain. If such Work is not in accordance with the Contract Documents, Contractor will pay such costs unless the condition was caused by Intermountain or a separate contractor in which event Intermountain will be responsible for payment of such costs.

9.4 Correction of Work and Guaranty Period.

- 9.4.1 Contractor Correct the Work. Contractor will correct Work rejected by A/E, Inspector or Intermountain, or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. Contractor will bear the costs of correcting such rejected Work, including additional testing and inspections and compensation for A/E’s and Inspector’s services and expenses made necessary thereby.
- 9.4.2 Guaranty and Correction after Substantial Completion. If within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Paragraph 9.2.1 or by terms of an applicable special warranty or guaranty required by the Contract Documents, any of the Work is found to be not in accordance with

the requirements of the Contract Documents, including failure to perform for its intended purpose, Contractor will correct it promptly after receipt of written notice from Intermountain to do so unless Intermountain has previously given Contractor a written acceptance of such condition. The period of one year will be extended with respect to portions of the Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work. This obligation of Contractor under this Paragraph 9.4.2 will be operative notwithstanding the acceptance of the Work under the Contract, the final certificate of payment, partial or total occupancy and/or termination of the Contract. Intermountain will give notice of observed defects with reasonable promptness, however, failure to give such notice will not relieve Contractor of its obligation to correct the Work at the cost that Contractor would have incurred if Intermountain did so report with reasonable promptness. All corrected Work will be subject to a one-year guaranty period the same in all respects as the original Work, except that such guaranty period will commence from the time of Substantial Completion of the corrected Work. This guaranty period does not affect Intermountain's right to pursue any available remedies against Contractor.

9.4.3 Removal of Work.

- a. Contractor will promptly remove from the premises all Work that Intermountain and/or A/E determines as being in nonconformance with the Contract Documents, whether incorporated or not.
- b. Contractor will promptly replace and re-execute the Work in accordance with the Contract Documents and without expense to Intermountain.
- c. Contractor will bear the expense of correcting destroyed or damaged construction, whether completed or partially completed, of Intermountain or of other contractors destroyed or damaged by such removal or replacement.
- d. If Contractor does not remove such rejected Work within a reasonable time, fixed by written notice, Intermountain may have the materials removed and stored at the expense of Contractor.
- e. If Contractor does not correct the nonconforming Work within a reasonable time, fixed by written notice, Intermountain may correct it in accordance with Paragraph 12.2.2 of these General Conditions.

9.4.4 Not Limit Other Obligations. Nothing contained in this Article 9.4 will be construed to establish a period of limitation with respect to other obligations which Contractor may have under the Contract Documents. Establishment of the time period of one year as described in Paragraph 9.4.2 relates only to the specific obligation of Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish Contractor's liability with respect to Contractor's obligations other than specifically to correct the Work.

9.5 Additional Warranties.

9.5.1 In General. In addition to any other provisions of this Article 9, the following warranties will apply:

- a. Contractor warrants to Intermountain that materials and equipment furnished under the Contract will be of good quality and new, except to the extent otherwise required or expressly permitted by the Contract Documents.
- b. Contractor also warrants to Intermountain that the Work will be free from defects not inherent in the quality required or permitted and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered Defective at Intermountain's option.

9.5.2 Correction of Work.

- a. Contractor will promptly correct any portion of the Work which is rejected by A/E, the inspector, or Intermountain, or which fails to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed, or completed. Contractor will bear the cost of correcting such rejected Work, including additional testing and inspection costs, compensation for A/E's services, and any other expenses made necessary thereby. Such costs will in no way be payable by Intermountain and will not increase the Contract Sum.
 - b. Contractor will remedy any Defects due to faulty materials, equipment, or workmanship which appear within a period of one (1) year from the date of Substantial Completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents. Contractor will pay all costs of correcting faulty work, including additional A/E fees, attorney fees, expert fees, consultant fees, copy costs, and other expenses when incurred. Such costs will in no way be payable by Intermountain and will not increase the Contract Sum.
 - c. Nothing in the Contract Documents will be construed to establish a period of limitation within which Intermountain may enforce the obligation of Contractor to comply with the Contract Documents. The one (1) year period specified in paragraph 9.5.2(2) has no relationship to the time within which Intermountain may enforce compliance with the Contract Documents, nor to the time within which proceedings may be commenced to establish Contractor's liability with respect to Contractor's obligations.
- 9.5.3 Exclusion. Unless due to the negligent or intentional act or omission of Contractor or those under Contractor's control, or as otherwise stated in the Contract Documents, Contractor's guaranty excludes remedy for damage or defect caused by abuse, modifications not executed by Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage.
- 9.5.4 Furnish Evidence on Request. If requested by A/E or Intermountain, Contractor will furnish satisfactory evidence as to the type and quality of materials and equipment.

9.6 Acceptance of Nonconforming Work. If Intermountain prefers to accept Work which is not in accordance with the requirements of the Contract Documents, Intermountain may do so in writing instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment will be effected whether or not final payment has been made. Without limitation, usage by Intermountain or A/E of mechanical devices, machinery, apparatus, equipment, or other work or materials supplied under the Contract Documents before written acceptance by Intermountain, will not constitute Intermountain's acceptance.

10. INSURANCE AND BONDS.

10.1 Insurance. To protect against liability, loss and/or expense arising in connection with the performance of services described under the Contract Documents, Contractor will obtain and maintain in force as set forth below in section 10.1.9 without interruption, the following stated insurance, in a form and content satisfactory to Intermountain, from insurance companies authorized to do business in the State in which the Project is located with an A.M. Best's Rating of A- or better and Class VII or better. Contractor will require all Subcontractors to have and maintain similarly required policies. All of the following listed insurance coverages will be provided by Contractor.

- 10.1.1 Contractor's Commercial General Liability Insurance. Contractor will maintain coverage, with ISO Form CG 00 01 or other policy form satisfactory to Intermountain, on an occurrence basis, including coverage for Premises-Operations, Independent Contractors' Protective, Products-Completed Operations, Contractual Liability, Personal Injury, and Broad-Formed Property Damage (including coverage for Explosion, Collapse, and Underground hazards), which will provide primary coverage to

the additional insureds (Intermountain and the A/E) in the event of any occurrence, claim, or suit, with per occurrence and annual aggregate policy limits of at least as follows:

\$2,000,000	General Aggregate;
\$2,000,000	Products-Completed Operations Aggregate;
\$1,000,000	Personal and Advertising Injury;
\$1,000,000	Each Occurrence.

Intermountain reserves the right to require additional coverage limits of liability from that stated above. Intermountain also reserves the right to require project specific insurance, and if such right has been exercised it will be indicated in the Contract Documents.

- 10.1.2 Excess and Umbrella Liability Insurance. Contractor will maintain excess and liability insurance with coverage at least as broad as the underlying liability insurance described in this section, written on an occurrence basis with per occurrence and annual aggregate policy limits based on the following chart, unless modified by mutual agreement of the parties,

Small Project (\$2,000,000 or less)
Minimum Commercial General Liability Coverage
\$1,000,000 each occurrence,
\$3,000,000 general aggregate
Medium Project (\$2,000,001 to \$10,000,000)
Minimum Commercial General Liability Coverage
\$5,000,000 each occurrence,
\$10,000,000 general aggregate
Large Project (Greater than \$10,000,000)
Minimum Commercial General Liability Coverage
\$10,000,000 each occurrence,
\$20,000,000 general aggregate

For insurance purposes, the size of the Project will be specified in the Contractor's Agreement. Such excess or umbrella liability policy will follow form with the primary liability policies, and contain a drop-down provision in case of impairment of underlying limits.

- 10.1.3 Workers' Compensation Insurance and Employers' Liability Insurance. Worker's Compensation Insurance will cover full liability under the Worker's Compensation Laws of the jurisdiction in which the Project is located at the statutory limits required by this jurisdiction's laws. Contractor will also maintain Employer's Liability Insurance with limits of at least \$1,000,000 each accident, \$1,000,000 for bodily injury by accident, and \$1,000,000 each employee for injury by disease. Contractor will collect and keep on-file evidence that Contractor and all tiers of Subcontractors have current certificates of this Workers Compensation Insurance (as required by State statute) as well as Employer's Liability Insurance, and will produce them upon request by Intermountain.
- 10.1.4 Automobile. Automobile liability insurance for claims arising from the ownership, maintenance, or use of a motor vehicle. The insurance will be written on an "occurrence" form and will apply to "any auto" and will cover all owned, non-owned, and hired automobiles used in connection with the work, with the following minimum limits of liability: \$1,000,000 – Combined Single Limit Bodily Injury and Property Damage per Occurrence.
- 10.1.5 Pollution Liability Insurance. Pollution Liability Insurance covering Contractor's or appropriate Subcontractor's liability for bodily injury, property damage and environmental damage resulting from sudden, accidental, and gradual pollution and related cleanup costs incurred by Contractor, all arising out of the goods delivered or Work and services performed (including transportation risk) under this Contract, is required with limits of at least \$1,000,000 per claim and \$1,000,000 annual aggregate.

- 10.1.6 Aircraft Use. Contractor using its own manned or unmanned aircraft, or employing manned or unmanned aircraft in connection with the work performed under the Contract Documents will maintain Aircraft Liability Insurance with a combined single limit of not less than \$1,000,000 per occurrence. This certificate will state that the policy required by this paragraph has been endorsed to name Intermountain as an Additional Insured.
- 10.1.7 Policy Aggregate(s). Unless project specific insurance is required by Intermountain, the above insurance coverages will be written or endorsed under a policy to have general, per occurrence, and aggregate limits of liability applicable to this project only.
- 10.1.8 Certificates. Before the Contract Documents are executed, Contractor will submit certificates in form and substance satisfactory to Intermountain as evidence of the insurance requirements of this Article 10. Contractor will obtain copies of Additional Insured (Ongoing and Completed Operations), Waiver of Subrogation, and Primary and Non-Contributory Endorsements and/or policy clauses. The certificates will contain provisions that no cancellation, or non-renewal will become effective except upon thirty (30) Days prior written notice by US Mail to Intermountain as evidenced by return receipt, certified mail sent to Intermountain. Contractor will notify Intermountain within thirty (30) Days of any claim(s) against Contractor which singly or in the aggregate exceed 20% of the applicable required insured limits and Contractor will, if requested by Intermountain, use its best efforts to reinstate the policy within the original limits and at a reasonable cost. Intermountain will be named as an additional insured party, as primary coverage and not contributing, on all the insurance policies required by this Article, except the professional liability and workers' compensation policies, by endorsements satisfactory to Intermountain -- using a combination of ISO forms CG 20 10 (07/04), Additional Insured – Owners, Lessees or Contractors – Scheduled Person or Organization and CG 20 37 (07.04) Additional Insured – Owners, Lessees or Contractors – Completed Operations, or other forms acceptable to Intermountain, naming Intermountain and A/E as additional insureds. Intermountain reserves the right to request Contractor to provide a loss report from its insurance carrier. Contractor will collect and keep on-file evidence that Contractor and each Subcontractor has current certificates of Commercial General Liability Insurance, Excess /Umbrella Liability Insurance, and other insurance required herein, and will produce them upon request by Intermountain.
- 10.1.9 Maintain throughout Contract Documents Term. Contractor will maintain, from commencement of the Work, insurance coverage required in Articles 10.1 and 10.2 as follows:
- a. Commercial General Liability Insurance through expiration of the statute of limitations/repose for completed operations, but in no event less than ten (10) years from completion of the Project; and
 - b. All other insurance through final payment.
- 10.1.10 Waivers of Subrogation. Contractor waives all rights against Intermountain and other additional insureds for recovery of damages to the extent the losses and damages are covered by existing insurance, including without limitation commercial general liability, commercial excess/umbrella liability, business auto liability, workers compensation or employer's liability insurance, and pollution liability insurance. Contractor will ensure that all insurance policies required herein will be endorsed to include waivers of subrogation in favor of Intermountain. Contractor hereby waives all rights of subrogation against Intermountain.
- 10.1.11 Excess Coverages. Any type of insurance or any increase of limits of liability not described in the Contract Documents which Contractor requires for its own protection or on account of any statute, rule or regulation, will be its own responsibility and at its own expense.
- 10.1.12 Not Relieve Contractor of Liability. The carrying of any insurance required by the Contract Documents will in no way be interpreted as relieving Contractor of any other responsibility or liability under the Contract Documents or any applicable law, statute, rule, regulation, or order.

- 10.1.13 Contractor Compliance with Policies. Contractor will not violate or permit to be violated any of the provisions of the insurance policies required under the Contract.
- 10.1.14 Deductible Liability. Any and all deductibles in the above described policies will be assumed by, for the account of, and at the sole risk of Contractor. The allowable deductible for any of the Contractor insurance policies required by these General Conditions shall be no less than \$1,000 or 0.1 percent of the Contract Amount, whichever is greater.

10.2 “Builder’s Risk” Property Insurance.

- 10.2.1 In General. Intermountain will provide through Substantial Completion “Builder’s Risk” property insurance for the cost of the Project. The policy will be written on an all risk basis, with exclusions standard for the insurance industry, on policy forms currently and commercially available, with insurance carriers selected by Intermountain.
- 10.2.2 Deductible. The above described “Builder’s Risk” policies shall be subject to a total deductible of \$5,000 per loss occurrence, which deductible shall be assumed by Contractor or Subcontractors, in proportion to their share of the total amount of an insured loss occurrence.
- 10.2.3 Waiver. To the extent damages are covered by the above described “Builder’s Risk” policies, Contractor, including all Subcontractors and Material Suppliers, and Intermountain hereby waive all rights against each other for damages caused by perils insured against under the “Builder’s Risk” insurance provided. Contractor will require similar waivers from each of their contractors, subcontractors, material suppliers, sub-consultants and agents, at any tier.
- 10.2.4 Policy Terms. Intermountain will provide a copy of the terms and conditions of the builders risk policy to Contractor upon Contractor’s request. Contractor will comply with terms, conditions, and deadlines of the builders risk policy. The terms, conditions, and deadlines of the builders risk policy shall govern coverage. Contractor will cooperate with Intermountain and the builders risk commercial insurer in the investigation, documentation, and settlement of loss claims, including without limitation promptly responding to all requests for information and documentation from the builders risk commercial insurer and/or Intermountain.
- 10.2.5 Special Hazards. Intermountain will bear the risk of loss, delay and/or damage due to earthquake and/or flood and may either insure or self-insure that risk.

10.3 Performance Bond and Payment Bond. If required by the Contract Documents, Contractor will before commencement of the Work or within ten (10) Days after signing the Agreement, whichever is earlier, submit and maintain in full force and effect as required by law and the Contract Documents, as part of the Construction Costs for the Project, written on Form AIA Document A312 (1984) or on other forms provided by Intermountain, and include as part of the quoted total all costs involved in securing and furnishing, a performance bond and a labor and material payment bond the bonds listed below, based on the completed cost of the Contract and effective upon execution of the Contract. These bonds will be from a surety company or companies licensed in the state in which the Project is located and holding valid certificates of authority under Sections 9304 to 9308, Title 31, of the United States Code as acceptable sureties or reinsurance companies on federal bonds, have a penal sum obligation not exceeding the authorization shown in the current revision of Circular #570 as issued by the United States Treasury Department, i.e. “Treasury List”, and be accompanied by a certified copy of the power of attorney stating the authority of the attorney-in-fact executing the bonds on behalf of the surety.

- a. A full 100 percent performance bond covering the faithful execution of the Contract in accordance with the Contract Documents; and
- b. A full 100 percent payment bond covering payment of all obligations arising under the Contract Documents, for the protection of each person supplying labor, service, equipment, or material for the performance of the Work.

All Subcontractor performance and payment bonds will name Contractor and Intermountain as Oblige. Intermountain reserves the right to reject any surety company, performance bond, or labor and material payment bond with or without cause.

10.4 Intermountain Self-Insurance. Intermountain may, at its option, satisfy any insurance requirements applicable to Intermountain through its self-insurance and risk management program.

11. MISCELLANEOUS PROVISIONS.

11.1 A/E's Responsibilities. These General Conditions are not intended to provide an exhaustive or complete list of A/E's responsibilities. A separate agreement between Intermountain and A/E incorporates these General Conditions by reference and includes additional design responsibilities.

11.2 Successors and Assigns. Intermountain and Contractor respectively bind themselves, to the other party in respect to covenants, agreements and obligations contained in the Contract Documents. Contractor will not assign the Contract, or any of its rights or obligations under the Contract, without the prior written consent of Intermountain, nor will Contractor assign any amount due or to become due as well as any rights under the Contract, without prior written consent of Intermountain. Intermountain may assign the Contract to an institutional lender providing financing for the Project. In such event, the lender will assume Intermountain's rights and obligations under the Contract. Contractor will execute all consents reasonably required to facilitate such assignment.

11.3 Written Notice. Written notice will be deemed to have been duly served if (a) delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or (b) delivered at or sent by registered or certified mail, return receipt requested, or (c) deposited for delivery with a nationally recognized overnight courier service, to the last business address known to the party giving notice.

11.4 Rights and Remedies.

11.4.1 Not Limit. Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder will be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

11.4.2 Not Waiver. Except as expressly provided elsewhere in the Contract Documents, no action or failure to act by Intermountain, A/E or Contractor will constitute a waiver of a right or duty afforded them under the Contract Documents, nor will such action or failure to act constitute approval or acquiescence in a breach thereunder, except as any of the above may be specifically agreed to in writing. In no case will Contractor or any Subcontractors be entitled to rely upon any waiver of any of these General Conditions unless agreed to in writing by Intermountain.

11.5 Use of Intermountain Forms. Unless otherwise specifically identified in the Contract, all references or requirements for use or submission of documents to Intermountain, to A/E, or to others must be on Intermountain's approved forms. These forms include, without limitation, pay application, requests for payment, proposed change orders, change orders, modifications, requests for information, continuation sheets, waiver and lien releases, verifications, and other project related documents. Notwithstanding, Intermountain may in its sole discretion accept alternate forms. However, Intermountain's acceptance of an alternate form in one instance does not waive or modify the requirements herein for subsequent submissions.

11.6 Governing Law, Jurisdiction and Venue. To the maximum extent permitted by law, Utah laws, excluding its conflict-of-law provisions, govern the Contract and both Intermountain and Contractor submit to the exclusive jurisdiction and venue of state and federal courts located in Salt Lake County, Utah.

- 11.7 Interpretation.** In the interest of brevity, the Contract Documents frequently omit modifying words such as “all” and “any” and articles such as “the” and “an”, but the fact that a modification or an article is absent from the statement and appears in another is not intended to affect the interpretation of either statement.
- 11.8 Severability.** The invalidity of any part, paragraph, subparagraph, phase, provision or aspect of the Contract documents will not impair or affect in any manner the validity, enforceability or effect of the remainder of the Contract Documents.
- 11.9 Construction of Words.** Unless otherwise stated in the Contract Documents, words, which have well-known technical or construction industry meanings, will be construed as having such recognized meanings. Unless the context requires otherwise, all other technical words will be construed in accordance with the meaning normally established by the particular, applicable profession or industry. All other words, unless the context requires otherwise, will be construed with an ordinary, plain meaning.
- 11.10 No Third-Party Rights.** The Contract Documents will not be construed to create a contractual relationship of any kind (1) between A/E and Contractor, (2) between Intermountain and a Subcontractor or (3) between any persons or entities other than Intermountain and Contractor. Nothing contained herein will be deemed as creating third party beneficiary contract rights or other actionable rights or duties as between Contractor and A/E, or as between Intermountain, Contractor, or A/E on the one hand, and any other person or entity.
- 11.11 Change of Control.** If a third party acquires a controlling interest (i.e., 50% ownership or more) of Contractor, then (a) Contractor will notify Intermountain within fifteen (15) Days of that acquisition, and (b) upon that acquisition, Intermountain may terminate for cause the Contract immediately upon written notice to Contractor.
- 11.12 Entire Agreement and Amendment Limitation.** The Contract represents the entire and integrated agreement between Intermountain and Contractor and supersedes all prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by (1) a written amendment executed by both Intermountain and Contractor, or (2) by a Modification.
- 11.13 Notices.** Any notice required by the Contract will be served upon the recipient’s designated representative by hand delivery at the last known business address, or by mail or nationally recognized overnight courier service with “delivery confirmation” to the last known address.
- 11.14 No Publicity.** Without receiving prior written approval from an Intermountain vice president, Contractor will not distribute any publicity regarding the Contract.
- 11.15 Waivers.** No waiver by Intermountain or Contractor of any default will constitute a waiver of the same default at a later time or of a different default.
- 11.16 Waiver of Consequential Damages.** Intermountain and Contractor waive all claims against each other for any consequential damages that may arise out of or relate to the Contract. Intermountain waives damages including but not limited to is loss of use of the Project, any rental expenses incurred, loss of income, profit, or financing related to the Project, loss of business, the services of employees, or loss of reputation. Contractor waives damages including but not limited to the loss of business, loss of financing, principal office overhead and expenses, loss of profits not related to this Project, loss of bonding capacity or loss of reputation. This section may not be construed to preclude recovery of consequential damages when such damages are actually recovered from insurance policies required by the Contract Documents. The provisions of this section also apply to the termination of the Contract and survive such termination.
- 11.17 Compliance.**
- 11.17.1 Remuneration.** Remuneration flowing between the parties is at fair market value for actual and necessary items furnished or services rendered, is based upon an arm’s-length transaction, and does

not take into account, directly or indirectly, the value or volume of any past or future referral or other business generated between the parties (or of any referral or business of any principal, affiliate, or immediate family member - as those terms may be defined by applicable laws - of either party).

- 11.17.2 Financial Relationships. To its knowledge, Contractor (a) is not a physician-owned entity and (b) has no prohibited financial relationship with any physician who is in a position to generate business for Intermountain, or with an immediate family member of that physician. Intermountain defines a “physician-owned entity” as any entity in which a physician, or immediate family member of a physician, holds an ownership, investment, or royalty interest (if royalties are paid on any purchase resulting from the royalty holder’s order). The Code of Federal Regulations (CFR) defines “financial relationship” (in 42 CFR 411.354) and “immediate family member” (in 42 CFR 411.351).

[Note: Physicians and their immediate family members may own investment securities of Contractor if that investment complies with 42 CFR 411.356(a) or (b), and may have a compensation arrangement that both complies with 42 CFR 411.357(p) and does not take into account the volume or value of referrals or other business generated for Intermountain by a physician or a physician’s immediate family members.]

- 11.17.3 Exclusion or Sanction. Contractor warrants that neither it, or any of its affiliates or employees, excluded from participation in, or sanctioned under, any state or federal healthcare program, including those set forth in 42 U.S.C. §1320a 7b(f). Contractor will notify Intermountain immediately in writing if the warranty in the preceding sentence is, or becomes, inaccurate during the Term.
- 11.17.4 Access to Books and Records. Intermountain is a provider under Federal Medicare programs and is subject to Section 952 of the Omnibus Reconciliation Act of 1980. That law requires Intermountain, as a provider, to include the following provision in its agreements with suppliers who receive \$10,000 or more under an agreement with Intermountain. If requested by the Secretary of HHS, by the U.S. Comptroller, or by an authorized representative of either of them, Contractor will make available to the requestor the Contract and Contractor’s books, documents, and records to allow the requestor to certify the nature and extent of the charges for services provided under the Contract and charged to Medicare. Contractor will continue to make those items available for four years after Contractor furnishes the final products (or services) under the Contract. If Contractor contracts with another to carry out any of Contractor’s duties under the Contract and the Subcontractor is to receive \$10,000 or more in value under that subcontract, then Contractor will obtain a written contractual commitment from the Subcontractor to comply with the obligations of this section of the Agreement. The obligations of this Section survive the expiration or other termination of the Contract.
- 11.17.5 Code of Ethics. In its dealings with Intermountain, Contractor has and will comply with all codes of ethics applicable to suppliers and their interactions with purchasers like Intermountain, including, without limitation, the AdvaMed Code of Ethics on Interactions with Health Care Professionals.
- 11.17.6 Facility Access Policy. All of Contractor’s representative(s) entering any Intermountain facility must comply with Intermountain’s Facility Access Policy. This policy requires each of these Contractor representatives to check in with Intermountain on each visit to an Intermountain facility to receive an identification badge; and as applicable, log onto: <https://intermountainhealthcare.org/supply-chain-organization/for-suppliers/for-current-suppliers/access-to-intermountain-facilities/> and complete the registration requirements. Please contact Intermountain representative with any questions.
- 11.17.7 Equal Opportunity. Affirmative Action. Intermountain is an equal opportunity employer and federal contractor. Consequently, the parties agree that, to the extent applicable, they will comply with the following, which are incorporated herein by reference: 41 CFR 60 1.4(a), 41 CFR 60 300.5(a), 41 CFR 60 741.5(a), and Executive Order 13496 (29 CFR Part 471, Appendix A to Subpart A), relating to the notice of employee rights under federal labor laws, specifically:
- a. Intermountain and Contractor will abide by the requirements of 41 CFR 60 300.5(a), as applicable. This regulation prohibits discrimination against qualified protected veterans, and

requires affirmative action by covered prime contractors and Subcontractors to employ and advance in employment qualified protected veterans.

- b. Intermountain and Contractor will abide by the requirements of 41 CFR 60 741.5(a), as applicable. This regulation prohibits discrimination against qualified individuals on the basis of disability, and requires affirmative action by covered prime contractors and Subcontractors to employ and advance in employment qualified individuals with disabilities.

11.17.8 **Remedies.** If Contractor breaches any obligation of this section, Intermountain may immediately terminate for cause the Contract upon written notice to Contractor.

11.18 Work Restrictions / Drug Testing. Contractor will ensure that Contractor, its agents, employees, and all Subcontractors do not use or consume alcohol or cannabis, or illegally use drugs, upon Intermountain's property or enter upon or perform any work on Intermountain's property while under their influence. Contractor will obtain necessary consents and will conduct periodic inspections and drug testing to monitor and ensure compliance with these requirements. Contractor will bear the expenses of such inspections and drug testing and will hold Intermountain harmless from all claims arising out of or relative thereto. In addition, Contractor will ensure that Contractor and all Subcontractors do not smoke or vape anything upon Intermountain's property except and only within designated smoking areas approved by Intermountain.

11.19 Utah State Sales Tax. Contractors should be exempt on purchases of material installed or converted into real property to be used by Intermountain. The Contractor will furnish each vendor with Intermountain's Tax exemption number.

11.20 Notice of Intent to Obtain Final Completion. Contractor shall file with the Utah State Construction Registry, on its own behalf and/or on behalf of Intermountain, a notice of intent to obtain final completion at least forty-five (45) Days before the day on which Intermountain or Contractor files or could file a notice of completion under Utah statutes if: (1) the completion of performance time under the original contract for construction work is greater than one hundred twenty (120) Days; (2) the total original construction contract price exceeds \$500,000; and (3) neither Contractor nor Intermountain has obtained a payment bond in accordance with Utah Code Ann. Section 14-2-1.

11.21 Notice of Completion. Within five (5) Days of final completion of the Project and in compliance with Section 38-1a-507 Utah Code Annotated, Contractor shall file with the Utah State Construction Registry, and copy to Intermountain, a notice of completion which shall include, without limitation, the following:

- a. The name, address, telephone number, and email address of the person filing the notice of completion;
- b. The name of the county in which the Project and/or Project site is located;
- c. The date on which final completion is alleged to have occurred;
- d. The method used to determine final completion; and
- e. One of the following:
 - 1. The tax parcel identification number of each parcel included in the Project and/or Project site;
 - 2. The entry number of a preliminary notice on the same project that includes the tax parcel identification number of each parcel included in the Project and/or Project site; or
 - 3. The entry number of the building permit issued for the Project.

Notwithstanding any other provision of the Contract Documents to the contrary, Contractor and Intermountain agree that any breach or failure to comply with this requirement by Contractor will

constitute a breach of contract and the Contractor will be liable for any direct, indirect, or consequential damages to Intermountain flowing from this breach.

11.22 Audit Rights. Contractor will keep, maintain and preserve complete, current and accurate books, records, and accounts of the transactions contemplated by this Agreement and such additional books, records and accounts as are necessary to establish and verify Contractor's compliance with the Contract. All these books, records and accounts will be available for inspection and audit by Intermountain and/or an independent third party designated by Intermountain and approved by Contractor at any time during the Term and for two (2) years thereafter, but only during reasonable business hours and upon reasonable notice. In addition:

- a. Intermountain agrees that its routine audits will not be conducted more frequently than once in any consecutive twelve (12) month period.
- b. If, after any audit of Contractor, Intermountain requires additional information regarding the transactions contemplated by the Contract, Contractor will furnish to Intermountain or to the third-party audit firm any additional information Intermountain specifies that relates to the audit period to establish and verify Contractor's compliance with the Contract Documents.
- c. Intermountain's right to inspect and audit is without prejudice to any other or additional rights or remedies of either party.
- d. Contractor agrees to not unreasonably withhold approval of any independent third-party audit firm.
- e. If an audit reveals an overcharge incurred by Intermountain on this Project, Contractor will provide a written response explanation, correct any error and remit any monies due within ten (10) Days after receiving notice of the error or overcharge.

Intermountain may audit applications for payments or any other aspect of the Services and Work of Contractor and of the Subcontractor or suppliers at any tier. Contractor will cooperate with Intermountain in providing all necessary information for any Intermountain audit.

12. TERMINATION OR SUSPENSION OF THE CONTRACT.

12.1 Termination by Contractor.

12.1.1 In General. If the Work is stopped for a period of ninety (90) Days through no act or fault of Contractor or a Subcontractor, or their agents or employees or any other persons performing portions of the Work under contract with any of the above, Contractor, may terminate the Contract in accordance with 12.1.2 herein below for any of the following reasons:

- a. Because Intermountain has persistently failed to fulfill fundamental Intermountain's obligations under the Contract Documents with respect to matters important to the progress of the Work;
- b. Issuance of an order of a court or other public authority having jurisdiction which necessitates such termination, except that where Contractor has standing, Contractor must cooperate in efforts to stay and/or appeal such order;
- c. A governmental declaration of national emergency, making material unavailable; or
- d. Unavoidable casualties or other similar causes as listed in Paragraph 12.2.2(2) herein below.

12.1.2 Notice. If one of the reasons for termination in Paragraph 12.1.1 hereinabove exist, Contractor may, upon ten (10) additional Days' written notice to Intermountain and A/E, and such condition giving cause for termination still not cured, terminate the Contract and recover from Intermountain payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead, profit and damages associated only with work completed before the notice of termination.

12.2 Termination by Intermountain for Cause.

12.2.1 In General. Intermountain may terminate the Contract if Contractor fails to cure any of the following within a period of ten (10) Days (or longer if Intermountain so approves in writing) after receipt of notice from Intermountain specifying the cause for termination:

- a. Contractor refuses or fails to supply enough properly skilled workers or proper materials;
- b. Contractor fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between Contractor and the Subcontractors;
- c. Contractor disregards laws, ordinances, or rules, regulations, resolutions or orders of a public authority having jurisdiction; or
- d. Contractor fails to perform the Work within the time specified in the Contract Documents or any authorized extension thereof or Contractor fails to make progress with the Work as to endanger such compliance;
- e. Contractor fails to perform the Work or is otherwise in breach of a provision of the Contract Documents;
- f. Contractor fails to respond promptly to the financial responsibility inquiry herein;
- g. As permissible by law for a reason to terminate, Contractor is adjudged bankrupt;
- h. As permissible by law for a reason to terminate, Contractor should make a general assignment for the benefit to creditors;
- i. As permissible by law for a reason to terminate, Contractor has or should have a receiver appointed on account of Contractor's insolvency; or
- j. Contractor fails to follow the material safety requirements and precautions either as expressly provided in the Contract Documents or as consistent with the customary practices in the industry.

12.2.2 Intermountain's Right to Carry Out the Work. If Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten (10) Day period (or longer if approved by Intermountain in writing) after receipt of written notice from Intermountain to cure such default or neglect, Intermountain may without prejudice to other remedies Intermountain may have, correct such deficiencies, including taking over the Work and prosecuting the same to completion, by contract or otherwise, and may take possession of, and utilize in completing the Work, such materials, appliances, and facilities as may be on the site of the Work as well as the site as necessary for its proper completion. In such case, Intermountain will offset from payments then or thereafter due Contractor the cost of correcting such deficiencies, including compensation for A/E, Intermountain's staff and legal counsel's additional services and expenses made necessary by such default, neglect or failure. If payments then or thereafter due Contractor are not sufficient to cover such amounts, Contractor will pay the difference to Intermountain. Contractor will continue performance of the Contract to the extent not terminated.

12.2.3 Items Required to Be Transferred or Delivered. Intermountain may require Contractor to transfer title and deliver to Intermountain, in the manner and to the extent directed by Intermountain:

- a. Any completed portion of the Work; and
- b. Any partially completed portion of the Work and any parts, tools, dies, jigs, fixtures, drawings, information, and contract rights (hereinafter called "construction materials") as Contractor has specifically produced or specifically acquired for the performance of such part of this Contract as has been terminated; and Contractor will, upon direction of Intermountain, protect and preserve property in the possession of Contractor in which Intermountain has an interest.

- 12.2.4 Payment. When Intermountain terminates the Contract for one or more of the reasons stated in Paragraph 12.2.1, Intermountain may withhold payment and/or pursue all available remedies.
- 12.2.5 Intermountain Protection If Liable. When the subject property is lienable, Intermountain may withhold from amounts otherwise due Contractor for such completed Work or construction materials such sum as Intermountain determines to be necessary to protect Intermountain against loss because of outstanding liens or claims for former lien holders.
- 12.2.6 Credits and Deficits. If the unpaid balance of the Contract Sum exceeds the full cost of finishing the Work, including compensation for A/E's services and expenses made necessary thereby, such excess will be paid to Contractor. If such cost exceeds the unpaid balance, Contractor will pay the difference to Intermountain this obligation for payment will survive the termination of the Contract.
- 12.2.7 If Contractor Found Not in Default or Excusable. If, after notice of termination of the Contract under the provisions of this Article, it is determined for any reason that Contractor was not in default under the provisions of this Article, or that the default was excusable under the provisions of this Article, the rights and obligations of the parties will be the same as if the notice of termination had been issued pursuant to the termination for convenience provisions.
- 12.2.8 Rights and Remedies Not Exclusive. The rights and remedies of Intermountain provided in this Article 12.2 will not be exclusive and are in addition to any other rights and remedies provided by law or under this Contract.

12.3 Suspension, Delay or Interruption of Work by Intermountain for Convenience.

- 12.3.1 By Intermountain in Writing. Intermountain may in writing and without cause, order Contractor to suspend, delay or interrupt the Work in whole or in part for such period of time as Intermountain may determine to be appropriate for the convenience of Intermountain.
- 12.3.2 Adjustments. Any adjustment in Contract Sum and Contract Time will be in accordance with Articles 3, 4, and 7.

12.4 Termination for Convenience of Intermountain.

- 12.4.1 In General. The performance of Work under this Contract may be terminated by Intermountain in accordance with this Article 12.4 in whole, or from time to time, in part, whenever Intermountain will determine that such termination is in the best interest of Intermountain or any person for whom Intermountain is acting under this Contract. Any such termination will be effected by delivery to Contractor of a notice of termination specifying the extent to which performance of Work under the Contract is terminated, and the date upon which such termination becomes effective.
- 12.4.2 Contractor Obligations. After receipt of a notice of termination, and except as otherwise directed by Intermountain in writing, Contractor will:
- Stop work under the Contract on the date and to the extent specified in the notice of termination;
 - Place no further orders or subcontracts for materials, services or facilities, except as may be necessary for completion of such portion of the Work under the Contract as is not terminated;
 - Terminate all orders and subcontracts to the extent that they relate to performance of Work terminated by the notice of termination;
 - Assign to Intermountain in the manner, at the times, and to the extent directed by Intermountain, all of the right, title and interest of Contractor under the orders and subcontracts so terminated, in which case Intermountain will have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;

- e. Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of Intermountain, which approval or ratification will be final for all the purposes of this Article 12.4;
 - f. Transfer title and deliver to Intermountain in the manner, at the times, and to the extent, if any, directed by Intermountain:
 - (i) The fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced as a part of, or acquired in connection with the performance of the Work terminated by the notice of termination; and
 - (ii) The completed or partially completed drawings, information, and other property which, if the Contract had been completed, would have been required to be furnished to Intermountain;
 - g. Use best efforts to sell, in the manner, at the times, to the extent, and at the price or prices directed or authorized by Intermountain, any property of the types referred to in Paragraph 12.4.2.f above; provided, however, that Contractor:
 - (i) Will not be required to extend credit to any purchaser; and
 - (ii) May acquire any such property under the conditions prescribed by and at a price or prices approved by Intermountain; and provided further that the proceeds of any such transfer of or disposition will be applied in reduction of any payments to be made by Intermountain to Contractor under this Contract or will otherwise be credited to the Contract Sum or paid in such other manner as Intermountain may direct;
 - h. Complete performance of such part of the Work as will not have been terminated by the notice of termination; and
 - i. Take such action as may be necessary, or as Intermountain may direct, for the protection and preservation of the property related to this Contract which is in the possession of Contractor in which Intermountain has or may acquire an interest.
- 12.4.3 Agreed Upon Payment. Subject to the provisions of Paragraph 12.4.2 above, Contractor and Intermountain may agree upon the amount to be paid to Contractor by reason of the total or partial termination of Work pursuant to this Article 12.4.
- 12.4.4 Payment Not Agreed Upon. In the event of the failure of Contractor and Intermountain to agree, as provided in Paragraph 12.4.3, upon the whole amount to be paid to Contractor by reason of the termination of Work pursuant to this Article 12.4, Intermountain will pay to Contractor the portion of the Contract Sum requisite with the portion of the Work completed as determined by Intermountain as of the date of termination, subject to offsets if any.
- 12.4.5 Deductions. In arriving at the amount due Contractor under this Article 12.4, there will be deducted:
- a. All unliquidated advance or other payments on account theretofore made to Contractor, applicable to the terminated portion of this Contract;
 - b. Any Claim which Intermountain may have against Contractor in connection with this Contract; and
 - c. The agreed price for, or the proceeds of sale of, any materials, supplies, or other things acquired by Contractor or sold, pursuant to the provisions of this Article 12.4, and not otherwise recovered by or credited to Intermountain.
- 12.4.6 Partial Payments. Intermountain may, from time to time, under such terms and conditions as it may prescribe, make partial payments and payments on account against cost incurred by Contractor in connection with the terminated portion of this Contract whenever, in the opinion of Intermountain the aggregate of such payments will be within the amount to which Contractor will be entitled

hereunder. If the total of such payments is in excess of the amount finally agreed or determined to be due under this Article 12.4, such excess will be payable by Contractor to Intermountain upon demand, together with interest at a rate of five percent (5%) per annum for the period until the date such excess is repaid to Intermountain; provided, however, that no interest will be charged with respect to any such excess payment attributable to a reduction in Contractor's claim by reason of retention or other disposition of termination inventory until ten (10) Days after the date of such retention or disposition, or such later date as determined by Intermountain by reason of the circumstances.

- 12.4.7 Preserve and Make Available Records. Unless otherwise provided for in this Contract, or by applicable law, Contractor will, from the effective date of termination until the expiration of three years after final settlement under this Contract, preserve and make available to Intermountain at all reasonable times at the office of Contractor, but without direct charge to Intermountain, all books, records, documents and other evidence bearing on the costs and expenses of Contractor under this Contract and relating to the Work terminated hereunder, or, to the extent approved by Intermountain Representative, photographs, micrographs, or other authentic reproductions thereof.
- 12.4.8 Intermountain's Right to Stop the Work. If Contractor fails to correct Work or fails to carry out Work, as required by the Contract Documents or fails to comply with all required and customary safety precautions; Intermountain, by written order signed personally or by an agent specifically so empowered by Intermountain in writing, may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of Intermountain to stop the Work will not give rise to a duty on the part of Intermountain to exercise this right for the benefit of Contractor or any other person or entity.

END OF DOCUMENT



CONSTRUCTION SAFETY REQUIREMENTS

- I. Outside Contractors and Intermountain Construction Employees performing construction activities on occupied Intermountain Healthcare property shall meet the following requirements. Stand-alone, new construction sites are not covered by these requirements. Outside Contractors will meet additional qualifications through the Supply Chain Organization Supplier Credentialing Procedure.
 - a. No work will be performed in any Intermountain Facility without prior approval and coordination with the accountable Facility Engineering Manager or Director.
 - b. Each outside contractor will have a Safety Program that complies with 29 CFR 1926 Subpart C. The Safety Program will be in writing.
 - c. Any chemical brought onto Intermountain Property must meet the following requirements:
 - i. Approved by the facility's Chemical Safety Officer,
 - ii. Accompanied by a current material safety data sheet,
 - iii. Stored in accordance with the chemical manufacturer's safety requirements in the appropriate labeled container.
 - iv. Where the chemical quantity is restricted for Healthcare Occupancies by NFPA 30 or other standards, it is the contractor's responsibility to provide for off-site storage.
 - v. The Contractor is responsible to comply with Intermountain's Hazardous Materials policy.
 - vi. The Contractor is responsible for the removal of all chemicals from Intermountain Property and for proper disposal in accordance with applicable laws and regulations.
 - d. No work will be performed without the completion of an Interim Life Safety and Infection Control Risk Assessment. These risk assessments will cover each phase of the construction project.
 - e. In existing facilities, an Asbestos inspection and any necessary abatement will be conducted prior to any renovation or remodel per the Hazmat policy.
 - f. Where work will cause noise or vibration, an assessment will be made following facility procedures to mitigate potential hazards to patients.
 - g. Above the Ceiling Permits
 - i. The Contractor will follow each facility's procedure for obtaining an above the ceiling work permit.
 - ii. No work will be performed prior to obtaining this permit.
 - h. Hot Work Permits
 - i. The Contractor will obtain a Hot Work Permit from Facilities Engineering prior to performing any hot work.
 - ii. The Contractor will provide a continuous and qualified fire watch for the duration and location specified by the Facility Engineering Director.
 - i. Confined Space Permits
 - i. The contractor will coordinate with the Intermountain Facility Engineering Director to assure that all requirements are met and a permit is completed prior to entering a permit required confined space.

- j. Control of Airborne Contaminants
 - i. The contractor will control all airborne dusts, mists, fumes, and vapors such that there is no exposure to Intermountain employees, patients, or visitors. This includes the generation of contaminants outside the building.
 - ii. If necessary, work will be conducted after hours to minimize potential exposures to staff, patients, and members of the public.
- k. Personal Protective Equipment.
 - i. PPE for head, eye, face, hand, foot, and respiratory protection is the responsibility of the contractor, and will be provided and worn as necessary for the exposure, except as follows:
 - 1. Hard Hats and Safety Glasses are required to be worn at all times when in the construction area. Hard hats may be removed when working in areas where the suspended ceiling grid has been completely installed.
 - ii. Fall Protection is the responsibility of the contractors and shall meet all 29 CFR 1926 requirements of the applicable Subparts.

Contractor Orientation

Intermountain Healthcare Facilities Management

This orientation is to be read to all workers by the Facility Manager or designee, and a copy is to be given to each worker on the job site.

Safety on the Job Site

Your Safety

Unsafe acts will not be tolerated on the job site. We want you to be as healthy and whole when you go home, as you were when you arrived.

Appropriate PPE will be worn at all times while working on the job site. Ladders and other equipment will be used properly.

Always use the proper lock-out/tag-out (LOTO) procedures and equipment to ensure that you and others are protected from hazardous energy while working. Be aware that energized systems in healthcare facilities can be complex, and your work may affect others in remote areas of the facility. Coordinate any LOTO activity with the Facility Manager and other affected trades.

The Safety of Others

Nothing you do should put others in danger or harm them in any way. Be thoughtful and deliberate about safety.

Your Behavior on the Job Site

How You Should Act

You should come to work with a clean body in clean clothes. You should come to work sober. Attempting to work while under the influence of any drugs or alcohol – even if they are prescribed – can be dangerous to you and others, and is cause for immediate removal from the job site.

Be considerate of others. Remember that others may take offense at things you do, even when you mean no harm. Avoid doing or saying things that may bother or upset others.

No music, no smoking, no cursing, no shouting, no leering, no fighting, no racially or culturally insensitive comments, no suggestive or offensive comments, no propositions, and no soliciting are permitted while you are on the job site.

Phones, Cameras, and Other Communication or Recording Devices

You should not carry on personal communication or phone conversations while on the job site.

You must NEVER photograph, or video or audio record ANYTHING or ANYONE on Intermountain Healthcare property. This will not be tolerated, and in some cases this may violate the law. If work needs to be photographed, have your supervisor or the facilities team on site take the pictures.

On this job site, the person who authorizes photography or recording is: _____.

Where You Should Be on the Property

Parking

Park only in the location identified by the Facility Manager in your orientation. Parking personal vehicles in any other location may result in their removal.

On this job site, the parking location is: _____.

Smoking

Smoking is not allowed on any Intermountain property. If you need to smoke, vape, or use tobacco in other ways, you must leave the property and return when you're done.

Drugs are never allowed.

Break Time

Take breaks only in areas identified by the Facility Manager in your orientation. During breaks do not engage in loud conversation or use offensive language.

On this job site, the break location is: _____.

Meals

The Facility Manager will tell you in your orientation if you are permitted to use the facility cafeteria and dining room during your meal time. Take meals only in areas identified by the Facility Manager in your orientation.

Never take breaks in public areas meant for patients and their guests.

On this job site, the meal location is: _____.

On this job site, the break location is: _____.

When You Should Be on the Property

When you are working, or on the property for work you should not arrive earlier than is necessary for you to assemble your tools and equipment for the day. Arriving very early and 'hanging around' is not permitted. Your supervisor will tell you what time you should arrive at work.

When you are done with the work day, and your tools and equipment are cleaned and put away, and your job site is clean, you should leave the property directly. Staying on the job site after work is not permitted.

Of course, if you are a patient, or are visiting one of our patients, you are always welcome in the public areas of the facility. Do not visit the job site unless you are here for work.

We ask you that while you are here you remember that you may be seen by others as representing your company or ours, and to please comport yourself accordingly.

How a Healthcare Facility May Be Different from Other Jobs Sites

People

The people who come to our hospitals and other facilities come because they feel sick, hurt, scared, or sad. They don't come to see us when everything is going fine. They want to feel safe and comfortable and confident that everything will be better soon.

Many of them are sensitive to noise, dust, fumes, odors, and vibrations. Please do everything you can to control these irritants.

The procedures we do in our facilities frequently require quiet and stillness. Please be sensitive to this and be ready to accommodate requests to stop work briefly or move to a different area of the facility to continue working.

Building Systems

The structure of our hospitals and other facilities is intended to actively work to protect our staff, patients, and visitors in the event of an emergency. This means that you must be very careful about how your work impacts other systems and parts of the building. Some of the rules are strange, but all are important.

Certain walls are intended to stop smoke or fire from spreading because when our buildings catch fire we cannot leave. We continue to care for our patients, perform surgeries, help birth babies, and provide emergency medical care. When working around or through these walls – “rated assemblies” – it is critical that you do so properly.

A pre-inspection by a member of the facility's maintenance team of the area you'll be working in is required so that you can understand where rated assemblies are, and how you must treat them. This also gives you an opportunity to identify existing conditions for which you may not be responsible.

A post-inspection by a member of the facility's maintenance team of the work you've done is required so that you can demonstrate that you've complied with all requirements for maintaining the integrity of our protective rated assemblies.

On this job site, the contact for fire stopping materials is: _____.

Along with rated assemblies, our facilities have very sensitive fire and smoke detection systems, as well as automatic sprinkler systems. If your activities will cause dust or vibration or impact, be aware and mitigate any adverse effect you may have on these systems.

On this job site, the contact for fire alarm systems is: _____.

If your work interrupts or disables any portion of the building's life safety systems, including fire alarm, fire suppression, and emergency egress, you may be required to implement interim life safety measures.

On this job site, the contact for interim life safety is: _____.

Much of our air is exhausted to the outside. If you are working around exhaust fans, you must know what areas the exhaust is coming from. Some exhausts are laden with radioactive elements. Some carry infectious diseases and other germs. Your supervisor will tell you about these areas.

On this job site, the hazardous exhaust areas are: _____.

Many of our patients depend on clean and fresh outside air to be provided to them. Smoking on roofs or around air intakes is strictly forbidden for this reason. If you must operate equipment on roofs or around air intakes, be certain to coordinate your work with the Facility Manager.

On this job site, the sensitive air intakes are: _____.

Much of our equipment may start without notice. Take care to avoid being harmed by unexpected starts, or unexpected discharges of steam, hot water, or chemicals. Unless you are authorized to be working around this equipment you should stay out of these spaces.

All work above the ceiling requires an Above Ceiling Work Permit, and all hot work requires a Hot Work Permit.

On this job site, the contact for Above Ceiling Work Permits is: _____.

On this job site, the contact for Hot Work Permits is: _____.

Infection Control

Because many of our patients are ill, there is a chance that you will be exposed to germs. There is also a chance that you will expose our patients to germs you've brought from outside the hospital. We do our best to keep our physical environment clean and to control all infectious matter.

You can protect yourself by ensuring that your vaccinations are current, and by only going in places you are authorized to go. Wash or sanitize your hands frequently – especially after using the restroom and before eating. Never eat food anywhere except where you are told to have meal breaks. The Plumber's Rule No. 3 applies to everyone in healthcare: Don't bite your fingernails!

Your work may require an Infection Control Risk Assessment. The Facility Manager will help you determine when that is, and will help you through the process. This process helps identify the best ways to keep you and our patients safe from infections and other impediments to healing. Once the assessment is done, be certain to abide by all of its conditions.

On this job site, the infection control contact is: _____.

A Clean Job Site

Throughout the work day, you will be responsible to maintain a reasonably clean job site. This makes it a safer place for you to work. It makes it a safer place for others to work, as well.

At the end of each work day, you will be responsible to leave all materials in an orderly state, remove all waste, scrap, and debris from the site, and leave the area broom clean. All potential hazards will be secured and made as safe as possible.

All construction waste and debris must be disposed of properly. Never use toilets or floor drains for this purpose. Cover all carts while moving debris through the facility, and use tacky mats to control dust tracking over floors.

Our Expectation of Workmanship

It doesn't matter if you're a ventilation mechanic, an electrician, a painter, or a plumber. It doesn't matter if you're installing carpet, or ceiling tiles, or kitchen equipment, or cabinetry. Every piece of our facilities is in place to support the lifesaving and healing work we do.

The hard reality is that someone's life will literally depend on the quality of the workmanship you put into the jobs you do in Intermountain Healthcare facilities.

And it's another hard reality that someone you care for may very likely come to the facilities you helped build. Please do the kind of job you'd trust your loved one's life to.

RESPONSIBILITY MATRIX

Updated February 13, 2023

The following list identifies the majority of the items that are to be included in the capital project build-out. All Owner items need to be coordinated with A/E (Design Team), Contractor, and Owner (Facility Design & Construction and Supply Chain Facility Equipment Planners). For OFOI or OFCI items, Contractor is required to track equipment on construction schedule and to notify Owner of required delivery times taking into account for equipment lead times.

ITEM	OWNER/VENDOR	NOTES	ADDITIONAL NOTES		
OFOI - (Owner Furnished / Owner Installed)		(Coordinate location of items with Owner and track within construction schedule)	Data	Power	Backlog
Art	Owner / Owner (Alpine Art)	All artwork to be coordinated with Dan Kohler. Provide power and backing to required artwork.			
Audio/Video (A/V)	Owner / Owner	Intermountain SCO will source & supply the A/V system including specialized cabling (e.g. HDMI, etc). Refer to CFCI section for Contractor requirements. A/E to identify locations on drawings, coordinate with Owner. Contractor to provide infrastructure, back boxes, conduits, pathways and cabling (from wall side back).	Yes	Yes	
Brochure Racks	Owner / Owner	Contractor to provide proper backing.			Yes
Cash (Manual) Drawer	Owner / Owner	Identify locations and coordinate with point-of-sale equipment vendor.			Yes
Chart Racks	Owner / Owner (Midwest)	Contractor to provide proper backing.			Yes
Clinical Garbage Cans (Clinical, Office, PT, Etc.)	Owner / Owner				
Computers, Printers, Scanners, Keyboards, Mice, etc.	Owner / Owner	In-ceiling & wall mounts, conduits and boxes mounted by Contractor. Computers to be All-in-One, typ. in IMG exam rooms.	Yes	Yes	Yes
Copiers, fax	Owner / Owner	A/E to locate where copy/fax/printer is not visual clutter.	Yes	Yes	
Cup Dispensers	Owner / Owner				
Emergency Evacuation Medical Sled (Med Sled)	Owner / Owner	A/E to coordinate location with Owner.			
Exam Tables	Owner / Owner			Yes	
Infant/Pediatric Security System	Owner / Owner (Totguard)	A/E to identify locations on drawings. This system is to be coordinated with Owner, Women's and Children's Operations, Clinical Programs and Security.	Yes	Yes	
IV Hangar	Owner / Owner	A/E to identify locations on drawings, coordinate with Owner. Backing to be coordinated, if required.			
Keyboard Trays	Owner / Owner				
Magnetic Marker Boards, Cork Boards, Huddle Boards, Idea Tracking Boards, etc.	Owner / Owner (Midwest)	A/E to coordinate location with Owner.			Yes
Moveable Metal Shelving	Owner / Owner				
Nurse Notification Call (NNC) System & Devices (Hospital Campus)*	Owner / Owner (Hillrom)	Hospital local facility team to work with Supply Chain Facility Equipment Planning team to contract directly with Nurse Notification Call (NNC) system vendor (Hillrom) for devices, equipment, monitors, etc. A/E to coordinate with Owner and Hillrom for all NNC infrastructure required to support the device locations and types designated by Hillrom on their site specific drawings. Hillrom site specific drawings to be coordinated and included in the A/E Contract Documents. Contractor to provide all infrastructure including conduits, back boxes, cabling (e.g. home-runs to RCB, RCB to device, device to device, etc.), etc. for all NNC devices (e.g. RCB, GSR-10, room devices, etc.). The cabling for the NNC system will be coordinated and installed by the Contractor/Subcontractor (i.e. low voltage sub). Contractor to coordinate with Hillrom. *Where an existing non-Intermountain standard NNC system exists (e.g., Rauland), Clinical Engineering must be engaged to determine if this existing system will continue or be replaced with the Intermountain standard NNC system. Please also coordinate with CTIS and Facility Equipment Planners. When an existing NNC system is determined to continue, this NNC system will fall under the CFCI section, where the A/E will design the system and the Contractor will provide/furnish and install the system.	Yes; see CFCI	Yes; see CFCI	
PACS	Owner / Owner				
Patient Monitoring System & Devices (Hospital Campus)	Owner / Owner	Hospital local facilities to work with Supply Chain Facility Equipment Planning team to contract directly with Patient Monitoring vendors for devices, equipment, monitors, etc. (from wall side out). A/E to identify locations on drawings, coordinate with Owner. Contractor to provide all infrastructure including conduits, back boxes, and home-run cabling from Patient Monitoring devices to TEC/TDR rooms that connect to Intermountain's network (Intermountain Siemon certified installer low voltage subcontractor to install). The Patient Monitoring system device to device cabling is by Vendor.	Yes	Yes	
Radiology Equipment	Owner / Owner (See subject matter expert list)	A/E responsible to coordinate final site equipment drawings into Construction Documents from Owner's Vendor.	Yes	Yes	
Receptionist Desk	Owner / Owner (Midwest & Steelcase)				
Recliners / Draw Chairs	Owner / Owner				
Sharps Disposal Container	Owner / Owner (Stericycle)	A/E to identify locations on drawings, coordinate with Owner. Backing to be coordinated, if required.			
Signage - Exterior	Owner / Owner (KB Signs, Trademark, YESCO)	Provide power and data to required exterior signage. Provide circuits for above ceiling signs. Coordinate thru-wall conduit sleeves with weather barrier. A/E to coordinate traffic signage and Contractor to install. Intermountain Logo Signs - (2) 20A Circuits - May vary. InstaCare and other Signs - (1) 20 A Circuits - May vary.	Yes	Yes	Yes
Signage - Interior (including Code Signage)	Owner / Owner (Intermountain Sign Shop, Scribbley, Hightech)	Provide power to required signage. Contractor to track in schedule and notify Owner for when Code Required signage is required to be installed.			

Staff Assist Notification Call System & Devices (Medical Group Clinics on hospital campuses to match NNC system)*	Owner / Owner (Hillrom)	Hospital local facility/IMG Ops team to work with Supply Chain Facility Equipment Planning team to contract directly with Staff Assist Notification Call system vendor (Hillrom) for devices, equipment, monitors, etc. (from wall side out). Staff Assist Notification system to be coordinated with Hospital Campus NNC system, as applicable, Medical Group Strategic Planner, and IMG Operations Officer. A/E to coordinate with Owner and Hillrom for all Staff Assist Notification Call system infrastructure required to support the device locations and types designated by Hillrom on their site specific drawings. Hillrom site specific drawings to be coordinated and included in the A/E Contract Documents. Contractor to provide all infrastructure including conduits, back boxes, cabling (e.g. home-runs to RCB, RCB to device, device to device, etc.), etc. for all NNC and Staff Assist Notification Call devices (e.g. RCB, GSR-10, etc.). The cabling for the NNC and Staff Assist Notification Call system will be coordinated and installed by the Contractor/Subcontractor (i.e. low voltage sub). Contractor to coordinate with Hillrom. *Where an existing non-Intermountain standard NNC system exists (e.g., Rauland), Clinical Engineering must be engaged to determine if this existing system will continue or be replaced with the Intermountain standard NNC system. Please also coordinate with CTIS and Facility Equipment Planners. When an existing NNC system is determined to continue, this NNC system will fall under the CFCI section, where the A/E will design the system and the Contractor will provide/furnish and install the system.	Yes; see CFCI	Yes; see CFCI	
Staff Assist Notification Call System & Devices (Stand-alone Medical Group Clinics)*	Owner / Owner (Hillrom)	IMG Ops team to work with Supply Chain Facility Equipment Planning team to contract directly with Staff Assist Notification Call system vendor (Hillrom) for devices, equipment, monitors, etc. (from wall side out). Staff Assist Notification Call system to be coordinated with Medical Group Strategic Planner and Operations Officer. A/E to coordinate with Owner and Hillrom for all Staff Assist Notification Call system infrastructure required to support the device locations and types designated by Hillrom on their site specific drawings. Hillrom site specific drawings to be coordinated and included in the A/E Contract Documents. Contractor to provide all infrastructure including conduits, back boxes, cabling (e.g. home-runs to RCB, RCB to device, device to device, etc.), etc. for all Staff Assist Notification Call devices (e.g. RCB, GSR-10, etc.). The cabling for the Staff Assist Notification Call system will be coordinated and installed by the Contractor/Subcontractor (i.e. low voltage sub). Contractor to coordinate with Hillrom. *Where an existing non-Intermountain standard NNC system exists (e.g., Rauland), Clinical Engineering must be engaged to determine if this existing system will continue or be replaced with the Intermountain standard NNC system. Please also coordinate with CTIS and Facility Equipment Planners. When an existing NNC system is determined to continue, this NNC system will fall under the CFCI section, where the A/E will design the system and the Contractor will provide/furnish and install the system.	Yes; see CFCI	Yes; see CFCI	
Supply Area Panels	Owner / Owner	Contractor to provide proper backing, coordinate with Owner.			Yes
Systems Furniture (including demountable partitions)	Owner / Owner (Midwest & Steelcase)	Coordinate modesty panels with elec. outlets. Sit/Stand desks to have modesty panel on front. Attention to be given to cord management. A/E to coordinate data and power with Midwest.	Yes	Yes	
Televisions, Digital Projectors, similar devices, etc.	Owner / Owner	These items to be provided by Owner, but A/E to coordinate locations and infrastructure. Contractor to refer to OFCI section.	Yes	Yes	Yes
OFCI - (Owner Furnished / Contractor Installed) (Coordinate location of items with Owner and track within construction schedule)					
Alertus - Mass Notification System (Public Areas)	Owner (Alertus) / Contractor	A/E to identify locations on drawings, coordinate with Owner.	Yes	Yes	
Apron Hooks/Rack (Heavy Duty in Radiology)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Automated External Defibrillator (AED)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner, A/E to coordinate recess, semi-recessed, or surface mount options with Owner.			Yes
Bio Safety Cabinet	Owner / Contractor	A/E to locate equipment on drawings and coordinate all connections. Contractor to track on construction schedule and coordinate final connections when equipment has been installed.		Yes	
Boom and Injector Ceiling Mounting Plates (Equipment, Lighting, Anesthesia, Injection, etc.)	Owner / Contractor	A/E to coordinate with Owner and Owner's selected equipment Vendor; A/E to identify boom locations on drawings, coordinate with Owner; A/E to coordinate the design of the boom support structure into drawings. Final site specific equipment drawings from Vendor to be coordinated with Construction Documents. Contractor to coordinate with Owner and install boom support structure and boom mounting plates. Contractor to coordinate with Owner for ordering and install of boom mounting plates.	Yes	Yes	Yes
Building Alarms / Medication Refrigerator Alarm / Pharmacy Alarm System	Owner / Contractor	A/E to identify locations and infrastructure on drawings, coordinate with Owner. Contractor to provide conduit and infrastructure into accessible ceiling for access from equipment and/or devices. Local Facility to contract with alarm company for alarm, wire, and monitoring.		Yes	
Chain Hoist Industrial Lift	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.		Yes	Yes
Clinical Clocks	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner. Contractor to coordinate with Owner for ordering and install coordination.		Yes	Yes
Clinical Storage Cabinet (Flammable Items)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			
Cubicle Curtains & Tracks	Owner (Medline) / Contractor	A/E to identify locations on drawings, coordinate with Owner. Contractor to coordinate with Owner for ordering and install coordination.			
Diagnostic Board including Wall Mount Replacable Tips (Otoscope / Ophthalmoscope)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.		Yes	Yes
Diaper Changing Station	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Digital Projector Mounts, TV Mounts, & Computer Mounts (Ergotron Brackets/Mounts, etc.)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner. Contractor to coordinate with Owner for ordering and install coordination. In-ceiling & wall mounts, conduits and boxes provide and installed by Contractor A/E to coordinate A/V requirements. Contractor to pull required A/V cabling.	Yes	Yes	Yes
Distributed Antenna System (DAS) including Public Safety	Owner (DAS vendor selected and managed by Intermountain CTIS/Telecom) / Contractor	A/E to locate infrastructure on drawings to simplify the DAS install. Contractor to track on construction schedule and coordinate DAS install with Owner's Vendor.			
Exercise Rack Wall Rack	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Face Mask Dispenser (Wall Mount)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Grossing Workstation	Owner / Contractor	A/E to locate equipment on drawings and coordinate all connections. Contractor to track on construction schedule and coordinate final connections when equipment has been installed.	Yes	Yes	Yes
Hand Sanitizer Dispensers (Avagard)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			

Hoods (Chemical Soak Station, Ranges, Horizontal Laminar Flow, and similar Hoods)	Owner / Contractor	A/E to identify locations on drawings, including infrastructure requirements, coordinate with Owner.		Yes	Yes
Ice Machine Dispenser (Undercounter, Countertop, etc.)	Owner / Contractor	A/E to identify locations on drawings, including infrastructure requirements, coordinate with Owner.		Yes	
iCentra Tracking Boards	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.	Yes	Yes	Yes
IV Track	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner. Backing to be coordinated, if required.			Yes
Kitchen Range (Electric)	Owner / Contractor	A/E to identify locations on drawings, including infrastructure requirements, coordinate with Owner.		Yes	
Laundry Dryer, Washer (single, stacked, disinfectant)	Owner / Contractor	A/E to identify locations on drawings, including infrastructure requirements, coordinate with Owner.		Yes	
Medication Return Bin	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner. This is a pass-thru unit for medication return accessed from public corridor into a secured locked room.			Yes
OR Clocks	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner. Contractor to coordinate with Owner for ordering and install coordination.	Yes	Yes	Yes
Paper Towel Dispensers	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			
Pass-thru Cleanroom Chamber	Owner / Contractor	A/E to identify locations on drawings, including infrastructure requirements, coordinate with Owner. Perimeter of each pass-thru unit must be sealed to maintain space pressurization.		Yes	Yes
Patient Lifts	Owner (Liko, subsidiary of Hillrom) / Contractor	A/E to identify locations on drawings, coordinate with Owner. A/E to design required support structure for Contractor to install for necessary Liko patient lift connections (e.g. pendant / rails / etc). Contractor to coordinate shop drawings and installation requirements prior with Liko. Connect to equipment branch if provided.		Yes	
Personal Protection Dispensers (gloves, gowns, masks, shoe covers, etc.)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Pharmaceutical Pass-thru Refrigerator	Owner / Contractor	A/E to identify locations on drawings, including infrastructure requirements, coordinate with Owner. Perimeter of each pass-thru unit must be sealed to maintain space pressurization.		Yes	
Pharmacy Dispensing Water Treatment System	Owner / Contractor	A/E to identify locations on drawings, including infrastructure requirements, coordinate with Owner.		Yes	Yes
Procedure Lights	Owner / Contractor	A/E to coordinate with Owner and Owner's selected equipment Vendor; A/E to identify locations on drawings, coordinate with Owner; A/E to coordinate the design of the procedure light support structure into drawings. Contractor to provide and install procedure light support structure.		Yes	Yes
Radiation Protection Calculations and Certification	Owner / Contractor	A/E to coordinate with Owner in the design phase for coordinating with Medical Physicists Consultants or others, when required. Contractor to coordinate prior to Gyp. Bd. install.			Yes
Sanitary Napkin Dispensers/Receptacles	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			
Scrub Brush Dispenser (Wall Mount)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Scrub Sinks & Carriers	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner. Contractor to coordinate with Owner for ordering and for install coordination.			Yes
Shower Curtains & Rods	Owner (Medline) / Contractor	A/E to identify locations on drawings, coordinate with Owner. Contractor to coordinate with Owner for ordering and install coordination.			
Soap Dispensers	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			
Stadiometers, Recessed Scales	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner; coordinate power and floor recesses.		Yes	
Time Clocks	Owner / Contractor	Conduit and boxes by Contractor, Coordinate location with Owner.	Yes	Yes	
Tissue Dispenser (Wall Mount)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Toilet Paper Dispensers	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			
Undercounter Dishwasher	Owner / Contractor	A/E to locate equipment on drawings and coordinate all connections. Contractor to track on construction schedule and coordinate final connections when equipment has been installed.		Yes	
UPS (MRI, Data Room, CPU, or other similar equipment)	Owner / Contractor	A/E to identify equipment locations on drawings, coordinate with Owner.	Yes	Yes	Yes
Wall Mount Basket for Cuff	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Wall Mount Bracket for Clinical Monitor (sizes vary)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.		Yes	Yes
Wall Mount Bracket for Disinfectant Wipes	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Wall Mount Bracket for Emesis Bags	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Wall Mount Bracket for Eyewear/Eyeshield Dispenser	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Wall Mount Bracket for Patient Transfer Device, Patient Evacuation Device (Med Sled),	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Wall Mount Bracket for Suction Canister	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Wall Mount for Area Radiation Monitor	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.		Yes	Yes
Wall Mount for Mops, Brooms, etc.	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Wall Mount for Phlebotomy Station (Infant)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Wall Mount Hair Dryer	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.		Yes	Yes
Wall Mounted Chemical Spill Kit	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Wall Mounted Modular Storage Shelving	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Wall Mounted Shelving	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Wall Mounted Thermometer (Temporal Artery, Digital, etc.)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Zip Line Exciser Kit	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes

CFCI - (Contractor Furnished / Contractor Installed)		(Coordinate location of items with A/E Design Team and track within construction schedule)	Data	Power	Backing
Access Control, Card Readers (Lenel)	Contractor / Contractor (AlphaCorp/Convergint)	A/E to identify locations on drawings, coordinate with Owner.	Yes	Yes	
Audio/Video (A/V)	Contractor / Contractor	Intermountain SCO will source & supply the A/V system including specialized cabling (e.g. HDMI, etc). A/E to identify locations on drawings, coordinate with Owner. Contractor to provide infrastructure, back boxes, conduits, pathways and misc. cabling (from wall side back).	Yes	Yes	
Blinds/Shades (manual and powered)	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner.		Yes	
Coat Hooks (Rest rooms/showers, Exam rooms, Offices/Workstations only)	Contractor / Contractor	A/E to identify locations on drawings.			Yes
Communication Boards (e.g. Patient Rooms)	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner. If boards are electronic, then data and power should also be provided.			Yes
Communication Cabling	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner. See Intermountain Design Guidelines and Construction Standards for additional information.			
Emergency Phones, Kiosks - Exterior	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner. Conduit and boxes by Contractor.	Yes	Yes	Yes
Emergency Shower Station / Eye Wash Station	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner. These shall meet ANSI and Owner requirements.			Yes
Fire Extinguishers	Contractor / Contractor	A/E to identify types and locations on drawings, coordinate with Owner. 10 lbs. minimum - refer to Intermountain Design Guidelines & Construction Standards.			Yes
Grab Bars (Rest rooms, Radiology, Exam rooms, etc.)	Contractor / Contractor	A/E to identify locations on drawings.			Yes
Intrusion Detection	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner.			
Med Gas Certification	Contractor / Contractor	Contractor to coordinate Vendor with Owner			

Mirrors (Rest rooms, Exams, Radiology, Rehab, etc.)	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Nurse Notification Call (NNC) System - Low Voltage Cabling (Hospital Campus)*	Contractor / Contractor (Hillrom)	A/E to coordinate with Owner and Hillrom for all NNC infrastructure required to support the device locations and types designated by Hillrom on their site specific drawings. Hillrom site specific drawings to be coordinated and included in the A/E Contract Documents. Contractor to provide all infrastructure including conduits, back boxes, cabling (e.g. home-runs to RCB, RCB to device, device to device, etc.), etc. for all NNC devices (e.g. RCB, GSR-10, etc.). The cabling for the NNC system will be coordinated and installed by the Contractor/Subcontractor (i.e. low voltage sub). Contractor to coordinate with Hillrom. *Where an existing non-Intermountain standard NNC system exists (e.g., Rauland), Clinical Engineering must be engaged to determine if this existing system will continue or be replaced with the Intermountain standard NNC system. Please also coordinate with CTIS and Facility Equipment Planners. When an existing NNC system is determined to continue, this NNC system will fall under the CFCI section, where the A/E will design the system and the Contractor will provide/furnish and install the system.	Yes	Yes	
Patient Monitoring System & Devices (Hospital Campus)	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner. Contractor to provide all infrastructure including conduits, back boxes, and home-run cabling from Patient Monitoring devices to TEC/TDR rooms that connect to Intermountain's network (Intermountain Siemon certified installer low voltage subcontractor to install). The Patient Monitoring system device to device cabling is by Vendor.	Yes	Yes	Yes
Plumbing Shrouds	Contractor / Contractor				
Pneumatic Tube Systems	Contractor / Contractor (SwissLog, Atreo Group, or other approved)	A/E to identify locations on drawings, coordinate with Owner. If SwissLog, verify pricing is per Intalere (Amerinet) Contract Agreement. Design assistance fees are included in this agreement.	Yes	Yes	
Radiation Protection (Lead) Installation - (ex. Cath Lab, CT Scanner, X-Ray)	Contractor / Contractor	A/E to identify locations on drawings and coordinate with Owner's Vendor on the required shielding thicknesses.			Yes
Radiofrequency/Magnetic (RF) Shielding Installation - MRI	Contractor / Contractor	A/E to coordinate with Owner in the design phase and coordinate appropriate shielding.			Yes
Security Cameras, Video Surveillance	Contractor / Contractor (AlphaCorp/Convergint)	A/E to identify locations on drawings, coordinate with Owner.	Yes		
Staff Assist Notification Call System - Low Voltage Cabling (Medical Group Clinics on hospital campuses to match NNC system)*	Contractor / Contractor (Hillrom)	A/E to coordinate with Owner and Hillrom for all Staff Assist Notification Call system infrastructure required to support the device locations and types designated by Hillrom on their site specific drawings. Hillrom site specific drawings to be coordinated and included in the A/E Contract Documents. Contractor to provide all infrastructure including conduits, back boxes, cabling (e.g. home-runs to RCB, RCB to device, device to device, etc.), etc. for all NNC and Staff Assist Notification Call devices (e.g. RCB, GSR-10, etc.). The cabling for the NNC and Staff Assist Notification Call system will be coordinated and installed by the Contractor/Subcontractor (i.e. low voltage sub). Contractor to coordinate with Hillrom. *Where an existing non-Intermountain standard NNC system exists (e.g., Rauland), Clinical Engineering must be engaged to determine if this existing system will continue or be replaced with the Intermountain standard NNC system. Please also coordinate with CTIS and Facility Equipment Planners. When an existing NNC system is determined to continue, this NNC system will fall under the CFCI section, where the A/E will design the system and the Contractor will provide/furnish and install the system.	Yes	Yes	
Staff Assist Notification Call System - Low Voltage Cabling (Stand-alone Medical Group Clinics)*	Contractor / Contractor (Hillrom)	A/E to coordinate with Owner and Hillrom for all Staff Assist Notification Call system infrastructure required to support the device locations and types designated by Hillrom on their site specific drawings. Hillrom site specific drawings to be coordinated and included in the A/E Contract Documents. Contractor to provide all infrastructure including conduits, back boxes, cabling (e.g. home-runs to RCB, RCB to device, device to device, etc.), etc. for all Staff Assist Notification Call devices (e.g. RCB, GSR-10, etc.). The cabling for the Staff Assist Notification Call system will be coordinated and installed by the Contractor/Subcontractor (i.e. low voltage sub). Contractor to coordinate with Hillrom. *Where an existing non-Intermountain standard NNC system exists (e.g., Rauland), Clinical Engineering must be engaged to determine if this existing system will continue or be replaced with the Intermountain standard NNC system. Please also coordinate with CTIS and Facility Equipment Planners. When an existing NNC system is determined to continue, this NNC system will fall under the CFCI section, where the A/E will design the system and the Contractor will provide/furnish and install the system.	Yes	Yes	
Support Bracing/Structure for Radiology and similar equipment	Contractor / Contractor	A/E to coordinate with Owner and Owner's selected Radiology equipment Vendor; A/E to coordinate the design of the support bracing/structure into drawings. Final site specific equipment drawings from Vendor to be coordinated with Construction Documents. Contractor to coordinate with Owner for install of support structure.	Yes	Yes	Yes
TV System Distribution	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner.			
Voice/Data Cabling (all horizontal cabling)	Contractor / Contractor (Cache Valley Elec., IES Commercial, Data Tech Professionals, Hunt Electric, and others listed in Intermountain Div. 27)	Refer to Division 27 in the Intermountain Design Guidelines and Construction Standards. Coordinate with Owner/User on connections, pairs of fiber/copper, conduits, inner-ducts, etc.	Yes		
Wall Protection (Incl. Bumper and Corner Guards)	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner. Backing should be included where heavy use/damage may occur.			

SECTION 01 10 00 - SUMMARY

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 the following:
 - 1. Work covered by the Contract Documents.
 - 2. Use of premises.
 - 3. Code compliance
 - 4. Dust control
 - 5. Protection of existing improvements
 - 6. Traffic Control
 - 7. Temporary Controls

1.3 WORK COVERED BY CONTRACT DOCUMENTS

Project Identification: THIS PROJECT INCLUDES THE FOLLOWING SCOPE OF WORK:

A. REMODEL EXISTING 1,397 SQFT PHARMACY AREA AT THE BUILDING 2 LEVEL 1 OF ALTA VIEW HOSPITAL TO CONVERT INTO A CARDIAC REHAB CLINIC.

B. ASSOCIATED MECHANICAL, PLUMBING, AND ELECTRICAL WORK AS DESCRIBED IN THE CONSTRUCTION DOCUMENTS.

Project Location: Altaview Hospital
Address: 9660 S 1300 E Sandy UT 84094

- A.
 - 1. Owner: Intermountain Healthcare, 36 South State Street, 23rd Floor
Salt Lake City, Utah 84631
 - 2. Owner's Representative: Jake Seiler
- B. Architect: NJRA Architects, 5223 S Ascension Way, Murray, Utah 84123.
- C. The Work consists of the following:
 - 1. The Work includes: architectural, structural, mechanical, plumbing and electrical work as defined on the contract documents.

1.4 USE OF PREMISES

- A. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. Assume full responsibility for the protection and safekeeping of products under this Contract, stored on the site.

1.5 CODE COMPLIANCE

- A. All work shall comply with current edition of codes including but not limited to the following:
 - 1. International Building Code
 - 2. International Mechanical Code
 - 3. International Plumbing Code
 - 4. NFPA
 - 5. National Electric Code
 - 6. OSHA Regulation
 - 7. Health and Safety Regulations
 - 8. Utility Company Regulations
 - 9. Police, Fire Department Rules
 - 10. Environmental Protection Regulations
 - 11. Americans with Disabilities Act
- B. Arrange for authorities having jurisdiction to inspect and test according to their requirements and for each temporary utility before use. Obtain required certifications and permits.
- C. Requirements of codes and regulations shall be considered as the minimum. Where the contract documents exceed (without violating) code and regulation requirements, contract requirements shall take precedence. Where codes conflict, the more stringent shall apply.

1.6 DUST CONTROL

Temporary partitions should be constructed as called out on the Contract Documents and as mentioned in specification Section 024119 – Selective Demolition.

1.7 PROTECTION OF EXISTING IMPROVEMENTS

- A. Take precautions necessary to protect all existing utilities, monitor wells, and other Site improvements to remain from damage due to the work of this Project.
- B. Provide restoration of damaged property if damage is a result of construction activities.

1.8 TRAFFIC CONTROL

- A. Maintain control of vehicular and pedestrian traffic caused by, or resulting from, the work

of this Project.

- B. Means of control shall be in accordance with the applicable regulations of the jurisdiction responsible for traffic safety.

1.9 TEMPORARY CONTROLS

- A. Conform to all applicable state and local ordinances and regulations. Obtain and pay for necessary permits and licenses as required by local jurisdictions.

END OF SECTION

SECTION 01 23 00 – ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section identifies each Alternate by number and describes basic changes to be incorporated into Work, only when that Alternate is made a part of Work by specific provisions in Construction Contract.
- B. Section includes only nontechnical descriptions of Alternates.
- C. Refer to specific Sections of Specifications and Drawings for technical description of Alternates.
- D. Coordinate related Work, and modify surrounding Work as required to properly integrate Work under each Alternate and to provide complete construction required by Contract Documents.

1.2 DESCRIPTION

A. Work includes:

- 1. Indicate Alternate prices on Bid Form.
- 2. Alternates will be selected after bids are evaluated.
- 3. Selected Alternates will be made a part of Contract and final Contract Amount will be adjusted accordingly.

1.3 ALTERNATES

- A. **Alternate No. 1: Remove existing roll up coiling door at the previous pharmacy opening** (Add Alternate): Base bid is to leave existing roll up coiling door as is. Add Alternate # 1 is to completely remove the roll up coiling door and patch and repair as required. see notes on the drawings for more information.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 012900 – PAYMENT PROCEDURES**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes measurement and payment provisions for, but not limited to, the following:
 - 1. Materials Delivered but Not Yet Installed.
 - 2. Schedule of Values.
 - 3. Applications for Payment.
 - 4. Preliminary Progress Schedule.
 - 5. Construction Progress Schedule.
 - 6. Change Orders.

1.2 MATERIALS DELIVERED BUT NOT INSTALLED

- A. Exclude from Applications for Payment materials or equipment delivered and stored, but not yet incorporated into the Work, unless circumstances dictate acceptance (i.e. pre-purchase of equipment for early delivery to prevent delay of construction or subsequent facility opening date) and pre-payment is agreed to, in writing, by the Owner.
- B. If Owner has agreed to make early payment on account of materials or equipment not incorporated in the Work, but delivered and stored in conformance with the requirements of the Contract Documents, at the site, or at some other location agreed upon in writing, such pre-payment shall be conditioned upon approval by Contractor's Insurance Carrier, and Architect, in writing, prior to submission by Contractor of the applicable payment request.
- C. Pre-payment request shall contain substantiating documentation, including:
 - 1. Bill(s) of Sale.
 - 2. Evidence of insurance for the materials or equipment, covering the item(s) until completion of installation.
 - 3. Provision for transportation to the Project Site.
 - 4. Protection of Owner's interest under any circumstance (i.e. Owner's right to retrieve equipment or materials from storage area of a bankrupt company's property).
 - 5. Provision for inspection/testing at the stored location.
 - 6. Provision for security until completion of installation.

1.3 SCHEDULE OF VALUES

- A. Type schedule on AIA Document G703. Owner's Standard Invoice/Schedule of Values or Contractor's standard forms and automated printout equivalent to the AIA Document will be considered for approval by Owner upon Contractor's request. Identify schedule with:

SECTION 01 31 00 – PROJECT MANAGEMENT AND COORDINATION**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section describes the requirements for Project coordination.

1.2 DESCRIPTION OF REQUIREMENTS

- A. Minimum administrative and supervisory requirements necessary for coordination of Work shall be fulfilled collectively by the Contractor in coordination with subcontractors including, but not necessarily limited to, the following:
 - 1. Coordination drawings.
 - 2. Coordination meetings.
 - 3. Administrative coordinating personnel.
 - 4. Contractor's coordination of work.

1.3 COORDINATION MEETINGS

- A. Schedule and conduct meetings and conferences at project site, unless otherwise indicated.

1.4 ADMINISTRATIVE COORDINATION PERSONNEL

- A. Provide a General Superintendent and other administrative and supervisory personnel required for performance of the Work.
- B. Provide specific coordinating personnel for each subcontractor as reasonably required for interfacing Work with other work of total Project.
- C. Submittal of Staff Names, Duties: Within 7 days of Notice to Proceed submit to the Owner a listing of principal staff assignments and consultants, including names, addresses and telephone numbers.

1.5 CONTRACTOR'S COORDINATION OF WORK

- A. Provide and coordinate the following:
 - 1. General and special services and operations to furnish and install Work.
 - 2. Primary, major and accessory materials, and items necessary to complete the installation.
 - 3. Labor operations and material items reasonably incidental for finishing.

SECTION 01 33 00 - SUBMITTAL PROCEDURES

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 administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.3 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
- C. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities. Submittals should be submitted by contractor to architect **within 30 days from notice to proceed.**
- D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Resubmittal Review: Allow 10 days for review of each resubmittal.
- E. Identification: Place a permanent label or title block on each submittal for identification.
 - 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 - 2. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.

SECTION 01 40 00 – QUALITY REQUIREMENTS**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section describes the requirements for Owner furnished testing and inspection services which include the following:
 - 1. Observation by Inspector of Record.
 - 2. Laboratory responsibilities.
 - 3. Laboratory reports.
 - 4. Limits on testing laboratory authority.
 - 5. Contractor responsibilities.
 - 6. Schedule of inspections and tests.
- B. These services are identified to indicate the requirement for cooperation and assistance needed by Owner's testing and inspection agency.

1.2 QUALITY ASSURANCE

- A. Testing and Inspection Agency Qualifications: A testing and inspection agency must have a minimum 5 years continuing experience preceding date of these Contract Documents, and be qualified in accordance with the following American Society for Testing and Materials (ASTM) publications:
 - 1. ASTM E 548-84 Standard Practice for Generic Criteria for use in the Evaluation of Testing and Inspection Agencies.
 - 2. ASTM E 699-79 (1984) Standard Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee E-6.
- B. Testing Equipment: Calibrated at intervals with devices of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.3 INSPECTION AND TESTING PERSONNEL AND FACILITIES

- A. Inspector of Record:
 - 1. The Owner will employ one or more qualified Inspectors of Record, acceptable to the Local Building Department issuing Permits who will be employed continuously at the construction site, working under the Owner Representative's general direction. The IOR(s) will observe progress of the work and to report to the Owner any non-conformance with Contract Documents.

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

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 requirements for temporary utilities, support facilities, and security and protection facilities.

1.3 USE CHARGES

- A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost.
- B. Water Service: Pay water service use charges for water used by all entities for construction operations.
- C. Electric Power Service: Pay electric power service use charges for electricity used by all entities for construction operations.

1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MATERIALS

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of construction personnel. Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
 - 2. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
 - 3. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

SECTION 01 60 00- PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: This Section contains definitions, product requirements and requirements for prior approved items.
- B. Delivery and storage of materials and equipment.
- C. Procedures for selecting products and approving substitutions.

1.2 DEFINITIONS

- A. General: Definitions are not intended to negate the meaning of other terms used in Contract Documents, including specialties, systems, structure, finishes, accessories, furnishings, special construction, and similar terms, which are self-explanatory and have recognized meanings in the construction industry.
- B. Products: Purchased items for incorporation into the Work, regardless of whether specifically purchased for Project or taken from Contractor's stock of previously purchased products.
- C. Materials: Products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form units of Work.
- D. Appliances, Equipment, and Fixtures: Products with operational parts, regardless of whether motorized or manually operated and particularly including products with service connections (wiring, piping, etc.).
- E. System: A unit of Work (i.e., structural system, vacuum system, etc.) shown or specified to include particular products, materials, appliances, equipment, or fixtures.
- F. Substitutions: Where products, materials, appliances, equipment, or fixtures are listed by trade name(s), manufacturer name(s), or catalog reference(s) or where these items are shown or specified as part of a system or systems, items or systems proposed for use by Contractor that are not listed or differ from those shown or specified as part of a system will be considered substitutions.
 - 1. Submit substitutions in accordance with requirements of this Section.
 - 2. The requirements for substitutions do not apply to specified Contractor options. Revisions to Contract Documents, where requested by Owner or Architect are changes, not substitutions.
 - 3. Contractor's determinations of and compliance with governing regulations and orders issued by governing authorities do not constitute substitutions, and do not constitute a basis for change orders; except as provided for under substitution procedures in this Section or elsewhere in Contract Documents.
- G. Prior -to-Bid Approvals: Products, materials, appliances, equipment, fixtures, or systems

SECTION 01 76 00- GUARANTIES AND WARRANTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for guaranties and warranties for contract closeout and during specified guaranty/warranty periods.

1.2 DESCRIPTION OF REQUIREMENTS

- A. General Limitations: It is recognized that specific guaranties and warranties are intended to protect Owner against failure of the Work to perform as required, and against deficient, defective, and faulty materials and workmanship, regardless of sources.
- B. Related Damages and Losses: When correcting guaranteed or warranted work which has failed, remove and replace other Work of Project which has been damaged as a result of such failure or which must be removed and replaced to provide access for correction of Work.
- C. Reinstatement of Guaranty or Warranty Period: In addition to requirements in the General Conditions, when Work covered by a special project guaranty or product warranty has failed and has been corrected by replacement or restoration, reinstate guaranty or warranty by written endorsement for 1 year starting on date of acceptance of replaced or restored Work.
- D. Replacement Cost, Obligations: Except as otherwise indicated, cost of replacing or restoring failing guaranties or warranted units or products is Contractor's obligation, without regard for whether Owner has already benefitted from use through a portion of anticipated useful service lives.
- E. Rejection of Warranties: Owner reserves the right, at time of Substantial Completion or thereafter, to reject coincidental product warranties submitted by Contractor, which in opinion of Owner detract from or confuse interpretation of requirements of Contract Documents.
- F. Contractor's Procurement Obligations: Do not purchase, subcontract for, or allow others to purchase or subcontract for materials or units of Work for Project where a special project guaranty, specified product warranty, certification, or similar commitment is required until it has been determined that entities required to sign or countersign such commitments are willing to do so.
- G. Specific Guaranty or Warranty Forms: Where a special project guaranty or specified project warranty is required, prepare a written document to contain terms and appropriate identification; ready for execution by required parties.
 - 1. A sample form is attached as the last article of this Section.
 - 2. Refer to individual sections of Divisions 2 through 33 for specific content and requirements.

3. Submit draft to Owner for approval prior to final executions.

1.3 REQUIREMENTS INCLUDED

- A. Compile specified warranties.
- B. Compile specified service and maintenance contracts.
- C. Co-execute submittals when so specified.
- D. Review submittals to verify compliance with Contract Documents.
- E. Submit to Architect for review and transmittal to Owner.

1.4 SUBMITTAL REQUIREMENTS

- A. Assemble warranties, bonds, and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.
- B. Number of original signed copies required: 2 each.
- C. Table of Contents: Neatly typed, in orderly sequence. Provide complete index information for each item.
 1. Product or work item with index number to bound item.
 2. Firm, with name of principal, address, and telephone number.
 3. Scope.
 4. Date of beginning of warranty, bond or service and maintenance contract.
 5. Duration of warranty, bond, or service maintenance contract.
 6. Provide information for Owner's personnel:
 - a. Procedure to be followed in case of failure.
 - b. Circumstances which might affect the validity of warranty or bond.
 7. Contractor, name of responsible principal, address and telephone number.

1.5 FORM OF SUBMITTALS

- A. Prepare in duplicate packets.
- B. Format:
 1. Size 8-1/2 x 11 inches on punched sheets for standard 3-ring binder.
 - a. Fold larger sheets to fit into binders.
 2. Warranty-Guaranty wording shall be as printed below.

3. Cover: Identify each packet with typed or printed title "GUARANTIES AND WARRANTIES". List:
 - a. Title of Project.
 - b. Name of Contractor.

C. Binders: Commercial quality, 3-ring, with durable and cleanable plastic covers.

1.6 TIME OF SUBMITTALS

- A. Make submittals within 10 days after date of Substantial Completion prior to final request for payment.
- B. For items or work, where acceptance is delayed materially beyond Date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

1.7 SUBMITTALS REQUIRED

- A. Submit warranties, bonds, service and maintenance contracts as specified in respective Sections of Specifications and as follows:
 1. Provide when noted in individual Sections of the Project Manual Divisions 2 through 33.

1.8 SAMPLE FORM OF WARRANTY-GUARANTY

- A. Print or type Warranty-Guaranty on installing contractor's own letterhead.
- B. Wording and signatures required.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

A. GUARANTEE-WARRANTY

When required by the specifications, warranties and/or guarantees other than one year shall be in the form of the following on the Contractor's own letterhead:

"GUARANTEE-WARRANTY FOR INTERMOUNTAIN HEALTHCARE, AVH- Cardiac Rehab Clinic"

We hereby warrant and the General Contractor and/or Material Manufacturer guarantee that the (name of product, equipment or system) that we have installed in the ____Alta View Hospital- Cardiac Rehab clinic Remodel project, has been done in accordance with the Contract Documents and that the work as installed will fulfill the requirements of the guaranty-warranty included in the specifications. We agree to repair or replace any or all of our work, together with any other adjacent work which may be displaced by so doing, that may prove to be defective in its workmanship or material within a period of _____ years from the date of Substantial Completion, without any expense whatsoever to the Owner, ordinary wear and tear and unusual abuse or neglect excepted.

In the event of our failure to comply with the above mentioned conditions within sixty (60) days after being notified in writing by the Owner, we collectively or separately do hereby authorize the Owner to proceed to have said defects repaired and made good at our expense, and we will honor and pay the costs and charges therefore upon demand.

Signed _____ Countersigned _____
(Subcontractor) (General Contractor)
Name _____ Name _____
(Print) (Print)

Company _____ Company _____
Address _____ Address _____

License No. _____ License No. _____

Countersigned _____
(Material Manufacturer)

Name _____
(Print)

Company _____

Address _____

SECTION 01 78 23 – OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

PART 2 - 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.

2.2 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Emergency manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Maintenance manuals for the care and maintenance of products, materials, and finishes.
- B. Related Sections include the following:
 - 1. Division 1 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Division 1 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
 - 3. Divisions 2 through 33 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

2.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

2.4 SUBMITTALS

- A. Final Submittal: Submit one copy one of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.
 - 1. Correct or modify each manual to comply with Architect's comments. Submit 3 copies of each corrected manual within 15 days of receipt of Architect's comments.

SECTION 01 78 39 – PROJECT RECORD DOCUMENTS

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 administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
- B. Related Sections include the following:
 - 1. Division 1 Section for general closeout procedures.
 - 2. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Divisions 2 through 33 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set(s) of marked-up Record Prints.
 - a. Final Submittal: Submit one set(s) of marked-up Record Prints showing modifications for trades involved in the project.
- B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one copy of each Product Data submittal.
 - 1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

SECTION 01 79 00- CLEANING**PART 1 - GENERAL****1.1 SUMMARY**

- A. Work Included: Requirements for periodic, general, and final cleaning of the project.
- B. Provide temporary and periodic clean-up of extra materials, waste and general debris during construction of the work, together with the final clean-up and cleaning, polishing and other "housekeeping" required to bring various surfaces to an acceptable condition prior to final inspection, or before additional work is done during construction.
- C. This Section includes requirements for Cleaning for all phases of the Project. Some requirements of this Section may not be applicable to individual project Phases.

1.2 GENERAL REQUIREMENTS

- A. Maintain premises and public properties free from accumulations of waste, debris, and rubbish in accordance with applicable safety and insurance standards and local ordinances.
- B. The acceptable level of cleanliness of the Project shall be the decision of the Architect.
 - 1. Work necessary to achieve such acceptable state shall be performed when required.
- C. Burning: Burning of waste materials and/or rubbish on Site is not permitted.

1.3 CLEAN-UP DURING CONSTRUCTION

- A. During construction, provide cleaning-up as follows:
 - 1. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
 - 2. Remove debris and rubbish from pipe chases, plenums, down spouts, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
 - 3. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
 - 4. Remove waste materials, debris, and rubbish from site weekly, or more often if needed, and dispose off-site in compliance with local regulations.
 - 5. Storage areas: Ensure that materials to be used for construction are stored in designated structures or areas by the appropriate trades. Maintain such areas or structures in a clean condition for the life of the Project.
 - 6. Containers: Provide appropriate containers, such as dump containers, and locate on site for collection of waste materials and rubbish.

SECTION 02 41 19 - SELECTIVE DEMOLITION

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 the following:
 - 1. Demolition and removal of selected portions of a building or structure.
 - 2. Repair procedures for selective demolition operations.

1.3 DEFINITIONS

- A. Remove: Carefully detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS

- A. Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.

1.6 PROJECT CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
- B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
 - 1. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.
- C. Owner assumes no responsibility for condition of areas to be selectively demolished.

SECTION 03 53 00– CONCRETE TOPPING**PART 1 - GENERAL****1.1 SUMMARY**

- A. Work Included: Provide and install concrete toppings (cementitious underlayments), complete, as shown on Drawings and as specified, including:
 - 1. Miscellaneous tapers and warps for alignment of top-of-finish flooring at transitions between materials of different heights and thickness, including:
 - a. Section 093000 – Tile.
 - b. Section 096519 – Resilient Tile Flooring.
 - c. Section 096813 – Tile Carpeting
 - d. Concrete Floors without finish or painted finish.
 - 2. Remedial correction of interior floor slabs to provide specified floor flatness as specified in Section 033000 – Cast-in-Place Concrete; at no additional cost to Owner.
- B. Work Specified Elsewhere:
 - 1. Section 033000 – Cast-in-Place Concrete. Use concrete from this Section when the thickness is at least 2-inches.
 - 2. Section 093000– Tile; Polymer-modified mortars for tile assemblies sloped to drains.

1.2 SUBMITTALS

- A. Comply with requirements of Section 013300 – Submittal Requirements.
- B. Product Data: Manufacturer's literature describing materials and specifications for mixing, placing, curing, and protecting.

1.3 QUALITY ASSURANCE

- A. Applicator: Approved and trained by manufacturer.
- B. Design Criteria:
 - 1. Compressive Strength: Minimum 4,100-PSI at 28 Days per ASTM C109.

1.4 PRODUCT HANDLING

- A. Delivery: Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use.
- B. Storage: Ensure storage facilities are weathertight and dry.

SECTION 05 05 00 – METAL FASTENERS**Part 1 - GENERAL****1.1 SUMMARY**

- A. Work Included: This Section establishes general standards and requirements for metal fasteners utilized for attachment of items to the primary structure of the building and is incorporated in others Sections of these specifications where referenced, including:
 - 1. Expansion Bolts.
 - 2. Bolts, screws and other fasteners.
- B. Work Specified Elsewhere:
 - 1. Division 5 – Miscellaneous Metal Fabrications.
 - 2. Division 23 – Mechanical.
 - 3. Division 26 – Electrical.

1.2 SUBMITTALS

- A. Comply with provisions of Section 01 33 00 – Submittal Procedures.
- B. Product Data: Manufacturers' information on materials, fabrication, and installation. Include current ICC or IAPMO Reports and other information to substantiate compliance with Contract Documents.
- C. Substitutions: Include with requests for substitution of fastening device type, minimum embedment, length, load capacity for pull out and shear, and installation torque of fasteners and statement that fastening devices meet or exceed requirements specified in Contract Documents.

1.3 QUALITY ASSURANCE

- A. Field Quality Control:
 - 1. The Owner's Testing Lab will perform and report on tests and inspections as follows:
 - 2. Expansion Bolts:
 - a. Test 50 percent of drilled-in anchorages to 2.0 times the allowable load specified with special inspection in tension.
 - b. If any anchor fails testing, test all anchors of the same category installed that day until twenty consecutive anchors pass, then resume the initial testing frequency. Cost of this testing shall be borne by Contractor.

Part 2 - PRODUCTS**2.1 MATERIALS**

- A. Expansion Bolts: Simpson CS Strong Bolt-2, Simpson or E.O.R. approved equivalent. Provide stainless steel expansion bolts for exterior exposure.
- B. Sheet Metal Screws: John Wagner Associates' Grabber or equal: Unless otherwise noted on Drawings, type to suit stud, track, or channel gauge and as follows.
 - 1. Where Overlaid with Gypsum Board or Other Finish Material:
 - a. For Fastening to 20 Gauge and Lighter Material: No. 8 by 9/16-inch Wafer Head Streaker.
 - b. For Fastening to 18 Gauge and Heavier Material: No. 8 by 1/2-inch Wafer Head Self-Drilling.

SECTION 06 10 00- ROUGH CARPENTRY**PART 1 - GENERAL****1.1 SUMMARY**

- A. Work Included: Rough carpentry, complete, as shown on Drawings and as specified, including:
 - 1. Miscellaneous fire-treated blocking, backing and plywood as shown.
- B. Work Specified Elsewhere:
 - 1. Section 06 41 23 – Interior Architectural Woodwork.

1.2 REFERENCE STANDARDS

- A. American Plywood Association (APA):
 - 1. Guide to Plywood Grades.
- B. American Wood Preservers Association (AWPA):
 - 1. C20; Structural Lumber - Fire-Retardant Treatment by Pressure Process.
 - 2. C27; Plywood - Fire-Retardant Treatment by Pressure Process.
 - 3. M4; Standard for the Care of Preservative-Treated Wood Products.
- C. West Coast Lumber Inspection Bureau (WCLIB):
 - 1. Standard Grading Rules for West Coast lumber.
- D. Western Wood Products Association (WWPA):
 - 1. Western Lumber Grading Rules.

1.3 SUBMITTALS

- A. Comply with requirements of Section 013300 – Submittal Requirements.
- B. Shop Drawings: Show specially fabricated rough hardware.

1.4 QUALITY ASSURANCE

- B. Comply with latest edition of the following standards:
 - 1. Western Coast Lumber Inspection Bureau (WCLIB) "Standard Grading Rules No. 16."
 - 2. Western Wood Products Association (WWPA) "Grading Rules for Western Lumber."

SECTION 06 16 00 - SHEATHING

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. Wall Sheathing.
 - 2. Exterior Gypsum Soffit Board.
 - 3. Fire Retardant Plywood.
 - 4. Exterior Wall Sheathing.
- B. Related Requirements:
 - 1. Section 061053 "Rough Carpentry" for plywood backing panels.
 - 2. Section 072729 "Fluid Applied Air and Vapor Barrier" for exterior weather barrier.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

2.2 EXTERIOR GYPSUM SOFFIT BOARD:

- A. ASTM C 1396/C 1396M, with manufacturer's standard edges.
- B. Core: 5/8 inch (15.9 mm), Type X for use at all exterior applications.

2.3 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Use materials complying 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 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

SECTION 06 41 23- INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

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. Work Included: Provide and install new plastic laminate and solid surface countertop. All casework to be:

AWI Premium Grade. AWI certification NOT required.

- B. This Section includes the following:
 - 1. Plastic-laminate cabinets- New (See floor plans)
 - 2. Plastic-laminate countertops- New (See floor plans)
 - 3. Solid-surfacing-material countertops- New (See floor plans)
- C. Related Sections include the following:
 - 1. Division 6 Section "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
 - 2. Division 8 Section "Flush Wood Doors."

1.3 DEFINITIONS

- A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items, unless concealed within other construction before woodwork installation.

1.4 SUBMITTALS

- A. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.
 - 1. Plastic laminates.
 - 2. Solid Surface
 - 3. Shop-applied transparent finishes.
- C. Samples for Verification:
 - 1. Plastic laminates, **8 by 10 inches**, for each type, color, pattern, and surface finish.

SECTION 07 84 00 – FIRESTOPPING

Part 1 - GENERAL

1.1 Summary

- A. Furnish labor, materials, tools, equipment, and services for Firestopping, in accordance with provisions of Contract Documents.
- B. Completely coordinate with work of other trades.

1.2 Quality Assurance

- A. Installer Qualifications:
 - 1. Certified, licensed or approved by firestopping manufacturer, trained to install firestop products per specified requirements.
 - 2. Licensed by State or local authority, where applicable.
 - 3. Shown to have successfully completed not less than five (5) comparable scale projects.
- B. Provide firestop systems in compliance with following requirements:
 - 1. Obtain firestop system for each type of penetration and construction condition from a single firestop systems manufacturer.
 - 2. Firestop products and systems shall bear classification marking of qualified testing and inspection agency.
 - 3. Firestopping tests, performed by qualified, testing and inspection agency.
 - a. UL or other agency, performing testing and follow-up inspection services for firestop systems, acceptable to local authorities having jurisdiction.
 - 4. Existing applications for which no tested and listed classified system is available through a manufacturer:
 - a. Provide Engineering Judgment or Equivalent Fire Resistance Rated Assembly (EFRA) for submittal derived from similar UL system designs or other tests approved by local authorities having jurisdiction, prior to installation.
 - b. Engineering judgment drawings must follow requirements set forth by International Firestop Council.
 - 5. Inspect applied firestopping systems in accordance with International Building Code (IBC) Chapter 17.
 - a. Inspections shall be performed by an FMG 4991 Approved Specialty Contractor/UL Qualified Firestop Contractor and/or ASTM E2174 and ASTM E2393.
 - b. See Section 01 45 23.
 - 6. FM Approved in accordance with FM Standard 4991 – Approval of Firestop Contractors.
 - 7. UL Qualified Firestop Contractor.
- C. Underwriters Laboratories, Inc. (UL):
 - 1. UL 263, Fire Tests of Building Construction and Materials
 - 2. UL 723, Surface Burning Characteristics of Building Materials
 - 3. UL 1479, Fire Tests of Through Penetration Firestops
 - 4. UL 2079, Tests for Fire Resistance of Building Joint Systems
- D. ASTM International (ASTM):
 - 1. ASTM E84 Surface Burning Characteristics of Building Materials
 - 2. ASTM E119 Fire Tests of Building Construction and Materials
 - 3. ASTM E136 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750F
 - 4. ASTM E814 Fire Tests of Through Penetration Fire Stops

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

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 sealants for the following applications, including those specified by reference to this Section:
 - 1. Exterior joints in the following vertical surfaces and nontraffic horizontal surfaces:
 - a. Perimeter joints between materials listed above and frames of doors and windows.
 - 2. Exterior joints in the following horizontal traffic surfaces:
 - a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
 - 3. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
 - a. Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
 - c. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - d. Other joints as indicated.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.

SECTION 08 11 13 – HOLLOW METAL DOORS AND FRAMES**PART 1 - GENERAL****1.1 SUMMARY**

- A. Work Included: Provide and install hollow metal doors and frames, complete, as shown on Drawings and as specified.
 - 1. Hollow Metal Door and Frame Sets.
 - 2. Hollow Metal Interior Window Frames.
 - 3. Hollow Metal Frames for Wood Doors specified in Section 081416 – Flush Wood Doors.
 - 4. Coordinate Door and Frame fabrication with door hardware specified in Section 087100 – Door Hardware as required for the hardware types scheduled on Drawings.
 - 5. Coordinate Door and Frame fabrication with Security and Access Control products specified in DIVISION 26 – Electrical as required for Security and Fire Alarm wiring and interface.
- B. Work Specified Elsewhere:
 - 1. Section 050500 – Metal Fasteners.
 - 2. Section 081416– Flush Wood Doors.
 - 3. Section 084113– Aluminum Entrances and Storefronts.
 - 4. Section 084213– Aluminum Framed Entrance
 - 5. Section 087100 – Door Hardware.
 - 7. Section 088000 –Glazing.
 - 8. Section 085113 – Aluminum Windows.

1.2 REFERENCE STANDARDS

- A. Hollow Metal Manufacturers Association (HMMA) Division of National Association of Architectural Metal Manufacturers (NAAMM):
 - 1. Hollow Metal Manual; including HMMA 800, 801, 802, 810, 820, 830, 840, 841, 850, 860, 861, 862, 863, 880, 881, and 882.

1.3 QUALITY ASSURANCE

- A. Comply with the latest edition of the following Standards:

SECTION 08 14 00 – FLUSH WOOD DOORS**PART 1 - GENERAL****1.1 REFERENCES**

- A. WDMA – Window & Door Manufacturers Association I.S. 1A latest edition
- B. NFPA 80 - Standards for Fire Doors

1.2 SUBMITTALS

- A. Product Data:
 - a. For each type of door include details of core and edge construction as well as trim for openings. Include factory finishing specifications
- B. Shop Drawings:
 - a. Indicate location, size and hand of each door; elevation and any details not covered in the product data sheets such as location and extent of blocking or any other pertinent data.
- C. Samples:
 - a. For each specie and type of finish submit one 8x10 finish sample.

1.3 QUALITY ASSURANCE

- A. Advise the architect immediately of any deviations from the listed standards or this Specification. Insure that all doors are in compliance with NFPA 80 and local fire codes.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Comply with requirements of referenced standard and manufacturers written instructions.
- B. Do not deliver doors until building is conditioned to temperature and humidity levels required by referenced standard are established and maintained. Humidity must be between 25% & 55%.
- C. Protect doors from exposure from natural and artificial light until the doors are hung.

1.5 WARRANTY

- A. Solid core interior doors life of installation
 - a. Warranty shall include installation and finishing that may be required do to repair or replacement of any defective doors. This includes doors deemed defective due to material or workmanship or doors defined by the WDMA as of out of tolerance due to bow, cup or twist.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Provide products from one of the following manufactures that is in strict compliance with this specification and referenced standards.

a. Field verify to match with adjacent existing hospital door finish and color.

2.2 GENERAL

- A. Construction: 5ply hot press. Two ply pre-manufactured skins are not acceptable as 5ply construction.

SECTION 08 31 13 – ACCESS PANELS**PART 1 - GENERAL****1.1 SUMMARY**

- A. Work Included: Provide and install access panels, complete, as shown on Drawings as specified, and if not shown on Drawings, as required to access mechanical, electrical, plumbing and other equipment in conformance with governing codes and workplace safety guidelines.
 - 1. Ceiling-mounted access panels.
- B. Work Specified Elsewhere:
 - 1. Section 092216 – Non-Structural Metal framing
 - 2. Section 092900 - Gypsum Board.
 - 4. Section 099123 – Interior Painting.

1.2 SUBMITTALS

- A. Conform to the requirements of Section 013300 – Submittal Requirements.
- B. Product Data: Submit manufacturer's specifications, catalog cuts, and installation instructions. Submit approved test data or State Fire Marshal listing for fire-rated assemblies.
- C. Shop Drawings: Show attachment to partition, soffit, and ceiling framing at each typical condition.

1.3 PRODUCT HANDLING

- A. Delivery and Storage: Deliver and store panels in manufacturer's standard protective packaging.
- B. Protection: Do not remove protective packaging until time of installation.

PART 2 - PRODUCTS**2.1 ACCESS PANELS FOR CEILINGS**

- A. Glass Fiber Reinforced Gypsum (GFRG) Types:
 - 1. Manufacturer: Stealth Panels by Wind-lock
 - 2. Non-Rated Gypsum Board Ceilings: Lay-in GFRG panels with rounded corners and matching GFRG frames with tapered edges. Panels to be gasketed to prevent migration of dust particles from structure above. Provide smooth finish on

SECTION 08 52 00 - ALUMINUM WINDOWS

PART 1 - GENERAL

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 Commercial Grade aluminum windows of the performance class indicated. Window types required include the following:
 - 1. Fixed windows.
 - 2. Projected windows.
 - 3. Operable windows.
- B. Related Sections include the following:
 - 1. Division 8 Section 84100 Aluminum entrances and Storefronts

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum windows engineered, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading without failure, as demonstrated by testing manufacturer's standard window assemblies representing types, grades, classes, and sizes required for Project according to test methods indicated.
- B. Performance Requirements: Testing shall demonstrate compliance with requirements indicated in AAMA 101 for air infiltration, water penetration, and structural performance for type, grade, and performance class of window units required. Where required design pressure exceeds the minimum for the specified window grade, comply with requirements of AAMA 101, Section 3, "Optional Performance Classes," for higher than minimum performance class.
 - 1. Air-Infiltration Rate for Operating Units: Not more than 0.37 cfm/ft. of operable sash joint for an inward test pressure of 1.57 lbf/sq. ft.
 - 2. Water Penetration: No water penetration as defined in the test method at an inward test pressure of 15 percent of the design pressure.

1.4 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 window required, including the following:
 - 1. Construction details and fabrication methods.
 - 2. Profiles and dimensions of individual components.
 - 3. Data on hardware, accessories, and finishes.
 - 4. Recommendations for maintaining and cleaning exterior surfaces.

- C. Shop Drawings showing fabrication and installation of each type of window required including information not fully detailed in manufacturer's standard Product Data and the following:
 - 1. Layout and installation details, including anchors.

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain aluminum windows from one source and by a single manufacturer.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Check window openings by field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Fixed, Projected Windows, Skylights:
 - a. Arch Amarlite.
 - b. Alenco Commercial Division.
 - c. Capitol Products Corp.
 - d. Custom Window Company.
 - e. EFCO Corporation.
 - f. Kawneer Company, Inc.
 - g. Tubelite Architectural Systems.
 - h. Vistawall Architectural Products
 - i. Wausau Metals Corporation.

2.2 MATERIALS

- A. Aluminum Extrusions: Provide alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi ultimate tensile strength and not less than 0.062 inch thick at any location for main frame and sash members.
- B. Fasteners: Provide aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum window members, trim, hardware, anchors, and other components of window units.
 - 1. Exposed Fasteners: Except where unavoidable for application of hardware, do not use exposed fasteners. For application of hardware, use fasteners that match finish of member or hardware being fastened, as appropriate.
- C. Anchors, Clips, and Window Accessories: Fabricate anchors, clips, and window accessories of aluminum, nonmagnetic stainless steel, or hot-dip zinc-coated steel or iron complying with requirements of ASTM B 633; provide sufficient strength to withstand design pressure indicated.

- D. Compression-Type Glazing Strips and Weatherstripping: Unless otherwise indicated, and at manufacturer's option, provide compressible stripping for glazing and weatherstripping such as molded EPDM or neoprene gaskets complying with ASTM D 2000 Designation 2BC415 to 3BC620, or molded PVC gaskets complying with ASTM D 2287, or molded expanded EPDM or neoprene gaskets complying with ASTM C 509, Grade 4.
- E. Sealant: For sealants required within fabricated window units, provide type recommended by manufacturer for joint size and movement. Sealant shall remain permanently elastic, nonshrinking, and nonmigrating. Comply with Division 7 Section "Joint Sealants" of these Specifications for selection and installation of sealants.

2.3 HARDWARE

- A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum and of sufficient strength to perform the function for which it is intended.
- B. Four-Bar Friction Hinges: Comply with AAMA 904.1.
 - 1. Friction Shoes: Provide friction shoes of nylon or other nonabrasive, nonstaining, noncorrosive, durable material.

2.4 ACCESSORIES

- A. General: Provide manufacturer's standard accessories that comply with indicated standards.

2.5 PROJECTED WINDOWS

- A. Window Grade and Class: Comply with requirements of AAMA Grade and Performance Class P-HC40. Window units shall successfully pass the following test requirements as specified in AAMA 101:
 - 1. Torsion test on an unglazed ventilator.
 - 2. Horizontal and vertical concentrated load tests on latch rail of each ventilator.
 - 3. Torsion load test on intermediate frame rails.
 - 4. Vertical concentrated load test on intermediate frame rails over each ventilator.
 - 5. Balance arm load test.
- B. Hardware: Provide the following equipment and operating hardware:
 - 1. Hinges: Concealed 4-bar friction hinges with adjustable slide shoe (2 per ventilator).
 - 2. Lock: Cam-action, sweep lock handle with surface-mounted strike.

2.6 FABRICATION

- A. General: Fabricate aluminum window units to comply with indicated standards. Include a complete system for assembly of components and anchorage of window units.
 - 1. Provide units that are reglazable without dismantling sash or ventilator framing.
- B. Thermally Improved Construction: Fabricate window units with an integral, concealed, low-conductance, thermal barrier, located between exterior materials and window members exposed on interior, in a manner that eliminates direct metal-to-metal contact.

1. Provide thermal-break construction that has been in use for not less than 3 years, has been tested to demonstrate resistance to thermal conductance and condensation, and has been tested to show adequate strength and security of glass retention.
 2. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
 3. Glazing Stops: Provide screw-applied or snap-on glazing stops, coordinated with glass selection and glazing system indicated. Finish to match window units.
- C. Preglazed Fabrication: Preglaze window units at the factory where possible and practical for applications indicated. Comply with glass and glazing requirements of Division 8 Section "Glazing" of these Specifications and AAMA 101.

2.7 FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. Finish aluminum windows to match other aluminum components of aluminum storefront system. Refer to Division 8 Section "Aluminum Entrances and Storefronts" for finish requirements.
- D. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect openings before installation. Verify that rough or masonry opening is correct and sill plate is level.
1. Masonry surfaces shall be visibly dry and free of excess mortar, sand, and other construction debris.

3.2 INSTALLATION

- A. Comply with manufacturer's specifications and recommendations for installing window units, hardware, operators, and other components of the Work.
- B. Set window units plumb, level, and true to line, without warp or rack of frames or sash. Provide proper support and anchor securely in place.
1. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified under "Dissimilar Materials" Paragraph in appendix to AAMA 101.
- C. Set sill members and other members in a bed of sealant or with joint fillers or gaskets, as shown on Shop Drawings, to provide weathertight construction. Refer to Division 7 Section "Joint Sealants" for compounds, fillers, and gaskets to be installed concurrently with

window units. Coordinate installation with wall flashings and other components of the Work.

3.3 ADJUSTING

- A. Adjust operating sash and hardware to provide a tight fit at contact points and at weatherstripping for smooth operation and a weathertight closure.

3.4 CLEANING

- A. Clean aluminum surfaces promptly after installing windows. Exercise care to avoid damage to protective coatings and finishes. Remove excess glazing and sealant compounds, dirt, and other substances. Lubricate hardware and other moving parts.
- B. Clean glass promptly after installing windows.

3.5 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to aluminum window manufacturer, that ensure window units are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 085200

SECTION 08 71 00 – DOOR HARDWARE**PART 1 - GENERAL****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 commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Sliding doors.
 - 3. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical door hardware, power supplies, back-ups and surge protection.
 - 3. Cylinders specified for doors in other sections.
- C. Related Sections:
 - 1. Section 08 06 71 – Door Hardware Schedule.
 - 2. Section 08 11 13 – Hollow Metal Doors and Frames.
 - 3. Section 08 12 16 – Interior Aluminum Doors and Frames.
 - 4. Section 08 14 16 – Flush Wood Doors.
 - 5. Section 08 74 00 – Access Control Hardware.
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 80 - Fire Doors and Windows.
 - 4. NFPA 101 - Life Safety Code.
 - 5. NFPA 105 - Installation of Smoke Door Assemblies.
 - 6. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series

2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 - 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
 - 1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

- a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
2. Electrical Coordination: Coordinate with related Division 26 Electrical Sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.
- F. Warranties and Maintenance: Special warranties and maintenance agreements specified in this Section.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Installer Qualifications: Installers, trained by the primary product manufacturers, with a minimum 3 years documented experience installing both standard and electrified builders hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor in good standing by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

1. Scheduling Responsibility: Preparation of door hardware and keying schedules.
- D. Source Limitations: Obtain each type and variety of Door Hardware specified in this Section from a single source, qualified supplier unless otherwise indicated.
1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- E. Regulatory Requirements: Comply with NFPA 70, NFPA 80, NFPA 101 and ANSI A117.1 requirements and guidelines as directed in the model building code including, but not limited to, the following:
1. NFPA 70 "National Electrical Code", including electrical components, devices, and accessories listed and labeled as defined in Article 100 by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 2. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1 as follows:
 - a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
 - b. Door Closers: Comply with the following maximum opening-force requirements indicated:
 - 1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
 - 2) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 - c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.
 3. NFPA 101: Comply with the following for means of egress doors:
 - a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
 - b. Thresholds: Not more than 1/2 inch high.
 4. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252 (neutral pressure at 40" above sill) or UL-10C.
 - a. Test Pressure: Positive pressure labeling.

- F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage and software.
 - 4. Installation of permanent keys, cylinder cores and software.
 - 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, arrange for manufacturers' representatives to hold a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight

package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Related Division 08 Sections (Steel, Aluminum and Wood) doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Seven years for heavy duty cylindrical (bored) locks and latches.
 - 2. Five years for exit hardware.
 - 3. Twenty five years for manual door closers.
 - 4. Two years for electromechanical door hardware.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Continuing Service: Beginning at Substantial Completion, and running concurrent with the specified warranty period, provide continuous (6) months full maintenance including repair and replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door opening operation. Provide parts and supplies as used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
 - 1. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - a. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- B. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.
 - 1. Quantity: Provide the following hinge quantity, unless otherwise indicated:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
 4. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:
 - a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the following applications:
 - 1) Out-swinging exterior doors.
 - 2) Out-swinging access controlled doors.
 - 3) Out-swinging lockable doors.
 5. Acceptable Manufacturers:
 - a. Hager Companies (HA).
 - b. McKinney Products (MK).
 - c. Stanley Hardware (ST).
 - d. Ives (IV)
- B. Pin and Barrel Continuous Hinges: ANSI/BHMA A156.26 certified pin and barrel continuous hinges with minimum 12 gauge (.105) Type 304 stainless steel hinge leaves, concealed teflon-coated stainless pin, and twin self-lubricated nylon bearings at each knuckle separation. Fabricate hinges non-handed and U.L. listed for use on up to and including 3 hour rated doors and U.L. listed for windstorm components where applicable. Provide hinges with power transfer cutouts where indicated at electrified openings.
1. Acceptable Manufacturers:
 - a. McKinney Products (MK).
 - b. Pemko Manufacturing (PE).
 - c. Markar (MA)

2.3 DOOR OPERATING TRIM

- A. Door Push Plates and Pulls: ANS/BHMA A156.6 certified door pushes and pulls of type and design specified below or in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
1. Push/Pull Plates: Minimum .050 inch thick, 4-inches wide by 16-inches high, with square corners and beveled edges, secured with exposed screws unless otherwise indicated.
 2. Straight Pull Design: Minimum 1-inch round diameter stainless steel bar or tube stock pulls with 2 1/2-inch projection from face of door unless otherwise indicated.
 3. Offset Pull Design: Minimum 1-inch round diameter stainless steel bar or tube stock pulls with 2 1/2-inch projection and offset of 90 degrees unless otherwise indicated.
 4. Push Bars: Minimum 1-inch round diameter horizontal push bars with minimum clearance of 2 1/2-inch projection from face of door unless otherwise indicated.
 5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
 - a. Acceptable Manufacturers:
 - 1) Rockwood Manufacturing (RO).
 - 2) Trimco (TC).
 - 3) Ives (IV)

2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
- C. Cylinders: Original manufacturer cylinders complying with the following:
1. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
 2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
 4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
- D. High Security Cylinders: High security cylinder conforming to UL437, including both pick and drill resistance. Pick resistance incorporates two or more independent locking mechanisms including a pin tumbler device with six top pin chambers, mushroom-shaped driver pins, and coded sidebar locking mechanism operated independently from the six top pin tumbler device. Drill resistance incorporates cylinder housing with fixed case-hardened inserts protecting the pin tumbler shear line, cylinder plugs with case-hardened inserts protecting both the pin tumbler shear line and the side bar,

mushroom-shaped stainless steel driver pins, and stainless steel sidepins. Cylinders to be factory keyed.

1. Acceptable Manufacturers:

a. ASSA (AS)

- E. Keying System: Each type of lock and cylinders to be factory keyed. Conduct specified "Keying Conference" to define and document keying system instructions and requirements. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner. Incorporate decisions made in keying conference, and as follows:

1. Existing System: Master key or grand master key locks to Owner's existing system.

F. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified cylindrical (bored) locksets furnished in the functions as specified in the Hardware Sets. Lock chassis fabricated of heavy gauge steel, zinc dichromate plated, with through-bolted application. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt. Locks are to be non-handed and fully field reversible.

1. Acceptable Manufacturers:

- a. Corbin Russwin Hardware (RU) – CL3300 Series.
b. Schlage (SC) – ND Series.

- B. Lock Trim Design: As specified in Hardware Sets.

2.6 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

- B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.5.
4. Dustproof Strikes: BHMA A156.16.

2.7 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
2. Standards: Closers to comply with UL-10C and UBC 7-2 for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 - a. Where closers are indicated to have mechanical dead-stop, provide heavy duty arms and brackets with an integral positive stop.
 - b. Where closers are indicated to have mechanical hold open, provide heavy duty units with an additional built-in mechanical holder assembly designed to hold open against normal wind and traffic conditions. Holder to be manually selectable to on-off position.
 - c. Where closers are indicated to have a cushion-type stop, provide heavy duty arms and brackets with spring stop mechanism to cushion door when opened to maximum degree.
 - d. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics. Provide drop plates or other accessories as required for proper mounting.
5. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates, and through-bolt or security type fasteners as specified in the door Hardware Sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Acceptable Manufacturers:

- a. LCN Closers (LC) - 4040XP Series.

2.8 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Metal Protection Plates: ANSI/BHMA A156.6 certified metal protection plates (kick, armor, or mop), beveled on four edges (B4E), fabricated from the following.
 - a. Stainless Steel: .050-inch thick, with countersunk screw holes (CSK).
 - b. Brass or Bronze: .050-inch thick, with countersunk screw holes (CSK).
 - c. Laminate Plastic or Acrylic: 1/8-inch thick, with countersunk screw holes (CSK).
4. Fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets.
5. Metal Door Edging: Door protection edging fabricated from a minimum .050-inch thick metal sheet, formed into an angle or "U" cap shapes, surface or mortised mounted onto edge of door. Provide appropriate leg overlap to account for protection plates as required. Height to be as specified in the Hardware Sets.
6. Acceptable Manufacturers:
 - a. Rockwood Manufacturing (RO).
 - b. Trimco (TC).
 - c. Ives (IV)

2.9 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 1. Acceptable Manufacturers:

- a. Rockwood Manufacturing (RO).
- b. Trimco (TC).
- c. Ives (IV)

2.10 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 - 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: :Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 - 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Acceptable Manufacturers:
 - 1. Pemko Manufacturing (PE).
 - 2. Reese Enterprises, Inc. (RS).
 - 3. Zero International (ZE).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish, and provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SCHEDULE

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. Manufacturer's Abbreviations:

- 1. MK - McKinney
- 2. SC - Schlage
- 3. AA – ASSA High Security Locks

4. CR- Corbin
5. RO- Rockwood
6. LC- LCN Closers
7. RO - Rockwood
8. PE- Pemko

Hardware Schedule**Set: 1.0**

Doors: A121A

3 Hinges	H TA2714 4 1/2 X 4 1/2 NRP	26D	MC
1 Exit Device	ED5200 x N957 NSA	630	CR
1 ASSA Max RIM Cylinder	9851	626	MISH
1 Closer	7500	689	NO
1 Electric Strike	9400	630	HE
1 Protection Plate	K1050 10" x2" LDW CSK	US32D	RO
1 Wall Stop	406	US26D	RO
3 Silencer	608		RO

Card Reader and Power Supply By Div 28

Set: 2.0

Doors: A121B

3 Hinges	H TA2714 4 1/2 X 4 1/2 NRP	26D	MC
1 Cylindrical Lockset	CLX3355 NZD LC	626	CR
1 ASSA Max KIL Cylinder	98611	626	MISH
1 Closer	7500	689	NO
1 Protection Plate	K1050 10" x2" LDW CSK	US32D	RO
1 Wall Stop	406	US26D	RO
3 Silencer	608		RO

END OF SECTION 087100

SECTION 08 80 00 – GLAZING**PART 1 - GENERAL****1.1 SUMMARY**

- A. Furnish labor, materials, tools, equipment, and services for Interior Glass and Glazing in accordance with provisions of Contract Documents.
- B. Completely coordinate with work of other trades.
- C. Related Sections:
 - 1. Section 08 41 00 "Aluminum Entrances and Storefronts."

1.2 QUALITY ASSURANCE

- A. Glass Standards:
 - 1. ANSI Z97.1.
 - 2. CPSC 16 CFR 1201.
 - 3. GANA Glazing Manual.
- B. Flat Glass ASTM C1036.
 - 1. Float glass: Type I, Quality q3 and Class 1 unless otherwise indicated.
 - 2. Figured glass: Type II, Quality q7, Form 3 and Class 1, Finish f1 and Pattern p2 unless otherwise indicated.
 - 3. Mirror glass and one-way vision glass: Type I, Quality q1 or q2, Class 1 and coated for purpose.
- C. Flat Glass, Heat Treated, Coated and Uncoated, ASTM C1048.
 - 1. Heat strengthened glass: Kind HS, Type I, Quality q3, Class 1 and Condition A unless otherwise indicated.
 - 2. Tempered glass: Kind FT, Type I, Quality q3, Class 1 and Condition A unless otherwise indicated.
- D. Mirror Glass:
 - 1. ASTM C1503;
 - 2. Quality: Mirror select.
 - 3. F.S.DD-M-00411B (1).
- E. Fire-Rated Assemblies:
 - 1. General:
 - a. Where glazing products are used in fire-rated assemblies, comply with requirements of specific assembly specified in other sections of these Specifications.
 - b. Underwriters Laboratories, Inc. (UL):
 - 1) UL 9 – Fire Tests of Window Assemblies.
 - 2) UL 10B – Fire Tests of Door Assemblies.
 - 3) UL 10C – Positive Pressure Fire Tests of Door Assemblies.
 - c. Fire Protective Rated Glass: Each lite shall bear permanent, non-removable label of UL certifying it for use in tested and rated fire protective assemblies.
 - 2. Door Assemblies:
 - a. Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
 - b. Positive Pressure Compliance: UL 10C.

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING**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. Non-load-bearing steel framing systems for interior gypsum board assemblies.
 - 2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.
- B. Related Requirements:
 - 1. Section 092900 "Gypsum Board" for interior Gypsum sheathing.

1.3 SUBMITTALS

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

PART 2 - PRODUCTS**2.1 PERFORMANCE REQUIREMENTS**

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: ASTM A 653/A 653M, G40 (Z120) hot-dip galvanized unless otherwise indicated.
- B. Studs and Runners: ASTM C 645. Use either steel studs and runners or dimpled steel studs and runners.

SECTION 09 22 20 – ACOUSTICAL INSULATION**PART 1 - GENERAL****1.1 SUMMARY**

- A. Provide materials, fabrications and installation of acoustical insulation and associated accessories.

1.2 SUBMITTALS

- A. Comply with requirements of Section 013300 – Submittal Procedures.
- B. Manufacturer's product data and literature describing each type of insulation.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Insulation shall be certified by the manufacturer to comply with California standards for insulating materials.
 - 2. Insulating materials shall be installed in compliance with Flame Spread Rating and Smoke Density requirements of IBC.
- B. Fire Performance Characteristics: Provide insulation materials whose fire performance characteristics have been determined per the ASTM test method indicated below. Identify products with appropriate markings of applicable testing and inspecting organization.
 - 1. Surface Burning Characteristic: ASTM E84
 - 2. Fire Resistance Ratings: ASTM E119
 - 3. Combustion Characteristics: ASTM E136
- C. Single Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of Section 016000 – Product Requirements.
- B. Deliver and store packaged materials in original containers bearing identification of manufacturer's name, thermal resistance rating, and fiber materials. Maintain seals unbroken and labels intact until time of use.
- C. Keep materials dry by storing off ground under watertight covers.

SECTION 09 29 00 – GYPSUM BOARD**PART 1 - GENERAL****1.1 SUMMARY**

- A. Work Included: Provide and Install gypsum board panels and cementitious panels, complete as shown, including finishing materials and accessories.
 - 1. Interior gypsum board walls, ceilings and soffits:
 - a. Fire/smoke-rated assemblies.
 - b. Acoustic assemblies.
 - c. Water-resistant assemblies.
 - d. Impact-resistant gypsum board wall assemblies.
 - e. General wall assemblies, including multi-layer assemblies to facilitate reveals and other decorative features.
 - f. Cementitious backer board for interior tile assemblies.
 - 2. Interior finishing materials and accessories:
 - a. Tapes, joint treatments, and coating materials to prepare wall surfaces for painting by others.
 - b. Corner beads, reveals, and other trims.
 - c. Neoprene tapes for sealing to work by others.
 - d. Fasteners, adhesives and sealants.
 - e. Special trim and accessories.
 - 3. Projectile Resistant Backing: ballistic-proof fiberglass backing for Pharmacy wall assemblies and where shown on Drawings.
- B. Work Specified Elsewhere:
 - 1. Section 092216 – Non-Structural Metal Framing.
 - 4. Section 093000 – Tile.
 - 5. Section 072400 – Exterior Insulation and Finish System (EIFS).
 - 6. Section 099123 – Interior Painting.

1.2 SUBMITTALS

SECTION 09 51 13 – ACOUSTICAL PANEL CEILINGS**PART 1 - GENERAL****1.1 SUMMARY**

- A. Work Included: Provide and install acoustical ceilings panels and accessories, complete, as shown and specified, including:
 - 1. Mineral core acoustical ceiling panels. (Re-use existing where applicable, replace with new if damaged during construction to match existing)
- B. Work Specified Elsewhere:
 - 1. Section 092216 – Non-Structural Metal Framing.
 - 2. Section 122200 – Curtains and Drapes.
 - 3. Division 23 – Mechanical (Air Supply, Ducts, and Connections).
 - 4. Division 26 – Electrical (Lighting Fixture Attachments).

1.2 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM):
 - 1. C635; Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
 - 2. C636; Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
- B. Ceiling and Interior System Contractors Association (CISCA):
 - 1. Ceiling Systems Handbook.

1.3 SYSTEM DESCRIPTION

- A. Performance Criteria:
 - 1. Fire-Hazard Classification: Provide acoustical ceilings that are identical to those tested for following fire hazard characteristics, per ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
 - a. Test Method: ASTM E84.
 - b. Flame Spread: 25 or less.
 - c. Smoke Developed: 50 or less.

1.4 SUBMITTALS

SECTION 09 65 19 – RESILIENT FLOORING**PART 1 - GENERAL****1.1 SUMMARY**

- A. Work Included: Provide and install resilient flooring, resilient base and accessories, complete as shown on Drawings and as specified, including:
 - 1. Homogeneous sheet vinyl, heat welded including integral coved base. (Coved base to be continuously glued and secured to wall and not attached with glue tape).
 - 2. Homogenous Sheet Vinyl Flooring
 - 3. Resilient Base at VCT flooring.
 - 4. Edge Strips, Reducer Strips and other floor-edge transitions.
 - 5. Cap trim, cove-shaped furring, and accessories for cove base installations.
 - 6. Hot Weld Strips and cold seam materials.
 - 7. Adhesives and other accessory materials as required to provide complete floor assemblies as specified.
- B. Work Specified Elsewhere:
 - 1. Section 035300 – Concrete Toppings.
 - 2. Section 087100 – Door Hardware.
 - 3. Section 093000 – Tile.

1.2 REFERENCE STANDARDS

- A. Resilient Floor Covering Institute (RFCI).
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM E-1907-98: "Standard Practices for Determining Moisture-Related Acceptability of Concrete Floors to Receive Moisture-Sensitive Finishes".

SECTION 09 91 23- INTERIOR PAINTING**PART 1 - GENERAL****1.1 SUMMARY**

- A. Work Included: Interior and Exterior Painting, complete as shown on Drawings and as specified.
1. Work includes, but is not limited to, painting of following items, materials, and spaces:
 - a. Paint every interior and exterior exposed-to-view unfinished surface, except as otherwise shown on Drawings or as specified.
 - b. Paint the following exposed mechanical and electrical items to match adjacent surfaces even if the items are factory-finished:
 - 1) Wall and ceiling diffusers/registers installed in gypsum board assemblies at any location.
 - 2) Access doors at any location except when concealed above suspended ceilings.
 - 3) Flush-mounted electrical panelboards and cabinets in gypsum board assemblies at any location.
 - 4) All exposed piping, conduit, duct work and similar surfaces in Stair Enclosures and Fire Control Room (except items with factory "red" finish).
 - c. Paint semi-visible areas behind registers, grilles, diffusers, screen vents as required to "black out".
 - d. Paint auxiliary rails of smoke containment screens with high-temperature coating.
 - e. Stairs: Paint all exposed ferrous metal assemblies, concrete landings and treads, including hazard striping as required by code.
 - f. Stenciling at Smoke Partition and Fire Rated Walls: See section 092900 Gypsum Board.
 2. Do not paint the following items:
 - a. Factory-finished items specified in various Sections.
 - b. Pre-finished wall, ceiling, and floor coverings.
 - c. Concrete traffic or walking decks, walks, steps, and ramps.

SECTION 10 26 00 – WALL AND DOOR PROTECTION**PART 1 - GENERAL****1.1 SUMMARY**

- A. Work Included: Provide and install wall protection, wall corner guards and other finish protection products, complete, as shown on Drawings and as specified, including:
 - 1. Surface-Mounted Corner Guards and Partition End Guards.
 - 2. Protective Wall Covering Wainscot
 - 3. Crash Rails
- B. Work Specified Elsewhere:
 - 1. Section 081113 – Hollow Metal Doors and Frames.
 - 2. Section 084113 – Aluminum Entrances and Storefronts.
 - 3. Section 081416 – Flush Wood Doors.
 - 4. Section 079200 – Joint Sealants.
 - 5. Section 087100 – Door Hardware
 - 6. Section 092216 – Non-Structural Metal Framing.

1.2 SUBMITTALS

- A. Comply with provisions of Section 013300 – Submittal Procedures.
- B. Product Data: Manufacturer's catalog cuts, standard color charts, and data sheets; including installation details and instructions, for each item specified.
- C. Samples:
 - 1. Crash Rails: 12-inch-long piece of each type specified, including color.
 - 2. Corridor Handrail: 12-inch-long piece of each specified type, including mounting bracket and specified finish.
 - 3. Partition End and Corner Guards: 12-inch-long piece of each type specified, including color.
 - 4. Wall protection and Door Protection: 12-inch-square piece of each specified type, including corner and specified color.

1.3 PRODUCT HANDLING

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SECTION 26 05 19
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

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. Building wires and cables rated 600 V and less.
 2. Connectors, splices, and terminations rated 600 V and less.
- B. Related Requirements:
1. Section 26 05 33 "Raceways and Boxes for Electrical Systems"
 2. Section 26 09 23 "Lighting Control Devices"
 3. Section 26 09 36 "Standalone Modular Preset Dimming Controls"
 4. Section 26 09 43 "Relay-Based Lighting Controls"
 5. Section 27 41 33 "Master Antenna Television System"
 6. Section 27 51 17 "Networked Public Address and Paging System"
 7. Section 27 51 19 "Sound Masking Systems"
 8. Section 28 13 00 "Access Control"
 9. Section 28 31 11 "Digital, Addressable Fire-Alarm System"
 10. Section 27 00 00 "Intermountain Healthcare Networked Structured Cable & Standards" for cabling used for voice and data circuits.

1.3 DEFINITIONS

- A. Outlet Box: Electrical box used to support utilization equipment such as a receptacle or light fixture.
- B. Pull Box: Electrical box through which branch circuit or feeder conductors are run but are not spliced.
- C. Junction Box: Electrical box used for splicing branch circuit or feeder conductors.
- D. Multiwire Branch Circuit: A branch circuit as defined by the National Electrical Code that shares a grounded conductor between two or more phase conductors.

1.4 ACTION SUBMITTALS

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

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

PART 2 - PRODUCTS**2.1 SINGLE CONDUCTORS**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Alpha Wire Company.
 2. Belden Inc.
 3. Cerro Wire LLC.
 4. Encore Wire Corporation.
 5. General Cable; General Cable Corporation.
 6. Southwire Company.
 7. Thomas & Betts Corporation; A Member of the ABB Group.
- B. Aluminum and Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.
- C. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN/THWN-2, Type XHHW-2 and Type SO.

2.2 MULTI-CONDUCTOR CABLES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Southwire Company.
 2. AFC Cable Systems.
- B. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.
- C. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN/THWN-2, Type XHHW-2 and Type SO.
- D. Multi-conductor Cable, Type AC-HCF:
1. Armor: Galvanized Interlocking Steel Strip (green striped or solid green).
 2. Conductors: Solid Copper
 3. Conductor Insulation: THHN-2 with individual moisture resistant, fire retardant paper wrap on each individual conductor.
 4. Grounding: 16 AWG integral bond wire and insulated green copper grounding conductor.
 5. Neutral (Grounded) Conductor: White for 120Y/208 volt systems and Grey 480Y/277 volt systems.
 6. Maximum Voltage Rating: 600 volts.
 7. References and Ratings:
 - a. UL 4, 83, 1479, 1581, 2556, File Reference E7330
 - b. NEC 250.118(8), 300.22(C), 392, 320, 517.13, 518, 645
 - c. Federal Specification A-A-59544 (formerly J-C-30B)
 - d. UL Classified 1, 2, and 3-hour through (Fire) penetration product, R-14141
 - e. Environmental Air-Handling Space Installation per NEC 300.22(C)

- E. Other Multi-conductor Cable: Comply with NEMA WC 70/ICEA S-95-658 for Type SO with ground wire.

2.3 CONNECTORS AND SPLICES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. 3M.
 - 2. AFC Cable Systems; a part of Atkore International.
 - 3. Hubbell Power Systems, Inc.
 - 4. Ideal Industries, Inc.
 - 5. ILSCO.
 - 6. O-Z/Gedney; a brand of Emerson Industrial Automation.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.4 CORD REELS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. APC Group; Kitchen Leash
- B. Case (housing):
 - 1. Dimensions: 9" x 12" x 3'
 - 2. Material: Molded Polypropylene 3.175 mm thickness
 - 3. 94v-2 flammability rating
- C. Power Cord
 - 1. Conductors: 14/3 AWG copper type SJOW
 - 2. Length: 10 feet
 - 3. Rating: 200 degrees F
- D. Receptacle/Plug
 - 1. Rated: 125vac/20 amp
 - 2. Receptacle: NEMA 5-15P
 - 3. Plug: Dual Duplex rated 20 amp
- E. Mounting Bracket: Designed for installation on the ceiling type where the cord reel will be installed.

2.5 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 NFPA 70.

2.6 FIRE-ALARM WIRE AND CABLE

- A. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.
- B. Signaling Line Circuits: Twisted, shielded pair, size as recommended by system manufacturer.
 - 1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70, Article 760, Classification CI, for power-limited fire-alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a two-hour rating.
- C. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation, and complying with requirements in UL 2196 for a two-hour rating.
 - 1. Low-Voltage Circuits: No. 14 AWG, minimum, in pathway.
 - 2. Line-Voltage Circuits: No. 12 AWG, minimum, in pathway.

PART 3 - EXECUTION**3.1 CONDUCTOR MATERIAL APPLICATIONS**

- A. Feeders: Copper for feeders smaller than No. 4 AWG; for feeders No. 4 AWG and larger provide copper feeders unless aluminum is specifically indicated on the one-line diagrams. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger. Aluminum conductors may not be installed for circuiting to imaging and mechanical equipment.
- B. Branch Circuits: Copper. Solid or stranded for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Refer to Section 26 05 33 "Raceways and Boxes for Electrical Systems" for raceway types and applications.
- 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 below Slabs-On-Grade, and Underground: Type THWN-2, single conductors in raceway.
- E. Multiwire Circuits: may not be used for branch circuit wiring. All 120 volt and 277 volt circuits shall be provided with a dedicated grounded conductor (neutral) for each phase conductor. Up to three of these circuits may be installed in a single conduit but not more than one conductor of each phase may be installed in a single conduit.
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.
 - 1. Armored cable, Type AC-HCF may be installed for normal and equipment system single branch circuits concealed in walls, and partitions in lengths between outlet boxes 30' or less and not as homeruns or wiring between pullboxes or junction boxes.

2. Armored cable, Type AC-HCF may be installed between the first outlet box concealed in a wall or partition and a junction box above an accessible ceiling immediately above the location where the cable exits the wall or partition framing.
- G. Branch Circuits below Slabs-on-Grade and Underground: Type THHN/THWN-2, single conductors in raceway. Installation of raceways within any concrete slab or composite concrete and steel deck is prohibited. NEC 517.13 (A) requires that all branch circuits serving patient care areas are provided with an effective ground-fault current path by installation in a metal raceway system, or a cable having a metallic armor or sheath assembly that qualifies as an equipment grounding conductor. Metallic raceways are not a specified raceway for branch circuits installed below slabs-on-grade. To assure compliance with the NEC requirement, both initially and when remodels occur in the future, the installation of branch circuit wiring under slabs-on-grade is limited to circuits supplying only the following rooms and area types without extension beyond the room or area to a room or area not listed here:
1. Mechanical Spaces.
 2. Electrical Rooms.
 3. Food Service.
- H. Branch circuit wiring may also be installed under slabs-on-grade to supply power for the following:
1. Systems Furniture.
 2. Floor Boxes.
 3. Direct wired equipment that is not located against a wall.
- I. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain-relief device at terminations to suit application.
- J. Isolated Power System Conductors: #10 AWG, Type XHHW-2 stranded with cross-linked PE insulation and a dielectric constant of 3.5 or less, installed in EMT conduit. To limit leakage-current the branch circuit conductors must be reduced to the shortest overall length possible. Install conduits for Isolated Power System branch circuits in the most direct path between the panel and the outlet box, which is not necessarily parallel and perpendicular to the structure and framing, to reduce conductor length. Install only one circuit in per conduit. Do not use pulling compounds when installing the branch circuit conductors of Isolated Power Systems.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. 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.
- C. 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. Do not use pulling compounds or lubricant for installation of branch circuit conductors for Isolated Power Systems.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

- F. Support cables according to Section 26 05 29 "Hangers and Supports for Electrical Systems."

3.4 CORD REELS

- A. Coordinate location of cord reels to align with kitchen equipment supplied by the cord reel.
- B. Fasten brackets to structure using minimum 3/8" threaded rod and to rigidly support the cord reel. Minimum of 2 rods per bracket with addition if required to provide a rigid support.
- C. Adjust cord stopper as coordinated with owner.

3.5 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 12 inches (300 mm) of slack.
- D. Comply with requirements in Section 283111 "Digital, Addressable Fire-Alarm System" for connecting, terminating, and identifying wires and cables.

3.6 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 panel and circuit number and identify as spare conductor.

3.7 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."

3.8 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."

3.9 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test feeder conductors and conductors feeding the following critical equipment and services for compliance with requirements.
 - a. Imaging Equipment
 2. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.
 - a. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
 - b. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - c. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- B. Test and Inspection Reports: Prepare a written report to record the following:
1. Procedures used.
 2. Results that comply with requirements.
 3. Results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- C. Cables will be considered defective if they do not pass tests and inspections.

END OF SECTION

SECTION 26 05 26
GROUNDING AND BONDING 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 grounding and bonding systems and equipment.
- B. Section includes grounding and bonding systems and equipment, plus the following special applications:
 - 1. Installation and Bonding of Grounding Electrodes including:
 - a. Metal Underground Water Pipe
 - b. Metal Frame of the Structure
 - c. Concrete-Encased Electrodes including UFER Grounds
 - d. Ground Ring
 - e. Rod Electrodes
 - 2. Ground bonding common with lightning protection system.
 - 3. Foundation steel electrodes.
 - 4. Electrical Room Ground Bus.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

- A. As-Built Data: Plans showing dimensioned as-built locations of grounding features specified in "Field Quality Control" Article, including the following:
 - 1. Test wells.
 - 2. Grounding Electrodes
 - 3. Bonding Jumpers
 - 4. Electrical Room Grounding Bus.
 - 5. TEC and TDR Grounding Bus.
- B. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Section 01 78 23 "Operation and Maintenance Data," include the following:

- a. Instructions for periodic testing and inspection of grounding features at test wells based on NFPA 70B.
 - 1) Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
 - 2) Include recommended testing intervals.

1.6 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. Comply with UL 467 for grounding and bonding materials and equipment.

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 CONDUCTORS

- A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Stranded Conductors: ASTM B 8.
 - 2. Tinned Conductors: ASTM B 33.
 - 3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
- C. Electrical Room Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches (6.3 by 100 mm) in cross section, with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) 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. Length as required for all specified terminations plus 25% spare but not less than 20 inches.
- D. TEC and TDR Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches (6.3 by 100 mm) in cross section, with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) 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. Length as required for all specified terminations plus 25% spare but not less than 12 inches.

2.3 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. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.4 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet (19 mm by 3 m).

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install stranded conductors unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 4/0 AWG minimum.
 - 1. Bury at least 18 inches (600 mm) below grade.
- C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.
- D. Grounding Bus: Install in Normal Power Electrical Room, Essential Power Electrical Room, TEC and all TDR. Install bus horizontally, on insulated spacers 2 inches (50 mm) minimum from wall, 96 inches (2400 mm) above finished floor unless otherwise indicated.
- E. Conductor Terminations and Connections:
 - 1. Pipe Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
 - 4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- B. Pad-Mounted Transformers and Switches: Install tinned-copper conductor not less than No. 4/0 AWG from equipment grounding terminals to ground ring. Bury ground ring not less 18 inches below finished grade.

3.3 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. Armored and metal-clad cable runs.
 - 8. 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.
 - 9. X-Ray Equipment Circuits: Install insulated equipment grounding conductor in circuits supplying x-ray equipment.
- 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. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.
- F. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.
- G. Metallic Fences: Comply with requirements of IEEE C2.
 - 1. Grounding Conductor: Bare, tinned copper, not less than No. 8 AWG.
 - 2. Gates: Shall be bonded to the grounding conductor with a flexible bonding jumper.

3.4 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. Ground Rods: Drive rods until tops are **2 inches (50 mm)** below finished floor or final grade unless otherwise indicated.
 - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
- D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are shall be at least **12 inches (300 mm)** deep, with cover.
 - 1. Test Wells: Install one test well at the ground rod location indicated on the drawings.
- E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through concrete footings.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Use exothermic-welded connectors; if a disconnect-type connection is required, use a bolted clamp.
- F. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate interior and exterior columns at distances not more than **60 feet (18 m)** apart.
 - 1.
- G. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod.
 - 1. Install tinned-copper conductor not less than No. 4/0 AWG for bond to ground ring and for taps to building steel.
 - 2. Bury ground ring not less than **24 inches (600 mm)** from building's foundation.
- H. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate according to NFPA 70; use a minimum of **20 feet (6 m)** of bare copper conductor not smaller than No. 4/0 AWG.
 - 1. If concrete foundation is less than **20 feet (6 m)** long, coil excess conductor within base of foundation.
 - 2. Bond grounding conductor to reinforcing steel in at least four locations in mat footing and at four spread footing locations evenly distributed throughout building. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.
- I. 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.
- J. Panelboard Bonding: To comply with NEC 517.14 panelboard bonding requirements install a minimum #10 AWG copper conductor between all branch-circuit panelboard grounding terminal buses in each electrical room. The conductor may be installed in ½" EMT conduit or may be exposed where securely fastened to the walls.

3.5 FIELD QUALITY CONTROL

- A. 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 conductor, at ground test wells, and at individual ground rods. 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.
- B. Grounding system will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.
- D. Report measured ground resistances that exceed 3 ohms.
- E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION

SECTION 26 05 29
HANGERS AND SUPPORTS 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. Hangers and supports for electrical equipment and systems.
 2. Construction requirements for concrete bases.
- B. Related Requirements:
1. Section 260548.16 "Seismic Controls for Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

1.3 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 the following:
 - a. Hangers.
 - b. Steel slotted support systems.
 - c. Nonmetallic support systems.
 - d. Trapeze hangers.
 - e. Clamps.
 - f. Turnbuckles.
 - g. Sockets.
 - h. Eye nuts.
 - i. Saddles.
 - j. Brackets.
 2. Include rated capacities and furnished specialties and accessories.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. For fabrication and installation details for electrical hangers and support systems.
1. Trapeze hangers. Include product data for components.
 2. Steel slotted-channel systems.
 - 3.
 4. Nonmetallic slotted-channel systems.
 5. Equipment supports.
 6. 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.
- C. Delegated-Design Submittal: For hangers and supports for electrical systems.
1. Include design calculations and details of trapeze hangers.

2. Include design calculations for seismic restraints.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) 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. Suspended ceiling components.
 2. Structural members to which hangers and supports will be attached.
 3. Size and location of initial access modules for acoustical tile.
 4. Items penetrating finished ceiling, including the following:
 - a. Lighting fixtures and lighting control.
 - b. Electrical power devices
 - c. Communications devices.
 - d. Air outlets and inlets.
 - e. Speakers.
 - f. Fire sprinklers.
 - g. Access panels.
 - h. Projectors.
 - i. Fire alarm system devices.
 - j. Nurse call system devices.
- B. Seismic Qualification Certificates: For hangers and supports for electrical equipment and systems, 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. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.

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 and the system will be fully operational after the seismic event."
 2. Component Importance Factor: 1.5.

- C. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame Rating: Class 1.
 - 2. Self-extinguishing according to ASTM D 635.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4 factory-fabricated components for field assembly.
 - 1. Material: Galvanized steel.
 - 2. Channel Width: Use 1-1/4 inches (31.75 mm) where possible and minimum 13/16 inches (20.64 mm) where necessary due to space restrictions.
 - 3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 4. 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 electrical conductors 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 and are limited to 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, stainless 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. 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.
- B. Materials: Comply with requirements in Section 05 50 00 "Metal Fabrications" for steel shapes and plates.

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 scheduled in NECA 1, where Table 1 lists maximum spacings that are less than those stated in NFPA 70. Minimum rod size shall be **3/8 inch (9 mm)** in diameter.
- D. Multiple Raceways: Install trapeze-type supports fabricated with steel slotted 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.
- E. Spring-steel clamps designed for supporting single conduits without bolts may be used for **1-1/2-inch (38-mm)** 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. Raceway Support Methods: In addition to methods described in NECA 1, EMTs, IMCs, and RMCs may be supported by openings through structure members, according to NFPA 70. Only prefabricated openings in structure members may be used. Do not create openings in structure members unless directed to do so by the structural engineer of record.
- C. Cable Support Methods: Cables used for Circuits and Equipment Operating at Less Than 50 Volts and Class 1, 2 or 3 Remote-Control, Signaling and Power-Limited Circuits shall be installed in J-hooks. Where cables extend from J-hooks to equipment cables shall be supported from the structure by straps, hangers, cable ties or similar fittings designed and installed so as not to damage the cable. Do not fasten or secure cables to the raceways of the power system.
- D. 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 (90 kg)**.
- E. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.

5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete **4 inches (100 mm)** thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than **4 inches (100 mm)** thick.
 6. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
 7. To Light Steel: Sheet metal screws.
 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on **13/16 inches (20.64 mm)** slotted-channel racks attached to substrate by means that comply with seismic-restraint strength and anchorage requirements.
- F. 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. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than **4 inches (100 mm)** larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use **3000-psi (20.7-MPa)**, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 03 30 00 "Cast-in-Place Concrete" or Section 03 30 53 "Miscellaneous Cast-in-Place Concrete."
- C. Anchor equipment to concrete base as follows:
 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

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 minimum dry film thickness of **2.0 mils (0.05 mm)**.

- B. Touchup: Comply with requirements in Section 09 91 13 "Exterior Painting", Section 099123 "Interior Painting" and Section 099600 "High-Performance Coatings" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 26 05 33
RACEWAYS AND BOXES 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. Metal conduits, tubing, and fittings.
 2. Nonmetal conduits, tubing, and fittings.
 3. Metal wireways and auxiliary gutters.
 4. Surface raceways.
 5. Boxes, enclosures, and cabinets.
 6. 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.

1.3 DEFINITIONS

- A. ARC: Aluminum Rigid Conduit.
- B. EMT: Electrical Metallic Tubing.
- C. GRC: Galvanized rigid steel conduit.
- D. IMC: Intermediate metal conduit.
- E. RTRC: Reinforced Thermosetting Resin Conduit.

1.4 ACTION SUBMITTALS

- A. Product Data: For color coded EMT conduit, surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. LEED Submittals:
1. Product Data for Credit IEQ 4.1: For solvent cements and adhesive primers, documentation including printed statement of VOC content.
 2. Laboratory Test Reports for Credit IEQ 4: For solvent cements and adhesive primers, documentation indicating that products 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. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.5 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. Qualification Data: For professional engineer.
- C. Seismic Qualification Certificates: For enclosures, cabinets, and conduit racks and their mounting provisions, including those for internal 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. Detailed description of conduit support devices and interconnections on which the certification is based and their installation requirements.
- D. Source quality-control reports.

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. GRC: Comply with ANSI C80.1 and UL 6.
- C. ARC: Comply with ANSI C80.5 and UL 6A.
- D. IMC: Comply with ANSI C80.6 and UL 1242.
- E. EMT: Comply with ANSI C80.3 and UL 797. Factory applied color finish available in black, orange, green, purple, red, yellow, blue, and white. Refer to Specification Section 26 05 53 "Identification for Electrical Systems" for color coding of raceways.
- F. FMC: Comply with UL 1; zinc-coated steel.
- G. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- H. 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: Set screw or compression.
 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.
- I. 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 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

- A. Listing and Labeling: Nonmetallic 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. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
- C. Continuous HDPE: Comply with UL 651B.
- D. RTRC: Comply with UL 1684A and NEMA TC 14.
- E. Fittings for RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
- F. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- G. Solvent cements and adhesive primers 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."

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 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.
- C. Wireway Covers: Hinged type unless otherwise indicated.
- D. Finish: Manufacturer's standard enamel finish.

2.4 RECEPTACLE RACEWAYS

- A. Listing and Labeling: Receptacle raceways shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- B. Surface Metal Raceways: Aluminum with snap-on covers complying with UL. Clear anodized finish.
 - 1. Raceways for receptacles only: Wiremold AL3300 series.
 - 2. Raceways for applications where both receptacles and data devices are installed in the raceway and at all laboratory locations: Wiremold ALA4800 series two-channel and dual-cover. Satin anodized finish.
 - 3. Provide duplex receptacles at 12 inches on center in all receptacle raceways. Provide GFCI receptacles as noted on drawings.

2.5 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, aluminum, Type FD, with gasketed cover.
- D. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- E. Floor Boxes and Poke-Through Devices: Refer to Specification Section 26 27 26 "Wiring Devices" for floor boxes and poke-through devices
- F. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing **50 lb (23 kg)**. Outlet boxes designed for attachment of luminaires weighing more than **50 lb (23 kg)** 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:
 - 1. **Wiring Devices other than data or communications devices: Minimum 4 inches square by 2-1/8 inches deep** with switch ring as required for the device configuration and wall or ceiling surface. Where light switches are indicated at a common location provide multi-gang boxes to accommodate the quantity and type of switches indicated. Where deeper boxes are required provide masonry type boxes which do not require a separate switch ring.
 - 2. Data and communications devices: Minimum 4-11/16 inches square by 3 inches deep with single-gang 5/8 inch deep (or deeper if wall or ceiling finish is deeper) ring.
- K. Pull boxes behind monitors: Minimum 6 inches square by 3-1/2 inches deep with two-gang ring.
- L. Gangable boxes are prohibited.
- M. Partitions: Provide partitions to separate emergency system conductors from conductors or other systems, where voltage between adjacent switches exceeds 300 volts and where switches controlling Low Voltage Controllers for interface to Nurse Call systems are installed in common boxes with line voltage switches.

- N. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250.
 - 1. Indoor: Type 1 with continuous-hinge cover with flush latch unless otherwise indicated. Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Outdoor: Type 4X with continuous-hinge cover with flush latch unless otherwise indicated. 304 stainless steel with smooth brushed finish.
 - 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel. Provide interior panels when there are control devices or power blocks located inside the enclosure.
- O. Handholes and Boxes for Exterior Underground Wiring: Refer to Specification Section 26 05 43 "Underground Ducts and Raceways for Electrical Systems".

2.6 PUTTY PADS

- A. Moldable intumescent wall opening-protective pads designed for application to the back of electrical outlet boxes prior to installation of the wall finish to provide up to 2-hour fire barrier ratings and minimum Sound Transmission Class (STC) of 52 when tested in an STC-53 rated wall assembly or 59 according to ASTM E90-97.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. 3M Company.
 - 2. Hilti

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed Conduit: GRC or IMC.
 - 2. Concealed Conduit, Aboveground: EMT.
 - 3. Underground Conduit for branch circuits: RNC, Type EPC-40-PVC, direct buried.
 - 4. Underground Conduit for feeders: Refer to Specification Section 26 05 43 "Underground Ducts and Raceways for Electrical Systems".
 - 5. Raceways Embedded in slabs or composite steel and concrete decks are prohibited.
 - 6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 7. Boxes and Enclosures, Aboveground: NEMA 250, Type 4X, 304 stainless steel.
- 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 or IMC. Raceway locations include the following:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms below 8 feet.
 - d. Gymnasiums.
 - 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 5. Feeder Raceways under Slabs: RNC, Type EPC-40-PVC encased in not less than 2 inches of 3000 psi concrete. Change from RNC, Type EPC-40-PVC to GRC or IMC before rising above floor.

6. Branch Circuit Raceways under Slabs: Refer to Specifications Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables" for allowable application of under slab raceways. RNC, Type EPC-40-PVC direct buried. Change from RNC, Type EPC-40-PVC to GRC or IMC before rising above floor.
 7. Raceways Embedded in slabs or composite steel and concrete decks are prohibited.
 8. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 9. Damp or Wet Locations: GRC or IMC.
 10. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4X, 304 stainless steel in kitchens and damp or wet locations.
 - 11.
- C. Minimum Raceway Size: **3/4-inch (21-mm)** 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. EMT: Use setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
 3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.
- F. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- G. Install surface raceways only where indicated on Drawings.

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. Separation of Life Safety and Critical Branch Wiring: Comply with NFPA 70 Article 517.
- C. Keep raceways at least **6 inches (150 mm)** away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- D. Complete raceway installation before starting conductor installation.
- E. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for hangers and supports.
- F. Arrange stub-ups so curved portions of bends are not visible above finished slab except where concealed in chases.
- G. 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 (300 mm)** of changes in direction.

- H. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- I. Support conduit within **12 inches (300 mm)** of enclosures to which attached.
- J. Raceways Embedded in Slabs are prohibited.
- K. 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.
- L. 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.
- M. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- N. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- O. 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 (35mm)** trade size and insulated throat metal bushings on **1-1/2-inch (41-mm)** trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- P. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- Q. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- R. Cut conduit perpendicular to the length. For conduits **2-inch (53-mm)** trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- S. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than **200-lb (90-kg)** tensile strength. Leave at least **12 inches (300 mm)** of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- T. Surface Raceways:
 - 1. Install surface raceway with a minimum **2-inch (50-mm)** radius control at bend points.
 - 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding **48 inches (1200 mm)** and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- U. 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. Install raceway sealing fittings according to NFPA 70.
- V. 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.
- W. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- X. Expansion(Seismic)-Joint Fittings:
1. Install flexible metal conduit at all locations where conduits cross building or structure expansion joints. Allow for minimum 4 inches deflection in all directions or greater if expansion joint exceeds 4 inches. Provide droop in flexible conduit to accommodate movement. Do not loop the flexible conduit. When calculating total bend degrees in conduit runs with expansion fittings use minimum 60 degrees for each expansion-joint fitting
 2. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- Y. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of **72 inches (1830 mm)** of flexible conduit for 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.
- Z. 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 center of box unless otherwise indicated.
- AA. 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 box and cover plate or supported equipment and box.
- BB. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- CC. Locate boxes so that cover or plate will not span different building finishes.
- DD. 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.
- EE. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- FF. Set metal floor boxes level and flush with finished floor surface.
- GG. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.
- 3.3 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."

3.4 FIRESTOPPING AND SOUND TRANSMISSION MITIGATION

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 07 84 13 "Penetration Firestopping."
- B. Install putty pads with acoustical and firestopping capabilities on all boxes that are installed in wall or partition cavities and in gypsum board ceilings.

3.5 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 44**SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING****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 for raceway and cable penetration of non-fire-rated construction walls and floors.
 - 2. Sleeve-seal systems.
 - 3. Sleeve-seal fittings.
 - 4. Grout.
 - 5. Silicone sealants.
- B. Related Requirements:
 - 1. Section 07 84 13 "Penetration Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. LEED Submittals:
 - 1. Product Data for Credit EQ 4.1: For sealants, documentation including printed statement of VOC content.
 - 2. Laboratory Test Reports for Credit EQ 4: For sealants, documentation indicating that products 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."

PART 2 - PRODUCTS**2.1 SLEEVES**

- A. Wall Sleeves:
 - 1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
 - 2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

- B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; **0.0239-inch (0.6-mm)** minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.
- C. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- D. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.
- E. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.
- F. Sleeves for Rectangular Openings:
 - 1. Material: Galvanized sheet steel.
 - 2. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than **50 inches (1270 mm)** and with no side larger than **16 inches (400 mm)**, thickness shall be **0.052 inch (1.3 mm)**.
 - b. For sleeve cross-section rectangle perimeter **50 inches (1270 mm)** or more and one or more sides larger than **16 inches (400 mm)**, thickness shall be **0.138 inch (3.5 mm)**.

2.2 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 - 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.

2.3 SLEEVE-SEAL FITTINGS

- A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.

2.4 GROUT

- A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: **5000-psi (34.5-MPa)**, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

2.5 SILICONE SEALANTS

- A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.
 - 2. Sealant shall have VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 3. 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."
- B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

PART 3 - EXECUTION**3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS**

- A. Comply with NECA 1.
- B. Comply with NEMA VE 2 for cable tray and cable penetrations.
- C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
 - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079200 "Joint Sealants."
 - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 - 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed or unless seismic criteria require different clearance.
 - 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
 - 5. Install sleeves for floor penetrations. Extend sleeves installed in floors 4 inches above finished floor level. Install sleeves during erection of floors.
- D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
 - 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using cast-iron pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

- G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing sleeve-seal system.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 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.

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. Identification for raceways.
 - 2. Identification of power and control cables.
 - 3. Identification for conductors.
 - 4. Underground-line warning tape.
 - 5. Warning labels and signs.
 - 6. Instruction signs.
 - 7. Equipment identification labels, including arc-flash warning labels.
 - 8. Miscellaneous identification products.

1.3 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 electrical identification products.
- 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. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.
- D. Delegated-Design Submittal: For arc-flash hazard study.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1 and IEEE C2.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Use the following color code for all electrical equipment and junction boxes that are specified to be labeled:
 - 1. Standby Power Circuits: Black letters on red field.
 - 2. Life Safety Branch Circuits: White letters on orange Field
 - 3. Critical Branch Circuits: White letters on red Field
 - 4. Equipment System Circuits: White letters on green field.
 - 5. Normal Power Circuits: White letters on black field.
 - 6. Uninterruptible Power Supply (UPS):
 - a. UPS-A: Blue letters on a grey field.
 - b. UPS-B: Red letters on a grey field.
 - 7. Fire Alarm: Red letters on white field.
 - 8. Communications: White letters on blue field.
- B. 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 XX INCHES" where XX is replaced by the clearance requirements of NFPA 70.
- C. Use the following color code for all electrical raceways that are specified to be labeled:
 - 1. Color Coding for Raceways:
 - a. Standby Power: Black
 - b. Life Safety Branch: Yellow
 - c. Critical Branch: Orange
 - d. Equipment Branch: Green
 - e. UPS: White
 - f. Fire alarm: Red
 - g. Communications: Blue
 - h. Access Control: Purple
 - 2. Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: where voltage, system type, or other written information is required, black lettering on orange background.
- D. Labels on receptacle and switch cover plates shall match the respective plate color.

2.3 LABELS

- A. Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: printed, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

- B. Indoor Equipment Labels: Self-adhesive, engraved, laminated acrylic or melamine plastic label. Unless otherwise indicated, provide a single line of text with **1/2-inch- (13-mm-)** high letters on **1-1/2-inch- (38-mm-)** high label; where two lines of text are required, use labels **2 inches (50 mm)** high. Color coded as indicated in Color and Legend Requirements.
- C. Outdoor Equipment: Engraved, laminated acrylic or melamine plastic label, punched or drilled for mechanical fasteners. Unless otherwise indicated, provide a single line of text with **1/2-inch- (13-mm-)** high letters on **1-1/2-inch- (38-mm-)** high label; where two lines of text are required, use labels **2 inches (50 mm)** high. Color coded as indicated in Color and Legend Requirements.

2.4 BANDS AND TUBES:

- A. Snap-Around, Color-Coding Bands for Cables: Slit, pretensioned, flexible, solid-colored acrylic sleeves, **2 inches (50 mm)** long, with diameters sized to suit diameters of raceways or cables they identify, 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.

2.6 SIGNS

- A. Laminated Acrylic or Melamine Plastic Signs:
 - 1. Engraved legend.
 - 2. Thickness:
 - a. For signs up to **20 sq. inches (129 sq. cm)**, minimum **1/16-inch- (1.6-mm-)**.
 - b. For signs larger than **20 sq. inches (129 sq. cm)**, **1/8 inch (3.2 mm)** thick.
 - c. Engraved legend with white letters on a dark grey background.
 - d. Punched or drilled for mechanical fasteners.
 - e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.7 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 PREPARATION

- A. 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.

3.2 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. 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.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- G. Attach plastic raceway and cable labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
- H. System Identification for Feeder Raceways: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at **50-foot (15-m)** maximum intervals in straight runs, and at **25-foot (7.6-m)** maximum intervals in congested areas.
- I. Fire Alarm: Provide raceway with factory applied finish or paint conduit in field.
- J. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at **6 to 8 inches (150 to 200 mm)** below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds **16 inches (400 mm)** overall.

3.3 IDENTIFICATION SCHEDULE

- A. Switchboards and Panelboards: Include Identification per the One-Line Diagrams and the Source Location, including the circuit number.
- B. Disconnect Switches, Enclosed Circuits Breakers and Motor Controllers. Identify the equipment that is controlled and the Source, including the circuit number.
- C. Accessible Raceways, including above accessible ceilings, for all Feeder Circuits and for Branch Circuit rated more than 30A: Identify with self-adhesive tape or vinyl label. Install labels at **30-foot (10-m)** maximum intervals.
- D. Accessible Raceways and Cables, including above accessible ceilings, within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels indicating the wiring system and system voltage. Conform to system color legend/schedule.
 - 1. Standby Power
 - 2. Life Safety Branch
 - 3. Critical Branch
 - 4. Equipment System

5. Normal Power
 6. UPS
 7. Fire Alarm
 8. Communications
 9. Access Control
- E. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
1. Grounded Systems: Color-Coding for Phase-, Neutral- and Voltage-Level Identification: Use colors listed below for feeder and branch-circuit conductors.
 - a. Colors for 208/120-V Circuits:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Feeder Neutral: White
 - 5) Branch Circuit Neutral: White with colored stripe matching the color of the phase circuit that is paired with the neutral.
 - b. Colors for 480/277-V Circuits:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - 4) Feeder Neutral: Grey
 - 5) Branch Circuit Neutral: Grey with colored stripe matching the color of the phase circuit that is paired with the neutral.
 2. Isolated Power Systems: Color-Coding for Circuit Identification: Use colors listed below for Isolated Power conductors.
 - a. Isolated Conductor No.1: Orange with at least one distinctive colored stripe other than white, green, or grey along the entire length of the conductor.
 - b. Isolated Conductor No. 2: Brown with at least one distinctive colored stripe other than white, green, or grey along the entire length of the conductor.
 3. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
 - a. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
 4. Provide a sign at each panelboard identifying the color coding scheme.
- F. Install instructional sign, including the color code for grounded and ungrounded conductors using adhesive-film-type labels.
- G. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive vinyl labels with the conductor or cable designation, origin, and destination.
- H. Control-Circuit Conductor Termination Identification: For identification at terminations, provide self-adhesive vinyl labels with the conductor designation.
- I. Conductors To Be Extended in the Future: Attach write-on tags to conductors and list source.
- J. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 2. Use system of marker-tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.

3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- K. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.
1. Limit use of underground-line warning tape to direct-buried cables.
 2. Install underground-line warning tape for direct-buried cables and cables in raceways.
- L. Workspace Indication: Install floor marking tape to 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.
- M. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.
1. Comply with 29 CFR 1910.145.
 2. Identify system voltage with black letters on an orange background.
 3. Apply to exterior of door, cover, or other access.
 4. 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 thermal transfer vinyl labels.
1. Comply with NFPA 70E and ANSI Z535.4.
 2. Comply with Section 26 05 74 "Overcurrent Protective Device Arc-Flash Study" requirements for arc-flash warning labels.
- O. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- P. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum **3/8-inch- (10-mm-)** high letters for emergency instructions at equipment used for power transfer or load shedding.
- Q. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm unless equipment is provided with its own identification.
1. Labeling Instructions:
 - a. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
 - b. Fasten mechanically fastened labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
 2. Equipment To Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer.
 - b. Enclosures and electrical cabinets.
 - c. Lighting control relay cabinets.
 - d. Access doors and panels for concealed electrical items.
 - e. Switchgear.
 - f. Switchboards.

- g. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
- h. Emergency system boxes and enclosures.
- i. Motor-control centers.
- j. Enclosed switches.
- k. Enclosed circuit breakers.
- l. Enclosed controllers.
- m. Variable-speed controllers.
- n. Push-button stations.
- o. Power-transfer equipment.
- p. Contactors.
- q. Remote-controlled switches, dimmer modules, and control devices.
- r. Battery-inverter units.
- s. Battery racks.
- t. Power-generating units.
- u. Monitoring and control equipment.
- v. UPS equipment.
- w. Communications Equipment Racks.
- x. Fire Alarm System.
- y. Access Control System.
- z. Overhead Paging System.
- aa. Nurse Call System.

END OF SECTION

SECTION 26 09 23

LIGHTING CONTROL DEVICES

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. Photoelectric switches.
 - 2. Standalone daylight-harvesting switching controls.
 - 3. Daylight-harvesting dimming controls.
 - 4. Room Controllers.
 - 5. Stand Alone Indoor occupancy sensors.
 - 6. Lighting contactors.
 - 7. Emergency shunt relays.
 - 8. Low-Voltage Controllers
- B. Related Requirements:
 - 1. Section 26 27 26 "Wiring Devices" for wall-box dimmers, wall-switch occupancy sensors, low voltage dimmers, low voltage switches, and manual light switches.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show installation details for occupancy and light-level sensors.
 - 1. Submit complete scale drawing showing recommended location for each sensor, optimized for project conditions and coverage patterns for submitted devices.
 - 2. Interconnection diagrams showing field-installed wiring.
 - 3. Include diagrams for power, signal, and control wiring.
 - 4. Include legend for each light switch keyed to the lighting control shop drawings indicating engraving/labelling factory applied to each switch.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of lighting control device to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS**2.1 OUTDOOR PHOTOELECTRIC SWITCHES**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cooper Industries, Inc.
 2. Intermatic, Inc.
 3. Leviton Manufacturing Co., Inc.
 4. NSi Industries LLC.
 5. TE Connectivity Ltd.
- B. Description: Solid state, with SPST dry contacts rated for 1800 VA, to operate connected load, complying with UL 773.
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Light-Level Monitoring Range: 1.5 to 10 fc (16.14 to 108 lux), with an adjustment for turn-on and turn-off levels within that range.
 3. Time Delay: Thirty-second minimum, to prevent false operation.
 4. Lightning Arrester: Air-gap type.
 5. Mounting: Twist lock complying with NEMA C136.10, with base.

2.2 DAYLIGHT-HARVESTING SWITCHING CONTROLS

- A. Provide products that are of the same manufacturer or compatible with the manufacturers listed in Section 26 09 43, Relay Based Lighting Controls.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eaton (Cooper Controls), Inc.
 2. Lutron, Inc.
 3. Leviton Manufacturing Co., Inc.
 4. Philips Controls
 5. Acuity Controls
 6. Nextlite
 7. ETC
 8. Douglas Controls
 9. WattStopper
- C. Ceiling-Mounted Switching Controls: Solid-state, light-level sensor unit, with separate power pack, to detect changes in indoor lighting levels that are perceived by the eye.
- D. Electrical Components, Devices, and Accessories:
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F (0 to 49 deg C).
 3. Sensor Output: Contacts rated to operate the associated power pack, complying with UL 773A. Sensor is powered by the power pack.
 4. Power Pack: Dry contacts rated for 20-A ballast load at 120- and 277-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
 5. General Space Sensors Light-Level Monitoring Range: 10 to 200 fc (108 to 2152 lux), with an adjustment for turn-on and turn-off levels within that range.

6. Atrium Space Sensors Light-Level Monitoring Range: 100 to 1000 fc (1080 to 10 800 lux), with an adjustment for turn-on and turn-off levels within that range.
7. Skylight Sensors Light-Level Monitoring Range: 1000 to 10,000 fc (10 800 to 108 000 lux), with an adjustment for turn-on and turn-off levels within that range.
8. Time Delay: Adjustable from 5 to 300 seconds to prevent cycling.
9. Set-Point Adjustment: Equip with deadband adjustment of 25, 50, and 75 percent above the "on" set point, or provide with separate adjustable "on" and "off" set points.
10. Test Mode: User selectable, overriding programmed time delay to allow settings check.
11. Control Load Status: User selectable to confirm that load wiring is correct.
12. Indicator: Two digital displays to indicate the beginning of on-off cycles.

2.3 DAYLIGHT-HARVESTING DIMMING CONTROLS

- A. Provide products that are of the same manufacturer or compatible with the manufacturers listed in Section 26 09 43, Relay Based Lighting Controls.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Eaton (Cooper Controls), Inc.
 2. Lutron, Inc.
 3. Leviton Manufacturing Co., Inc.
 4. Philips Controls
 5. Acuity Controls
 6. NextLite
 7. Douglas Controls
 8. ETC
 9. WattStopper
- C. System Description: Sensing daylight and electrical lighting levels, the system adjusts the indoor electrical lighting levels. As daylight increases, the lights are dimmed.
 1. Lighting control set point is based on two lighting conditions:
 - a. When no daylight is present (target level).
 - b. When significant daylight is present.
 2. System programming is done with two hand-held, remote-control tools.
 - a. Initial setup tool.
 - b. Tool for occupants to adjust the target levels by increasing the set point up to 25 percent, or by minimizing the electric lighting level.
- D. Ceiling-Mounted Dimming Controls: Solid-state, light-level sensor unit, with separate controller unit, to detect changes in lighting levels that are perceived by the eye. The separate dimming control may be located in the appropriate relay cabinet for these circuits.
 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Sensor Output: 0- to 10-V dc to operate electronic dimming ballasts. Sensor is powered by controller unit.
 3. Power Pack: Sensor has 24-V dc, Class 2 power source, as defined by NFPA 70.
 4. Light-Level Sensor Set-Point Adjustment Range: 20 to 100 fc (120 to 600 lux).

2.4 ROOM CONTROLLERS

- A. Room Controllers are used to independently control lighting and switched receptacles.

- B. Provide products that are compatible with Indoor Occupancy Sensors.
- C. Digitally addressable room controller with the following functions.
 - 1. Autonomous space control.
 - 2. Networking to a central Dialog control system.
 - 3. Networking to a central BACnet based management system.
- D. The Room Controller shall consist of:
 - 1. A universal voltage type (120Vac/277Vac/347Vac) power supply.
 - 2. Four 20A rated relays complete with manual override. Circuit Load rating dependent on usage. One circuit dedicated for 20A receptacle control.
 - 3. Four 0-10V control channels, capable of 100mA current sinking
 - 4. A port to connect downstream switches, occupancy sensors and daylight sensors.
 - 5. A port to connect upstream to BACnet IP building management system. The Controller shall communicate using native BACnet command objects appropriate for the application.
 - 6. An indicating LED to aid in locating the controller in a darkened ceiling space.
 - 7. Circuit testing buttons
 - 8. Capable of connecting with WUL-3924
 - 9. Output 24Vac 120mA
 - 10. Relay Ratings
 - a. 20A Suitable for General Purpose Loads @ 120/277 VAC
 - b. 20A Suitable for Standard Ballasts and Tungsten Loads @ 120/277 VAC
 - c. 16A Suitable for Electronic Ballasts @ 120/277 VAC
 - d. 0.5HP @120/277 VAC.
 - 11. The Room Controller relays shall be connected such that 120Vac plug load(s) and 277Vac lighting loads can be switched by a single Controller with no additional add-ons or remote modules
 - 12. The Room Controller shall mount to electrical junction box via threaded ½" chase nipple. No other mounting hardware shall be required.
 - 13. Switches shall connect to the lighting control network via a common low voltage, 2-wire, non-polarized data line.
 - a. Switches shall be factory configured and programmed to control one or more outputs in the lighting control system.
 - b. Switches can be programmed for preset control to set a specific lighting scene.
 - c. Switches, with LED indicators to indicate both ON and OFF output/group status, shall be available with 2 or 4 single button switches per gang. Switch to fit standard Decora opening.
 - d. Switches and switch hardware shall mount to standard wall boxes.
 - e. Each switch shall provide a location for a label to identify function. The label shall be under a clear plastic cover and shall be field replaceable should the operation of the switch change. Permanently etched switches are not acceptable.
 - 14. Dimmer switches shall be connected to the lighting control network via a common low voltage 2-wire, non-polarized data line.
 - a. Dimmer switches shall be capable of raising or lowering light levels of individual or groups of lighting fixtures.
 - b. Dimmer switches shall be capable of controlling across the full range of dimming settings within a period of three (3) seconds.
 - 15. Space Control Requirements:
 - a. Provide manual-on / auto-off control for lighting in all spaces that are controlled by a Room Controller.
 - b. Provide auto-on / auto-off control for all switched receptacles that are controlled by a Room Controller.
 - c. Provide auto-on / auto-off control for HVAC serving all spaces that contain a Room Controller. Control to be provided by either two-wire signal based on relay contact position or direct communication with the building management system

using BACnet commands. Coordinate with building management system installer.

16. Shall have a built in dimmer memory, the light output will remain at the previous setting when the lights are turned off and back on.

2.5 INDOOR OCCUPANCY SENSORS

- A. Provide products that are of the same manufacturer or compatible with the manufacturers listed in Section 26 09 43, Relay Based Lighting Controls.
- B. General Requirements for Sensors: Wall- or ceiling-mounted, solid-state indoor occupancy sensors with a separate power pack.
 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Operation: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn them off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 3. In locations where the sensor or the local switch is/are marked "VS" the sensor shall turn the lights off automatically upon room vacancy. The lights shall turn on only upon activation from the associated wall station.
 4. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor is powered from the power pack.
 5. Power Pack: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
 6. Mounting:
 - a. Sensor: Suitable for mounting in any position on a standard outlet box.
 - b. Relay: Externally mounted through a 1/2-inch (13-mm) knockout in a standard electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
 7. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
 8. Bypass Switch: Override the "on" function in case of sensor failure.
 9. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc (21.5 to 2152 lux); turn lights off when selected lighting level is present.
- C. Dual-Technology Type: Ceiling mounted; detect occupants in coverage area using both PIR and ultrasonic detection methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.
 1. Sensitivity Adjustment: Separate for each sensing technology.
 2. Detector Sensitivity: Detect occurrences of 6-inch- (150-mm-) minimum movement of any portion of a human body that presents a target of not less than 36 sq. in. (232 sq. cm), and detect a person of average size and weight moving not less than 12 inches (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inches/s (305 mm/s).
 3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.
 4. Remote powerpacks using one or more sensors shall be used to cover space as indicated on drawings.
 5. Device shall be vacancy sensing (in conjunction with local wall station) if marked "VS". Otherwise device shall be occupancy sensing.

2.6 SWITCHBOX-MOUNTED OCCUPANCY SENSORS

- A. Provide products that are of the same manufacturer or compatible with the manufacturers listed in Section 260943, Relay Based Lighting Controls.
- B. General Requirements for Sensors: Automatic-wall-switch occupancy sensor, suitable for mounting in a single gang switchbox.
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application,
 - 2. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F (0 to 49 deg C).
 - 3. Switch Rating: Not less than 800-VA LED at 120 V, 1200-VA LED loads at 277 V,
- C. Wall-Switch Sensor:
 - 1. Standard Range: 180-degree field of view, field adjustable from 180 to 40 degrees; with a minimum coverage area of 900 sq. ft. (84 sq. m).
 - 2. Sensing Technology: Dual technology - PIR and ultrasonic.
 - 3. Switch Type: SP. SP, manual "on," automatic "off."
 - 4. Voltage: Dual voltage, 120 and 277 V;
 - 5. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc (108 to 1600 lux). The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
 - 6. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.
 - 7. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and helps eliminate false "off" switching.
 - 8. Device shall be Vacancy sensing if marked VS or occupancy sensing if not otherwise marked.

2.7 LIGHTING CONTACTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. [Allen-Bradley/Rockwell Automation.](#)
 - 2. [ASCO Power Technologies, LP; a division of Emerson Electric Co.](#)
 - 3. [Eaton Corporation.](#)
 - 4. GE Industrial Systems; Total Lighting Control.
 - 5. [Square D; a brand of Schneider Electric.](#)
- B. Description: Electrically operated, electrically held, combination-type lighting contactors with fusible switch complying with NEMA ICS 2 and UL 508.
 - 1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less total harmonic distortion of normal load current).
 - 2. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.
 - 3. Enclosure: Comply with NEMA 250.
 - 4. Provide with control and pilot devices as indicated on Drawings, matching the NEMA type specified for the enclosure.
- C. Interface with DDC System for HVAC: Provide hardware interface to enable the DDC system for HVAC to monitor and control lighting control systems and contactors.
 - 1. Monitoring: On-off status
 - 2. Control: On-off operation

2.8 EMERGENCY SHUNT RELAY

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eaton (Cooper Controls), Inc.
 2. Lutron, Inc.
 3. Leviton Manufacturing Co., Inc.
 4. Philips Controls
 5. Acuity Controls
 6. NextLite
 7. Douglas Controls
 8. Wattstopper
- B. Description: Normally closed, electrically held relay, arranged for wiring in parallel with automatic switching contacts; complying with UL 924.
1. Coil Rating: as scheduled.

2.9 LOW-VOLTAGE CONTROLLERS

- A. Low-Voltage Controllers are used to turn on and dim line voltage lighting safely when used with Nurse Call Pillow Speakers, Bed Side-Rail Controls and Momentary Dry Contact Switches.
- B. Manufacturers: Subject to compliance with requirements, provide the following:
1. Curbell Medical Products (Basis of Design is # LVC-2000-001)
- C. Description: 3 Channel lighting controller to continuously dim 2 channels using 0-10 vdc signals to the dimming LED drivers for the ambient light and reading light channels in the luminaire and to switch one channel via the LED driver(s) for the exam light portion of the luminaire. Controller shall have control inputs from nurse call pillow speaker contacts and also be switched from wall switches as shown.
- D. Installation: Lighting Controller shall be installed above the accessible ceiling outside the patient room for ease of access. All leads shall be extended from the switches, luminaire and nurse call system in an approved manner. Installer shall provide a NEMA 12 enclosure suitable for the purpose and mount the controller in this box. Observe required high and low voltage separation and physical barriers. Label the cover with the words "LIGHTING CONTROLLER FOR ROOM #####".

2.10 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."
- B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 22 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."
- C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION**3.1 SENSOR INSTALLATION**

- A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.
- B. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.2 CONTACTOR INSTALLATION

- A. Mount electrically held lighting contactors with elastomeric isolator pads to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.3 WIRING INSTALLATION

- A. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch (13 mm).
- B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- C. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.
- D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.4 IDENTIFICATION

- A. Identify components and power and control wiring according to Section 260553 "Identification for Electrical Systems."
 - 1. Identify controlled circuits in lighting contactors.
 - 2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.
- B. Label time switches and contactors with a unique designation.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified commissioning agent to evaluate lighting control devices and perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

- C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Lighting control devices will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.6 ADJUSTING

- A. Occupancy Adjustments: When requested within **12** months from date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to **two** visits to Project during other-than-normal occupancy hours for this purpose.
 - 1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.
 - 2. For daylighting controls, adjust set points and deadband controls to suit Owner's operations.
 - 3. Align high-bay occupancy sensors using manufacturer's laser aiming tool.

3.7 DEMONSTRATION

- A. Coordinate demonstration of products specified in this Section with demonstration requirements for low-voltage, programmable lighting control systems specified in Section 260943.13 "Addressable-Fixture Lighting Controls" and Section 26 09 43 "Relay-Based Lighting Controls."
- B. Train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION

SECTION 26 27 26
WIRING DEVICES**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. Receptacles, receptacles with integral GFCI, and associated device plates.
 - 2. Twist-locking receptacles.
 - 3. USB charger devices.
 - 4. Isolated-ground receptacles.
 - 5. Hospital-grade receptacles.
 - 6. Tamper-resistant receptacles.
 - 7. Weather-resistant receptacles.
 - 8. Snap switches and wall-box dimmers.
 - 9. Floor service outlets (floor boxes) and poke-through assemblies.
 - 10. Pendant Cord Connector Devices (Drop Cords).
 - 11. Cord Reels

1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- D. RFI: Radio-frequency interference.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Receptacles for Owner-Furnished Equipment: Match plug configurations.
 - 2. Cord and Plug Sets: Match equipment requirements.

1.5 ACTION SUBMITTALS

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

1.6 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton (Arrow Hart).
 - 2. Hubbell Incorporated; Wiring Device-Kellems.
 - 3. Leviton Manufacturing Co., Inc.
 - 4. Pass & Seymour/Legrand (Pass & Seymour).
- B. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, 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 NFPA 70.
- C. All devices must be manufactured for use with modular plug-in connectors, shall comply with UL 2459 and shall be made with stranded building wire. Devices shall comply with the requirements in this Section.

2.3 STRAIGHT-BLADE RECEPTACLES

- A. Hospital-Grade, Tamper Resistant, Duplex Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498 Supplement sd, and FS W-C-596.
 - 1. Description: Single-piece, rivetless, nickel-plated, all-brass grounding system. Nickel-plated, brass mounting strap. Mechanical shutter system to help prevent insertion of foreign objects. Labeled shall comply with NFPA 70, "Health Care Facilities" Article, "Pediatric Locations" Section.
- B. Isolated-Ground, Duplex Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.
 - 1. Description: Straight blade; equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.

- C. Tamper-Resistant Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498 Supplement sd, and FS W-C-596.
 - 1. Description: Labeled shall comply with NFPA 70, "Health Care Facilities" Article, "Pediatric Locations" Section.

2.4 GFCI RECEPTACLES

- A. General Description:
 - 1. Straight blade, non-feed-through type.
 - 2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
 - 3. Include indicator light that illuminates only when the GFCI has malfunctioned or tripped and no longer provides proper GFCI protection.
- B. Tamper-Resistant GFCI Convenience Receptacles, 125 V, 20 A:
- C. Hospital-Grade, Tamper Resistant, Duplex GFCI Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498 Supplement sd, and FS W-C-596.

2.5 TWIST-LOCKING RECEPTACLES

- A. Provide NEMA configurations as indicated on drawings.

2.6 PENDANT CORD-CONNECTOR DEVICES

- A. Description:
 - 1. Matching, locking-type plug and receptacle body connector.
 - 2. NEMA WD 6 Configurations L5-20P and L5-20R, heavy-duty grade, and FS W-C-596.
 - 3. Body: Nylon, with screw-open, cable-gripping jaws and provision for attaching external cable grip.
 - 4. External Cable Grip: Woven wire-mesh type made of high-strength, galvanized-steel wire strand, matched to cable diameter, and with attachment provision designed for corresponding connector.

2.7 CORD REELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Kitchen Leash by APC Group
- B. Description:
 - 1. Molded Polypropylene Housing.
 - 2. Retracting cord with adjustable stop.
 - 3. SJOW Power cord, 10 foot; rated 200 degrees.
 - 4. Receptacles Dual Duplex NEMA 5-20R unless noted otherwise.
 - 5. Impact: UL746C
 - 6. Hose Down: CSA 6.8.2
 - 7. Strain Relief: CSA 6.4
 - 8. Flame Retardant: UL 94-94V-2
 - 9. Mounting Bracket for ceiling mount.

2.8 CORD AND PLUG SETS

- A. Description:
1. Match voltage and current ratings and number of conductors to requirements of equipment being connected.
 2. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and ampacity of at least 130 percent of the equipment rating.
 3. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.9 TOGGLE SWITCHES

- A. Comply with NEMA WD 1, UL 20, and FS W-S-896.
- B. Switches, 120/277 V, 20 A:
1. Single Pole and Three Way:
 - a. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1) [Eaton \(Arrow Hart\)](#).
 - 2) [Hubbell Incorporated; Wiring Device-Kellems](#).
 - 3) [Leviton Manufacturing Co., Inc.](#)
 - 4) [Pass & Seymour/Legrand \(Pass & Seymour\)](#).
- C. Key-Operated Switches, 120/277 V, 20 A:
1. Description: Single pole, with factory-supplied key in lieu of switch handle.
 - a. Public Restrooms and Other Spaces: Keyed switch, heavy duty specification grade (Pass & Seymour PS20AC1-WL or equivalent).
 - b. Behavioral Health Patient Accessible Spaces: Keyed locking switch, extra heavy duty specification grade security switch (Pass & Seymour PS20AC1-KL or equivalent). Coordinate common or differentiated keying of multiple switches with owner.
- D. Momentary Contact Switches: 2-Button, Single Pole, Low-voltage switch, mounts in standard single gang ring.
- E. Key-Operated, Single-Pole, Double-Throw, Momentary-Contact, Center-off Switches: 120/277 V, 20 A; for use with mechanically held lighting contactors, with factory-supplied key in lieu of switch handle.
- F. Decora style rocker switches are not permitted.

2.10 WALL-BOX DIMMERS

- A. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.
- B. Control: Continuously adjustable full width slider; with single-pole or three-way switching. Comply with UL 1472.

- C. Incandescent Lamp Dimmers: 120 V; control shall follow square-law dimming curve. On-off switch positions shall bypass dimmer module for off.
 - 1. These shall be used to control power modules driving large quantity of LED drivers using 0-10VDC control signals. This interface shall operate either 120 or 277 volt circuits, 200 ma rating.
- D. Decora style rocker switches are not permitted.
- E. LED and Low Voltage Dimmer Switches:
 - 1. Modular; compatible with LED drivers; trim potentiometer to adjust low-end dimming used where "LR" is shown, otherwise full range of 1% to 100% of lumen output or as noted.
 - 2. Maximum of four (4) buttons per gang.
 - 3. Dimmer shall operate either 120 or 277 volt circuits, 28 ma minimum rating.
 - 4. Touch dimming switches shall cover the full range of dimming with a single press-and-hold function in not more than three (3) seconds.
 - 5. Switches, with LED indicators to indicate both ON and OFF status, shall be available with 2 or 4 single button switches per gang. Switch to fit standard Decora opening.
 - 6. Switches and switch hardware shall mount to standard wall boxes.
 - 7. Each switch shall provide a location for a label to identify function. The label shall be under a clear plastic cover and shall be field replaceable should the operation of the switch change. Permanently etched switches are not acceptable unless specifically noted otherwise.
- F. Slide Dimmer Locations:
 - 1. Exam Rooms, Imaging Rooms, Operating Rooms, Procedure Rooms, Recovery Bays, and Imaging Control Rooms: Provide slide dimmer switches; do not provide touch dimming switches in these spaces except when an integrated component of an antimicrobial or integrated operating room ceiling system.

2.11 WALL PLATES

- A. Single and combination types shall match corresponding wiring devices.
 - 1. Plate-Securing Screws (behavioral health spaces): Metal tamper resistant TORX screws with head color to match plate finish.
 - 2. Plate-Securing Screws (other than behavioral health spaces): Metal with head color to match plate finish.
 - 3. Material for Finished Spaces, except Operating Rooms, Food Service Kitchens, and Behavioral Health Spaces: Smooth, high-impact thermoplastic.
 - 4. Material for Operating Rooms and Food Service Kitchen: **0.035-inch- (1-mm-)** thick, satin-finished, Type 302 stainless steel.
 - 5. Material for Behavioral Health Spaces: Smooth, nylon, unbreakable, with a minimum of two (2) screws per gang; provide Torx head tamper resistant screws.
 - 6. Material for Unfinished Spaces: Galvanized steel.
 - 7. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable, weatherproof-in-use cover.

2.12 FLOOR SERVICE FITTINGS

- A. **Manufacturers:** Subject to compliance with requirements, provide products by the following:

1. [Wiremold / Legrand](#).
- B. Type: Modular, flush-type, dual- or multi- service units suitable for wiring method used.
- C. Compartments: Barrier separates power from voice and data communication cabling.
- D. Service Plate: Round, die-cast aluminum with satin finish.
- E. Power Receptacle: NEMA WD 6 Configuration 5-20R, gray finish, unless otherwise indicated.
- F. Voice and Data Communication Outlet: Two modular, keyed, color-coded, RJ-45 jacks for UTP cable complying with requirements in owner's Section 27 00 00 requirements.
- G. Description by Device Type:

FB1	Flush, Dual Service, Furniture Feed. One .75" conduit for power and One 2" conduit for data cabling. See plans for circuits and data drops. Finish selected by architect.	Legrand EFBFF Hubbell CFB2G30/2GCFFCVR
FB4	Flush, Dual Service, one piece finish flange. Four gang capacity. One .75" conduit for power and one 2" conduit for data cabling. See plans for circuits and data drops. Finish selected by architect.	Legrand EFG45S Hubbell CFB2G30/24GCCVR
FB6	Flush, Dual Service, one piece finish flange. Six gang capacity. One .75" conduit for power and one 2" conduit for data cabling. See plans for circuits and data drops. Finish selected by architect.	Legrand EFB6S Evolution Hubbell CFB6G30/610GCCVR
FB8	Flush, Dual Service, one piece finish flange. Eight gang capacity. One .75" conduit for power and one 2" conduit for data cabling. See plans for circuits and data drops. Finish selected by architect.	Legrand EFB8S Evolution
FB10	Flush, Dual Service, one piece finish flange. Ten gang capacity. One .75" conduit for power and one 2" conduit for data cabling. See plans for circuits and data drops. Finish selected by architect.	Legrand EFB10S Evolution Hubbell CFB10G30/610GCCVR
FB11	Flush single service floor box suitable for the wiring method used. NEMA 5-20R duplex receptacle with brushed aluminum flange and cover plate. Hinged receptacle covers. Housing material shall be stamped steel above grade and cast iron at grade. Provide appropriate carpet and tile flanges.	Legrand 880MS(CS)/817/828 Hubbell B2431/S3825

2.13 POKE-THROUGH ASSEMBLIES

- A. [Manufacturers](#): Subject to compliance with requirements, provide products by the following:
 1. [Wiremold / Legrand](#).
- B. Description:
 1. Factory-fabricated and -wired assembly of below-floor junction box with multichanneled, through-floor raceway/firestop unit and detachable matching floor service-outlet assembly.
 2. Comply with UL 514 scrub water exclusion requirements.
 3. Size: Selected to fit cored holes in floor and matched to floor thickness.
 4. Fire Rating: Unit is listed and labeled for fire rating of floor-ceiling assembly.
 5. Closure Plug: Arranged to close unused cored openings and reestablish fire rating of floor.
- C. Description by Device Type:

PT1	Flush, Dual Service, 4" Diameter Furniture Feed Poke-Thru. One piece finish flange. One .75" conduit for power, One 1.5" conduit for data	Legrand 4FFATC Hubbell PT73FFS/FRF3
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	cabling. See plans for circuits and data drops. Finish selected by architect.	
PT2	Flush, Dual Service Capable, 4"Diameter Poke-Thru. One .75" conduit for power, one 1.5" conduit for data cabling. Two Gang Capacity. See plans for circuits and data drops. Receptacles shall be NEMA 5-20R, Finish selected by architect.	Legrand 4AT Evolution Hubbell S1R4PT
PT3	Flush, Dual Service Capable, 6"Diameter Poke-Thru. One .75" conduit for power, one 1.5" conduit for data cabling. Three Gang Capacity. See plans for circuits and data drops. Receptacles shall be NEMA 5-20R, Finish selected by architect.	Legrand 6AT Evolution Hubbell S1R6PT
PT8	Flush, Dual Service Capable, 8"Diameter Poke-Thru. One .75" conduit for power, one 2" conduit for data cabling. Five Gang Capacity. See plans for circuits and data drops. Receptacles shall be NEMA 5-20R, Finish selected by architect.	Legrand 8AT Evolution Hubbell S1R8PT
PT10	Flush, Dual Service Capable, 10"Diameter Poke-Thru. One .75" conduit for power, one 2" conduit for data cabling. Eight Gang Capacity. See plans for circuits and data drops. Receptacles shall be NEMA 5-20R, Finish selected by architect.	Legrand 10AT Evolution Hubbell S1R10PT
PT11	Flush single service floor box suitable for the wiring method used. NEMA 5-20R duplex receptacle with brushed aluminum flange and cover plate. Hinged receptacle covers.	Legrand RC7CTC Hubbell PT7FS/FRF

2.14 FINISHES

A. Device Color:

1. Wiring Devices Connected to Normal Power System: Gray in Food Service Kitchen. As selected by Architect in other finished spaces unless otherwise indicated or required by NFPA 70 or device listing.
2. Wiring Devices Connected to Essential Power System: Red.
3. Isolated-Ground Receptacles: Orange.
4. UPS receptacles: Grey

B. Wall Plate Color:

1. Plastic covers: Match device color.
2. Cover plates for receptacles mounted above data racks in TEC and TDR rooms: Provide blue cover plates for receptacles served by UPS-A and red cover plates for receptacles served by UPS-B.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.

4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
 4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtailling existing conductors is permitted, provided the outlet box is large enough.
- D. Device Installation:
1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
 4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
 5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
 6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
 7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
 8. Tighten unused terminal screws on the device.
 9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
- E. Receptacle Orientation:
1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.
 2. Install hospital-grade receptacles in patient-care areas with the ground pin or neutral blade at the top.
- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Dimmers:
1. Install dimmers within terms of their listing.
 2. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.
 3. Install 0-10VDC control wiring in conduit with power wiring. Use conductors with insulation equivalent to insulation of power wiring.
- H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
- I. Adjust locations of floor boxes and pokethroughs to suit arrangement of partitions and furnishings.

3.2 GFCI RECEPTACLES

- A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

3.3 IDENTIFICATION

- A. Comply with Section 260553 "Identification for Electrical Systems."
- B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. In healthcare facilities, prepare reports that comply with recommendations in NFPA 99.
 - 2. Test Instruments: Use instruments that comply with UL 1436.
 - 3. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- B. Tests for Convenience Receptacles:
 - 1. Line Voltage: Acceptable range is 105 to 132 V.
 - 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
 - 3. Ground Impedance: Values of up to 2 ohms are acceptable.
 - 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 - 5. Using the test plug, verify that the device and its outlet box are securely mounted.
 - 6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- C. Test straight-blade convenience outlets in patient-care areas for the retention force of the grounding blade according to NFPA 99. Retention force shall be not less than 4 oz. (115 g). Submit test report indicting each receptacle and test result.
- D. Wiring device will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

END OF SECTION

SECTION 26 28 13
FUSES**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. Cartridge fuses rated 600-V ac and less for use in enclosed switches, panelboards and enclosed controllers.,
 - 2. Spare-fuse cabinets.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material, dimensions, descriptions of individual components, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:
 - 1. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.
 - a. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
 - b. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.
 - 2. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
 - 3. Fuse sizes for elevator feeders and elevator disconnect switches.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - 1. Ambient temperature adjustment information.
 - 2. Coordination charts and tables and related data.

1.5 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. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.
- 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. Comply with UL 248-11 for plug fuses.

1.7 PROJECT CONDITIONS

- A. Where ambient temperature to which fuses are directly exposed is less than **40 deg F (5 deg C)** or more than **100 deg F (38 deg C)**, apply manufacturer's ambient temperature adjustment factors to fuse ratings.

1.8 COORDINATION

- A. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper Bussmann, Inc.
 - 2. Edison Fuse, Inc.
 - 3. Ferraz Shawmut, Inc.
 - 4. Littelfuse, Inc.

2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

2.3 PLUG FUSES

- A. Characteristics: UL 248-11, nonrenewable plug fuses; 125-V ac.

2.4 PLUG-FUSE ADAPTERS

- A. Characteristics: Adapters for using Type S, rejection-base plug fuses in Edison-base fuseholders or sockets; ampere ratings matching fuse ratings; irremovable once installed.

2.5 SPARE-FUSE CABINET

- A. Characteristics: Wall-mounted steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.
 - 1. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.
 - 2. Finish: Gray, baked enamel.
 - 3. Identification: "SPARE FUSES" in **1-1/2-inch- (38-mm-)** high letters on exterior of door.
 - 4. Fuse Pullers: For each size of fuse, where applicable and available, from fuse manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.
- B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
- C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

- A. Cartridge Fuses:
 - 1. Feeders: Class J, time delay.

3.3 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.
- B. Install spare-fuse cabinet(s).

3.4 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information on inside door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION

SECTION 26 28 16

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Fusible switches.
 - 2. Nonfusible switches.
 - 3. Receptacle switches.
 - 4. Shunt trip switches.
 - 5. Molded-case circuit breakers (MCCBs).
 - 6. Enclosures.

1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

1.4 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 and the unit will be fully operational after the seismic event."

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current ratings (interrupting and withstand, as appropriate).
 - 4. Include evidence of NRTL listing for series rating of installed devices.
 - 5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.

6. 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.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Seismic Qualification Certificates: For enclosed switches and circuit breakers, 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. Field quality-control reports.
 1. Test procedures used.
 2. Test results that comply with requirements.
 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- D. Manufacturer's field service report.

1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
 2. 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.

1.8 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA or an NRTL.
 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
- B. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.
- C. 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.
- D. 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.

- E. Comply with NFPA 70.

1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - 1. Ambient Temperature: Not less than **minus 22 deg F (minus 30 deg C)** and not exceeding **104 deg F (40 deg C)**.
 - 2. Altitude: Not exceeding **6600 feet (2010 m)**.
- B. 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 Owner no fewer than 2 weeks 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 Owner's written permission.
 - 4. Comply with NFPA 70E.

1.10 COORDINATION

- A. 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.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton.
 - 2. General Electric Company.
 - 3. Siemens Industry, Inc.
 - 4. Square D; by Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 240, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, 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. Auxiliary Contact Kit: Two NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.
 - 4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
 - 5. Lugs: Mechanical type, suitable for number, size, and conductor material.

6. Service-Rated Switches: Labeled for use as service equipment.
7. Accessory Control Power Voltage: Remote mounted and powered; 120-V ac.

2.2 NONFUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eaton.
 2. General Electric Company.
 3. Siemens Industry, Inc.
 4. Square D; by Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 240, 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.
- 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. Auxiliary Contact Kit: Two NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.
 4. Lugs: Mechanical type, suitable for number, size, and conductor material.
 5. Accessory Control Power Voltage: Remote mounted and powered; 120-V ac.

2.3 MOLDED-CASE CIRCUIT BREAKERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eaton.
 2. General Electric Company.
 3. Siemens Industry, Inc.
 4. Square D; by Schneider Electric.
- B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- C. Thermal-Magnetic Circuit Breakers: Inverse time-current 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.
- D. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
- E. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:
1. Instantaneous trip.
 2. Long- and short-time pickup levels.
 3. Long- and short-time time adjustments.
 4. Ground-fault pickup level, time delay, and I^2t response.

- F. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.
- G. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker and trip activation on fuse opening or on opening of fuse compartment door.
- H. Ground-Fault, Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
- I. Ground-Fault, Equipment-Protection (GFEP) Circuit Breakers: With Class B ground-fault protection (30-mA trip).
- J. Features and Accessories:
 - 1. Standard frame sizes, trip ratings, and number of poles.
 - 2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.
 - 3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.
 - 4. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.
 - 5. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.

2.4 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
 - 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 - 2. Outdoor Locations: NEMA 250, Type 3R.
 - 3. Kitchen Locations (other than Wash Down Areas): NEMA 250, Type 4X, stainless steel.
 - 4. Kitchen Wash Down Areas: NEMA 250, Type 4X, stainless steel.
 - 5. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
 - 6. Imaging Rooms: Flush Mount.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."

- C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- D. Install fuses in fusible devices.
- E. Comply with NECA 1.

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. 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. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test 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.
 - 3. Perform the following infrared scan tests and inspections and prepare reports:
 - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each enclosed switch and circuit breaker. Remove front panels so joints and connections are accessible to portable scanner.
 - b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each enclosed switch and circuit breaker 11 months after date of Substantial Completion.
 - c. Instruments and Equipment: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - 4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in Section 26 05 73 "Overcurrent Protective Device Coordination Study."

END OF SECTION

SECTION 26 51 19

LED INTERIOR LIGHTING

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. Interior solid-state luminaires that use LED technology.
 - 2. Lighting fixture supports.
 - 3. Standby Emergency Power supplies for individual luminaires
- B. Related Requirements:
 - 1. Section 26 09 23 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
 - 2. Section 26 09 36 "Standalone Multipreset Modular Dimming Controls" for architectural dimming systems and for fluorescent dimming controls with dimming ballasts specified in interior lighting Sections.
 - 3. Section 26 09 43 "Relay-Based Lighting Controls" for manual or programmable control systems with low-voltage control wiring or data communication circuits.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of lamp and luminaire, or both.
- G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Arrange in order of luminaire designation.
 - 2. Include data on features, accessories, and finishes.

3. Include physical description and dimensions of luminaires.
 4. Include emergency lighting units, including batteries and chargers.
 5. Include life, output (lumens, CCT, and CRI), and energy efficiency data.
 6. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing and Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps and accessories identical to those indicated for the lighting fixture as applied in this Project. Report data compliant with IES LM-79 and IES LM-80. Only Absolute Photometry is acceptable.
 - a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products (NVLAP).
- B. Shop Drawings: For nonstandard or custom luminaires.
1. Include plans, elevations, sections, and mounting and attachment details.
 2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 3. Include diagrams for power, signal, and control wiring.
- C. LEED Submittals:
1. Product Data for Credit IEQ 4.2: For paints and coatings, documentation including printed statement of VOC content.
 2. Laboratory Test Reports for Credit IEQ 4.2: For paints and coatings, documentation indicating that products comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Samples: For each luminaire and for each color and texture with standard factory-applied finish.
- E. Samples for Initial Selection: For each type of luminaire with custom factory-applied finishes.
1. Include Samples of luminaires and accessories involving color and finish selection.
- F. Samples for Verification: For each type of luminaire.
1. Include Samples of luminaires and accessories to verify finish selection.
- G. Product Schedule: For luminaires and lamps. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) 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. Lighting luminaires.
 2. Suspended ceiling components.
 3. Partitions and millwork that penetrate the ceiling or extend to within 12 inches (300 mm) of the plane of the luminaires.
 4. Structural members to which equipment and or luminaires will be attached.
 5. Initial access modules for acoustical tile, including size and locations.
 6. Items penetrating finished ceiling, including the following:
 - a. Other luminaires.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.

- e. Access panels.
 - f. Ceiling-mounted projectors.
 - g. Moldings.
- 7. Moldings.
- B. Qualification Data: For testing laboratory providing photometric data for luminaires.
- C. Seismic Qualification Certificates: For luminaires, 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.
- D. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- E. Product Certificates: For each type of luminaire.
- F. Product Test Reports: For each luminaire, for tests performed by manufacturer or a qualified testing agency holding NVLAP accreditation.
- G. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.
 - 1. Provide a list of all lamp types LED Modules and LED Drivers used on Project; use ANSI and manufacturers' codes.

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 citing lighting fixture types.
 - 1. Lamps: 2 for every 100 of each type and rating installed. Furnish at least one of each type.
 - 2. Diffusers and Lenses: One for every 100 of each type and rating installed. Furnish at least one of each type.
 - 3. Globes and Guards: One for every 20 of each type and rating installed. Furnish at least one of each type.

1.8 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.
- B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.

- C. Provide luminaires from a single manufacturer for each luminaire type.
- D. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.
- E. Mockups: For interior lighting luminaires in room or module mockups, complete with power and control connections.
 - 1. Obtain Architect's approval of luminaires in mockups before starting installations.
 - 2. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.10 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.
 - 1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."

2.2 LUMINAIRE 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. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.
- C. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.

- D. Recessed Fixtures: Comply with NEMA LE 4.
- E. Bulb shape complying with ANSI C79.1.
- F. Lamp base complying with ANSI C81.61 or IEC 60061-1, where employing universal base or mount.
- G. CRI of minimum 90. CCT of 3500 K.
- H. L70 rated lamp life of 50,000 hours.
- I. Lamps dimmable as indicated or 0.5 to 100 percent of maximum light output, via 0-10 VDC control signal or, where indicated, Digital Dimming Control Signal.
- J. Field Replaceable driver.
- K. Nominal Operating Voltage: Universal voltage 120 V ac or 277 V ac unless scheduled differently.
 - 1. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.
- L. Housings:
 - 1. Hydroformed, cast or extruded-aluminum housing and heat sink suitable for the environment.
 - 2. Anodized or powder-coat finish.

2.3 LED LAMPS AND DRIVERS:

- A. Minimum CRI Ra- 82 or as specified.
- B. Lumen output shall be Luminaire Lumens or Delivered Lumens. Source lumens shall not be used.
- C. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.
- D. LED Rated life L70 of 50,000 hours per (IES LM-80). Luminaire shall maintain LED operating temperature to achieve this rating per TM-21.
- E. Flicker: No visible or detectable flicker, operating on all dimmed intensities.
- F. Dimming drivers shall be compatible with the control method shown on the drawings. All dimmed drivers shall use 0-10vdc control unless specified differently. Minimum level as scheduled.
- G. Inrush current shall be reported and the lighting controls adjusted for inrush of LED product supplied.
- H. THD: THD shall not exceed 80%.
- I. Minimum driver efficiency shall be 83%.
- J. LED module shall be replaceable in the field using modules with digitally traceable matching modules.

- K. Luminaire shall be NRTL Listed at intended operating temperature.
- L. Photometry shall be measured or absolute photometry. Derived or calculated photometry shall not be provided for consideration.
- M. Approved Manufacturers- Drivers
 - 1. General Electric.
 - 2. Philips.
 - 3. Osram / Sylvania.
 - 4. Lutron
 - 5. EldoLED
 - 6. Thomas Research
- N. Approved Manufacturers- LEDs
 - 1. General Electric
 - 2. Philips
 - 3. Osram
 - 4. Cree
 - 5. Xicato
 - 6. Nichia
- O. Approved Manufacturers for Luminaires shall be as scheduled.

2.4 MATERIALS

- A. Metal Parts:
 - 1. Free of burrs and sharp corners and edges.
 - 2. Sheet metal components shall be steel unless otherwise indicated.
 - 3. Form and support to prevent warping and sagging.
- B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- C. Diffusers and Globes:
 - 1. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - 2. Glass: Annealed crystal glass unless otherwise indicated.
 - 3. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.
- D. Housings:
 - 1. Hydroformed, cast or extruded-aluminum housing and heat sink suitable for the environment.
 - 2. Anodized or powder-coat finish.
- E. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps and line wattage. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
 - 1. Label shall include the following lamp characteristics:
 - a. "USE ONLY" and include specific lamp type.
 - b. Lamp diameter, shape, size, wattage, and coating.
 - c. CCT and CRI for all luminaires.

2.5 METAL FINISHES

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.6 LUMINAIRE FIXTURE SUPPORT COMPONENTS

- A. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: **1/2-inch (13-mm)** steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, **12 gauge (2.68 mm)**.
- D. Rod Hangers: **3/16-inch (5-mm)** minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

2.7 GENERAL REQUIREMENTS FOR EMERGENCY LIGHTING

- 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. NRTL Compliance: Fabricate and label emergency lighting units, exit signs, and batteries to comply with UL 924.
- C. Comply with NFPA 70 and NFPA 101.
- D. Comply with NEMA LE 4 for recessed luminaires.
- E. Internal Type Emergency Power Unit: Self-contained, modular, battery-inverter unit, factory mounted within luminaire body and compatible with LED light source and driver, including dimming driver.
 - 1. Emergency Connection: Operate luminaire continuously at an output of 5 watts upon loss of normal power. Connect unswitched circuit to battery-inverter unit and switched circuit to luminaire ballast.
 - 2. Operation: Relay automatically turns driver/led module on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
 - 3. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - a. Ambient Temperature: Less than **0 deg F** or exceeding **104 deg F** with an average value exceeding **95 deg** over a 24-hour period.
 - b. Ambient Storage Temperature: Not less than **minus 4 deg F** and not exceeding **140 deg F**
 - c. Humidity: More than 95 percent (condensing).

- d. Altitude: Exceeding 3300 feet
- 4. Battery: Sealed, maintenance-free, lead-acid type.
- 5. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.
- 6. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

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 roughing-in for luminaire to verify actual locations of luminaire and electrical connections before fixture installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

- A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.3 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Supports:
 - 1. Sized and rated for luminaire weight.
 - 2. Able to maintain luminaire position after cleaning and repair.
 - 3. Provide support for luminaire without causing deflection of ceiling or wall.
 - 4. Luminaire mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and vertical force of 400 percent of luminaire weight.
- D. Flush-Mounted Luminaire Support:
 - 1. Secured to outlet box.
 - 2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
 - 3. Trim ring flush with finished surface.
- E. Wall-Mounted Luminaire Support:
 - 1. Attached to structural members or approved backer plate in walls
 - 2. Do not attach luminaires directly to gypsum board.
- F. Ceiling-Mounted Luminaire Support:
 - 1. Ceiling mount with four 5/32-inch- (4-mm) diameter steel wire or aircraft cable supports.

2. Ceiling mount with hook mount.
- G. Suspended Luminaire Support:
1. Pendants and Rods: Where longer than **48 inches (1200 mm)**, brace to limit swinging.
 2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
 3. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and wire support for suspension for each unit length of luminaire chassis, including one at each end.
 4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.
- H. Ceiling-Grid-Mounted Luminaires:
1. Secure to any required outlet box.
 2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
 3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.
- I. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

3.6 STARTUP SERVICE

- A. Comply with requirements for startup specified in Section 26 09 43 "Relay-Based Lighting Controls."

3.7 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.

1. During adjustment visits, inspect all luminaires. Replace luminaires that are defective.
2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
3. Adjust the aim of luminaires in the presence of the Architect.

END OF SECTION

SECTION 270000**General Common Conditions For All Communications Sections****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, and other documents as designated, apply to this Document.
- B. See additional requirements in Division 7 and section 27 01 00 Part 3.

1.2 RELATED SECTIONS

- A. Specifications throughout all Divisions of the Project Manual are directly applicable to this section, and this section is directly applicable to them.
 - 1. All Division 27 Sections
 - 2. Requirements of the following Division 26 sections apply to this section
 - a. Basic electrical requirements
 - b. Basic electrical materials and methods
 - c. Grounding, earthing, and bonding
 - 3. Division 21 Fire Suppression
 - 4. Division 22 Plumbing
 - 5. Division 23 HVAC
 - 6. Division 28 Electronic Safety and Security

1.3 SUMMARY

- A. The work on many processes in this section is not part of the Division 27 contract. In their proposals, the respective trades shall include portions and administration topics applicable to all Division 27 Sections.
- B. This document is based upon the 2018 Construction Specification Institute (CSI) Master Format numbers and titles for sections within Division 27: Communications.
- C. Where IT or Owner representation is stipulated in this Division, the Data Center Operations Infrastructure Cabling team shall provide it.

1.4 SUBMITTALS

- A. Product data shall be supplied for any parts or equipment that do not match the specified part number.
- B. Shop drawings
 - 1. Labeling schedules and layouts in owner-designated electronic format
 - 2. Cabling administrative drawings

1.5 CONDITIONS

- A. Drawings and General provisions of the contract, including Uniform General Conditions, Supplementary General Conditions, architectural plans and specifications, requirements of Division 1, electrical, mechanical, plumbing, audio visual, security, and telecommunications specifications and plans, apply to the communications section. They shall be considered a part of this section. The contractor shall read all sections in their entirety and apply them as appropriate for work in this section.
- B. A kick-off meeting should be held to coordinate the tray installation and set expectations before starting installation. The General Contractor should organize this meeting, which must include representatives from the following trades: FP&D, Electrical (Division 26), Structured Cable, Nurse Call, Paging, Building Automation and Control, Plumbing, HVAC, Fire Sprinkler, Framing, and any other relevant trades. The Data Center Operations Infrastructure Cabling Team will lead the meeting.
- C. Conflicts:

1. Drawings and specifications will be used in conjunction with and supplement one another. Generally, the drawings determine the nature and quality of the installation, including the materials and tests. The quantities are derived from the drawings, details, listings, and manufacturer's directions.
 - a. Final order counts and distances are the contractor's responsibility.
 2. If there is an apparent conflict between the drawings and specifications, or between specification sections, the items with the greater quality or quantity shall be submitted, estimated, and installed.
 3. Clarification with the Owner and/or the owner's representative regarding these items shall be made before ordering and installation.
- D. Owner / Contractor
1. The Architect/Project Manager will submit an appropriate scope of work that allows the contractor to plan and bid on the project accordingly.
- E. Contractor
1. Furnish all labor, materials, tools, equipment, and services for the installation described herein. Provide add/deduct unit pricing for all components as part of the bid response. Base fixed price add/deduct units on an average cable length of 175 linear feet.
 2. The Contractor shall procure and maintain insurance against claims for the duration of this agreement.
 3. Use of Subcontractors: The Successful bidder shall inform the Owner's contact and/or General Contractor in writing about the intention to use Subcontractors and the scope of work for which they are being hired. The Owner or the owner's designated contact must approve the chosen Subcontractors in writing before the subcontractor's hiring and the start of any work. The low-voltage Subcontractor must be approved and certified. Refer to the listing in Appendix 7.
 4. Use of Subcontractors: The Contractor's designated project manager will be recognized as the single point of contact. The Project Manager shall oversee all work performed to ensure compliance with the specifications outlined in the bid documents (which include all specifications and drawings) to ensure quality installation.

1.6 SCOPE OF WORK:

- A. This establishes a communications infrastructure to be used as signal pathways for voice, high-speed data transmission, and other low-voltage services. Contractor shall:
1. Comply with all Master Specifications documents and the following requirements for a complete project installation.
 2. Provide a structured cabling system as described hereafter that includes, but is not limited to, supplying, installing, labeling, and testing fiber backbone, fiber and voice riser cable; data copper, fiber, and voice copper horizontal cabling; cable connectors, communications outlets and terminations, patch cables, and equipment racks/cabinets for networking hardware and patch panels.
 3. All requirements and specifications will be enforced. Cable pathways and runs to individual outlets are not shown in their entirety; however, they shall be provided as if shown in their entirety.
 4. Coordinate with electrical tradespersons to verify that conduit routing does not cause cabling to exceed allowable link length.
 5. Follow industry-standard installation procedures, including the BICSI Installation Standard and guidelines, as well as specified manufacturers' standard recommended procedures and installation practices for communications cables, to ensure that this cable plant and equipment maintain their mechanical and electrical transmission characteristics.
 6. An approved, certified installer shall perform the Division 27 work.
 7. The low-voltage communications Subcontractor shall complete non-concealed work.

1.7 REFERENCE STANDARDS:

- A. The latest published edition of a reference shall apply to this Project unless identified by a specific edition date.
- B. All reference amendments adopted before the effective date of the Contract shall apply to this Project.
- C. The publications listed below form a part of this specification. The publications are referred to in the text by basic designation only.

- D. Specific reference in specifications to codes, rules, regulations, standards, manufacturer's instructions, or requirements of regulatory agencies shall mean reference to the latest printed edition of each in effect at the date of contract.
- E. Codes and Standards (Most recent editions with addenda/TSB, etc.) All materials, installation, and workmanship shall meet or exceed the applicable requirements and standards addressed within the references listed in **Appendix 04**.

1.8 DEFINITIONS:

- 1. Definitions and Abbreviations are listed in **Appendix 05**:

PART 2 - PRODUCTS

2.1 PRODUCTS AND WORK NOT INCLUDED BY DIVISION 27

- A. Others shall separately purchase and/or provide certain equipment and miscellaneous items that will be installed during the installation process. Such items may not be indicated in the documents. Contractor shall coordinate with the Owner and his suppliers when considering:
 - 1. Provision and installation of phone systems, computer hardware, and related networking software and equipment.
 - 2. Provision and installation of multi-port routers and hubs in communications rooms.
 - a. The owner provides TEC/TDR UPSs.
 - 3. Communications grounding bus bars and grounding wires connecting to the main building electrode system by Division 26.
 - 4. Dedicated power panels, ground bus bars, circuits, and utility outlets.
 - 5. Installation and finishing of fire-rated plywood backboards.
 - 6. Building mechanical ductwork, cooling/heating system, and environmental control sensors.
 - 7. Communication pathway devices such as conduits, conduit sleeves, back boxes, and penetrations in walls and floors. Including, but not limited to, concealed work, office spaces, and open areas.
 - 8. Provision and installation of modular furniture and millwork.

PART 3 - PENETRATIONS

3.1 THE WORK IN THIS SECTION IS IN DIVISION 7 CONTRACT AND VERIFIED COMPLETE AT PROJECT TURNOVER.

- A. Wall Penetrations - Fire - Smoke – Sound
 - 1. All fire, smoke, and sound wall penetrations must be correctly made to protect the safety of patients and employees. A facility is designed, architected, and built with fire integrity that must not be compromised as the building is modified over its lifetime.
 - 2. The items listed often penetrate 1—and 2—hour fire-resistance-rated (FRR) assemblies. The requirements for filling the space between the item in question and the wall are in NFPC 101® Section 8.2.3.2.4.2. The option is to either fill the space with appropriately rated fire-stop material or protect the space with an approved device designed to maintain the wall's fire resistance.
 - 3. If a sleeve is used around the item that traverses the wall, it must be installed into the wall without any opening between it and the wall. The open space within the sleeve must then be filled with an appropriately rated fire stop.
- B. All items listed in 1 through 2 must have penetrations in fire-resistance-rated assemblies filled to maintain the integrity of the fire barrier.
 - 1. Conduits
 - a. When a conduit passes through a wall that is either rated or must be fire-stopped due to the compartment's lack of sprinklers, it is essential to fill any gap around the conduit as described above.
 - 2. Cables/Wires
 - a. Sometimes cables or wires are passed through a penetration contained in a firewall as a single installation. This often occurs in healthcare organizations with communication cables. Even in these cases, the penetration must be patched appropriately.

3. NOTE: Local and state building codes also govern fire, smoke, and sound wall penetrations.
4. NOTE: This requirement applies to all departments, organizations, employees, and/or vendors who perform structured cable work in the facilities for:
 - a. Telephony and Computer networks, fire, smoke and sound wall penetrations, alarm systems, security systems, HVAC Control or sensors, patient entertainment systems, announcing systems, nurse call, telemetry, RFID, etc.
5. NOTE: While this document is written specifically for low-voltage wiring, the JCAHO standards apply to any fire or smoke wall penetration. As you work in the facility, if you note any existing penetrations that are not up to standard, please immediately notify the construction Project Manager.
6. While Facility Engineering has overall responsibility, each department, organization, employee, and/or vendor is responsible for following the process to obtain a permit from Facility Engineering before work commences and for adhering to the guidelines to maintain the fire/smoke wall integrity.

C. Process:

1. NOTE: This process applies to all individuals, groups, and vendors performing low-voltage cable installations at any Intermountain facility or clinic.
 - a. Fire/Smoke Walls
 - 1) Any Vendor, department,/or person needing to do any cable work that involves wall penetrations, adding to existing or new, is required to obtain a "Low Voltage Cable Work Permit" from the Facility Engineer.
 - b. Above Ceiling Work
 - 1) Any vendor, department, or person needing to perform cable work above ceiling tiles, including adding to existing or new ones, must obtain all necessary permits.
 - c. Above Ceiling Permit to be obtained from Facilities Management
 - 1) The permit requires detailed information regarding the work being done and the location where it will be performed. The permit will also state the current approved sealing compound for the facility and specific requirements for conduits.
 - 2) Specific rules governing the conduct of work in certain areas of the hospital may also exist. NOTE: Sealing products from different manufacturers cannot be used in the same penetration. Therefore, if an additional cable is added to an existing penetration and you don't have the same brand of caulk, you must remove all of the caulk and redo the seal completely.
 - d. ICRA Permit to be obtained from the Infectious Preventionist
 - e. Hot Work Permit to be obtained from Facilities Engineer
2. Quality of Work
 - a. Facility Engineering Orientation

3.2 MEASUREMENT PROCEDURES:

- A. The Contractor shall
1. Coordinate supports, adjacent construction, and fixture locations to ensure actual dimensions correspond to established dimensions.
 2. Verify dimensions in installation areas through field measurements before fabrication and indicate the measurements and scale on the shop drawings.
 3. Coordinate the fabrication schedule with construction progress to avoid delays in the work.
 4. Where field measurements cannot be made without delaying the work, establish dimensions and coordinate with the General Contractor.
 5. When approved, proceed with fabricating units without field measurements.

3.3 CHANGES

- A. ALTERNATES:
1. If an alternate material is proposed that meets or exceeds the specified requirements, the Contractor shall provide the manufacturer's specifications in writing to the Owner for approval before purchase and installation.
 2. Substitutions of material by the Contractor shall be in writing, complete with written manufacturers' specifications. The material substituted shall not void, alter, or change the manufacturer's structured cabling system warranty.

3. Contractor shall:
 - a. Provide a complete cabling infrastructure per these written specifications and drawings. If the Owner changes the scope of work to be performed by the Contractor, it shall be in writing.
 - b. Promptly respond to these changes with a complete material list, including pricing and labor, in writing, and present it to the Owner for approval. Also include unit pricing.
 - c. Do not proceed with any additional scope of work without a signed approval by the Owner.
 4. The Owner will not pay for the Contractor's additional work without signed approval of these changes. The contractor will submit a copy of the signed change order upon billing.
 5. The Owner's Infrastructure Cable team will be the final judge of acceptability, with review by the Owner's Representative and acceptance distributed by the Architect. No substitute shall be ordered, installed, or utilized without the Architect's prior written verification of acceptance from the Owner's Infrastructure Cable team.
- B. SUBSTITUTION PROCEDURES**
1. Substitution may be considered when a product becomes unavailable through no fault of the Contractor.
 2. Document each request with complete data substantiating that the proposed substitution complies with the Contract Documents. Include in each request for substitution:
 - a. Product identification, manufacturer's name, and address.
 - b. Product Data: Description, performance and test data, reference standards, finishes, and colors.
 - c. Samples: Finishes
 - d. Complete and accurate drawings indicating construction revisions required (if any) to accommodate substitutions.
 - e. Data relating to changes required in the construction schedule.
 - f. Cost comparison between specified and proposed substitution.
 3. Substitutions indicated or implied on shop drawings or product data submittals will not be considered unless a separate written request is submitted or when acceptance would require revision to the Contract Documents.
 4. The Owner will be the final judge of acceptability, with the Owner's Representative reviewing the proposal and the architect distributing the acceptance.
 5. No substitute shall be ordered, installed, or utilized without the Architect's prior written verification of acceptance from the Owner's Infrastructure Cable team.

PART 4 - EXECUTION

4.1 QUALITY ASSURANCE

- A. Regulatory Requirements:**
1. Contractor shall supply all city, county, and state telecommunication cabling permits required by the appropriate governing agency.
 2. Before commencing work, the Contractor and staff shall obtain all required Intermountain Healthcare permits, including, but not limited to, facility sign-in permits, ceiling work permits, hot work permits, and confined space permits.
 3. The contractor shall be city, county, and state-licensed and/or bonded as required for communications/low-voltage cabling systems work.
- B. Certifications:**
1. At the time of bid submission, the contractor shall submit an up-to-date and valid certification verifying the qualifications of the Contractor and installers to perform the work specified herein.
 2. Contractor shall have a complete working knowledge of low-voltage cabling applications, such as, but not limited to, data, voice, and video network systems.
 3. The contracting firm shall have installed similar-sized systems in at least ten (10) other projects in the last five years before this bid and be regularly engaged in installing the types of systems specified in this document. Certification shall include, but is not limited to, items such as the name and location of project contacts and numbers, total square footage, total number of cables/drops, types of media, etc.

4. Contractor shall provide certificates for the appropriate insurance coverage as defined in the contract documents.
 5. A qualification document shall list all installer personnel assigned to this project.
 6. Fifty percent of the personnel working on the job site shall have a minimum of three years' experience in installing the types of systems, equipment, and cables specified in this document. Before commencement of work, any personnel substitutions shall be noted in writing to the Owner's Data Center Operations Infrastructure Cabling representative.
 7. BICSI ITS Cabling Installation Program Installer Level 1 or 2 or Technician certifications may be substituted in lieu of the 3-year requirement. All cabling installers shall be trained and certified by the cable manufacturer to install and maintain communication cabling.
 8. Refer also to General Conditions.
- C. Administrative Requirements and Coordination:
1. The Contractor shall:
 - a. Ensure that all technicians performing work have obtained badge access at least 48 hours before the scheduled start.
 - b. Provide a specified contact person (name and contact number) to coordinate attendance at project meetings with the communication consultant, the Owner, and others.
 - c. Coordinate work of this section with the Owner's system specifications, workstations, equipment suppliers, and installers.
 - d. Coordinate installation work with other crafts (e.g., ceiling grid contractors, HVAC, and sheet metal contractors) under the direction of the General Contractor to resolve procedures and installation placement for cable trays and cable bundle pathways. The goal of this coordination will be to establish priority pathways for critical data and voice network cable infrastructure, materials, and associated hardware, while mitigating project delays and allowing service access for communications and HVAC components. Damage by the Contractor to the craftwork of others will be remediated at the Contractor's expense in a timely manner.
 - e. Exchange information and agree on details of equipment arrangements and installation interfaces. Record agreements are reached in meetings, and the record is distributed to other participants, the owner, and the communication consultant.
 - f. Arrangement, layout, and locations of distribution frames, patch panels, and cross-connect blocks in equipment rooms and racks to accommodate and optimize the arrangement and space requirements of any service provider equipment, telephone system, and LAN equipment as directed by Data Center Operations. Tasks shall be coordinated with the Owner's Data Center Operations team and representatives from other trades' installations.
 - g. Where installed, confirm exact locations and method of mounting outlets in modular furniture. Follow furniture manufacturers' instructions for installing cable and devices in modular partitions. Obtain modular furniture and power pole locations from the General Contractor. Wiring locations noted in plans along walls for modular furniture are approximate and will have to be determined by the Contractor at the time of installation. Field condition adjustments for installation may be necessary, and coordination efforts with the mechanical and electrical contractor for the pathway must be initiated early in the project to comply with the maximum 40% conduit fill factor requirements.
 - h. When requested by the Owner or the Owner's representative, furnish extra materials that match specified products, are factory packaged with protective covering for storage, and are identified with labels describing contents. Unit pricing shall apply.
- D. Contract Administration:
1. Change orders, complete with a price breakdown and description, shall be submitted to the owner/project manager for approval before any work is commenced.
 2. The Owner's Data Center Operations Representative will provide job field reports upon inspection of the Contractor's installation, materials, supporting hardware, coordination with other trades, and progress to schedule to the Owner's project manager.
 3. Job Field Report outline:
 - a. General installation progress in relation to scheduled work made by the Contractor up to that date.
 - b. The Contractor will correct all deficiencies noted in the cable installation.

- E. Pre-Installation Meetings - Contractor shall:
 - 1. Attend and/or arrange a scheduled pre-installation conference before beginning any work in this section.
 - a. Agenda: This venue is for asking and clarifying questions in writing related to work to be performed, scheduling, coordination, etc., with the consultant, project manager, and/or Data Center Operations Infrastructure Cabling representative.
 - b. Attendance: The communications project manager/supervisor shall attend meetings arranged by the General Contractor, the Owner's Data Center Operations Infrastructure Cabling representatives, and other parties affected by the work of this document.
 - c. All individuals who will be installers of communication cables and equipment in an on-site supervisory capacity shall be required to attend the pre-installation conference. Individuals who do not attend the conference will not be permitted to supervise the installation of, or install, terminate, or test communications cables on the project. This includes supervisors, project managers, and lead installers of this project.
- F. Request for Change (RFC)
 - 1. The Change Approval Board shall open and approve a Request for Change before any modifications, attachments, or other activities that may affect production systems.
 - a. Policy and details available through the Data Center Operations Infrastructure Cable Representative.
- G. Post-Installation Meetings:
 - 1. Schedule Div. 27 Final Inspection
 - 2. At the time of substantial completion, or shortly thereafter, the low-voltage Sub-Contractor shall call and arrange for a post-installation meeting to present and review all submittal documents, including, but not limited to, as-built drawings, test reports, warranty documentation, and other relevant documents. Attendees shall be Owner staff, Owner's Representative, General Contractor, and others that the General Contractor deems appropriate.
 - 3. At this meeting, the Contractor shall present and explain all documentation, including test results, and ask for feedback on its completeness. Any discrepancies or deviations noted and agreed to by participants shall be remedied by the Contractor and resubmitted within one week of the meeting.

4.2 DELIVERY, STORAGE, AND HANDLING:

- A. Coordination with delivery companies, drivers, site address, and contact person(s) will be the responsibility of the Contractor.
- B. Contractor Shall:
 - 1. Ensure prompt material deliveries to meet the contracted completion date.
 - 2. Coordinate deliveries and submittals with the General Contractor to ensure a timely installation.
 - 3. No equipment materials shall be delivered to the job site more than three weeks prior to the commencement of its installation.
 - 4. Equipment shall be delivered in original packages with intact labels and clearly marked identification.
 - 5. Materials shall not be damaged in any way and shall comply with the manufacturer's operating specifications.
 - 6. Equipment and components shall be protected from the weather, humidity, temperature variations, dirt, dust, or other contaminants. Equipment damaged before system acceptance shall be replaced at no cost to the Owner.
 - 7. The Material Contractor shall be responsible for all handling and control of equipment.
 - 8. The Material Contractor is liable for any material loss due to delivery and storage problems.
- C. Owner/General Contractor shall supply a list of security requirements for the Contractor to follow.

4.3 PROJECT/SITE CONDITIONS

- A. For all environmental recommendations, refer to the master Architectural section.
- B. For all security recommendations, refer to related Division 01.

- C. After completing system installation, including outlet fittings and devices, inspect the exposed finish. The contractor will remove burrs, dirt, and construction debris. If applicable, the Contractor will repair damaged finishes, including chips, scratches, and abrasions, to restore the original appearance.
- D. Contractor shall provide a clean work environment daily, free from trash/rubbish accumulated during and after cabling installation.
- E. Food and drink are not permitted in work areas. They shall be stored, prepared, and consumed only in designated break or cafeteria areas.
- F. Contractor shall keep all liquids (drinks, sodas, etc.) off finished floors, carpets, and tiles. If any liquid or other detrimental (cuts, soils, stains, etc.) damages the above finishes, Contractor shall provide professional services to clean or repair scratched/soiled finishes, at Contractor's expense.

4.4 CLEANING

- A. Work areas will be kept in a broom-clean condition throughout installation.
- B. Remove all unnecessary tools and equipment, unused materials, packing materials, and debris from each area where work has been performed daily, unless designated for storage.
- C. The Contractor will damp clean all surfaces before final acceptance by the Owner.

END OF SECTION

SECTION 270100**Operation And Maintenance of Communications Systems****PART 1 - GENERAL****1.1 INTRODUCTION**

- A. To make the approval of such a large topic possible, the structured cable topic has been broken into its subcomponents, and each subcomponent was completed, reviewed, and approved in turn. The result is that this comprehensive guideline should provide adequate guidance on this topic.

PART 2 - PRODUCT**2.1 KEY POINTS**

- A. Category 6A shielded foil over unshielded twisted pair (F/UTP) is the only approved standard for cabling.
 - 1. Specifically, for all Intermountain health properties, Siemon category CAT6A F/UTP (foil over unshielded twisted pair) cable and associated patch panels, wall plates, and jacks.
 - 2. Only Siemon-certified contractors or certified Intermountain Health cable technicians will install structured cable at Intermountain Health facilities.

2.2 IMPLEMENTATION

- A. This guide is for New Construction and Remodels. These standards will be implemented over time in existing cabling environments as rework is performed.
- B. If servers need to be connected at 10GBaseT and copper is the only option, CAT6A F/UTP is required. New Server connections shall be a minimum of OS1 Single Mode Fiber.
- C. Installations already in place do not require removing or replacing existing CAT5e or newer cabling. All new cabling shall follow the recommendation to use CAT6A F/UTP cabling.

2.3 STANDARD PRODUCT

- A. The approved cable type for horizontal cabling is CAT 6A F/UTP.
 - 1. The Approved Standard Manufacturer for Intermountain Health's horizontal cabling is:
 - a. Siemon Company USA
 - b. 101 Siemon Company Drive
 - c. Watertown, CT 06795
 - 1) Approved Suppliers of Siemon cable, patch panels, jacks, and parts are listed in Appendix 06:

PART 3 - EXECUTION**3.1 HORIZONTAL CABLING**

- A. Horizontal Subsystem is the portion of the cabling system that extends from (and includes) the work area telecommunications outlet/connector to the Floor Distributor (FD)/Horizontal Cross-connect (HC) in the telecommunications room (TDR). It consists of the communications outlet/connector, the horizontal cable, an optional consolidation point, and that portion of the cross-connect in the telecommunications room serving the horizontal cable. Each building floor should be served by its own Floor Distributor/Horizontal (FD/HC) Subsystem in the Telecommunications Room (TDR).
 - 1. NOTE: Cable installers have rigorous requirements to be certified for Siemon cables and products. Validation of certification is required before accepting a bid.
 - 2. Current Siemon Approved/Certified Cable Installers for the Siemon Network are listed in Appendix 07.
- B. The horizontal cabling system's reliability is critical to the operation of IS equipment throughout a facility. Installing the cable is highly labor-intensive, and several learned skills are needed to install it correctly. Cable installers are certified; to be certified, installers must demonstrate the ability to install the

cable correctly. If the cable is installed by a certified installer and is installed in accordance with the manufacturer's guidelines, the manufacturer will warranty the cable installation.

- C. The manufacturer also requires the cables to be individually labeled and 100% tested and certified. Cable testing and certification equipment is usually expensive and not commonly available at the facility or by many telecom installers. The manufacturer requires Certified Installer companies to be knowledgeable in using "Qualified" Field Testing equipment and provide test results for warranty registration.
 - 1. The contractor is to verify the current "Qualified" tester manufacturers and the current operating software with the manufacturer.
 - 2. Upon completion, contractors will provide Intermountain Health with test results in the operating software format (not PDF, text, or Word).
- D. Much of the cable is installed in walls and the ceiling and usually lasts the lifespan of the building. Like most technology, cable's lifespan is its usability and applicability to future computing technology.

END OF SECTION

SECTION 270113

Warranty, Product, and System

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.
- B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them, including but not limited to the listing found in Section 27 00 00.

PART 2 - PRODUCTS

2.1 STANDARD WARRANTY

- A. The contractor shall provide a minimum one (1) year warranty on installation and workmanship, PLUS an Extended Product Warranty and System Assurance Warranty for this wiring system, and shall commit to making available local support for the product and system during the Warranty period.
- B. System Certification: Upon successful completion of the installation and subsequent inspection, the customer shall be provided with a Manufacturer's Warranty certificate.
- C. A permanent link or channel model configuration may be applied to the structured cabling system's horizontal and/or backbone sub-systems. Application assurance is only applied to a channel model configuration. All channels must be qualified for linear transmission performance up to 500 MHz to ensure that high-frequency voltage phase and magnitude contributions do not prove cumulative or adversely affect channel performance.

2.2 EXTENDED WARRANTY

- A. The manufacturer of passive telecommunications equipment used in a manner not associated with the Systems Warranty must have a minimum five (5) year Component Warranty on all its products. The Product's Warranty covers the components against defects in material or workmanship under normal and proper use.
 - 1. Special Project Warranty: A full end-to-end written warranty mutually executed by the manufacturer and the principal Installer, agreeing to replace and install voice/data distribution system components that fail in materials or workmanship, or do not meet the manufacturer's official published specifications and performance criteria within the special Project warranty period specified below. This shall cover applications assurance, cable, and connecting hardware, including labor and materials. This warranty shall be in addition to, and not a limitation of, other rights and remedies the Owner may have against the Contractor under the Contract Documents.
- B. A twenty-five (25) year warranty available for the Category 6A Z-MAX copper structured cabling system shall be provided for an end-to-end channel model installation, which covers applications assurance, cable, connecting hardware, and the labor cost for the repair or replacement thereof. The fiber warranty will be an XGLO twenty-five (25) year warranty, which is based on using laser-optimized single-mode fiber as a minimum.
 - 1. Performance claims based on worst-case testing and channel configurations.
 - 2. Special Project Warranty Period: 25 years minimum, beginning on the date of Substantial Completion.
 - 3. Siemon Certified Warranty Requirements:
 - a. Upon the project's completion, Intermountain Health must receive the Full Warranty Documentation from The Siemon Company before final retention funds are released to the general contractor, electrical contractor, and structured cabling subcontractor, if applicable.

2.3 MAINTENANCE

- A. Support Availability: The Contractor shall commit to making available local support for the product and system during the Warranty or Extended Warranty period.

END OF SECTION

SECTION 270119

Field Testing and Reporting

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.
- B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them, including but not limited to the listing found in Section 27 00 00.

1.2 SYSTEM DESCRIPTION

- A. The owner reserves the right to be present during any or all testing.
- B. The objective of this project is to provide a complete communications cabling infrastructure system installation including, but not limited to fiber backbone, riser system, horizontal data and voice cabling with associated terminations, mounting equipment, cable pathway and management systems, testing and other items/materials, as specified in drawings, these specifications, and contract documents.
- C. The Contractor's BICSI Registered Communications Distribution Designer (RCDD) supervisor shall review, approve, and stamp all documents before submitting. The Contractor's RCDD shall warrant in writing that 100% of the installation meets the requirements specified herein upon completion of all work.
- D. Product Certificates shall be signed by manufacturers of cables, connectors, and terminal equipment certifying that products furnished comply with requirements.
- E. Upon completion of testing the installed system, the contractor shall submit the required field test reports in the specified format and media.
- F. The contractor shall deliver the manufacturer's signed long-term warranty for the installed cabling system, including all components that comprise the complete cabling system. Delivery will be affected within two weeks of the final punch list review. Failure of any component to pass system component tests shall be promptly corrected, repaired, or replaced to meet standards compliance.

1.3 PREFERRED OWNER INSPECTION & TEST CHECKPOINTS

- A. DCO & ICT Inspection Milestones and responsibilities need to be coordinated into the master project plan to allow the GC to make timely arrangements. All are per floor and/or phase.
 - 1. ICT & DCO = Framing, during and/or after boxes & conduits are in place, prior to sheetrock.
 - 2. ICT = When the cable basket is starting to be installed.
 - 3. ICT = When the cable basket is ready, but before pulling the cable.
 - 4. ICT & DCO = When TDRs are ready for racks and ladders.
 - 5. DCO = When anchoring racks and laying out equipment.
 - 6. ICT & DCO = When the TDR environmental requirements are ready, the room must be dust-free and secure. See the attached TDR checklist.
 - a. The TEC and TDRs must be high on the build timeline and be completed early in the construction to accommodate the building systems to be tested and commissioned, such as BAS, Security, and Wireless Network.
 - 7. ICT = When trim and testing are in progress.
 - 8. OTHERS
 - a. Depending on the project, the manufacturer will inspect 1 or 2 times.
 - b. DCO or ICT = When problems or questions arise.

PART 2 - PRODUCTS

2.1 SITE TESTS & INSPECTIONS

- A. Before pulling the cable, the cabling contractor shall schedule an inspection of the pathways with a member of the Data Center Operations Infrastructure cabling team.
- B. The contractor shall test the communications infrastructure system upon completion, including all pathways and grounding.
 - 1. Before testing, the Cables and termination modules shall be affixed, mounted, or installed to the designed/specified permanent location.
 - 2. Any removal and reinstallation of any component in a circuit, including faceplates, requires retesting of that circuit and any other disturbed or affected circuits.
 - 3. Approved instruments, apparatus, services, and qualified personnel shall be utilized.
 - 4. If tests fail, Contractor shall correct as required to produce a legitimate passing test.
 - 5. Manipulating tester parameters on a failing test to achieve a passing test is unacceptable.
- C. These specifications will be strictly enforced. The Contractor must verify that the specifications' requirements are fully met through testing with an approved tester (rated for testing the cable type in use) and documentation as specified below. This includes confirmation of requirements by demonstration, testing, and inspection. A demonstration shall be provided in soft copy at the final walk-through.
- D. Before installation, the contractor must notify the owner of the likelihood of a cable exceeding standardized lengths. Without the owner's written approval and prior written notice, testing that shows some or all pairs of cable not meeting specifications shall be replaced at the Contractor's expense (including respective connectors).
- E. Testing is still required for non-compliant cabling. The tests shall be for wire-mapping, opens, cable-pair shorts, and shorts-to-ground. The test results must be within acceptable tolerances and shall be submitted with the Owner's acceptance document.

2.2 CABLE TESTING PLAN

- A. The Contractor shall:
 - 1. Before beginning cable testing, provide a complete and detailed test plan for approval of the cabling system specified herein, including a complete list of test equipment for copper and fiber optic components and accessories. The following minimal items shall be submitted for review:
 - a. All testing methods that clearly describe procedures and methods.
 - b. Product data for test equipment
 - c. Certifications and qualifications of all persons conducting the testing.
 - d. Calibration certificates indicate that equipment calibration meets National Institute of Standards and Technology (NIST) standards and has been calibrated at least once in the previous year of the testing date.
 - 2. Include validation and testing. The owner will require that the telecommunications cabling system installed by the Contractor be fully certified to meet all necessary requirements to comply with referenced IEEE and TIA specifications and the vendor's warranty.
 - 3. The source/cause of test failure readings will be determined, and the malfunctioning component and/or workmanship within each channel or permanent link will be corrected. A retest will be performed to demonstrate compliance until the corrected failure produces a passing result.

2.3 CABLE TESTING REPORTS

- A. The Contractor shall submit cable test reports as follows:
 - 1. Submit certified test reports of Contractor-performed tests.
 - a. The tests shall clearly demonstrate that the media and its components fully comply with the requirements specified herein.
 - b. (1) A set of electronic test reports shall be submitted and clearly identified with cable identification.

PART 3 - EXECUTION**3.1 TEST EQUIPMENT**

- A. All transmission testing of balanced twisted-pair cables shall be performed with an approved Level III balanced twisted-pair tester found on the Siemon Ally Website. The latest version of the software shall be installed before conducting testing. Refer to the Siemon Warranty Documents for proper testing requirements of associated cables and components.
- B. All balanced twisted-pair field testers shall be factory calibrated each calendar year by the field test equipment manufacturer as stipulated by the manuals provided with the field test unit. The calibration certificate shall be provided for review before the start of testing
- C. Auto test settings provided in the field tester for testing the installed cabling shall be set to the default parameters
- D. Test settings selected from options provided in the field testers shall be compatible with the installed cable under test.

3.2 TEST METHOD / CRITERIA

- A. Copper Testing
 - 1. Testing all newly installed cable channels shall be performed before system cutover.
 - a. Visually inspect F/UTP and optical fiber cable jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments and inspect cabling connections for compliance with TIA/EIA-568-C.1.
 - b. Visually confirm Category 6A marking of outlets, cover plates, outlet/connectors, and patch panels.
 - c. Visually inspect cable placement, cable termination, grounding and bonding, equipment, patch cords, and labeling of all components.
 - d. Test F/UTP copper cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test the operation of shorting bars in connection blocks. Test cables after termination, but not cross-connection.
 - e. Test instruments shall meet or exceed the applicable requirements in TIA/EIA-568-C and those required by the manufacturer to validate and start the warranty.
 - 2. Copper Testing all 500 MHz category 6A field-testing shall be performed with an approved level 111e balanced twisted-pair field test device, that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex (Level IIe or IIIe balanced twisted pair field test device). Use only test cords and adapters qualified by test equipment manufacturers for channel or link test configuration.
 - 3. All installed 500 MHz category 6A channels shall perform equal to or better than the minimum requirements as specified below:
 - a. Category 3 balanced twisted-pair backbone cables, for the channel shall be 100 percent tested according to ANSI/TIA/EIA-568-C.1. Test parameters include wire map plus F/UTP (ScTP) shield continuity (when present), insertion loss, length, and NEXT loss (pair-to-pair). NEXT testing shall be done in both directions.
 - b. 500 MHZ Category 6A balanced twisted-pair horizontal and backbone cables shall be 100 percent tested.
 - 4. F/UTP Performance Tests
 - a. Wire map.
 - b. Length (physical vs. electrical, and length requirements)
 - c. Insertion loss
 - d. Near-end crosstalk (NEXT) loss
 - e. Power sum near-end crosstalk (PSNEXT) loss
 - f. Equal-level far-end crosstalk (ELFEXT)
 - g. Power sum equal-level far-end crosstalk (PSELFEXT)
 - h. Return loss

- i. Propagation delay
 - j. Delay skew
 - k. F/UTP Shield continuity
 5. Final Verification Tests: Verification tests for F/UTP systems are performed after the complete communications cabling and workstation outlet/connectors are installed.
 6. Document data for each measurement. Data for submittals shall be printed in a summary report.
 7. End-to-end cabling will be considered defective if it does not pass tests and inspections.
 8. Prepare and submit test and inspection reports.
- B. Horizontal Fiber Testing
1. Fiber horizontal cables shall be 100% tested for insertion loss and length.
 2. Insertion loss shall be tested at 850 nm or 1300 nm for 50/125µm and 62.5/125µm multimode cabling in at least one direction using the Method B (1-jumper) test procedure as specified in ANSI/TIA/EIA-526-14A.
 3. Length shall be tested using an OTDR, optical length test measurement device or sequential cable measurement markings.
 4. The horizontal link performance guarantees are based on an optical fiber calculation for the appropriate fiber solution. Optical fiber calculations shall be determined using the Siemon Fiber Loss Calculator on the Siemon Ally Website.
- C. Backbone Fiber Testing
1. Fiber backbone cables shall be 100% tested for insertion loss.
 2. Insertion loss shall be tested at both 850 nm and 1300 nm for 50/125µm and 62.5/125µm multimode cabling and at both 1310 nm and 1550 nm for 8.5/125µm single mode cabling in at least one direction using the Method B (1-jumper) test procedure as specified in ANSI/TIA/EIA-526-14A.
 3. Insertion loss shall be tested at 1310 and 1550 for single-mode cabling in at least one direction using Method A.1 (1-jumper) test procedure as specified in ANSI/TIA/EIA-526-7.
 4. Length shall be tested using an OTDR, optical length test measurement device, or sequential cable measurement markings.
 5. The backbone link performance guarantees are based on an optical fiber calculation for the appropriate fiber solution. Optical fiber calculations for any fiber cable greater than 90m (295 ft.) shall be determined using the Siemon Fiber Loss Calculator found on the Siemon Ally Website.

3.3 DEMONSTRATION

- A. Include training for appropriate IT staff in numbering system, documentation system methods, record keeping, proper fiber terminations, and fiber jumper installations.

END OF SECTION

SECTION 270133**Shop Drawings Product Data Samples Design Records & Existing Conditions****PART 1 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES****1.1 SUBMITTALS**

- A. The Contractor:
 - 1. Shall not perform any portion of the work requiring submittal and review of shop drawings, product data, or samples until the Owner has approved the respective submittal. Such work shall be in accordance with approved submittals.
 - a. Shop drawings as required by the owner, or as a minimum, to include a minimum of two sets of a plan view and elevations of all work to be installed. The Contractor shall make any corrections required by the owner or the owner's representative or consultant team, file with him two corrected copies, and furnish such other copies as needed. The consultant's approval of such drawings or schedules shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless he has in writing and called to the Architect's attention such deviations at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings or schedules.
- B. The Contractor shall provide a copy of the Certified Test Data Sheet, available from the delivering distribution warehouse, for either a full run or cut piece from the Master Reel of the fiber cable to be installed
 - 1. The Certified Test Data Sheet shall include the Master Reel number, cable description, passing test result with details, test equipment description, date certified, and a certificate of compliance stamp. It shall be included in the O&M Manual as a component of the final deliverables submittal package.

1.2 DRAWINGS

- A. Shop Drawings
 - 1. The Contractor shall:
 - a. Submit catalogue cut sheets that include manufacturer, trade name, and complete model number for each product specified. Model number shall be handwritten, marked with an arrow, or underlined to indicate exact selection.
 - b. Identify the applicable specification section reference for each product performance for each component specified for approval before purchase and installation.
- B. Record Drawings
 - 1. Drawings for the cabling system infrastructure elements shall be maintained and kept on file by the Siemon Certified Installer (Company) for the entire term of the warranty. Drawings shall include:
 - a. Horizontal cable routing and terminations
 - b. Telecommunications outlets/connectors
 - c. Backbone cable routing and terminations
 - d. Telecommunication Spaces (TS)
- C. Samples
 - 1. For workstation outlet connectors, jack assemblies, housing, and faceplates for color selection and evaluation of technical specifications and requirements. Confirm the color with the architect, the interior designer, and the owner representative before purchasing materials. Face plates shall match the electrical face plates in Color and material type.
 - 2. Upon request, provide samples for workstation outlets, jacks, and jack assemblies in the specified finish, one for each size and outlet configuration
 - 3. Sample mock-up rooms may be required in some areas to ensure proper equipment placement and fit.
- D. Qualifications:
 - 1. The Contractor shall provide the appropriate documentation to comply with the requirements outlined in Section 01 43 23 Qualifications, included with and at the time of the bid submission.

PART 2 - SUSTAINABLE DESIGN RECORDS AND REPORTS

2.1 DRAWINGS

- A. Closeout Submittals (As-built Drawings):
 - 1. Communications Design drawings will be supplied to the Architect so that the master “As-Built” drawings can be prepared.
 - 2. As-built drawings shall be compatible with the Architect and consultant's format. The dimensions and scale of the drawing sheets submitted shall match the size of the drawing used for the contract documents and shall include the cable numbers labeled per this document.
 - 3. Utilize commonly recognized drafting procedures that match standards, architect and consultant guidelines, and methodology.
 - 4. The As-Built drawings shall incorporate all changes to the building identified in, but not limited to, addendum, change notices, site instructions, or deviations resulting from site conditions.
- B. Contractor shall:
 - 1. Clearly identify any resubmitted drawing sheets, documents, or cut sheets by using a color to highlight or cloud around resubmitted information.
 - 2. Maintain consistency of drawing numbering or page/sheet scheme per previously issued drawings/documents.
 - 3. Provide dimensioned plan and elevation views of networking components, showing:
 - a. All communications data/voice outlet locations complete with outlet/cable labeling.
 - b. Cable routing paths of communications cables to identified infrastructure pathways.
 - c. All rack and cabinet locations and labeling thereof.
 - d. One-line diagram of equipment/device interconnecting data/voice cabling of the data and voice systems.
 - e. Standard or typical installation details unique to the Owner's requirements.
 - f. Graphic symbols and component identification on detail drawing shall conform to the latest ANSI/TIA 568-C, ANSI/TIA 569-B, ANSI/TIA 606-A, and ANSI/NECA/BICSI 607-A conventions.
 - 4. Submit one soft (compatible with Microsoft software) and hard copy with project deliverables within three weeks after substantial completion.
 - 5. A hard copy of the floor plans shall be plotted to a standard, saleable, identified drawing scale for record.

2.2 RECORDS AND REPORTS

- A. All records shall be created by the installation contractor and turned over at the completion of work.
 - 1. The format shall be computer-based
 - a. Soft copies and hard copies shall be part of the As-built package.
 - b. The minimum requirements include:
 - 1) Cable records must contain the identifier, cable type, termination positions at both ends, splice information, and any damaged pairs/conductors.
 - 2) Connecting hardware and connecting hardware position records must contain the identifier, type, damaged position numbers, and references to the attached cable identifier.
 - c. The As-built package shall include Test documentation on all cable types.
- B. All Siemon Warranty Registration documents shall be included.
- C. All reports shall be generated from the computer-based program used to create the records above. These reports should include, but not be limited to:
 - 1. Cable Reports
 - 2. Cross-connect Reports
 - 3. Connecting Hardware Reports

PART 3 - EXISTING CONDITIONS SITE SURVEY

3.1 SITE SURVEY

- A. Before placing any cable pathways or cable, the contractor shall survey the site to determine that job conditions will not impose any obstructions that would interfere with the safe and satisfactory placement of the cables. The arrangements to remove any obstructions with the Project Manager must be determined at that time.

END OF SECTION

SECTION 270143**Qualifications and Required Training for Contractors and Installers****PART 1 - GENERAL INSTALLER QUALIFICATIONS****1.1 ENTITIES**

- A. Communications contractors
 - 1. The Communications Contractor shall, at a minimum, possess the following qualifications:
 - 2. The contractor shall be a Siemon Certified Contractor with valid, up-to-date contract certification and good standing with the Siemon Company.
 - 3. Be in business for a minimum of five (5) years.
 - 4. The contractor shall demonstrate satisfaction of sound financial condition and be adequately bonded and insured if the project deems it necessary.
 - 5. Possess those licenses/permits required to perform telecommunications installations in the specified jurisdiction.
 - 6. Use personnel knowledgeable in local, state, provincial, and national codes and regulations. All work shall comply with the latest revision of the codes or regulations. When conflict exists between local or national codes or regulations, the most stringent codes or regulations shall be followed.
- B. Contractors must possess current liability and workers' compensation insurance certificates.
- C. Contractors must be registered with BICSI and have at least one RCDD on staff or an ITS Cabling Installer Program Technician certification and Installer Level 1 & 2 for a minimum of 75 percent of staff.

1.2 TRAINING

- A. The Contractor shall be fully conversant and capable of cabling low voltage applications such as, but not limited to, data, voice, and imaging network systems. The Contractor shall, at a minimum, possess the following qualifications:
 - 1. Personnel trained and certified in the design of the Siemon Cabling System®.
 - 2. Personnel trained and certified to install the Siemon Cabling System®.
 - 3. The Designer and Installer shall show proof of the Siemon Cabling System®'s current certification via an updated certificate given after attending the Certified Installer training course or an online recertification class given every two years.
 - 4. Provide references for the type of installation provided in this specification.
 - 5. Personnel trained and certified in installing copper cable and using Level IIIe Copper Transmission Performance testers, fiber optic cabling, splicing, termination, and testing techniques. Personnel must have experience using an optical light source, a power meter, and an OTDR.
 - 6. Personnel trained in installing pathways and supports for housing horizontal and backbone cabling.
- B. Facilities Orientation
 - 1. Personnel must complete the on-site Facilities Orientation

END OF SECTION

SECTION 270171**Responsibility and Workmanship of Contractor****PART 1 - GENERAL****1.1 CONTRACTOR RESPONSIBILITY**

- A. The contractor shall be obligated to exercise the highest standard of care in performing its obligations as defined in a request for proposal. All work shall be done in a workmanlike fashion that meets the highest standards in the telecommunications industry.
- B. All equipment and materials are to be installed neatly and securely, while cables are to be dressed appropriately in accordance with standards recommendations for a specific type of media (i.e., UTP vs. F/UTP @ 10 Gigabit)
- C. Workers must clean any debris and trash at the close of each job and workday.
- D. The Contractor acknowledges that Intermountain Health will rely on the Contractor's expertise, ability, and knowledge of the proposed system and shall be obligated to exercise the highest standard of care when performing contractual obligations as defined in the Scope of Work.
- E. The contractor must submit the Siemon warranty, cable records, as-built drawings, and test results upon completion of the work. Note: Intermountain Health reserves the right to withhold final payments until all registration documents are approved by the Siemon Company and received by Intermountain Health.

1.2 CONTRACTOR AND EMPLOYEE RESPONSIBILITY

- A. Contractors, their employees, and installers will attend Intermountain Health's required Infection Control training annually.
- B. Contractors, their employees, and installers will complete Symplr registration.
- C. Contractors, their employees, and installers will attend Intermountain Health's required site and job-specific orientation.
- D. Contractors, their employees, and installers will maintain Intermountain Health's required immunizations.
- E. Contractors, their employees, and installers will keep their Intermountain Health required confidentiality agreements current.
- F. Contractors, their employees, and installers always agree to follow all Intermountain Health Policies and procedures and wear the appropriate ID while on any Intermountain properties.
- G. The contractor will determine with the Owner the appropriate level of Environmental Containment precautions to utilize for each work location. Infection Control Risk Assessments and permits will be performed as required.
- H. Upon request, provide qualification data for all qualified layout technicians, installation supervisors, and field inspectors.
 - 1. Siemon issued qualification badges shall be readily available for this purpose.

1.3 EXAMINATION

- A. Field Measurements: Before fabrication, verify dimensions in installation areas by field measurements and indicate measurements on shop drawings. Coordinate the fabrication schedule with construction progress to avoid delaying the work.
- B. Established Dimensions: Where field measurements cannot be made without delaying the work, establish dimensions and proceed with fabricating units without field measurements. Coordinate supports, adjacent construction, and fixture locations to ensure actual dimensions correspond to established dimensions.

1.4 PREPARATION

- A. Pre-installation inspection
 - 1. The Contractor shall visually inspect all cables, cable reels, and shipping cartons to detect possible cable damage incurred during shipping and transport. Visibly damaged goods are unacceptable and shall be replaced by the contractor at no additional cost to the Owner.

1.5 MISCELLANEOUS CONTRACTOR RESPONSIBILITIES

- A. Contractors will maintain unobstructed egress in work areas.
- B. The contractor will keep access to all emergency services.
- C. Contractor will maintain training for Personnel in alternate exits if needed.
- D. Contractor will maintain Temporary construction partitions, as required, that are smoke-tight and built of non-combustible materials.
- E. Additional Fire Extinguishers may be required and will be adequately maintained and inspected.
- F. The construction site will be maintained clean and orderly.
- G. The contractor will observe Intermountain Health's Tobacco Use Policy. (All forms of tobacco use are strictly prohibited.)
- H. All Electrical Extension cords will be grounded, in good condition, and plugged into approved GFI Receptacles.
- I. Construction sites will be restricted. (Approved personnel only)
- J. Personal Protective Equipment (PPE) will be worn as required. (i.e., hard hats, safety glasses, safety shoes, fluorescent vest, in accordance with the general contractor's safety policy)
- K. Tools will be unplugged, and power will be secured at the end of each working day.
- L. All employees and contractors will understand how to obtain MSDS sheets.
- M. The contractor will notify the proper personnel of any fire system shutdown within 48 hours.
- N. The contractor will address all vibration concerns to Intermountain Health and the general contractor's staff.
- O. The contractor will address all Noise Issues with Intermountain Health and the general contractor's staff.
- P. The contractor will fill out a Hot Work permit and keep it on site daily as needed.
- Q. The contractor will fill out an Above Ceiling Work Permit and keep it on site daily as needed.
- R. The contractor will complete an Infection Prevention permit and not begin work until approved.
- S. Contractors will obtain a Confined Space Permit, when required, and keep it on site.
- T. The contractor shall notify Information Systems 72 hours before any shutdown or known interruption of required environmental services. Follow up by notifying the Service Desk.
- U. The low-voltage installation contractor shall perform demolition of low-voltage cabling.
 - 1. To prevent accidental removal of in-use circuits.
 - 2. To allow for the re-use of circuits where practical.
- V. Before removing unused low-voltage cabling, you must verify that both ends are no longer attached to any device. (Both ends of the cable are un-terminated).

END OF SECTION

SECTION 270500

Common Work Results for Communications

PART 1 - PRODUCT

1.1 SUMMARY

- A. This section covers general work results for all Communications Division detail subsections.
- B. Work of the following sections covers a complete installation of permanent and channel links for a data and voice communications network utilizing copper and fiber transmission media.

PART 2 - EXECUTION

2.1 SCOPE OF WORK

- A. Includes, but is not limited to, the following.
 - 1. The Contractor shall:
 - 2. Provide and install fabric and/or plenum, PE, or PVC Innerduct, rated appropriately for the installation environment, in accordance with all applicable codes and ordinances.
 - 3. Provide, install, terminate, test, label, and document all fiber backbone, fiber, and copper riser cable.
 - 4. Provide, install, terminate, test, and document all fiber, copper voice, and data horizontal cable.
 - a. CAT6A UTP and CAT6A F/UTP shall not be mixed on the same campus.
 - 5. Provide and place all termination devices, such as, but not limited to, modular patch panels, blank panels, termination blocks, information outlets (jacks and plates), phone jacks, fiber distribution panels, bulkheads, connectors, and fiber fan-out kits.
 - 6. Provide in quantities specified interconnect components such as, but not limited to, copper patch cords, fiber patch cables.
 - 7. Provide and place horizontal and vertical cable support devices such as, but not limited to, rack and wall-mounted horizontal and vertical cable management, cable runway, communications cable runway, and all required mounting hardware, unless otherwise noted.
 - 8. Provide and install all equipment, mounting racks, cabinets, and/or brackets.
 - 9. In coordination with the general contractor, provide and install UL-approved fire-stopping systems in all communication pass-thrus, conduits, cable trays, and ceiling, wall, and floor penetrations.
 - 10. Provide all appropriate consumable items required to complete the installation.
 - 11. Grounding and bonding in TEC and TR rooms to grounding bus provided by Division 26.
 - 12. Provide complete documentation and demonstration of work.
 - 13. Completion of all punch list deficiencies within 10 working days.
 - 14. Provide indexed and organized complete Test Results of all copper and fiber cable and their components.
 - 15. Provide Submittals.
 - 16. Conduct a final document handover meeting with the client, consultant, and PM to review, discuss, and educate the Owner on the test results and As-Built Drawings.
 - 17. Provide a Manufacturer's Extended Product Warranty and System Assurance Warranty for this wiring system.

END OF SECTION

SECTION 270526**Grounding and Bonding for Communications Systems****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. This work shall be provided by Division 26.
 - 1. Division 26 shall provide and install the communications system grounding bus bar.
- B. Systems other than the voice/data system shall be bonded by their respective installers or Division 26.
- C. Exception: Division 27 shall bond racks, ladders, and other conductive IT equipment and enclosures as required.
- D. Requirements of the following Division 26 Sections apply to this section:
 - 1. Basic Electrical Requirements
 - 2. Basic Electrical Materials and Methods
 - 3. Grounding and Bonding for Electrical Systems

1.2 SUMMARY

- A. This Section includes methods and materials for grounding and bonding Communications systems.
- B. All grounding/earthing and bonding shall comply with applicable codes and regulations. It is recommended that the requirements of IEC/TR 61000-5-2: 1.0, ANSI-J-STD-607-A, or both be observed throughout the entire cabling system.

PART 2 - PRODUCTS**2.1 CONDUCTORS**

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
 - 1. Stranded conductors No. 6 AWG.

2.2 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Compression fitting – 2-hole strap.

PART 3 - EXECUTION**3.1 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70 (NEC), Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

3.2 APPLICATIONS

- A. Conductors: Install stranded conductors for No. 6 AWG and larger, unless otherwise indicated.

3.3 INSTALLATION

- A. Grounding Conductors
 - 1. Route along the shortest and straightest paths, unless otherwise indicated or required by Code.

- a. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
 - 1) The jumper across all tray junctions uses two-hole crimp lugs with a bolt, lock washer, and nut to prevent the ground connections from loosening over time.
 - 2) The contractor will remove a small powder coat or paint area to create a metal-to-metal bonding connection.
 - 3) Per current BICSI TDMM "Grounding, Bonding and Electrical Protection":
 - 4) Grounding and bonding connectors should be one of the following: Tin-plated copper, copper, or copper alloy
 - 5) Connections should be made using crimp connectors or exothermic welding.
 - 6) Per TIA/EIA 607-A the TBB (Telecommunications Bonding Backbone) connections "shall be made using irreversible compression-type connectors, exothermic welding or equivalent."

END OF SECTION

SECTION 270528

Pathways for Communications Systems

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Main pathways for communications systems shall be the responsibility of the Division 27 low-voltage contract.
 - 1. Includes, but is not limited to, hangars, supports, J-hooks, and cable trays.
 - 2. Sections 270536 and 270543_46 are supplemental clarifications that are additions to this section. The appropriate section(s) shall be added for the material used.
- B. The Division 26 electrical contractor shall be responsible for conduits, pathways, and boxes embedded within building finishes for communications systems.
- C. Requirements of the following Division 26 sections apply to this section.
 - 1. Basic electrical requirements
 - 2. Basic electrical materials and methods
 - 3. Grounding, earthing, and bonding for electrical systems.

1.2 SUMMARY

- A. Contractors shall install work following specifications, drawings, manufacturer's instructions, and approved submittal data.

PART 2 - PRODUCTS

2.1 CABLE PATHWAYS

- A. Comply with TIA/EIA-569-B.
- B. Pathways shall be designed and installed to meet applicable local and national building and electrical codes or regulations.
 - 1. All materials shall be UL-and/or CSA- and/or ETL-approved and labeled in accordance with NEC for all products where labeling service typically applies.
 - 2. NRTL is labeled for support of Category 6A cabling and designed to prevent degradation of cable performance and pinch points that could damage the cable.
 - 3. Materials and equipment requiring UL 94, 149, or 1863 listing shall be so labeled. Modification of products that nullify UL labels is not permitted.
 - 4. The installed systems shall not generate or be susceptible to any harmful electromagnetic emission, radiation, or induction that degrades or obstructs any equipment.
- C. Pathways consist of fire-rated sleeves, conduit, basket tray/ladder rack, J-hooks, surface-mounted raceway, and power poles.
 - 1. Basket trays shall be utilized for distribution pathways.
 - a. Provides proper support and load distribution along pathways.
 - b. All wall penetration for the basket tray shall be framed.
 - c. Flexibility, scalability, and accessibility.
 - d. The ladder rack shall be used for all TEC and TDRs.
 - 2. Conduits may be utilized where basket trays are not viable, provided the conduit's cross-sectional area is greater than the basket tray's.
 - 3. Fire-rated sleeves must be used instead of conduit when penetrating a fire-rated wall.
 - a. 2" x 2" for room penetrations, 4" x 4" for j-hook pathways
 - b. Approved Manufacturers
 - 1) STI EZ Path

- 2) Hilti Modular Sleeve
- 4. J-hooks are the minimum pathway device required for all low-voltage contractors for use in ceiling distribution.
 - a. Refer to section 270529.
Note: Surface-mounted raceway and power poles should be installed only when other pathway choices are not feasible.
- D. Outdoor Microduct
 - 1. Manufacturers
 - a. Duraline
 - b. Pre-Approved Equal
 - 2. Description: 7 Way MicroDuct
 - a. All Microduct shall comprise all dielectric materials (except for the armored version). All Microduct shall be manufactured to include enhanced jetting design, such as internal ribbing to minimize surface contact and a permanent slick interior to eliminate the need for jetting lubricant.
 - b. 12.7mm OD1MM ID
 - c. Microduct rating FP (OSP)
 - d. 7-Way
 - e. Color: Orange

2.2 EQUIPMENT

- A. Compatibility
 - 1. All material and equipment provided should be the standard Commercial-Off-The-Shelf (COTS) products of a manufacturer engaged in the manufacture of such products. They shall all be typical commercial designs that comply with the requirements specified. All material and equipment shall be readily available through manufacturers and/or distributors.
 - a. All equipment shall be standard catalogued items of the manufacturer and shall be entirely supplied with any optional items required for proper installation.
 - b. Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum future performance and backward compatibility
- B. Horizontal cables shall be installed in “clean, dry” locations that provide protection from moisture levels above the intended operating range of inside plant (ISP) cables.
 - 1. Cable pathways shall be installed to provide protection from the elements (i.e., moisture) and other hazards.
 - 2. Cables and cable pathways shall be protected from detritus elements such as paints, adhesives, water, and cleaners.
 - a. In case of contamination, the cables shall be replaced at the expense of the General Contractors. Cleaning is not acceptable.
 - 1) Pathways shall not have exposed sharp edges that may meet telecommunications cables.
- C. Pathways shall not be in elevator shafts.
- D. Grounding / Earthing and bonding of pathways shall comply with applicable codes and regulations. It is recommended that the requirements of IEC/TR3 61000-5-2—Ed. 1.0, ANSI-J-STD-607-B, or both, be observed throughout the entire cabling system.

2.3 SURFACE MOUNTING

- A. Surface Mount Cable Runs and Faceplate Boxes
 - 1. Surface mounting of cable pathway runs and/or boxes for outlets/faceplates is only authorized as a last resort and as an exception to running cables through the wall and above the ceiling.
 - a. If surface mount cable runs are used:
 - 1) Burs will be removed from the inside of the plastic or metal surface mount pathway to prevent damage to cables pulled through the run.
 - 2) Raceway manufacturer plastic bushings shall be installed at all outlet openings in the raceway to prevent damage to the cable.

- 3) "T", Splice, and corner pieces will be used to join runs. Runs will not be butted together without the appropriate joining pieces.

PART 3 - EXECUTION

3.1 HORIZONTAL PARAMETERS

- A. Allowable Cable Bend Radius and Pull Tension:
 1. In general, communications cables cannot tolerate sharp bends or excessive pull tension during installation.
 - a. The bend radius for four pair UTP and F/UTP under no load (no pulling tension) shall not exceed four (4) times the outside diameter of the cable and eight (8) times the outside diameter of the cable under load (110N/25lbf). Note: Cable bend radius and pulling tensions for cables other than 4-pair cables increase with the diameter and type of cable. Refer to the manufacturer's recommendations for specific requirements.
 2. After installation, exposed cable and other surfaces must be cleaned free of lubricant residue. Use only lubricants designed explicitly for cable installation.
- B. Pull Strings:
 1. Horizontal and Vertical Pathways
 2. The pathway installer shall:
 - a. Provide pull strings in all new conduits, including all conduits with cable installed as part of this contract.
 - b. Provide pull strings in all new cable trays.
 - c. The pull string shall have a rated average breaking strength of 200 pounds.
 - d. Pull strings must move freely during pulling sessions to prevent cable jacket/cable damage.
 - e. Free-moving pull strings shall be provided in all locations where they are utilized as part of this contract.
 3. Conduit Fill:
 - a. Reference the manufacturer's Design Installation Guidelines manual.
 - b. Comply with the requirements of NFPA 70 (NEC)
 - c. The number of cables placed in a pathway shall not exceed the manufacturer's specifications, and the geometric shape of a cable will not be affected.
 - 1) Conduit pathways shall have a maximum fill ratio of 40% to allow for proper pulling tension and the laying of the CAT6A F/UTP cable. A minimum of a 1" diameter conduit is required for new construction. Existing conduits will require reducing the number of cables placed in the conduit to meet the required fill ratio.

3.2 INTRA-BUILDING CABLE ROUTING

- A. Pathways
 1. The backbone subsystem shall include cable installed vertically between floor telecommunications rooms and the main or intermediate cross-connect in a multi-story building, and cable installed horizontally between Telecommunications rooms and the main or intermediate cross-connect in a long single-story building.
 2. Adequate riser sleeve/slot space shall be available in all telecommunications rooms, with the ability to ingress the area later, so no drilling of additional sleeves/slots is necessary. All sleeves/slots are required for proper fire stopping per national and local codes. Install fire stop material designed specifically for the building construction conditions and to meet the existing fire stop material as directed by the building engineer.
 3. Backbone pathways shall be installed or selected so that the minimum bend radius of backbone cables remains within the manufacturer's specifications during and after installation.
 4. Where redundant paths are required, they shall be separated by a minimum of 24".
 - a. Separate innerducts and/or armored fiber are required for each leg of the redundant path.
 - b. Separate physical routes for each path shall be utilized where possible.
 5. Building backbone cables shall be installed in "dry" locations that provide protection from moisture levels above the intended operating range of inside plant (ISP) cables.

6. "Slab-on-Grade" building designs wherein pathways are installed underground on/in the poured concrete slabs in direct contact with the soil are considered wet locations and hence are not permitted.

END OF SECTION

SECTION 270529**Hangers and Supports for Communications Systems****PART 1 - PRODUCTS****1.1 APPROVED PRODUCT**

- A. The J-hooks shall meet or exceed the characteristics of construction and features below
 - 1. Provide broad-based support for cabling to aid in maintaining overall system performance.
 - 2. Be available in 50.8mm (2") and 101.6mm (4") options
 - 3. Come equipped with a cable retention clip
 - 4. Offers a full line of mounting accessories.

1.2 APPROVED MANUFACTURERS

- A. Ericson / Caddy
- B. B-Line
- C. Stiffy

PART 2 - EXECUTION**2.1 J-HOOKS AND OTHER SUPPORTS SHALL BE INSTALLED SUCH THAT**

- A. They are supported by devices designed for this purpose and shall be installed independently of any other structural component. J-Hooks shall not use the suspended ceiling support wires or lighting fixture support wires.
- B. The number of cables placed into the J-hooks shall be limited to a number that will not cause a change to the geometric shape of the cables.
 - 1. Limit to a 40% fill in new construction.
- C. J-hooks shall not be spaced farther than 1.5 meters (5 ft.) apart, with a recommendation that they be spaced at 1 meter (3 ft.) apart. Note: Construction may require distances to exceed the maximum and are considered an exception requiring approval of the project manager or building engineer.
- D. J-hooks or better must be installed without exception.
- E. All J-hooks that pass through a fire-rated wall must have an EZ-Path Sleeve or Hilti Modular Sleeve installed to go through the fire wall. The size is to be based on the size of the J-hook. To be installed by the Low Voltage Contractor installing the J-hooks.

2.2 UNACCEPTABLE INSTALLATIONS

- A. Free flight of cables
- B. Resting or attaching cables on pipes, conduits, HVAC duct work, fire sprinkler systems, basket tray, basket tray supports, or ceiling tiles/grid.

END OF SECTION

SECTION 270533**Conduits and Back Boxes for Communications Systems****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Division 26-Electrical work

PART 2 - PRODUCTS**2.1 APPROVED PRODUCT**

- A. Conduits and back boxes shall meet the construction requirements of the NEC for the type of structure and space in which they are installed. They will be of the diameter and size required to provide adequate fill, bend radius, and connector space. Refer to section 270528

PART 3 - EXECUTION**3.1 CONDUIT SIZING**

- A. Conduit size shall be based on the type of cable installed and the required fill ratio and bend radius associated with the specified kind of cable.
1. The minimum conduit size for the back box for CAT6A F/UTP shall be a 1-inch EMT.

Conduit Trade Size (metric designator)	Max number of cables based upon allowable fill		
	Cable O.D.		
	7.4mm (0.29 in.)	8.4mm (0.33 in.)	8.9mm (0.35 in.)
1 (27)	4	3	2
1-1/4 (35)	6	5	4
1-1/2 (41)	9	7	6
2 (53)	14	11	10
2-1/2 (63)	20	16	14
3 (78)	31	24	22
3-1/2 (91)	42	32	29
4 (100)	54	42	37

- B. Conduit and installation shall be provided by Division 26.
- C. All conduit stubs shall be installed with plastic bushings appropriate for the size of conduit used.
- D. Conduits that stub to the accessible ceiling shall be installed in the direction that provides the shortest path to the TDR, complete with a pull string.
- E. Conduit pathway must be provided to the nearest basket tray when the area has a hard lid or a decorative ceiling.

3.2 BACK BOX SIZING

- A. New work back boxes for CAT6A F/UTP shall be a minimum of trade size 4-11/16" x 4-11/16" x 3" (depth) plus a 5/8" plaster ring to allow for proper bend radius and connector termination/installation. Side knockouts shall be avoided.
- B. Back boxes for rework shall meet the exact specifications as those for new work.
 - 1. If existing back boxes or back boxes are smaller due to construction restrictions, devices such as extension rings, bezels, or faceplates shall be used to modify the back box to ensure proper bend radius and connector termination/installation.
 - a. Verification and approval of the size change must be obtained from DCO Infrastructure Cabling and engineering.

3.3 BACK BOX COMPOSITION

- A. All back boxes for IT systems shall be UL/CSA listed and approved for the purpose.
 - 1. Non-metal back boxes shall not be used for any interior IT-related device.

3.4 SPECIAL CONDITIONS – LEAD LINED WALLS FOR RADIATION CONTROL

- A. Refer to the complete IT Lead Lined Wall Procedure – Attachment Appendix 8

END OF SECTION

SECTION 270536

Cable Tray for Communications Systems

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. This section shall be coordinated with Sections 270528, and 270543_46

1.2 COORDINATION

- A. Before beginning installation, a kick-off meeting should be held to coordinate the tray installation and expectations properly. The General Contractor should arrange it and, at a minimum, include representatives of the following trades: FP&D, Electrical (Div 26), Structured cable, Nurse Call, paging, building automation and control, plumbing, HVAC, fire sprinkler, framing, and others as applicable.
- B. The low-voltage CI cable contractor (Div. 27 subcontractor) and the Data Center Operation Team shall approve and install the wire basket tray routing.
- C. Where adequate space is available, a 4", triple-tier J-Hook pathway shall parallel the basket trays for other services
- D. The cable tray installer shall install the triple-tier J-Hooks.
- E. Single J-Hooks, as needed to extend beyond the triple tier, shall be installed by the trade that will utilize them.
- F. The cable tray shall be a high-priority installation to allow adequate time for proper and complete cable installation before the ceiling grid.

PART 2 - PRODUCTS

2.1 APPROVED PRODUCT

- A. The Cable Ladder Tray meets or exceeds the characteristics of construction and features below:
 - 1. It shall be fully welded and available in a galvanized silver or powder-coated black finish
 - 2. Have an optional construction using "elongated" shaped wires offering broader support for installed cables.
 - 3. The Cable ladder tray shall be used in data rooms for horizontal management above the racks.
 - 4. Ladder shall match the manufacturer of the data racks or be an exact equal.
 - 5. The ladder shall be assembled with manufacturer-approved parts and methods.
 - 6. Ladder Rack must be installed using waterfalls.

2.2 PART NUMBERS (SUBMITTAL REQUIRED)

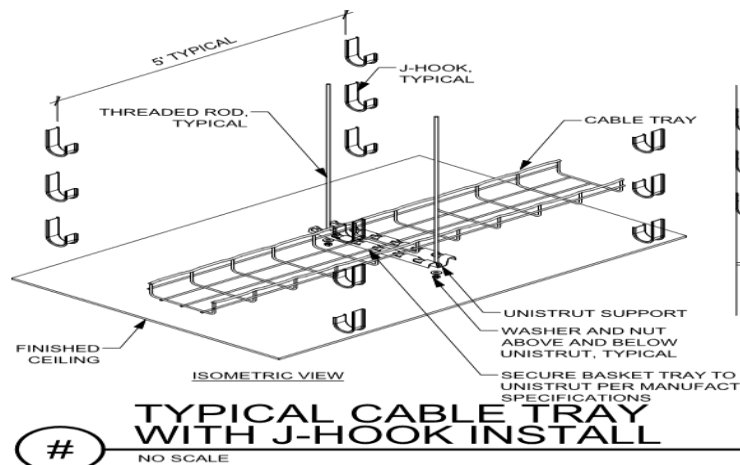
- A. Cable Ladder Tray
 - 1. Refer to Appendix 3 or the plans for part numbers.
- B. APPROVED BASKET TRAY MANUFACTURERS
 - 1. WBT – Wire Basket Ray (preferred).
 - 2. Simon RouteIT TM Wire Mesh Cable Tray, or equal basket-type tray.
 - 3. Cabolfil per owner's approval.

PART 3 - EXECUTION

3.1 PATHWAY INSTALLATION

- A. Supports

1. Installed per the Manufacturer's Specifications and utilize components specific to the maintenance of proper access in and out of the basket tray using bend delimiters.
 2. Distance between supports shall not exceed 5 feet
 - a. Less distance between supports required if per the manufacturer's instructions.
 - b. A minimum of one support is required within 24" on each side of any junction point.
 3. Supports shall be of the trapeze design to provide maximum stability.
 - a. Each support shall attach to the structure via its own hangers.
 - 1) All hanger supports shall be constructed of rigid material such as all-thread.
 - 2) All hangers and supports shall be installed perpendicular and plumb to the tray. No angle supports shall be permitted unless augmented perpendicularly.
 - 3) Vibration and sway (seismic) damping is required.
 - 4) Provide support across the tray width underneath, not via the basket side wires.
 - 5) Building walls do not qualify as support and shall not be used as support.
 - 6) All basket tray penetrations through a wall are to be framed by the General Contractor.
 - b. Support shall be of sufficient strength to support at least 200% of the expected load
 4. Wall-mounted angle brackets shall not be used as a load-bearing support for the basket tray.
 5. Basket Tray should not be installed directly below pressurized water pipes.
- B. Complete system access
1. Basket trays shall have a dedicated free clearance zone surrounding them.
 - a. 12" clear space shall be provided on the side where natural feed will occur.
 - b. 6" clear space shall be provided on the side opposite the feed access.
 - c. 8" clear space above the top of the tray, minimum – recommended 12".
 - d. 3" clear space below the tray.
 2. Exception: Other services may pass through the free clearance zone provided it is perpendicular to the tray direction and does not exceed 6' in width or interfere with the access to pull wire in the tray.
 3. When the basket tray is installed in Hard Lid or decorative locations, access panel locations must be installed at corners or T intersections. Consult DCO personnel on placement.
 4. NOTHING shall be attached to the basket tray or basket tray supports without prior written approval from DCO.



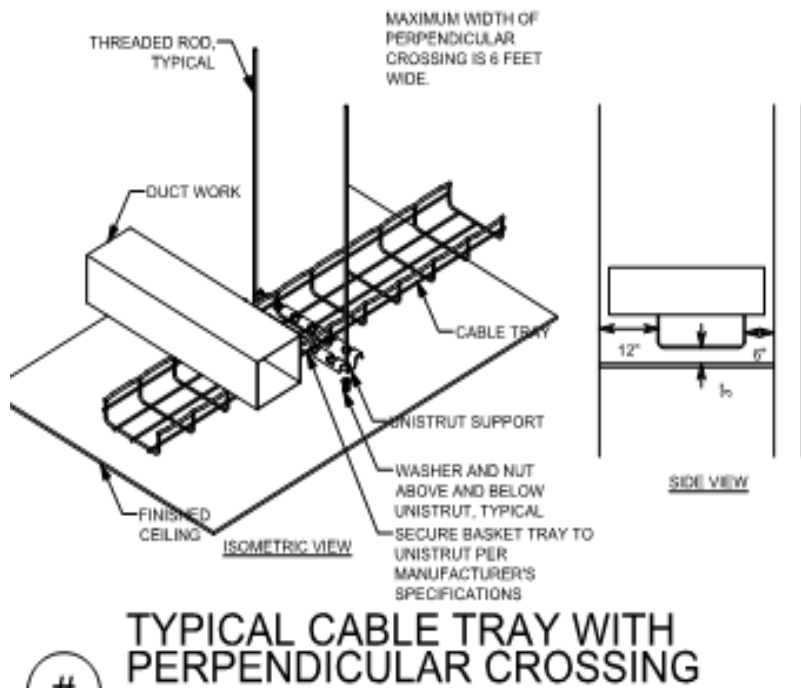
3.2 ROUTING OF BASKET TRAY

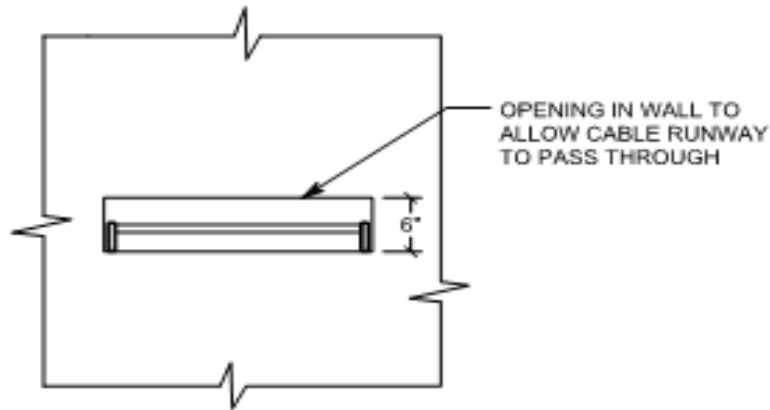
- A. The exact basket tray location shall be coordinated with other trades to ensure proper clearances and access. Prior to installation, the owner's DCO/infrastructure cabling team must approve the final cable tray routes.
- B. Basket tray shall be installed in straight lines, either parallel or perpendicular to building lines
- C. Wire basket trays are assumed to include joiner kits, stabilizer kits, rack mount kits, splices, clamps, hangers, supports, waterfalls, and thus no accessories are called out below except the tray divider.

- D. Cut basket tray structural components/rods will not be left with any edges that can cause injury to the skin and eyes by someone in the ceiling working. Cut ends are to be covered with a coating or cap.
- E. A waterfall device will protect all changes in cable elevation(s) transitioning between the basket tray and the cable rack.
 - 1. This may also be mitigated by creating a rack 'ramp' which lowers the upper rack to the lower rack by cutting and bending the upper rack to slope downward to the lower rack.
 - 2. This method requires DCO pre-approval and proper ceiling support for the ramp.
- F. Basket tray shall follow the corridor paths
 - 1. Routing above rooms and other partitions shall be avoided
 - 2. The cable tray shall not block access to VAV's valves or other similar equipment.
- G. Basket tray and flush penetrations shall be utilized over hard-lid areas as specified.
- H. Access panels shall be provided where needed to access the basket tray on both sides of the wall in hard lid areas within 3' or less of the basket tray.

3.3 TRAY INTEGRITY

- A. The tray shall be installed as a complete, continuous system with no open spaces, cutouts, or missing segments. Bonding between sections shall be accomplished by the manufacturer's approved clamp or designated method.
- B. Trays shall be free from obstructions, other systems, trash, or debris. Access to the tray shall be provided as outlined.
- C. No other trade infrastructure or equipment may be connected to or rely on the basket tray or its support system.
- D. Tray must not be notched or cut out to accommodate other trades. Repairs will not be accepted. Section replacement will be required at no cost to the owner.
- E. As much tray material as possible shall be left uncut at turns, junctions, elevation changes, width changes, etc. Overlap shall be clamped to maximize strength and prevent pinch points.





CABLE RUNWAY THROUGH WALL DETAIL

3.4 WALL OR OTHER PENETRATIONS (SUBMITTAL REQUIRED)

- A. Fire and smoke-rated assemblies
 - 1. Penetrations shall comply with all fire and smoke prevention methods per code and as outlined in this document, including Section 270528 and Division 7 (Thermal and Moisture Protection).
- B. Approved penetration methods
 - 1. The preferred barrier penetration method shall be to run the tray continuously through the barrier, with closure provided by Firestop pillows.
 - a. Framing shall be boxed around openings to permit proper pillow insertion. Coordinate with the framing contractor.
 - 2. Sleeves or conduits
 - a. Fire assemblies or alternate penetrations must provide 150% of the designed cross-sectional area of the basket.
 - b. Conduit permitted only with written pre-bid permission or engineering notation on the drawings.
 - c. Each penetration sleeve or conduit shall be bonded on both sides of the penetrated barrier using UL and AHJ-approved methods.
 - 3. All penetrations shall be positioned in line with the basket tray to facilitate ease of pulling conductors and provide a straight-line path.
 - a. The bottom of the penetration device shall be flush with the bottom of the basket tray
 - b. Side-to-side penetrations must be entirely within the cable tray space or directly above whenever possible.
 - 4. Approved penetration devices shall be a minimum size of 4"
 - a. The total penetration space at each location shall be sized for 20% growth and equal to or greater than the cross-sectional area of the basket tray.
 - 5. Approved devices where smaller penetrations are permitted shall be a minimum size of 1".
 - 6. The local facility manager shall approve devices:
 - a. Fire-rated assemblies
 - b. Tray with enclosed walls, properly sized and installed pillows
 - c. Conduit sleeves
 - 1) Conduit sleeves should only be used as a last resort upon approval from the owner's DCO representative.

3.5 UTILIZATION

- A. Capacity
 - 1. Trays and penetration devices shall be sized appropriately
 - a. Provide a maximum calculated fill ratio of 40% to an inside depth not to exceed 3 inches (75 mm)
 - b. Provide capacity to allow for at least 20% future growth
- B. Systems served
 - 1. A single system shall be dedicated to Basket trays, J-hooks, and penetrations. Mixing of other systems with voice and data shall not be permitted in tray or J-hook paths.
- C. Restricted content in trays
 - 1. The wire basket tray shall only contain voice and data communications system cables.
 - a. If there is sufficient space in the tray, and with approval from both the data network subcontractor and DCO, certain other IP services (e.g., camera, telemetry, etc.) may share tray space.
 - b. Service loops must not reduce tray capacity.
 - c. Nurse call cabling shall be run in the J-Hook path. All nurse call installations must provide their own path or utilize the triple J-Hook system.
- D. Triple J-Hook
 - 1. Triple Tree J-Hooks – Caddy CAT64HPS WM3
 - 2. Path Assignments
 - a. The Lower tier of the triple J-Hook path is designated for Card Access, building automation, and controls
 - b. The Middle tier of the triple J-Hook path is designated for Nurse Call.
 - c. The Top tier of the triple J-Hook path is designated for satellite, DAS, or similar systems.
 - 3. When a triple J-hook pathway is not installed or available, each system provider shall install its own J-hook pathway and wall penetrations.
 - 4. Service loop and slack shall not interfere with other pathways.
 - 5. Triple J-Hooks must be a minimum of 4 hooks each.

END OF SECTION

SECTION 270553**Identification for Low-Voltage Cables and Labeling****PART 1 - GENERAL****1.1 NOT USED****PART 2 - PRODUCTS****2.1 LABELING**

- A. Structured cabling shall be labeled in accordance with ANSI/TIA 606-B standards.
- B. A unique identifier shall be marked on each faceplate to identify it as connecting hardware.
- C. Each port in the faceplate shall be labeled with its identifier.
- D. A unique identifier shall be marked on each piece of connecting hardware to identify it as connecting hardware.
- E. Each port on the connecting hardware shall be labeled with its identifier.
- F. Cable Labeling
 - 1. Label System
 - a. Label Identification (Labeling) System:
 - 1) Brady
 - 2) Dymo
 - 3) Hellerman-Tyton
 - 4) Panduit
 - 5) Acceptable alternate
 - a) Approval from the Data Center Operations Infrastructure Cabling team member is required before bidding.
 - 2. Cable Labels
 - a. Self-adhesive vinyl or vinyl-cloth wraparound tape markers, machine printed with alphanumeric cable designations. Plastic, self-adhesive labels are not acceptable.
 - b. Each end of the Horizontal cables shall be labeled with a mechanically generated label within 300mm (12 in) of the end of the cable jacket, with the link identifier, which shall be a unique configuration determined by the owner. This also applies to Backbone Cables.
 - 3. Flat-surface labels
 - a. Self-adhesive vinyl or vinyl-cloth labels, machine printed with alphanumeric cable designations.
 - 4. Contractor shall:
 - a. Provide transparent plastic label holders and four pairs of marked colored labels.
 - b. Install colored labels according to the field type as per ANSI/TIA 606-B.1 color code designations.
- G. Palette
 - 1. Use the owner's color-code guidelines for voice, data, cross-connect, riser, and backbone fields. Otherwise, use the ANSI/TIA 606-B designation strip color-code guidelines for voice, data, cross-connect, riser, and backbone fields. Color designations for F/UTP cable:
 - a. Intermountain Health Standard Wiring Palettes for Horizontal Cabling

Use	Color
Data & IP Phones	Blue
Analog Phone	Blue
Security Card Readers	Grey/Yellow

IP Security Cameras	Blue
Fire Systems	Red
TV Coax	Black
Public Address/Telecom Patching in TEC Only	White
Clinical Engineering	Orange
a. Monitoring, Bed Systems	Orange
b. Nurse Call (5e)	Orange
c. Real time patient data	Orange
Wireless	Yellow
Foreseer (Belden 1422)	Red

- H. Outlet/Jack/Faceplate Icons/labeling will match the color of the cable attached to the back side of the outlet/jack.

PART 3 - EXECUTION

3.1 GENERAL IDENTIFICATION

- A. The installer shall label all cables, regardless of length.
- B. Identify system components, wiring, and cabling complying with TIA/EIA-606-B.1. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
- C. Color-code cross-connect fields. Apply colors to voice and data service backboards, connections, covers, and labels.
- D. Using cable management system software specified in Part 2, develop Cabling Administration Drawings for system identification, testing, and management. Use a unique, alphanumeric designation for each cable and label the cable, jacks, connectors, and terminals to which it connects with the same designation. At completion, cable and asset management software shall reflect as-built conditions.
- E. Cable Schedule: Post in a prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with a rigid frame and clear plastic cover. Furnish an electronic copy of the comprehensive final schedules for the Project.
- F. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify the labeling convention and show labels for telecommunications rooms, backbone pathways and cables, entrance pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors. Follow the convention of TIA/EIA-606-B.1. Furnish an electronic record of all drawings in the software and format selected by the Owner.

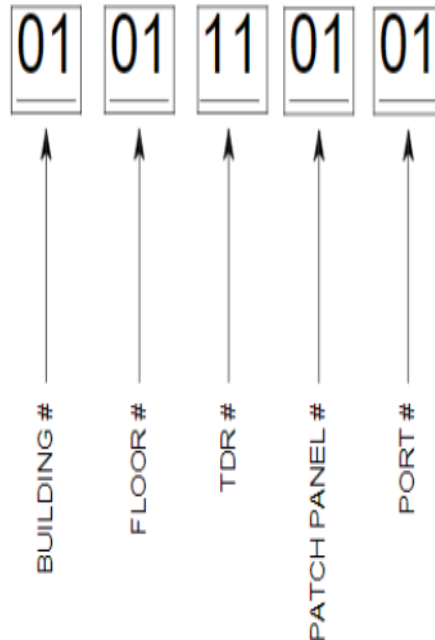
3.2 CONCEALED ENDS

- A. Jacks, connectors, terminations, and similar items concealed in locations such as above grid ceilings shall have additional labeling. The additional label shall be on the face of the grid in a visible location immediately adjacent to the termination location.

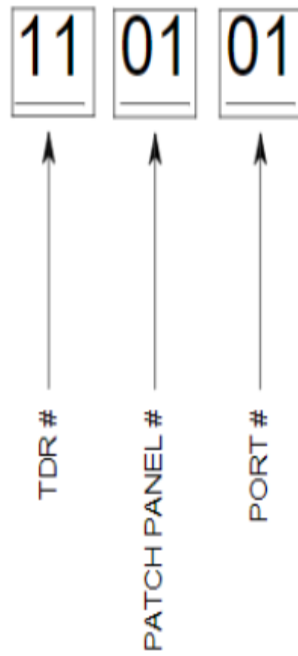
3.3 CABLE AND WIRE IDENTIFICATION

- A. Label each cable visibly within 4 inches of each termination and tap, where it is accessible in a cabinet, junction, or outlet box, and elsewhere as indicated.
- B. Each wire connected to building-mounted devices is not required to be numbered at the device if the wire's color is consistent with the associated wire connected and numbered within the panel or cabinet.
- C. Label each terminal strip and screw terminal in each cabinet, rack, or panel.

1. Individual number wiring conductors connected to terminal strips and identified each cable or wiring group being extended from a panel or cabinet to a building. The mounted device shall be identified with the name and number of devices as shown.
2. Label each unit and field within distribution racks and frames.
3. Cable ID Example



4. Building # - The building number is assigned to the building if multiple buildings exist.
Floor # - Will be incorporated into the TDR #
TDR #—Begin with 1A through 1Z for the 1st Floor, 2A, and so on, per the floor the cabling is on.
Patch Panel #-1 through however many patch panels there are.
Port #-1 -48 for each patch panel.
5. Cable ID Example for Small Clinics.



- D. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA-606-B.1.

END OF SECTION

SECTION 271116**Cabinets, Racks, Frames, and Enclosures****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Cabinets and racks specifications are in TIA569-C and the plans' ET pages.

PART 2 - PRODUCTS**2.1 APPROVED PRODUCT**

- A. **OPEN RACKS**
1. For rack-mounted installations in a telecommunications room, the installer shall use a 19-inch by 3-inch-deep equipment rack.
 2. Equipment Rack 19" X 8', 52 RU, Black – Chatsworth 55053-715
 3. Equipment Rack 19" X 7', 45 RU, Black – Chatsworth 55053-703
 4. Exception: Where other size cabinets are specified by the design team at the owner's direction
 5. All equipment racks must be bolted to the floor for seismic support.
- B. **WALL MOUNTED RACK**
1. Wall Mounted Rack 53.6" H x 17" D, 26RU, Black – Chatsworth 11807-718
 2. Heavy Duty Swing Gate – Chatsworth 12795-701
- C. **WIRE MANAGERS**
1. Part Numbers
 - a. Vertical Wire Manager, Double Sided, Black 10" wide x 8' tall – Chatsworth 40096-715
 - b. Vertical Wire Manager, Double Sided, Black 10" wide x 7' tall – Chatsworth 40096-703
 - c. Horizontal Wire Manager, 4U – Panduit PR2HF4
 2. Typical Standard Layout
 - a. The layout is 10" vertical manager, then 19" rack, then 10" vertical manager, then 19" rack, then 10" vertical manager.
 - b. Where more than 2 racks are needed, maintain the pattern of 10" vertical wire management on the ends and 10" vertical management between racks.
- D. **CABINETS**
1. Standard Cabinet
 - a. DCE 1-Sided Cabinet – 600mm x 1200mm - Vertiv E4562121120001S
 - b. DCE 2-Sided Cabinet – 600mm x 1200mm - Vertiv E4562122120001S
 - c. DCE 1-Sided Cabinet – 700mm x 1200mm – Vertiv E4572112120001S
 - d. DCE 2-Sided Cabinet – 700mm x 1200mm – Vertiv E4572122120001S
 - e. Baying Gasket – Baying Gasket Kit – Vertiv E4013
 - f. Baying Kit – Baying Hardware Kit – Vertiv E9013
 - g. Blanking Panel – Upsite Hotlok 10031 1U
 - h. Blanking Panel – Upsite Hotlok – 10033 2U
 - i. All cabinets must be bolted to the floor for seismic support.
 2. Wall Mount Cabinet
 - a. **Cube-It** – CPI 11996-736 (36" H x 30" D). Or specified size.
 - b. Stand Fan and Filter Kit for Cube-It – CPI 40972-001
 - c. Power strip for Cube-It – CPI 12820-705 (20 Amp – NEMA 5-20P)
 - d. Vertical Wall Mount Cabinet – Legrand VWMSD-4RU-42-B
 - e. Vertical Wall Mount Cabinet – Legrand VWMSD-8RU-42-B
 - f. Fixed Mounting Rail Kit – Legrand VWM-RR-4RU
 - g. Fixed Mounting Rail Kit – Legrand VWM-RR-8RU

- h. Pivoting Mounting Rail Kit – Legrand VWM-PIV-4RU
- i. Fan Kits with 115 VAC fans – Legrand VWMFK-115
- j. Top Brush Grommet Kit – Legrand VWMBGK
- k. Circular Knockout Grommet Kit – Legrand VWMGR-30
- l. Vertical Wall-Mount Cabinets - Refrigerated Cabinet 24” – Hubbell IR221APG.
- m. Vertical Wall-Mount Cabinets - Refrigerated Cabinet 36” – Hubbell IR321APG.
- n. Vertical Wall-Mount Cabinets - Refrigerated Cabinet 48” – Hubbell IR421APG.
- o. Air Conditioners – Air conditioner for Hubbell refrigerated cabinets - Hubbell IRAC1

END OF SECTION

SECTION 271119**Termination Blocks and Patch Panels****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

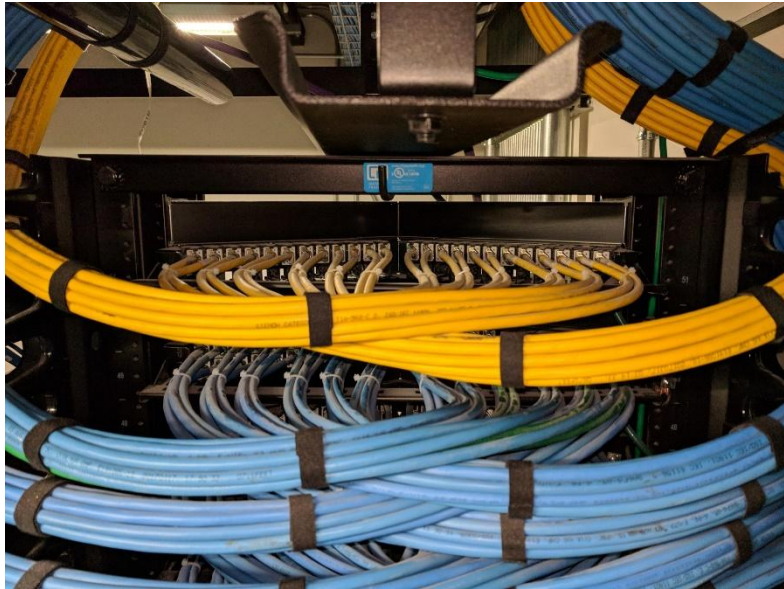
- A. Requirements of the following Division 26 sections apply to this section.
 - 1. Basic electrical requirements
 - 2. Basic electrical materials and methods
 - 3. Grounding, Earthing, and Bonding

PART 2 - PRODUCTS**2.1 APPROVED PRODUCT**

- A. PATCH PANELS – COPPER
 - 1. 48 Port CAT 6A Shielded, 1RU Angled Patch Panel with Outlets –
 - 2. Siemon Z6AS-PA-48A
 - 3. 48 Port CAT 6A Shielded, 1RU Flat Patch Panel with Outlets –
 - 4. Siemon Z6AS-PNL-U48K
 - 5. 24 Port CAT 6A Shielded, 1RU Flat Patch Panel with Outlets –
 - 6. Siemon Z6AS-PNL-U24K
 - 7. 48 Port CAT 6, 2RU Angled Patch Panel, 110 Style – Siemon UP6-A2-48L-RS
 - 8. 48 Port CAT 6, 2RU Flat Patch Panel, 110 Style – Siemon UP6-F2-48L-RS
 - 9. 24 Port CAT 6, 1RU Angled Patch Panel, 110 Style – Siemon UP6-A1-24L-RS
 - 10. 24 Port CAT 6, 1RU Flat Patch Panel, 110 Style – Siemon UP6-F1-24L-RS
 - 11. 19” Angled Blank Filler Panel, 1U, Black – Siemon PNL-BLNKA-1
 - a. Provide blank fillers where appropriate.
 - 12. 19” Flat Blank Filler Panel, 1U, Black – Siemon PNL-BLNK-1
 - a. Provide blank fillers where appropriate.
- B. PATCH PANELS – FIBER
 - 1. LightVerse Rack Mount Fiber Enclosure – Siemon LVE-4U-MD-P01A
 - 2. Lightverse Blank Adapter Plate, Black – Siemon LVA-BLANK-01A
 - 3. LightVerse LC Splice Cassette - Siemon LVS12-LSUARAB1A
 - 4. LightVerse Splice Tray – Siemon TRAYHD—1-A
 - 5. OM4 Splice Cassette – Siemon LVS12-LS-PVRAB1A
 - 6. Wall Mount Fiber Enclosure – Siemon LVW-M1-01
 - 7. Lightstack Surface Mount Module Enclosure – Siemon – LSE-01
 - 8. Lightstack Surface Mount Splice Enclosure – Siemon – LSS-01
 - 9. Lightstack LC Adapter Plate – Siemon LS-LS12-01C-AQ

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. For angled patch panels, the terminations shall cross in the back to the opposite path of the patch panel to maximize available cable bend radius.
- B. See illustration below in this section:



END OF SECTION

SECTION 271300
Backbone Cabling**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawing and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.
- B. Section 27 05 28 – Pathways for Communications Systems.

1.2 DEFINITIONS

- A. INTRA-BUILDING CABLING
 - 1. Cable that runs between telecommunications rooms (TRs) inside a building. Can be vertical or horizontal in physical orientation. It consists of the backbone transmission media between these locations and the associated connecting hardware terminating this media.
- B. INTER-BUILDING / CAMPUS CABLING
 - 1. A cable that runs between buildings in a campus environment. It is normally a first-level backbone cable beginning at the main cross-connect in the equipment room of the hub building and extending to the intermediate cross-connect in the equipment room of a satellite building. Campus Backbones require an optical fiber cable to be installed to support high-speed data applications.
 - 2. Customer-owned outside plant (OSP) cabling.

PART 2 - PRODUCTS**1.1 PERMITTED BACKBONE MEDIA**

- A. Cables allowed for use in the backbone include:
 - 1. CAT 6A F/UTP Riser, Blue, Data – Siemon 9A6R4-A5-06-R1A
 - 2. CAT 6A F/UTP Plenum, Blue, Data – Siemon 9A6P4-A5-06-R1A
 - 3. 50 Pair Category 3 Riser Cable Gray – General Cable 2133161 or equal
 - 4. 50 Pair Category 3, OSP Rated PE-89, Black, 22 AWG – General Cable 7525637 or equal.
 - 5. Building Entrance Terminal, 50-Pair, 110 Style Termination – Circa 1880ECA1-50
 - 6. Fiber Optic Cable, Single-mode, 24 Strand, Armored Indoor/Outdoor Cable, Black – Siemon 9BG8P024L-E201A
 - 7. Fiber Optic Cable, Single-mode, 24 Strand, Armored, Plenum Cable, Yellow – Siemon 9BC8P024L-E205A
 - 8. Fiber optic Cable, Single-mode, 48 Strand, Armored Outdoor Cable, Black – Siemon 9PF8C048G-E201A
 - 9. Fiber Optic Cable, Single-mode, 144 Strand, Armored Outdoor Cable, Black – Siemon 9PF8C144G-E201A
 - 10. Fiber Optic cable, multi-mode, OM4, 12 Strand, Armored, Riser Cable, Aqua – Siemon 9BC5R012G-T512A (Data Centers must be OM4 or better)
 - 11. Microfiber
- B. The cable shall support voice, data, and imaging applications. All backbone cables' bending radius and pulling strength requirements shall be observed during handling and installation.
- C. Multi-pair twisted pair cable is intended to support analog voice applications and shall be tested for continuity only.
- D. In addition to meeting the applicable performance specifications, all copper and optical fiber cables shall be appropriate for the environment in which they are installed.

2.2 MEDIA PRODUCTS

- A. COPPER

1. The total channel length between the Campus Distributor/Main Cross-connect and any floor Distributor/Horizontal Cross-connect shall not exceed the following length limits for copper cabling:
 - a. 2,000 m (6,560 ft) for balanced twisted pair for PBX/Class A (100 kHz) applications.
 - b. 200 m (656 ft) for balanced twisted pair for Class B (≤ 1 MHz) applications.
 - c. 100 m (328 ft) for balanced twisted-pair categories 6, 6A & 7 (per Backbone segment when providing a two-level Backbone).
- B. MULTIMODE OPTICAL FIBER
 1. See the Siemon website for supportable fiber distances
 - a. Laser-qualified 50/125 μ m multimode fiber optical fiber cables shall follow the following standards: ISO/IEC 11801:2002 OM3, ANSI/TIA-568-C.3, ANSI/TIA-568-C.1 and Telcordia GR-409-CORE, as well as the guaranteed application distances, attenuation, bandwidth, and group index requirements of refraction.
 - b. Specifications:
 - 1) Shall support 10GBASE-SX for all horizontal workstations, risers, and short length backbone (<300 m) locations.
 - 2) Constructed for overfilled launch (OFL) and restricted mode launch (RML) bandwidth to ensure compatibility with both LED and laser light sources.
 - 3) Have an Aqua Outer Jacket available in cable ratings, including OFNR and OFNP.
- C. SINGLE-MODE OPTICAL FIBER
 1. See the Siemon website for supportable fiber distances
 2. Single-mode optical fiber cable shall only be used for 1st and 2nd Level Backbone applications.
 3. All fiber is to fusion-spliced terminations.

PART 3 - EXECUTION

3.1 TOPOLOGY

- A. The Backbone cabling shall use a conventional hierarchical star topology.
 1. There shall be no more than two (2) levels of cross-connects between the campus distributor/main cross-connect (CD/MC) and any given floor distributor/horizontal cross-connect (FD/HC).
 2. From the FD/HC, no more than one cross-connect shall be passed through to reach the CD/MC.
- B. Splicing of UTP, F/UTP and S/FTP copper cables is not permitted.

3.2 TYPICAL TDR BACKBONE

- A. A typical TDR backbone for a hospital campus shall consist of:
 1. Redundant (2 ea.) 24-strand single-mode fiber, each routed in a separate path.
 2. One 50-pair copper feed line.

END OF SECTION

SECTION 271500
Horizontal Cabling**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.

PART 2 - SECTION 27 05 28 - PATHWAYS FOR COMMUNICATIONS SYSTEMS**2.1 SUMMARY**

- A. This section includes requirements and guidelines for installing F/UTP, ScTP, and Fiber horizontal cabling.
1. Horizontal cable and its connecting hardware transport signal between the telecommunications outlet/connector and the horizontal cross-connect located in the communications termination room. This cabling and its connecting hardware are called "permanent link," a term used in the testing protocols.

PART 3 - EXECUTION**3.1 HORIZONTAL CABLE**

- A. Quantity
1. Two horizontal cables shall be routed to each work area. Cable connected to information outlets shall be CAT6A F/UTP, 4-pair, 100Ω balanced twisted-pair.
 - a. A work area is approximately 100 sq. ft. and includes the components that extend from the telecommunications outlet/connectors to the station equipment.
 - b. According to current best practice, two (2) standard cables shall be run to each wireless access point location.
 - c. One (1) standard horizontal cable may be run to the following locations:
 - 1) The building controls vendor directs each building control system enclosure.
 - 2) Each IP Video Surveillance Camera at each of the designated locations.
 - 3) Each wall phone.
 - 4) Each wall monitor/display.
 2. For voice or data applications, 4-pair balanced twisted-pair or fiber optic cables shall be run using a star topology from the telecommunications room serving that floor to every individual information outlet. The customer shall approve all cable routes before the installation of the cabling.
 3. Installation interfaces shall be T568B wiring standards.
- B. Maximum Length
1. All horizontal cables, regardless of media type, shall not exceed 90 m (295 ft.) from the telecommunications outlets in the work area to the Floor Telecommunications Room.
 2. Distributor/Horizontal Cross-connect (FD/HC) located in the Telecommunication Room.
 3. The combined length of jumpers and patch cords, including equipment cables in the Floor Distributor/Horizontal Cross-connect, shall not exceed 5m (16 ft.).
 4. The maximum length of Work Area equipment cables shall be 5m (16 ft.) If a
 5. MuTOA (Multiple User Telecommunication Outlet) environment exists, then the
 6. Maximum equipment cable shall not exceed 22m (72 ft.) (Lake Park Facility)
 7. Terminate all conductors; no cable shall contain un-terminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
- C. Minimum Length

1. It is recommended that a minimum horizontal cable distance of 15m (49 ft.) shall be maintained between the telecommunications room and the work area. This will provide adequate Insertion Loss/Attenuation for applications over 1 Gig.
 2. For installations with consolidation points, a minimum horizontal cable distance of 15m (49 ft.) shall be maintained between the telecommunications room and the consolidation point, and 5m (16 ft.) between the consolidation point and the work area. This will provide adequate Insertion Loss/Attenuation for applications over 1 Gig.
- D. Splice Free
1. Each run of balanced twisted-pair cable between the Floor Distributor/Horizontal Cross-connect in the telecommunication room and the information outlet at the Work Area shall not contain splices.
 2. Bridged taps and splices shall not be installed in the horizontal cabling.
- E. Protection
1. Horizontal distribution cables shall not be run under slab raceways in damp or wet locations unless they are suitably rated for the environment.
 - a. Under-slab conduits that are outside of the building are considered wet locations.
- F. Slack -Service Loop – Routing
1. A minimum of 1m (3 ft) should be left in the work area for balanced twisted-pair cables and fiber cables.
 2. In telecommunications rooms, a minimum of 3m (10 ft) of slack should be left for all cable types. This slack must be neatly managed on trays or other support types.

3.2 SEPARATION

- A. Separation from EMI sources
1. Installation shall comply with BICSI TDMM and TIA/EIA-569-B for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
 2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and EMI Source shall be as follows:
 - a. EMI Source Rating Less Than 2 kVA: A minimum clearance of 5 inches.
 - b. EMI Source Rating between 2 and 5 kVA: A minimum clearance of 12 inches.
 - c. EMI Source Rating More Than 5 kVA: A minimum clearance of 24 inches.
 3. Separation between communications cables in grounded metallic raceways and unshielded power lines or EMI Source shall be as follows:
 - a. EMI Source Rating Less Than 2 kVA: A minimum clearance of 2-1/2 inches.
 - b. EMI Source Rating between 2 and 5 kVA: A minimum clearance of 6 inches.
 - c. EMI Source Rating More Than 5 kVA: A minimum clearance of 12 inches.
 4. Separation between communications cables in grounded metallic raceways and power lines and EMI Source located in grounded metallic conduits or enclosures shall be as follows:
 - a. EMI Source Rating Less Than 2 kVA: A minimum clearance of 2 inches.
 - b. EMI Source Rating between 2 and 5 kVA: A minimum clearance of 3 inches.
 - c. EMI Source Rating More Than 5 kVA: A minimum clearance of 6 inches.
 5. Separation between Communications Cables and Electrical Motors and Transformers, five kVA or 1 HP and Larger: A minimum clearance of 48 inches.
 6. Separation between Communications Cables and Fluorescent Fixtures: A minimum clearance of 5 inches
- B. Other Clearances
1. Horizontal pathways used for telecommunications cabling shall be dedicated for telecommunications use and not shared by other building services.
 2. A minimum of 75 mm (3 in) shall be observed between the cable supports and the false ceiling in a false ceiling environment.

3.3 PATHWAY

- A. Cable Tie Wraps
1. Cable Tie Wraps are prohibited as a pathway device or support.

2. Tie Wraps shall only be used to provide strain relief at termination points.
3. Tie wraps shall not be over-tightened to the point of deforming or crimping the cable sheath.

B. Constraints

1. Horizontal cables shall be installed in “dry” locations that provide protection from moisture levels above the intended operating range of inside plant (ISP) cables.
 - a. If cabling is intentionally or unintentionally exposed to water or otherwise coated with or exposed to direct contact with solvents, paints, adhesives, sealants, or other third-party materials, Siemon will not warranty the cabling product, or if after the warranty has been issued, it would become void. Therefore, any cabling that has been exposed as listed above must be removed and replaced.
2. Horizontal pathways shall be installed or selected so that the minimum bend radius of horizontal cables remains within the manufacturer's specifications during and after installation.
3. New construction requires a minimum of a 1” diameter conduit. Existing conduits will require reducing the number of cables placed in them to meet the required fill ratio.
 - a. The Contractor shall observe the bending radius and pulling strength requirements of the 4-pair balanced twisted-pair and fiber optic cable during handling and installation.
 - 1) 4-Pair UTP, F/UTP, S/FTP bend radius = 4 times outside diameter of cable under no-load conditions. 8 times the outside diameter under load (pulling 110 N/25 lbf.) conditions.
 - 2) Multi-pair or Hybrid cable bend radius = 10 times the outside diameter under all conditions.
 - 3) 2-Fiber and 4-Fiber cables bend radius = 25mm (1 in.) under no-load conditions. 50mm (2 in.) under load (pulling 222 N 50 lbf)
4. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
5. Cable that passes through non-Intermountain Health spaces must be installed in conduit.
6. Horizontal cabling shall contain no more than one transition point or consolidation point between the horizontal cross-connect and the telecommunications outlet/connector.
7. Do not install bruised, kinked, scored, deformed, abraded, or otherwise damaged cable. Do not splice cable between termination, tap, or junction points. If the cable is damaged during installation, remove and discard it and replace it with a new cable.
8. During Cold-Weather Installation, bring the cable to room temperature before de-reeling. Heat lamps shall not be used for heating.

C. Capacity

1. The number of horizontal cables placed in a cable support or pathway shall be limited to the number of cables that will not alter the geometric shape of the cables.
2. Maximum pathway (cable tray/basket tray/wireway) capacity shall not exceed a calculated fill ratio of 50% to a maximum of 75 mm (3 in) inside depth.
3. Maximum conduit pathway capacity shall not exceed 40% fill. However, perimeter and furniture fill are limited to 60% fill for moves and changes. A 40% fill ratio is the maximum fill for CAT6A F/UTP cables.
4. All unused cables shall be removed
 - a. Or labeled at both ends, designating future purpose and locations of each end.

Cable Tray Size [W x D] mm (in.)	Cable O.D. - CAT 6A Shielded (.29 in.)		
	7.4mm (0.29 in.)	8.4mm (0.33 in.)	8.9mm (0.35 in.)
304x101 (12 x 4)	363	280	249
457x101 (18 x 4)	545	20	374
610x101 (24 x 4)	726	561	498
304x152 (12 x 6)	545	420	374
457x152 (18 x 6)	817	631	561
610 x 152 (24 x 6)	1099	841	748

END OF SECTION

SECTION 271513**Copper Cable****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 PALLETTE

- A. Color palette shall be in accordance with Section 27 05 53

1.3 SUMMARY

- A. This Section covers approved F/UTP / UTP cable types
- B. All systems except for Nurse Call shall be CAT6A F/UTP unless a written deviation has been approved.
- C. CAT6A UTP and CAT6A F/UTP shall not be mixed on the same campus.
- D. This cable shall be used for both voice and data applications and shall be plenum-rated where required by code
- E. All Nurse Call cables shall be CAT6 UTP.

PART 2 - PRODUCT**2.1 APPROVED PRODUCT**

- A. TYPE 6A F/UTP (foil over unshielded twisted pair) - Siemon
 - 1. CAT 6A F/UTP Riser, (CMR) – Siemon 9A6R4-A5-(XX)-R1A
 - 2. CAT 6A F/UTP Plenum, (CMP) – Siemon 9A6P4-A5-(XX)-R1A
 - a. (XX) = Color – 06, Blue – 05, Yellow – 09, Orange
- B. TYPE 6 UTP (unshielded twisted pair) – Siemon – Nurse Call only
 - 1. CAT 6 UTP Riser, (CMR) – Siemon 9C6R4-E3-09-RXB
 - 2. CAT 6 UTP Plenum, (CMP) – Siemon 9C6P4-E3-09-RXA

END OF SECTION

SECTION 271543

Faceplates and Connectors

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 DEFINITION

- A. Work-Area Cabling
 - 1. The work area is comprised of work area outlets/connectors, faceplates, outlet boxes, and equipment cords. It acts as the interface to the horizontal cabling from the horizontal cross-connect (HC) to telephone, network equipment, wireless access points (WAP), and OIP devices.

PART 2 - PRODUCT

2.1 OUTLETS

- A. Category 6A Shielded Jack – Siemon Z6A-S(XX)
 - 1. Use (XX) to specify color.
 - 2. Universal design allows the same outlet to be mounted in a flat or angled orientation.
- B. UltraMAX Category 6 Jack – Orange – Nurse Call – Siemon U6-H09NS
- C. Category 6A Z-Plug WO Latch Protector – Siemon ZP1-6AS-(00)s
- D. Voice Outlet, Single Gang Faceplate, White W/Wall Hung Phone W/6A Insert – Siemon MX-WP-Z6AS-SS

2.2 FACEPLATES/BOXES

- A. 10G Single Gang Faceplate, White, 4 Position – Siemon 10GMX-FP-04-02
- B. MAX Single Gang Faceplate, White – Siemon MX-FP-S-(XX)-02
 - 1. USE (XX) to specify the number of ports.
- C. MAX Single Gang Faceplate, Stainless Steel, 4 Position, with Label Holder – Siemon MX-FP-S-04-SS-L
 - 1. To be used in the Operation Rooms
- D. Surface Mount Box, White, 2 Position – Siemon MX-SMZ2-02
- E. Furniture Faceplate, Black – Siemon MX-UMA-01
- F. Blank Insert, White – Siemon MX-BL-02
- G. Blank Insert, Black – Siemon MX-BL-01
- H. Conference Room Table Inserts shall include an HDMI port.

PART 3 - EXECUTION

3.1 WORK AREA TERMINATION

- A. All balanced twisted-pair cables wired to the telecommunications outlet/connector shall have 4-pairs terminated in eight-position modular outlets in the work area. All pairs shall be terminated.
- B. Outlet/connector back boxes shall be a minimum 4-11/16 square box (4-11/16" x 4-11/16" x 3") with a minimum single gang 5/8" mud ring for new construction to accommodate the CAT6A connectors.
- C. All outlets need to be installed in the angled position.

END OF SECTION

SECTION 271619**Patch Cables****PART 1 - GENERAL****1.1 SUMMARY**

- A. This section is issued as a guide for patch cable installations in the Data Center, wiring closets (TDR), user areas where patch cables are required for connectivity to IP and TDM phones, and IP data connectivity needs for Intermountain Healthcare. All patch cables will support voice, data, and imaging applications within the Intermountain Healthcare Enterprise.

PART 2 - PRODUCTS**2.1 APPROVED PRODUCT**

- A. Patch Cable, CAT 6A Shielded Skinny- Siemon SP6A-S (XX)-(XX)
 - 1. Use 1st (xx) to specify length. Use 2nd (xx) for color.
- B. Patch Cable, CAT 6, Orange – Siemon MC6-(XX)-09-28
 - 1. Use (xx) to specify length. For use with NURSE CALL only.
- C. Patch Cable, Fiber, Single mode Duplex W/LC Connectors, Yellow – Siemon FJ2-LCULCUL-(xx)
 - 1. Use (xx) to specify length.
- D. Patch Cable, Fiber, Multimode Duplex W/LC Connectors, Aqua – Siemon FJ2-LCLC5V-(xx)AQ
 - 1. Use (xx) to specify length. For use in the Data Center.

PART 3 - EXECUTION**3.1 PALLETTE**

- A. Patch Cable Color Codes
 - 1. The Intermountain Healthcare Enterprise standard for patch cable color is in Section 27 05 53.
 - 2. The patch cable color shall match the feed cable color to identify the service provided.
- B. Contractor furnished.
 - 1. All patch cables for the TECs and TDRs shall be included in the low-voltage contract and will be required to match or exceed the existing level of the installed structured cabling system.
 - 2. All patch cables for the user areas shall be owner-furnished and will be required to match or exceed the existing level of the installed structured cabling system.
 - 3. All patch cables shall be Owner-installed.
 - 4. The quantity of patch cables the low-voltage contractor provides shall be specified in the plans.
 - a. 50% 5ft – 40% 7ft – 5% 10ft – 5% 15ft

END OF SECTION

SECTION 27 52 23
NURSE CALL/CODE BLUE 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.
- B. Specification Section 27 00 00 "Intermountain Healthcare Structured Cabling Standards".

1.2 SUMMARY

- A. Section includes raceways, back boxes and cabling for a Hill-Rom Navicare Nurse Call (NNC) system.
- B. All active components and software to be provided, installed and programmed by Hill-Rom Vendor under contract with the owner.

PART 2 - PRODUCTS

2.1 NURSE-CALL SYSTEM:

- A. Nurse-Call System: Hill-Rom Navicare Nurse Call (NNC) System. All electronic components

2.2 CONDUCTORS AND CABLES

- A. Data Cable and Hardware: Category 6, Orange, UTP and UTP hardware. Comply with requirements in Section 270000.
- B. Power Conductors and Cables: Copper, solid, No. 20 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."
- C. Grounding Conductors and Cables: Copper, stranded, No. 16 AWG. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. Wiring Method:
 - 1. Install cables in raceways and J-Hooks except within consoles, cabinets, desks, and counters
 - a. Conceal raceway and cables except in unfinished spaces.
 - 2. Conduit and Boxes: Comply with requirements in Section 26 05 33 "Raceway and Boxes for Electrical Systems." Flexible metal conduit shall not be used.
 - a. Outlet boxes shall be no smaller than 2 inches (50 mm) wide, 3 inches (75 mm) high, and 2-1/2 inches (64 mm) deep.
 - b. Coordinate each outlet box type with Hill-Rom.
- B. Install cables without damaging conductors, shield, or jacket.
- C. Do not bend cables, while handling or installing, to radii smaller than as recommended by manufacturer.
- D. Pull cables without exceeding cable manufacturer's recommended pulling tensions.
 - 1. Pull cables simultaneously if more than one is being installed in same raceway.
 - 2. Use pulling compound or lubricant if necessary. Use compounds that will not damage conductor or insulation.
 - 3. Use pulling means, including fish tape, cable, rope, and basket-weave wire or cable grips, that will not damage media or raceway.
- E. Install exposed raceways and cables parallel and perpendicular to surfaces or exposed structural members, and follow surface contours. Secure and support cables by straps, staples, or similar fittings designed and installed so as not to damage cables. Secure cable at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, or fittings.
- F. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.
- G. Separation of Wires: Separate speaker/microphone, line-level, speaker-level, and power-wiring runs. Run in separate raceways or, if exposed or in same enclosure, provide 12-inch (300-mm) minimum separation between conductors to speaker/microphones and adjacent parallel power and telephone wiring. Provide separation as recommended by equipment manufacturer for other conductors.
- H. Splices, Taps, and Terminations: Make splices, taps, and terminations on numbered terminal strips in junction, pull, and outlet boxes; terminal

cabinets; and equipment enclosures. Install terminal cabinets where there are splices, taps, or terminations for eight or more conductors.

- I. Impedance and Level Matching: Carefully match input and output impedances and signal levels at signal interfaces. Provide matching networks if required.
- J. Identification of Conductors and Cables: Comply with requirements in Section 271500 "Communications Horizontal Cabling" for cable administration, cable schedule, and cable and wire identification.
- K. Equipment Identification:
 - 1. Comply with requirements in Section 260553 "Identification for Electrical Systems" for equipment labels and signs and labeling installation requirements.
 - 2. Label stations, controls, and indications using approved consistent nomenclature.

3.2 EXISTING SYSTEMS

- A. Examine existing systems for proper operation, compatibility with new equipment, and deficiencies. If discrepancies or impairments to successful connection and operation of interconnected equipment are found, report them and do not proceed with installation until directed. Schedule existing systems' examination so there is reasonable time to resolve problems without delaying construction.

3.3 GROUNDING

- A. Ground cable shields and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other signal impairments.
- B. Signal Ground Terminal: Locate at main equipment cabinet. Isolate from power system and equipment grounding except at connection to main building ground bus.
- C. Grounding Provisions: Comply with requirements in Section 270526 "Grounding and Bonding for Communications Systems."

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. 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.

END OF SECTION

SECTION 276001

APPENDIX 01 – Deviation Request Process

PART 1 - GENERAL

1.1 DEFINITIONS

- A. Cable Plant Deviation
 - 1. A business deviation to not fully comply with the requirements of the “Division 27 – Communications and Structured Cabling Specification document”
- B. Cable Plant Deviation Request form.
 - 1. The document is available from the Facilities Planning team, the Data Center Ops team, or the Infrastructure Cabling team.
 - 2. Usage:
 - a. The deviation request form shall be used if there is a business need to not comply with the requirements of the “Division 27 – Communications and Structured Cabling Specification document.”
 - b. The deviation request form should also be used to propose a change to that document. Always verify that you are using the current version of the Standard before requesting a modification.

PART 2 - PROCESS

2.1 STANDARDS MODIFICATION

- A. Check the box and explain why the standard should be modified.

2.2 ALTERNATE PRODUCT

- A. The deviation form must be completed, submitted through channels, and approved prior to any deviation from the specifications. This includes issuing change orders.

2.3 AUTHORIZED SIGNATURES

- A. Both the Standards Holder and the DCO Manager signatures are required for a deviation to be valid.

2.4 DEVIATION REVIEW PROCESS STE

- A. First be sure that there is an actual need. Then be certain that your manager, supervisor, or project manager agrees with the requested deviation. Be sure to state this or obtain their signature on the deviation form. By doing so you are confirming that your supervisor or project manager has approved.
- B. The requestor will then complete sections 1, 2, and 3 of the deviation form.
 - 1. The requestor should then digitally sign in the designated location at the end of Section 3. Do not write in the sections below 3.
- A. Forward the saved copy of this form to the Standards Holder via email.
 - 1. Email to: melissa.lopez2@imail.org
- B. The Standards Holder will then review and evaluate the request. The requestor should be prepared to provide plans, specifications, and competitive bids if requested. Any email threads or meeting discussions regarding the issue will be taken into consideration.
- C. The Standards Holder will then cast an Approve or Deny vote and forward the request to the DCO Manager for a decision.
- D. When the decision has been made by the DCO Manager, the Standards Holder will then notify the requester by returning the completed and signed form via email.
- E. An approved deviation will have the final disposition button ‘Approved’ and be signed by

at least 2 people. One will be from the Standards Holder, and the other the DCO Manager. Other signatures may be required for specific features and areas such as Safety, Security, Print, Medical group, etc.

- F. The deviation request is only good for the specific project that it was submitted on. A change to Division 27 is required for the deviation to be in place moving forward on all future projects.

PART 3 - EXECUTION

3.1 POST DECISION EXECUTION

A. DENIED

- 1. If the requester is not satisfied with the decision, they may file an appeal with the Data Center Operations manager (shawn.folkman@imail.org), who will then escalate the issue to the appropriate business leaders as needed. The decision from the appeal is final.

B. APPROVED

- 1. If a deviation is approved for contracted material, labor, or method; the facilities project manager will arrange for fulfillment or contract adjustment as needed via appropriate contract channels such as change orders.

END OF SECTION

SECTION 276002

APPENDIX 02 – Document Refresh Process

PART 1 - GENERAL

1.1 NOT USED

PART 2 - PRODUCTS

2.1 APPROVED PRODUCT

- A. This section aims to help ensure a current standards document.
 - 1. The product delivered will be a current revision or version of the Cable Plant Standards Document.
 - 2. The Enterprise Infrastructure Cabling team must approve all changes.

PART 3 - EXECUTION

3.1 REVIEWS AND UPDATES

- A. Minor updates
 - 1. Changes that do not significantly affect the scope of work or contract pricing will be made, and the Rev number will be updated (i.e., updated part numbers, etc.).
 - 2. Significant changes will be added to the Change Log for review and approval from the DCO/Infrastructure Cabling Team.
 - a. When approved, they will be implemented in the new Version.
- B. Major updates
 - 1. The DCO/Infrastructure Cabling Team will review the entire document at least once every three years.
 - 2. This review will coincide with the release of new versions of NFPA70 (National Electrical Code) (2017, 2020, etc. - to be completed by the end of each designated year).
 - 3. The review will cover standards adjustments that may be deemed necessary and ensure compliance with applicable codes and standards.
 - 4. The standards document will be submitted for approval upon completion of the reviews and updates.

END OF SECTION

Model	Manufacture	Part Number	Description	Notes
Eaton Single-Phase UPS				
5S UPS	Eaton	5S550	550VA/330W, 120V Line Interactive UPS	
9PX UPS	Eaton	9PX1000RT	1000VA/900W, 120V Online UPS, RM or Tower	
9PX UPS	Eaton	9PX1500RTN	1500VA/1350W, 120V Online UPS, RM or Tower, Includes NETWORK-M3 Card	
9PX UPS	Eaton	9PX2000RTN	2000VA/1800W, 120V Online UPS RM, or Tower, Includes NETWORK-M3 Card	
9PX UPS	Eaton	9PX3000RTN	3000VA/2700W, 120V Online UPS RM, or Tower, Includes NETWORK-M3 Card	
9PX UPS	Eaton	9PX3K3UNP1	3000VA/2700W, 208/240V to 120V Online UPS, RM or Tower, Includes NETWORK-M3 Card	
Bypass Option 9PX 1-3kVA	Eaton	9PXEBM72RT	EBM for use with 9PX2000RTN & 9PX3000RTN UPS	
Network Card option 9PX 1-3K	Eaton	NETWORK-M3	Eaton Gigabit Network Card	
Rack mount kit 9PX 1-3kVA Option	Eaton	RK2PC	2-post rack mounting kit for 1-6kVA UPS & EBM	
9PX SP UPS	Eaton	9PX6KSP	5500VA/4900W, 120/208 or 120/240V Split-Phase Online UPS, RM or Tower, Includes NETWORK-M3 Card	
Model	Manufacture	Part Number	Description	Notes
9PX SP UPS	Eaton	9PX8KSP	8000VA/7200W, 120/208 or 120/240V Split-Phase Online UPS, RM or Tower, Includes NETWORK-M3 Card	

9PX SP UPS	Eaton	9PX10KSP	10000VA/9000W, 120/208 or 120/240V Split-Phase Online UPS, RM or Tower, Includes NETWORK-M3 Card	
Bypass 9PX SP 6-10kVA, 9PXM	Eaton	BPM125HW	Bypass Power Module for 6, 8 & 10kVA 9PX Split-Phase, 9PXM & 9155 UPS, Hardwired Input/Output	
9PXM UPS	Eaton	9PXM8S8K	8kVA expandable to 16kVA, (1) 8-slot enclosure, (2) power modules, (4) battery modules, (1) network card, Hardwired Input/Output	
9PXM UPS	Eaton	9PXM8S12K	12kVA expandable to 16kVA, (1) 8-slot enclosure, (3) power modules, (6) battery modules, (1) network card, Hardwired Input/Output	
9PXM UPS	Eaton	9PXM8S16K	16kVA, (1) 8-slot enclosure, (4) power modules, (8) battery modules, (1) network card, Hardwired Input/Output	
9PXM UPS	Eaton	9PXM12S12K	12kVA expandable to 20kVA N+1, (1) 12-slot enclosure, (3) power modules, (6) battery modules, (1) network card, Hardwired Input/Output	
Model	Manufacture	Part Number	Description	Notes
9PXM UPS	Eaton	9PXM12S16K	16kVA expandable to 20kVA N+1, (1) 12-slot enclosure, (4) power modules, (8) battery modules, (1) network card, Hardwired Input/Output	
9PXM UPS	Eaton	9PXM12S20K	20kVA expandable to 20kVA N+1, (1) 12-slot enclosure, (5) power modules, (10) battery modules, (1) network card, Hardwired Input/Output	
PDU's				

Smart PRO1 PDU	Server Tech	C1C10SA-2CBA2B4	Smart Primary PRO1 PIPS PDU, 1U, (10) HDOT Outlets (6xC13 + 4xCx), Input Amp Meter, 208V 30A, NEMA L6-30P, 10 ft (3m) Input Cord, Circuit Breakers, (2) Temperature/Humidity Sensor Capable	Horizontal
Smart POPS PRO2 PDU	Server tech	C2SG36TE-DQME2M66/ZB	Smart POPS Primary PRO2 (36) Alt Phase HDOT Outlets (24xC13 + 12xCx), 208V 3PH Delta 6BR 60A, IP67 Water-tight IEC60309 3m/10ft cord, Auto-Orient Mid Display, Bottom Cord Entry, Doghouse Breakers, Phase Monitoring, Blue Highlights	Vertical
Smart POPS PRO2 PDU	Server tech	C2LG36TE-DQME2M66/ZR	Smart POPS Expansion PRO2 (36) Alt Phase HDOT Outlets (24xC13 + 12xCx), 208V 3PH Delta 6BR 60A, IP67 Water-tight IEC60309 3m/10ft cord, Auto-Orient Mid Display, Bottom Cord Entry, Doghouse Breakers, Phase Monitoring, Red Highlights	Vertical
Model	Manufacture	Part Number	Description	Notes
Smart POPS PRO2 PDU	Server Tech	C2SG36TE-DCMFAM66/C	Smart POPS Master PRO2 (36) Alt Phase HDOT Configurable Outlets, 208V 3PH Delta 3BR 30A L15-30P 3m/10ft cord, Auto-Orient Mid Display, Bottom Base Cord Entry, Doghouse Breakers, Phase Monitoring, WxD = 2.20in x 2.50in	Notes
Smart PRO1 PDU	Server Tech	C1S24VS-YCFA13C9/C	Smart PRO1 Primary, 0U, 18 x IEC C13 and 6 x IEC C19 Outlets, 1 x NEMA 5-20R Utility Outlet, 3 x LED Amp Meters, 3-phase Wye 30A Input w/ NEMA L21-30P Connector, 10ft (3m) Cord (Bottom/base Entry), (2) Temperature/Humidity Sensor Capable, with Retractable Fuses	Vertical

Smart PRO1 PDU	Server Tech	C1L24VS-YCFA13C9/C	Smart PRO1 Expansion, 0U, 18 x IEC C13 and 6 x IEC C19 Outlets, 1 x NEMA 5-20R Utility Outlet, 3 x LED Amp Meters, 3-phase Wye 30A Input w/ NEMA L21-30P Connector, 10ft (3m) Cord (Bottom/base Entry), (2) Temperature/Humidity Sensor Capable, with Retractable Fuses	Vertical
Smart PRO1 PDU	Server Tech	STV-3531C	Smart PRO1, PIPS (Per Input Power Sensing), 0U, (24) IEC C13 + (6) IEC C19 Outlets, (1) LED Current Meter w/ Auto-flip, 208-240V 30A, NEMA L6-30P Plug, 10 ft (3m) Cord w/ Power Pivot Cord Entry, Middle Display/Network, (2) Temperature/Humidity Sensor Capable, Circuit Breakers	Vertical
Model	Manufacture	Part Number	Description	Notes
Smart PRO1 PDU	Server Tech	SEV-3531C	Smart PRO1 (Expansion Unit), PIPS (Per Input Power Sensing), 0U, (24) IEC C13 + (6) IEC C19 Outlets, (1) LED Current Meter w/ Auto-flip, 208-240V 30A, NEMA L6-30P Plug, 10 ft (3m) Cord w/ Power Pivot Cord Entry, Middle Display/Network, (2) Temperature/Humidity Sensor Capable, Circuit Breakers	Vertical
MN03E1R0-10D203-2TL5A0H10-S	Vertiv/Geist PDU	NI30202	Unit-level monitored PDU, 20A, 120V, rackmount, 10x rear NEMA 5-20R receptacles	Horizontal
MNR3E1R6-12CF18-3TL6A0H10-S	Vertiv/Geist PDU	NR30206	12-Outlets PDU - Monitored - NEMA L6-30P - 12 x Combination C13/C19 - 230 V AC - Network (RJ-45) - Horizontal - Rack-mountable - Horizontal	Horizontal
MN03E4W1-44MB19-3TL21A0B10-S	Vertiv/Geist PDU	VP8865	rPDU, Monitored Unit Level EC, 30A, 120/208V WYE, 8.6kW, Vertical, (36) IEC C13, (6) IEC C19, (2) NEMA 5-20R, 10ft power cord with L21-30P, Black Powder Coat.	Vertical

ePDU	Eaton	EMIT06-10	Metered Input ePDU, 208V, 5.76 Max. kW, L6-30P Input (10ft), (10) C13, (4) C19 Output, 1U	
ePDU	Eaton	EMIT09-10	Metered Input ePDU, 120V, 1.92 Max. kW, L5-20P (5-20P adapter) Input (10ft), (8) 5-20R Output, 1U	
Model	Manufacture	Part Number	Description	Notes
T- Sensor ePDU	Eaton	EMPDT1H1C2	Environmental Monitoring Probe Gen 2	
eATS	Eaton	EATS120	Rack Mount Automatic Transfer Switch, Non-phase Synchronized Switching Compatible, 120V, 1.92 Max. kW, (2) 5-20P (10ft) Input, (10) 5-20R Output, 1U	
eATS	Eaton	EATS30P	Rack Mount Automatic Transfer Switch, Non-phase Synchronized Switching Compatible, 208V, 5.76 Max. kW, (2) L6-30P (10ft) Input, (1) L-6-30R Output, 1U	
Power Cords				
Dual Lock Power Cord	StayOnline Power Cords	5656N	IEC320 C14 Male Plug to C13 Connector Dual-Lock 1.8 meters / 6 feet 10A/250V 18/3 SVT Red - Locking Power Cord	
Dual Lock Power Cord	StayOnline Power Cords	6694N	IEC320 C14 Male Plug to C13 Connector Dual-Lock 1.8 meters / 6 feet 10A/250V 18/3 SVT Blue - Locking Power Cord	
Dual Lock Power Cord	StayOnline Power Cords	5914N	IEC320 C20 Male Plug to C19 Connector Dual-Lock 1.8 meters / 6 feet 20A/250V 12/3 SJT Red - Locking Power Cord	
Dual Lock Power Cord	StayOnline Power Cords	6766N	IEC320 C20 Male Plug to C19 Connector Dual-Lock 1.8 meters / 6 feet 20A/250V 12/3 SJT Blue - Locking Power Cord	

NEMA to IEC Power Cord	StayOnline Power Cords	9008	NEMA 5-15 Male Plug to IEC320 C13 Connector 1.8 meters / 6 feet 15A/125V 14/3 SJT Red - Power Cord	
Model	Manufacture	Part Number	Description	Notes
NEMA to IEC Power Cord	StayOnline Power Cords	7978	NEMA 5-15 Male Plug to IEC320 C13 Connector 1.8 meters / 6 feet 15A/125V 14/3 SJT Blue - Power Cord	
P-Lock Power Cord	StayOnline Power Cords	9144	IEC320 C14 Male Plug to C15 Connector P-Lock 1.8 meters / 6 feet 15A/250V 14/3 SJT Red - Locking Power Cord	
P-Lock Power Cord	StayOnline Power Cords	9138	IEC320 C14 Male Plug to C15 Connector P-Lock 1.8 meters / 6 feet 15A/250V 14/3 SJT Blue - Locking Power Cord	
Mechanical				
VRC	Vertiv		3.5kW Rack Mounted Cooling Unit	VRC100 (Self Contained Version)
Mini-Mate 3	Liebert	MT036HE1A00XCH	Ceiling mounted thermal management system, direct expansion unit.	
Mini-Mate 4	Liebert	MT048HE1A00AP4	Ceiling mounted thermal management system, direct expansion unit.	
Mini-Mate 5	Liebert	MT060HE1A00WPZ	Ceiling mounted thermal management system, direct expansion unit.	
Mini-Mate 3	Liebert	MMD40C2AJ0D5	Ceiling mount chilled water unit	
Mini-Mate 5	Liebert	MMD92CDAJ0L5	Ceiling mount chilled water unit	
CRV	Liebert	CR020RA1A70A71	Row-Based Environmental Control System, DX direct expansion 5 ton Unit	
Model	Manufacture	Part Number	Description	Notes

CRV	Liebert	CR035RA1A70A71	Row-Based Environmental Control System, DX direct expansion 10 ton Unit	
CRV	Liebert	CR032RC1A2SH	Row-Based Environmental Control System, Chilled water 5 ton unit	
CRV	Liebert	CR040RC1A2SH	Row-Based Environmental Control System, Chilled water 10 ton unit	
Cable Ladder Tray				
Cable Runway	CHATSWORTH	10250-724	CABLE RUNWAY - 24", BLACK WITH ALL REQUIRED MOUNTING ACCESSORIES	
Cable Runway	CHATSWORTH	10250-718	CABLE RUNWAY - 18", BLACK WITH ALL REQUIRED MOUNTING ACCESSORIES	
Butt Splice	CHATSWORTH	11301-701	BUTT SPLICE KIT, Black	
Junction Splice	CHATSWORTH	11302-701	JUNCTION SPLICE KIT	
Foot kit	CHATSWORTH	11309-701	FOOT KIT, BLACK	
Rack to Runway	CHATSWORTH	12409-724	6" CHANNEL RACK TO RUNWAY, BLACK	
Triangle Bracket	CHATSWORTH	11746-718	18" TRIANGLE BRACKETS, BLACK	
Triangle Bracket	CHATSWORTH	11746-724	24" TRIANGLE BRACKETS, BLACK	
End Closing Kit	CHATSWORTH	11700-724	END CLOSING KIT, CABLE RUNWAY, BLACK	
Wall Angle Support Kit	CHATSWORTH	11421-718	18" WALL ANGLE SUPPORT KIT, CABLE RUNWAY, BLACK	
Model	Manufacture	Part Number	Description	Notes
Wall Angle Support Kit	CHATSWORTH	11421-724	24" WALL ANGLE SUPPORT KIT, CABLE RUNWAY, BLACK	
Elevation Kit	CHATSWORTH	10506-706	CABLE RUNWAY ELEVATION KIT, 6"	
Radius Drop	CHATSWORTH	12100-712	CABLE RUNWAY RADIUS DROP	

DC Fiber modules & Jumpers				
Wall Mount Module Box	SIEMON	WMF-A-01	Wall Mount Module Box, OM4 Aqua, LC/MTP	
Wall Mount Module Box	SIEMON	WMF-B-01	Wall Mount Module Box, OM4 Violet, LC/MTP	
Fiber Patch Cable	SIEMON	LBP-LCULCUL-(XX)	PATCH CABLE LBP, FIBER, SINGLEMODE DUPLEX W/LC CONNECTORS, YELLOW, (XX) = LENGTH IN METERS	
Fiber Patch Cable	SIEMON	LBP-LCLC5V-(XX)AQ	PATCH CABLE LBP, FIBER, MULTIMODE DUPLEX W/LC CONNECTORS, AQUA, (XX) = LEGTH IN METERS	
Fiber Patch Cable	SIEMON	LBP-LCLC5V-(XX)EQ	PATCH CABLE LBP, FIBER, MULTIMODE DUPLEX W/LC CONNECTORS, ERIKA VIOLET, (XX) = LEGTH IN METERS	
Foreseer Cable, 2 Pair	Belden	88723		
Cold/Hot aisle containment provided by Data Center Operations				
Electronic Key Cylinders				
Cylinder	Medeco	100500 G	1 ¼" Mortise Cylinder	
Cylinder	Medeco	100400H G	Rim Cylinder, Horizontal Tailpiece	
Cylinder	Medeco	EA-100108	Small Format Interchangeable Core (SFIC) Cylinder	
Model	Manufacture	Part Number	Description	Notes
Cylinder	Medeco	20200S1 G	Cylinder Package for Schlage	
Cam Lock	Medeco	EN-150002-219	7/8" Cam Lock Assembly, Key Retaining	
Cam Lock	Medeco	EN-150003-219	1 1/8" Cam Lock Assembly, Key Retaining	
Cylinder for Legrand cabinet front door	Medeco	232301S 800 G	Modular Profile Cylinder – 30mm Half Profile - Assembled	
Electronic Key	Medeco	94-0271	Medeco Slim Line Key (G2) & Charger Bundle	
Programming Station for Small Locations	Medeco	EA-100109	Medeco XT Desktop USB Programming Station (not preferred)	
Programming Station for Large Locations	Medeco	EA-100158	Medeco XT Wall USB Programming Station (preferred)	
Wall Mount for Wall Programmer	Medeco	94-0294	Medeco XT Remote Wall Programmer Wall Mount Kit	
Padlock	Master	6842D045KZ	Padlock for use with Electronic Cylinder	

SECTION 276004
APPENDIX 04 – Reference Standards**PART 1 - GENERAL****1.1 REFERENCE STANDARDS**

- A. Codes and Standards (Most recent editions with addenda/TSB, etc.) All materials, installation and workmanship shall meet or exceed the applicable requirements and standards addressed within the references listed below:
1. ANSI/TIA-568.0-D and addenda “Generic Telecommunications Cabling for Customer Premises
 2. ANSI/TIA-568.1-D and addenda “Commercial Building Telecommunications Cabling Standard
 3. ANSI/TIA-568.2-D and addenda “Balanced Twisted-Pair Telecommunications Cabling and Components
 4. ANSI/TIA-568.3-D and addenda “Optical Fiber Cabling Components Standard”
 5. ANSI/TIA-568.4-D and addenda “Broadband Coaxial Cabling and Components Standard”
 6. ANSI/TIA-569-D and addenda “Telecommunications Pathways and Spaces”
 7. ANSI/TIA-606-C and addenda “Administration Standard for Commercial Telecommunications Infrastructure”
 8. ANSI/TIA-607-D and addenda “Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises”
 9. ANSI/TIA-758-B “Customer-Owned Outside Plant Telecommunication Infrastructure Standard”
 10. IEEE 802.3at PoE Plus and Next Gen PoE CFI March 2013 and IEEE P802.3ba latest draft revision and amendments.
 11. “Media Access Control Parameters, Physical Layers and Management Parameters for 40 Gbp/s and 100 Gbp/s Operation”.
 12. ANSI/TIA-526-7-A “Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant”
 13. ANSI/TIA/EIA-526-14-C “Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant”
 14. ANSI/TIA-942-B “Telecommunications Infrastructure Standard for Data Centers”
 15. ANSI/TIA – 1179-A “Healthcare Facility Telecommunications Infrastructure Standard”
 16. IEC/TR3 61000-5-2 - Ed. 1.0 and amendments “Electromagnetic compatibility (EMC) - Part 5: Installation and mitigation guidelines - Section 2: Earthing and cabling.”
 17. ISO/IEC 11801-1 (2017) and amendments “Information technology - Generic cabling for customer premises – PART 1: General Requirements”
 18. EN 50173-1 and amendments “Information Technology - Generic cabling systems – PART 1 General Requirements”
 19. AIA Guidelines for Design and Construction of Hospital and Healthcare Facilities
 20. Construction Specification Institute Master Format
 21. BICSI: Comply with the most current editions of the following BICSI manuals:
 - a. BICSI - Telecommunications Distribution Methods Manual
 - b. BICSI – Installation Transport Systems Information Manual
 - c. BICSI – Network Design Reference Design Manual
 - d. BICSI – Outside Plant Design Reference Manual
 - e. BICSI – Wireless Design Reference Manual
 - f. BICSI -Electronic Safety and Security Design Reference Manual
 - g. Infocomm/BICSI – AV Design Reference Manual
 22. Underwriters Laboratories (UL) Cable Certification and Follow-Up Program.
 23. National Electrical Manufacturers Association (NEMA)
 24. American Society for Testing Materials (ASTM)
 25. National Electrical Code (NEC) NFPA70 2020
 26. National Electrical Safety Code (NESC) 2017
 27. Institute of Electrical and Electronic Engineers (IEEE)

28. UL Testing Bulletin
29. Building Industry Consulting Services International (BICSI) Information Transport Systems Methods Manual (ITSMM)
30. Local, county, state and federal regulations and codes in effect as of date of installation.
31. Equipment of foreign manufacture must meet U.S. codes and standards. It shall be indicated in the proposal the components that may be of foreign manufacture, if any, and the country of origin.

END OF SECTION

SECTION 276005**APPENDIX 05 – Definitions and Abbreviations****PART 1 - GENERAL****1.1 RELATED TERMS**

- A. Codes and Standards (Most recent editions with addenda/TSB, etc.) All materials, installation and workmanship shall meet or exceed the applicable requirements and standards addressed within the references listed below:
1. Basket Cable Tray: A fabricated structure consisting of wire mesh bottom and side rails.
 2. BICSI: Building Industry Consulting Service International.
 3. CBC: Coupled Bonding Conductor
 4. CFCI: Customer Furnished Customer Installed
 5. Cable Run - A single cable to a single location
 6. Cable Drop - Two cables to a single location
 7. Cable Tri Drop - Three cables to a single location.
 8. CT Coupler A type of wall connector made by the Siemon Company
 9. DCO: Data Center Operations
 10. Div.1: Division 1 General and Performance Requirements
 11. Div. 23: Division 23 Heating, Ventilating, and Air Conditioning
 12. Div. 22: Division 22 Plumbing
 13. Div. 26: Division 26 Electrical
 14. Div. 27: Division 27 Communications and Audio Visual
 15. Div. 28: Division 28 Electronic Safety and Security
 16. E.E.: Electrical Engineer
 17. EMI: Electromagnetic Interference
 18. F/UTP: Foil over Unshielded Twisted Pair. Individual pairs are unshielded.
 19. GC: General Contractor
 20. GE: Ground Equalizer
 21. Horizontal Cabling: The cable and connecting hardware utilized to transport communications signals.
 22. ICT: Infrastructure Cabling Team
 23. LAN: Local Area Network
 24. N/A: Not Applicable
 25. NIC: Not in Contract
 26. OFCI: Owner Furnished Contractor Installed
 27. OFOI: Owner Furnished Owner Installed
 28. OTDR: Optical Time Domain Reflectometer
 29. Outlet/Connectors: A connecting device in the work area on which horizontal cable or outlet cable terminates.
 30. RCDD: Registered Communications Distribution Designer
 31. RFI: Radio Frequency Interference
 32. TBA or TBD: To Be Determined
 33. TDR: Technology Distribution Room
 34. TEC: Technology Equipment Center
 35. TGB: Telecommunications Ground Bus Bar
 36. TMBC: Telecommunications Main Bonding Conductor
 37. TMGB: Telecommunications Main Grounding Bus Bar
 38. TSER: Telecommunications Service Entrance Room
 39. UTP: Unshielded Twisted Pair
 40. Work Area: approx. 100 sq. ft. equipped for workstation equipment.
 41. DCO = Data Center Operations – Boe.Sausedo@imail.org
 42. ICT = Information and Communications Technology – Melissa.Lopez2@imail.org

END OF SECTION

SECTION 276006**APPENDIX 06 – MATERIAL SUPPLIERS****PART 1 - GENERAL****1.1 RELATED TERMS**

- A. Siemon Authorized Suppliers are listed below. To help prevent counterfeiting and support warranties, known, factory-authorized distributors are recommended.
1. Approved Suppliers of Siemon cable, patch panels, jacks, and parts:

Wesco/Anixter

Randi Whittaker

Inside Sales

3775 W. California Ave. Ste 400

Salt Lake City, UT 84104 US

Main Phone: (801) 973-2121

Fax: (801) 973-4472

Email: randi.whittaker@anixter.com

Karl Bartlam

End User/Outside Sales

3775 W. California Ave. Ste 400

Salt Lake City, UT 84104 US

Main Phone: (801) 973-2121

Fax: (801) 973-4472

Email: karl.bartlam@anixter.com**Graybar Electric**

Elizabeth Vaughn

Inside Sales

2841 South 900 West

Salt Lake City, UT 84119 US

Main Phone: (801) 656-3016

Fax: (801) 973-4314

Email: Elizabeth.Vaughn@graybar.com

Erika Morrison

Contractor Outside Sales

2841 South 900 West

Salt Lake City, UT 84119 US

Main Phone: (801) 656-3014

Fax: (801) 973-4314

Email: Erika.Morrison@graybar.com**WESCO / CSC**

Brian Walters

Inside Sales

3210 South 900 West

Salt Lake City, UT 84119 US

Main Phone: (801) 975-0600

Fax: (801) 907-4450

Email: Bwalters@gocsc.com

Adam Tueller

Contractor Outside Sales

3210 South 900 West

Salt Lake City, UT 84119 US

Main Phone: (801) 975-0600

Direct: (801) 618-6665

Email: Atueller@gocsc.com

- B. The Siemon Company is represented locally by: Easton.Jones@siemon.com

END OF SECTION

SECTION 281300
Access Control**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. This section includes the complete installation of a PC-based and managed access control and security system (Lenel) and specifies sensors, signal equipment, and system controls. The Lenel system shall function with standard wired locks and card readers as well as network-connected integrated hardware.
- B. This project's electrified locking and access hardware is specified using ASSA ABLOY products that will require the security contractor to provide integrated access control connection locking devices and wire harnesses. Locking devices are specified to use either POE or standard wiring connections. Cabling for the POE locking devices shall be provided by Div 27 contractors, with the security contractor providing the cabling for non-POE locking hardware.
- C. The system shall also interface with wireless access control for medical cabinets and refrigerators via wired hubs. Aperio IP hubs shall be provided for the wireless communication and wired connections back to the network patch panels. Provide an optional external antenna with each hub.

1.3 DEFINITIONS

- A. Hard-Wired System: Alarm, supervisory, and detection devices are directly connected, through individual dedicated conductors, to central control panels.

1.4 SYSTEM DESCRIPTION

- A. The system shall have both access-controlled doors and alarm inputs for panic buttons and intrusion detection.
- B. The system shall support automatic responses to alarms entering it. Each alarm condition shall be capable of initiating numerous events, including, but not limited to, Activation of remote devices, door control, remote annunciation LEDs, and card validation.
- C. Access control functions shall include, but not be limited to, Validation based on time of day and day of week, holiday scheduling with card validation override, and access validation based on positive card verification.
- D. The system shall interface with the fire alarm system and in the event of an alarm, shall release all controlled doors designated for emergency egress, and put them in fail-safe mode allowing free egress.

1.5 FUNCTIONAL PERFORMANCE

- A. The system shall consist of a network controller and network nodes using a standard TCP/IP network. Each controller shall retain all data necessary for system operation in its own RAM. Each controller will contain an integrated real-time clock that continues to govern events even if communication with the main network controller is interrupted.
- B. The network controller shall act as an interface point with the node network, a database management tool, and a transaction storage device.

1.6 ACTION SUBMITTALS

- A. General: Submit the following according to the Conditions of Contract and Division 1 Specification Sections

- B. Product data for system components, including "Nationally Recognized Testing Laboratory" (NRTL) listing data and list of materials, dimensioned plans, sections, and elevations showing minimum clearances, mounting arrangements, and installed features and devices.
- C. Wiring Diagrams and Door Elevations: Provide the following for each opening having electric hardware, except doors with only magnetic holder/release units.
 - 1. Wiring diagrams for scheduled items requiring power. Identify manufacturer-installed and field-installed wiring.
 - 2. Provide load calculations and requirements for each electro-mechanical locking device within +/-5% of 24 VDC. Size the conductors for each device appropriately to maintain this requirement.
 - 3. Provide cable type (as indicated on the Shop Drawings Wire Legend) that is used for each electro-mechanical locking device, the conductor size, the estimated total length of cable, the estimated line loss (voltage drop), and the percentage of estimated line loss (voltage drop).
- D. System operation description, including method of operation and supervision of each component and each type of circuit, and sequence of operations for all manually and automatically initiated system inputs. Description must cover this specific Project; manufacturer's standard descriptions for generic systems are not acceptable.

1.7 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data for inclusion in the "Operating and Maintenance Manual" specified in Division 01. Include data for each type of product, including all features and operating sequences, both automatic and manual. Include the user's software data and recommendations for spare parts to be stocked at the site. Provide names, addresses, and telephone numbers of service organizations that stock repair parts for the system.
- B. Product certifications signed by the manufacturers of system components certifying that their products comply with the referenced standards.
- C. Separate Qualification Data for Manufacturers and Installers: Demonstrate their capabilities and experience as specified in the Quality Assurance Article. Include lists of completed projects with project names and addresses, names of Contracting Officer and Government representatives, plus other information specified.
- D. Record of field tests of system.

1.8 QUALITY ASSURANCE

- A. Convergent and Security 101 are Intermountain Healthcare's approved installers.
- B. Comply with NFPA 70, "National Electrical Code."
- C. Listing and Labeling: Provide system and components that are listed and labeled for their indicated use and location on the Project.
 - 1. The Terms "Listed" and "Labeled": As defined in the "National Electrical Code," Article 100.
 - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
- D. Comply with UL Standard 609, 1023, and 1076.
- E. FM Compliance: Provide FM approved card access system and components.
- F. Single Source Responsibility: Obtain system components from a single source (the prime system manufacturer) that assumes responsibility for system components and for their compatibility.
- G. The successful bidding contractor shall be required to have training and accreditation with both ASSA ABLOY and Lenel.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of card readers, sensors, equipment related to access control operation, etc., that fail in materials or workmanship within specified warranty period.

1. Warranty Period: One year from date of Substantial Completion.

1.10 COORDINATION

- A. Access Control System Electrical Coordination: Coordinate with the layout and installation of scheduled electrified door hardware, and related access control equipment, with required connections to source power junction boxes, power supplies, detection and monitoring hardware and fire alarm system.
 1. Door Hardware Interface: The card access control system shall be connected to electronic door control hardware (electromechanical locks, electric strikes, magnetic locks, door position switches, other monitoring contacts, and related auxiliary control devices) as described under Division 8 "Door Hardware". Coordinate with the installation and configuration of specified door hardware being monitored or controlled with the controls, software and access control hardware specified in this Section.
 2. Access Control Hardware Sets: The hardware sets listed represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality. **Refer to Section 08 71 00 Door Hardware Schedule for hardware set information.**
 3. Fire Alarm Interface: Review Door Hardware Schedule for sequence of operation requiring an interface with the fire alarm system, such as release upon fire alarm. Coordinate with the fire alarm installer to provide all fire alarm system components to accomplish the specified sequence of operation. Provide fire alarm release at all delayed egress doors and any other doors in the path of egress that are allowed to be locked.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

2.2 ACCESS CONTROL SYSTEM EQUIPMENT, GENERAL

- A. Surge Protection: Comply with minimum requirements of UL Standard 1449, "Transient Voltage Surge Suppressors," for each component using solid state devices and having a line voltage power source connection or an exterior underground signal connection.
- B. Provide at the locations identified, a complete and operational Access Control and Security System including but not limited to the following equipment:
 1. Card Readers
 2. Door Logic Panels
 3. Relay output contacts
 4. All power supplies and/or transformers
 5. All equipment, security devices, components, wire, cable, and mounting hardware as required to meet specification requirements and manufacturers documented installation procedures.
- C. Provide the quantity of new door licenses to the existing Lenel building package to accommodate the increased number of readers being added as part of this project.

2.3 PHYSICAL SECURITY APPLIANCE

- A. Physical Security Appliance (PSA): Stand-alone, modular multi-reader access controller shall be provided for standard door opening access control. The appliances shall communicate to the main system server using Ethernet TCP/IP, and shall serve as the data collection and communications interface between the system server and the various field devices such as card readers, alarm inputs and control outputs.

- B. Power Requirements: Each Physical Security Appliance (PSA) shall accept a power input voltage of 120 VAC, 60Hz. Maximum power draw shall be no more than 300W. The PSA shall generate appropriate DC voltage levels for on-board use as required. External lock power supplies shall be required and sized for the appropriate number of locks (plus 20%) associated with each distributed controller. All power outputs to external devices shall be current limited in accordance with class 2 power limited wiring standards
- C. Battery Backup: The power supplies inherent in the PSA shall have the capability of charging standard gel-cell batteries, and shall be capable of operating on direct battery backup. The PSA shall be capable of providing at least four hours of full operation backup time, and shall be capable of recharging its batteries in less than 48 hours. Batteries shall be mounted in a separate, dedicated battery shelf sized to contain the amount of batteries required.

2.4 ELECTRICAL POWER

- A. Normal System Power Supply: 120 V 60 Hz from locked disconnect device. System components are supplied with power through separate power supplies. Provide all required power supplies and associated transformers as specified by the manufacturer.
- B. Power Source Transfer: When normal power is interrupted, system is automatically switched to backup supply without degradation of critical system function or loss of signals or status data.
 - 1. Backup Source: Batteries in power supplies of individual system components. Such batteries are an integral part of power supplies of the components.
 - 2. Annunciation: Switching of the system or any system component to backup power is indicated as a change in system condition.

2.5 CARD ACCESS SYSTEM HARDWARE, GENERAL

- A. Types, features, accessories, and mounting conditions of individual devices are as indicated.
- B. Battery Backup: The access control panel shall be provided with back up battery power for up to four hours operation upon loss of AC power.
- C. Suppression: The access control panel shall have provisions for relay suppressor kits for each relay used, to protect the access control panel from collapsing electrical fields.
- D. Card Readers: Card readers shall be HID Signos readers.
 - 1. Proximity Readers: The system shall be provided with uni directional proximity card readers. The standard multi-class SE readers shall have a read range of five to eight inches. The reader shall be able to be mounted with its sides against metal door or window frames, and masonry walls. Long range readers mounted at vehicle gates shall have a minimum 10 inch read range.
 - a. Standard readers: HID Signo 40
 - b. Keypad/Pinpad: HID Signo 40k
 - c. Mullion Installation: HID Signo 20

2.6 POWER SUPPLIES

- A. Provide power supplies as per manufacturers written recommendations with total number of powered devices for each power supply restricted to only consuming 75 percent of the power supplies rated amperage. Provide separate power supplies for system controllers (As per manufacturer), card readers (12VDC, 5 A), and locks (24 VDC, 7 A).

2.7 CONTACT INDICATOR SWITCHES

- A. Contact indicators on overhead doors that are not supplied by the door manufacturer shall be Sentrol series 2300 type surface mounted magnetic reed type switches with opposing magnet, and shall be per manufacturer's recommendations for the type of door.

2.8 WIRE AND CABLE

- A. Cables: Bundled, shielded and unshielded, twisted-pair cable, shielded where manufacturer recommends shielded cable for standard readers and locking hardware. Cat 6A cable shall be provided by Div 27 to all network connected locking hardware.
 - 1. Specified Manufacturer: Provide the specified product or prior approved equal.

- a. Coleman Cable Inc. (CCI) Part Number 73101 consisting the following cables bundled plenum rated within a yellow Low Smoke PVC, CMP/CL3P/FPLP jacket:
 - 1) PN 72321: 22 AWG 2/Conductor CMP. Typical use, Door Contact
 - 2) PN 72344: 22 AWG 4/Conductor CMP. Typical use, Request to Exit/Spare
 - 3) PN 75366: 22 AWG 6/Conductor shielded CMP. Typical use, Card Reader.
 - 4) PN 71944: 18 AWG 4/Conductor CMP. Typical use, Lock Power
- b. Any of the above cables may be used individually where cables in addition to those included in the bundle are required.
- B. Comply with Division 26 Section "Wires and Cables" except as indicated.
- C. Cable for Low Voltage Control and Signal Circuits: Shielded twisted pair cable with drain. Comply with Division 26 Section "Wires and Cables."

2.9 RACEWAY

- A. Comply with Division 26 Section "Raceways."

2.10 DOOR HARDWARE SCHEDULE

- A. Refer to Section 08 71 00 Door Hardware Schedule for hardware set information and assignment of required components to be provided by the Division 28 contractor.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.
- B. Examine roughing-in for card readers, and other cable-connected devices to verify actual locations of conduit and back boxes before device installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with recommendations in SIA CP-01.
- B. Comply with TIA/EIA 606-A, "Administration Standard for Commercial Telecommunications Infrastructure."
- C. Obtain detailed Project planning forms from manufacturer of access-control system; develop custom forms to suit Project. Fill in all data available from Project plans and specifications and publish as Project planning documents for review and approval.
 - 1. For each Location, record setup of controller features and access requirements.
 - 2. Prepare a specific plan for system testing, startup, and demonstration.
 - 3. Develop acceptance test concept and, on approval, develop specifics of the test.
 - 4. Develop cable and asset-management system details; input data from construction documents.

3.3 INSTALLATION

- A. General: Install system according to NFPA 70, applicable codes, and manufacturer's printed instructions.
- B. Intermountain Healthcare Approved Installers:
 - 1. Convergent
 - 2. Security 101
- C. Wiring Method:
 - 1. Concealed in walls or above inaccessible ceilings: Install all cabling in raceways, 1 inch minimum. Conduit fill shall not exceed 40%.

2. Above Accessible Ceilings: Provide J-Hooks at not more than 5 feet on center. Fasten J-Hooks to walls with solid anchoring to studs. Where wall are unavailable suspend from structure using not less than 3/8" diameter threaded rod and provide tie to ceiling grid to prevent sway.
 3. Exposed: Install exposed cables in minimum 3/4" galvanized rigid metal conduit with straps at not more than 3 feet on center and minimum 1/4" gap between conduit and building surface. Use boxes that are specified for surface mounting.
- D. Wiring within Panels and Enclosures: Bundle, wrap, and train the conductors to terminal points with 6-inches of slack minimum, 12-inches of slack maximum. Provide and use cable management hardware and distribution spools.
 - E. Number of Conductors: As recommended by system manufacturer for functions indicated. As a minimum install one bundled, shielded and unshielded, twisted pair cable for every access controlled door.
 - F. Splices, Taps, and Terminations: Make splices, taps, and terminations on numbered terminal strips in junction, pull and outlet boxes, terminal cabinets, and equipment enclosures.
 - G. Tighten connections to comply with tightening torques specified in UL Standard 486A.
 - H. Identification of Conductors and Cables: Color code conductors and apply wire and cable marking tape to designate wires and cables so media are identified and coordinated with system wiring diagrams.
 - I. Install power supplies and other auxiliary components for detection devices at the door controller panel or at a data gathering panel except as otherwise indicated. Do not install such items in the vicinity of the devices they serve.
 - J. Provide spare capacity within access control system to accommodate 2 additional future access control doors in each access panel location (i.e., in each electrical or telecommunications room with access control panels).

3.4 GROUNDING

- A. Comply with Section 280526 "Grounding and Bonding for Electronic Safety and Security."
- B. Comply with IEEE 1100, "Recommended Practice for Power and Grounding Electronic Equipment."
- C. Ground cable shields, drain conductors, and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.
- D. Bond shields and drain conductors to ground at only one point in each circuit.

3.5 DOOR RELEASE BUTTON INSTALLATION

- A. Push Buttons: Push-button switches shall be connected to the controller associated with the portal to which they are applied, and shall operate the appropriate electric strike, electric lock, or other facility release device. The system shall also use card readers in place of push-buttons at designated locations for remote operation of access controlled doors.

3.6 IDENTIFICATION

- A. In addition to requirements in this article, comply with applicable requirements in Section 260553 "Identification for Electrical Systems" and with TIA/EIA 606-A.
- B. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
 1. All wiring conductors connected to terminal strips shall be individually numbered, and each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with the name and number of the particular device as shown.
 2. Each wire connected to building-mounted devices is not required to be numbered at the device if the color of the wire is consistent with the associated wire connected and numbered within the panel or cabinet.

3.7 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Provide services of a factory authorized service representative to supervise the field assembly and connection of components and system pre-testing, testing, adjustment, and programming.
- B. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified.
- C. Pre-testing: Align and adjust the system and perform pre-testing of all components, wiring, and functions to verify conformance with specified requirements. Correct deficiencies by replacing malfunctioning or damaged items with new items. Retest until satisfactory performance and conditions are achieved.
- D. Testing: Provide at least 10 days' notice of acceptance test performance schedule.
- E. Operational Tests: Perform operational system tests to verify conformance with specifications. Test all modes of system operation and intrusion detection. Methodically test for false alarms in each zone of space intrusion detection devices by simulating activities outside indicated detection patterns.
- F. Installer Start-up Responsibility: The Installer shall initiate system operation. The Installer shall provide competent start up personnel on each consecutive working day until the system is fully functional. Upon reoccurring technical problems, the Installer shall supply factory direct Manufacturer's support in the form of factory technical representation and/or diagnostic equipment until the resolution of those defined problems.

3.8 ADJUSTMENT

- A. Occupancy Adjustments: When requested within 1 year of date of substantial completion, provide on site assistance in adjusting and reprogramming to suit actual occupied conditions. Provide up to 3 visits to the site for this purpose without additional cost.

3.9 DEMONSTRATION

- A. Train Owner's operating personnel in the programming and operation of the system. Train Owner's maintenance personnel in the procedures and schedules involved in preventive maintenance and in programming, operating, adjusting, troubleshooting, and servicing of the system. Provide a minimum of 4 hours training.
- B. Schedule training with advance notice of at least 7 days.

END OF SECTION

SECTION 28 23 00
VIDEO SURVEILLANCE**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes a video surveillance system consisting of cameras, software installation, configuration, and licensing. Network electronics shall be provided by the Owner. Cabling and terminations shall be provided by Section 27 10 00. Owner approved installers:
1. CONVERGINT TECHNOLOGIES.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include dimensions and data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For video surveillance, submit shop drawings with product data in one submittal. 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.
 2. Functional Block Diagram: Show single-line interconnections between components for signal transmission and control. Show cable types and sizes.
 3. Dimensioned plan and elevations of equipment racks, control panels, and consoles. Show access and workspace requirements.
 4. Wiring Diagrams: For power, signal, and control wiring.
- C. Equipment List: Include every piece of equipment by model number, manufacturer, location, and date of original installation.
- D. Field quality-control reports.
- E. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Convergent is Intermountain Healthcare's approved installer.
- 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 NECA 1.
- D. Comply with NFPA 70.
- E. Electronic data exchange between video surveillance system with an access-control system shall comply with SIA TVAC.

1.4 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, and control-station equipment that fail in materials or workmanship within specified warranty period.

1. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS**2.1 SYSTEM REQUIREMENTS**

- A. Video-signal format shall comply with IP based digital transmission.
- B. Surge Protection: Protect components from voltage surges entering through power, communication, signal, control, or sensing leads. Include surge protection for external wiring of each conductor's entry connection to components.
1. Minimum Protection for Power Connections 120 V and More: Auxiliary panel suppressors complying with requirements in Division 26 Section "Transient-Voltage Suppression for Low-Voltage Electrical Power Circuits."
 2. Minimum Protection for Communication, Signal, Control, and Low-Voltage Power Connections: Comply with requirements in Division 26 Section "Transient-Voltage Suppression for Low-Voltage Electrical Power Circuits." as recommended by manufacturer for type of line being protected.
- C. Tamper Protection: Tamper protection capability shall be provided as part of the camera manufacture and design.

2.2 CAMERAS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. AXIS
- B. Description: Camera shall be an all-in-one solution with integrated megapixel camera, varifocal lens, and dome enclosure. Refer to camera type schedule in the drawings.

2.3 CAMERA-SUPPORTING EQUIPMENT

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. AXIS
- B. Minimum Load Rating: Rated for load in excess of the total weight supported times a minimum safety factor of two.
- C. Mounting Brackets for Fixed Cameras: Type matched to items supported and mounting conditions. Include manual pan-and-tilt adjustment.

- D. Protective Housings for Fixed Cameras: Dome type enclosures with internal camera mounting and connecting provisions that are matched to camera/lens combination and mounting and installing arrangement of camera to be housed. Dome enclosures mounted outside shall be manufactured with environmental features for sustained function in all expected temperatures.

2.4 IP VIDEO MANAGEMENT SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Genetec
- B. Description:
 - 1. System shall provide high-quality delivery and processing of IP-based video, audio, and control data using standard Ethernet-based networks.
 - 2. System shall have seamless integration of all video surveillance and control functions.
 - 3. System design shall include all necessary compression software for high-performance, dual-stream, MPEG-2/MPEG-4/h.264 video. Unit shall provide connections for all video cameras, camera PTZ control data, bidirectional audio, discreet sensor inputs, and control system outputs.
 - 4. All camera signals shall be compressed, encoded, and delivered onto the network for processing and control by the IP video-management software.
 - 5. All system interconnect cables, camera licenses, workstation programming, and other system intermediate devices shall be provided for full performance of specified system.

2.5 SIGNAL AND POWER TRANSMISSION COMPONENTS

- A. Cable: Four pair, 100 ohm, Category 6A compliant UTP. (By Section 271500)
- B. Video Surveillance Cable Connectors: Category 6A compliant. (By Section 271500)
- C. Camera Power: POE enabled network switches. (By Owner)
- D. **Media Converter (Camera Fiber Connections): 10/100/1000 Media converter with Power over Ethernet. Provide OmniConverter GPoE+ by Omnitron systems or approved equal. (BA2)**

PART 3 - EXECUTION

3.1 VIDEO SURVEILLANCE SYSTEM INSTALLATION

- A. Intermountain Healthcare Approved Installers:
 - 1. Convergent
- B. Install cameras at heights noted in drawings.
- C. Set pan-and-tilt unit stops to suit final camera position and to obtain the field of view required for camera. Connect all controls and alarms, and adjust.

- D. Identify system components, wiring, cabling, and terminals according to Division 26 Section "Identification for Electrical Systems."

3.2 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. Inspection: Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
 - 2. Pretesting: Align and adjust system and pretest components, wiring, and functions to verify that they comply with specified requirements. Conduct tests at varying lighting levels, including day and night scenes as applicable. Prepare video-surveillance equipment for acceptance and operational testing as follows:
 - a. Verify operation of auto-iris lenses.
 - b. Set back-focus of fixed focal length lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Adjust until image is in focus with and without the filter.
 - c. Set back-focus of zoom lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Additionally, set zoom to full wide angle and aim camera at an object **50 to 75 feet** away. Adjust until image is in focus from full wide angle to full telephoto, with the filter in place.
 - d. Set sensitivity of motion detection.
 - e. Connect and verify responses to alarms.
 - f. Verify operation of control-station equipment.
 - 3. Test Schedule: Schedule tests after pretesting has been successfully completed and system has been in normal functional operation for at least 14 days. Provide a minimum of 10 days' notice of test schedule.
 - 4. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation.
- C. Video surveillance system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.3 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain video-surveillance equipment.

END OF SECTION

SECTION 28 31 11
DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

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. Fire-alarm control unit.
 2. Manual fire-alarm boxes.
 3. System smoke detectors.
 4. Nonsystem smoke detectors.
 5. Heat detectors.
 6. Notification appliances.
 7. Firefighters' two-way telephone communication service.
 8. Magnetic door holders.
 9. Remote annunciator.
 10. Addressable interface device.
 11. Digital alarm communicator transmitter.
 12. Radio alarm transmitter.
 13. System printer.

1.3 DEFINITIONS

- A. LED: Light-emitting diode.
- B. NICET: National Institute for Certification in Engineering Technologies.

1.4 SYSTEM DESCRIPTION

- A. Noncoded, UL-certified FMG-placarded addressable system, with automatic sensitivity control of smoke detectors and multiplexed signal transmission, dedicated to fire-alarm service only.

1.5 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to SEI/ASCE 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."

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For fire-alarm system, submit shop drawings with product data in one submittal. Include plans, elevations, sections, details, and attachments to other work.
1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
 2. Include voltage drop calculations for notification appliance circuits.
 3. Include fire alarm zoning diagrams indicating zoning of the fire alarm system coordinated with the corresponding fire protection zones and smoke compartments. Comply with NFPA 99.
 4. Include battery-size calculations.
 5. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.

6. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations. Provide remote test switches (RTS) as required by NFPA 72.
 7. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
 8. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.
- C. General Submittal Requirements:
1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.
 2. Shop Drawings shall be prepared by persons with the following qualifications:
 - a. Trained and certified by manufacturer in fire-alarm system design.
 - b. NICET-certified fire-alarm technician, Level III minimum.
 - c. Licensed or certified by authorities having jurisdiction.
- D. Delegated-Design Submittal: For smoke and heat detectors 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. Drawings showing the location of each smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the detector.
 2. Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Seismic Qualification Certificates: For fire-alarm control unit, 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. Field quality-control reports.

1.8 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
 2. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
 3. Record copy of site-specific software.
 4. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:
 - a. Frequency of testing of installed components.
 - b. Frequency of inspection of installed components.
 - c. Requirements and recommendations related to results of maintenance.
 - d. Manufacturer's user training manuals.
 5. Manufacturer's required maintenance related to system warranty requirements.

6. Abbreviated operating instructions for mounting at fire-alarm control unit.
- B. Software and Firmware Operational Documentation:
 1. Software operating and upgrade manuals.
 2. Program Software Backup: On magnetic media or compact disk, complete with data files.
 3. Device address list.
 4. Printout of software application and graphic screens.

1.9 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. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but no fewer than 1 unit.
 2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but no fewer than 1 unit.
 3. Smoke Detectors, Fire Detectors: Quantity equal to 10 percent of amount of each type installed, but no fewer than 1 unit of each type.
 4. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but no fewer than 1 unit of each type.
 5. Keys and Tools: One extra set for access to locked and tamperproofed components.
 6. Audible and Visual Notification Appliances: One of each type installed.
 7. Fuses: Two of each type installed in the system.

1.10 QUALITY ASSURANCE

- A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.
- B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level II technician.
- C. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Components shall be compatible with, and operate as, an extension of existing system.
- D. 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.
- E. NFPA Certification: Obtain certification according to NFPA 72 by an NRTL.
- F. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.
- G. NFPA Certification: Obtain certification according to NFPA 72 in the form of a placard by an FMG-approved alarm company.
- H. NFPA Certification: Obtain certification according to NFPA 72 by the Authority Having Jurisdiction.

1.11 PROJECT CONDITIONS

- A. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:
 1. Notify Construction Manager no fewer than 7 days in advance of proposed interruption of fire-alarm service.
 2. Do not proceed with interruption of fire-alarm service without Construction Manager's written permission.

1.12 SEQUENCING AND SCHEDULING

- A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service and label existing fire-alarm equipment "NOT IN SERVICE" until removed from the building.

- B. Equipment Removal: After acceptance of new fire-alarm system, remove existing disconnected fire-alarm equipment and wiring.

1.13 SOFTWARE SERVICE AGREEMENT

- A. Comply with UL 864.
- B. Technical Support: Beginning with Substantial Completion, provide software support for two years.
- C. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.
 - 1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide product by the following:
 - 1. Notifier (Match Existing)

2.2 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices[and systems]:
 - 1. Manual stations.
 - 2. Smoke detectors.
 - 3. Duct smoke detectors.
 - 4. Verified automatic alarm operation of smoke detectors.
 - 5. Automatic sprinkler system water flow.
 - 6. Heat detectors in elevator shaft and pit.
 - 7. Fire-extinguishing system operation.
 - 8. Fire standpipe system.
- B. Fire-alarm signal shall initiate the following actions:
 - 1. In the Clinic and Central Utility Plant (CUP), continuously operate alarm notification appliances.
 - 2. In the hospital, continuously operate chime/strobe appliances in smoke zone where alarm is initiated. Continuously operate strobe appliances throughout the hospital
 - 3. Identify alarm at fire-alarm control unit and remote annunciators.
 - 4. Transmit an alarm signal to the remote alarm receiving station.
 - 5. Unlock electric door locks in designated egress paths.
 - 6. Release fire and smoke doors held open by magnetic door holders.
 - 7. Activate voice/alarm communication system.
 - 8. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
 - 9. Activate smoke-control system (smoke management) at firefighter smoke-control system panel.
 - 10. Activate stairwell and elevator-shaft pressurization systems.
 - 11. Close smoke dampers in air ducts of designated air-conditioning duct systems.
 - 12. Recall elevators to primary or alternate recall floors.
 - 13. Activate emergency lighting control.
 - 14. Activate emergency shutoffs for gas and fuel supplies.
 - 15. Record events in the system memory.
 - 16. Record events by the system printer.
- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
 - 1. Valve supervisory switch.
 - 2. Low-air-pressure switch of a dry-pipe sprinkler system.

3. Elevator shunt-trip supervision.
- D. System trouble signal initiation shall be by one or more of the following devices and actions:
1. Open circuits, shorts, and grounds in designated circuits.
 2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
 3. Loss of primary power at fire-alarm control unit.
 4. Ground or a single break in fire-alarm control unit internal circuits.
 5. Abnormal ac voltage at fire-alarm control unit.
 6. Break in standby battery circuitry.
 7. Failure of battery charging.
 8. Abnormal position of any switch at fire-alarm control unit or annunciator.
 9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
 10. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system.
- E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators. Record the event on system printer.

2.3 FIRE-ALARM CONTROL UNIT

- A. General Requirements for Fire-Alarm Control Unit:
1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864 and listed and labeled by an NRTL.
 - a. System software and programs shall be held in flash electrically erasable programmable read-only memory (EEPROM), retaining the information through failure of primary and secondary power supplies.
 - b. Include a real-time clock for time annotation of events on the event recorder
 - c. Must be able to operate and monitor Pre-action systems throughout hospital
 2. Addressable initiation devices that communicate device identity and status.
 - a. Smoke sensors shall additionally communicate sensitivity setting and allow for adjustment of sensitivity at fire-alarm control unit.
 - b. Temperature sensors shall additionally test for and communicate the sensitivity range of the device.
 3. Addressable control circuits for operation of mechanical equipment.
- B. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
1. Annunciator and Display: Liquid-crystal type, 3 line(s) of 80 characters, minimum.
 2. Keypad: Arranged to permit entry and execution of programming, display, and control commands and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters.
- C. Circuits:
1. Initiating Device, Notification Appliance, and Signaling Line Circuits: NFPA 72, Class A.
 - a. Initiating Device Circuits: Style D.
 - b. Notification Appliance Circuits: Style Z.
 - c. Signaling Line Circuits: Style 7.
 - d. Install no more than 50 addressable devices on each signaling line circuit.
 2. Serial Interfaces: Two RS-232 ports for printers.
- D. Stairwell Pressurization: Provide an output signal using an addressable relay to start the stairwell pressurization system. Signal shall remain on until alarm conditions are cleared and

- fire-alarm system is reset. Signal shall not stop in response to alarm acknowledge or signal silence commands.
1. Pressurization starts when any alarm is received at fire-alarm control unit.
 2. Alarm signals from smoke detectors at pressurization air supplies have a higher priority than other alarm signals that start the system.
- E. Smoke-Alarm Verification:
1. Initiate audible and visible indication of an "alarm-verification" signal at fire-alarm control unit.
 2. Activate an NRTL-listed and -approved "alarm-verification" sequence at fire-alarm control unit and detector.
 3. Record events by the system printer.
 4. Sound general alarm if the alarm is verified.
 5. Cancel fire-alarm control unit indication and system reset if the alarm is not verified.
- F. Notification Appliance Circuit: Operation shall sound in a temporal.
- G. Elevator Recall:
1. Smoke detectors at the following locations shall initiate automatic elevator recall. Alarm-initiating devices, except those listed, shall not start elevator recall.
 - a. Elevator lobby detectors except the lobby detector on the designated floor.
 - b. Smoke detector in elevator machine room.
 - c. Smoke detectors in elevator hoistway.
 2. Elevator lobby detectors located on the designated recall floors shall be programmed to move the cars to the alternate recall floor.
 3. Water-flow alarm connected to sprinkler in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay.
 - a. Water-flow switch associated with the sprinkler in the elevator pit may have a delay to allow elevators to move to the designated floor.
1. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke barrier walls shall be connected to fire-alarm system. Review Door Hardware Schedule for sequence of operation requiring an interface with the fire alarm system, such as release upon fire alarm. Provide all fire alarm system components to accomplish the specified sequence of operation which may require components beyond those that are indicated on drawings. Provide fire alarm release at all delayed egress doors and any other doors in the path of egress that are allowed to be locked.
- H. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and print out the final adjusted values on system printer.
- I. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.
- J. Printout of Events: On receipt of signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble) and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also print system reset event, including same information for device, location, date, and time. Commands initiate the printing of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.
- K. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory and digital alarm communicator transmitters shall be powered by 24-V dc source.

1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.
- L. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.
 1. Batteries: Sealed, valve-regulated, recombinant lead acid.
- M. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

2.4 MANUAL FIRE-ALARM BOXES

- A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
 1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
 2. Station Reset: Key- or wrench-operated switch.
 3. Indoor Protective Shield: Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.
 4. Weatherproof Protective Shield: Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm.

2.5 SYSTEM SMOKE DETECTORS

- A. General Requirements for System Smoke Detectors:
 1. Comply with UL 268; operating at 24-V dc, nominal.
 2. Detectors shall be four-wire type.
 3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
 4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
 5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
 6. Integral Visual-Indicating Light: LED type indicating detector has operated and power-on status.
 7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit.
 - a. Rate-of-rise temperature characteristic shall be selectable at fire-alarm control unit for **15 or 20 deg F (8 or 11 deg C)** per minute.
 - b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at **135 or 155 deg F (57 or 68 deg C)**.
 - c. Provide multiple levels of detection sensitivity for each sensor.
- B. Photoelectric Smoke Detectors:
 1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
 2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.

- d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).
- C. Ionization Smoke Detector:
 - 1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
 - 2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).
- D. Duct Smoke Detectors: Photoelectric type complying with UL 268A.
 - 1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
 - 2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).
 - 3. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector.
 - 4. Each sensor shall have multiple levels of detection sensitivity.
 - 5. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
 - 6. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.
 - 7. Remote Test Station (RTS): Provide keyed type RTS. Comply with NFPA 72, owner, AHJ, architect, and EOR locations.

2.6 HEAT DETECTORS

- A. General Requirements for Heat Detectors: Comply with UL 521.
- B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) or a rate of rise that exceeds 15 deg F (8 deg C) per minute unless otherwise indicated.
 - 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
 - 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.7 NOTIFICATION APPLIANCES

- A. General Requirements for Notification Appliances: Individually addressed, connected to a signaling line circuit, equipped for mounting as indicated and with screw terminals for system connections.
- B. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, zoned as indicated, equipped for mounting as indicated and with screw terminals for system connections.
 - 1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated and with screw terminals for system connections.
- C. Chimes, Low-Level Output: Vibrating type, 75-dBA minimum rated output.
- D. Chimes, High-Level Output: Vibrating type, 81-dBA minimum rated output.
- E. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level

of 90 dBA, measured **10 feet (3 m)** from the horn, using the coded signal prescribed in UL 464 test protocol.

- F. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum **1-inch- (25-mm-)** high letters on the lens.
1. Rated Light Output:
 - a. 15/30/75/110 cd, selectable in the field.
 2. Mounting: Wall mounted unless otherwise indicated.
 3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
 4. Flashing shall be in a temporal pattern, synchronized with other units.
 5. Strobe Leads: Factory connected to screw terminals.
 6. Mounting Faceplate: Factory finished, white.

2.8 MAGNETIC DOOR HOLDERS

- A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.
1. Electromagnet: Requires no more than 3 W to develop **25-lbf (111-N)** holding force.
 2. Wall-Mounted Units: Flush mounted unless otherwise indicated.
 3. Rating: 24-V ac or dc.
 4. Rating: 120-V ac.
- B. Material and Finish: Match door hardware.

2.9 REMOTE ANNUNCIATOR

- A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.
1. Mounting: Flush cabinet, NEMA 250, Type 1.
- B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

2.10 ADDRESSABLE INTERFACE DEVICE

- A. Description: Microelectronic monitor module, NRTL listed for use in providing a system address for alarm-initiating devices for wired applications with normally open contacts.
- B. Integral Relay: Capable of providing a direct signal to elevator controller to initiate elevator recall to circuit-breaker shunt trip for power shutdown.

2.11 DIGITAL ALARM COMMUNICATOR TRANSMITTER

- A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632 and be listed and labeled by an NRTL.
- B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture two telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.
- C. Local functions and display at the digital alarm communicator transmitter shall include the following:
1. Verification that both telephone lines are available.
 2. Programming device.
 3. LED display.

4. Manual test report function and manual transmission clear indication.
5. Communications failure with the central station or fire-alarm control unit.
- D. Digital data transmission shall include the following:
 1. Address of the alarm-initiating device.
 2. Address of the supervisory signal.
 3. Address of the trouble-initiating device.
 4. Loss of ac supply or loss of power.
 5. Low battery.
 6. Abnormal test signal.
 7. Communication bus failure.
- E. Secondary Power: Integral rechargeable battery and automatic charger.
- F. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

2.12 SYSTEM PRINTER

- A. Printer shall be listed and labeled by an NRTL as an integral part of fire-alarm system.

2.13 DEVICE GUARDS

- A. Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection.
 1. Factory fabricated and furnished by manufacturer of device.
 2. Finish: Paint of color to match the protected device.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

- A. Comply with NFPA 72 for installation of fire-alarm equipment.
- B. Install wall-mounted equipment, with tops of cabinets not more than **72 inches (1830 mm)** above the finished floor.
 1. Comply with requirements for seismic-restraint devices specified in Section 260548 "Vibration and Seismic Controls for Electrical Systems."
- C. Smoke- or Heat-Detector Spacing:
 1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
 2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
 3. Smooth ceiling spacing shall not exceed **30 feet (9 m)**.
 4. HVAC: Locate detectors not closer than **3 feet (1 m)** from air-supply diffuser or return-air opening.
 5. Lighting Fixtures: Locate detectors not closer than **12 inches (300 mm)** from any part of a lighting fixture.
- D. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct. Install keyed remote test stations in acceptable locations.
- E. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.
- F. Single-Station Smoke Detectors: Where more than one smoke alarm is installed within a dwelling or suite, they shall be connected so that the operation of any smoke alarm causes the alarm in all smoke alarms to sound.
- G. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.
- H. Remote Test Station (RTS): Install keyed test station in wall near each duct smoke detector that is not readily visible from normal viewing position. Provide in locations acceptable to owner, AHJ, Architect, & EOR.

- I. Audible Alarm-Indicating Devices: Install not less than **6 inches (150 mm)** below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.
- J. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least **6 inches (150 mm)** below the ceiling.
- K. Device Location-Indicating Lights: Locate in public space near the device they monitor.
- L. Fire-Alarm Control Unit: Surface mounted, with tops of cabinets not more than **72 inches (1830 mm)** above the finished floor.
- M. Annunciator: Install with top of panel not more than **72 inches (1830 mm)** above the finished floor.

3.2 WIRING INSTALLATION

- A. Wiring Method: Install wiring in metal raceway according to Division 26 Section 260519 Conceal raceway except in unfinished spaces and as indicated.
- B. Wiring for Grid Ceiling Mounted Devices: Install junction box at accessible location above ceiling. Use flexible metal conduit for wiring between junction box and outlet box for ceiling mounted device. Secure flexible conduit within 12 inches of junction box.
- C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by the manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
- D. Cable Taps: Use numbered terminal strips in junction, pull and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.
- E. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.
- F. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signal from other floors or zones.
- G. Wiring to Remote Alarm Transmitting Device: **1-inch (25-mm)** conduit between the FACP and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.3 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Section 087100 "Door Hardware." Connect hardware and devices to fire-alarm system.
 - 1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than **3 feet (1 m)** from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
 - 1. Alarm-initiating connection to smoke-control system (smoke management) at firefighter smoke-control system panel.
 - 2. Alarm-initiating connection to stairwell and elevator-shaft pressurization systems.
 - 3. Smoke dampers in air ducts of designated air-conditioning duct systems. Provide end switches at each smoke and fire/smoke damper
 - 4. Alarm-initiating connection to elevator recall system and components.
 - 5. Alarm-initiating connection to activate emergency lighting control.
 - 6. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
 - 7. Supervisory connections at valve supervisory switches.
 - 8. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
 - 9. Supervisory connections at elevator shunt trip breaker.
 - 10. Supervisory connections at fire-pump power failure including a dead-phase or phase-reversal condition.
 - 11. Supervisory connections at fire-pump engine control panel.

3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Install framed instructions in a location visible from fire-alarm control unit.

3.5 GROUNDING

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

3.6 FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by authorities having jurisdiction.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. 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.
- D. Tests and Inspections:
 - 1. Visual Inspection: Conduct visual inspection prior to testing.
 - a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
 - b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
 - 2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.

3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
 4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
 5. Test visible appliances for the public operating mode according to manufacturer's written instructions.
 6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
- E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
- F. Fire-alarm system will be considered defective if it does not pass tests and inspections.
- G. Prepare test and inspection reports.
- H. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
- I. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION