



Addendum No. 2 September 05, 2024 - This Addendum contains 7 pages -

PROJECT: Ruth Enlow Library - Friendsville Branch

315 Chestnut Street, Friendsville, MD 21531

This Addendum is hereby made part of the Bid Documents dated August 08, 2024 (Project Manual and Drawings) for the above referenced project.

The provisions of this Addendum are intended to supplement and/or supersede the provisions of the Construction Documents only where contrary thereto.

This Addendum contains changes to the requirements of the Project Manual. Such changes shall be incorporated into the Construction Documents and shall apply to work with the same meaning and force as if they had been included in the original Documents. Whenever this Addendum modifies a portion of a paragraph of the Project Manual, the remainder of the paragraph affected shall remain in force.

The conditions and terms of the basic Specifications shall govern work described in this Addendum. Whenever the conditions of work, and the quality or quantity of materials, or workmanship are not fully described in this Addendum, the conditions of work, etc., included in the basic Specifications for similar items of work shall apply to the work described in this Addendum.

If no similar items of work are included in the basic Specifications, the best quality of material and workmanship shall apply and all work shall be subject to the written acceptance of the Architect.

CHANGES TO THE PROJECT MANUAL

- 1. <u>00 01 00 TOC</u> Added Specification section 033543.
- 2. <u>00 01 15 LIST OF DRAWING SHEETS</u> Added Electrical Sheet E-401
- 3. <u>00 02 00 Invitation to Bid</u>
 - Revised 1.1.H to exclude multiple Prime contracts; removed erroneous references to PA in 1.11.A.
- 4. <u>00 22 13 Supplementary Instructions to Bidders</u> Removed erroneous reference to PA in 1.3.B.
- <u>00 41 13 Bid Form</u> Clarified type of Construction contract in 1.0.E. Removed tax exemption on materials permanently incorporated into the work in 1.2. Corrected paragraph 1.7.A.
- 6. 01 50 00 TEMPORARY FACILITES AND CONTROLS Clarified Project Sign requirements.
- 7. 03 30 00 CAST-IN-PLACE CONCRETE
- Requirements added for exterior slabs and walks.
- 8. <u>03 35 43 POLISHED CONCRETE FINISHING</u> Added Specification section to clarify requirements.

Murphy & Dittenhafer, Inc. 805 North Charles Street Baltimore, Maryland 21201 410•625•4823 410•625•4674 FAX



- 9. 06 17 53 SHOP FABRICATED WOOD TRUSSES Removed paragraph 1.3.A. Added a sample requirement.
- 10. 064023 INTERIOR ARCHITECTURAL WOODWORK Added manufacturer information for veneer; add WV-1 veneer specification under heading 2.1.B.; change WV-1 to WV-2; included stain information in 2.8.C.; deleted paragraph 2.9.E. PLAM-5.
- 11. 07 61 00 SHEET METAL ROOFING Added watertightness warranty; revised paragraph 2.2.B.3
- 12. 09 65 19 RESILIENT FLOORING Revised paragraph 2.1.A.3. to change color.
- 13. 12 36 61 COUNTERTOPS Revised [SSM-2]. Added paragraph 2.2.A.3: [SSM-4]

С

HAN	GES TO THE CONSTRUCTION DRAWINGS
1.	<u>CS-1</u> <u>COVER SHEET & SHEET LIST</u>
•	Added Sheet E-401; moved sheet list from CS-2
2.	<u>CS-4</u> CODE AND OCCUPANCY PLAN
-	Removed stray question marks below area tags.
3.	<u>C-551 – GENERAL DETAILS</u>
	Revised Details 2 and 3 to show concrete subbase in lieu of stone under pavement patch.
4.	<u>C-553 – GENERAL DETAILS</u> .
	Revised Details 19 and 20 to show concrete subbase in lieu of stone under pavement patch.
	Revised Detail 21 to clarify reinforcement and call out specification for stair nosing.
5.	A-102 FLOOR PLAN
	Corrected dimensions; added dimensions for floor boxes.
6.	A-103 ROOF PLAN
	Added valley detail.
7.	A-122 ENLARGED RCP & SECTIONS – VESTIBULE
	Changed background graphics in Detail 2; clarified verbiage in Details 2&3; added sample
	requirement for truss hanging.
8.	A-200 ELEVATIONS
	Reworded text on elevation 1; added reference to enlarged elevation.
9.	A-302 WALL SECTIONS
	Added enlarged elevations of fibercement freeze on North facade & defined number of
	colors.
10.	A-402 INTERIOR ELEVATIONS
	Reworded text on elevation 1; added information to elevation 3.
11.	A-410 TOILET ROOMS PLANS & ELEVS
	Added clarifying text notes.
12.	A-440 CASEWORK DETAILS
	Adjusted text size; changed "wire pull" to "bar pull".
13.	A-442 CHILDREN'S ROOM DETAILS
	Added detail callouts in Elevation 1; clarified veneer type in drawings 1,2,4 & 5; deleted note
	in drawing 3.
14.	A-600 ROOM FINISH SCHEDULE & PLAN
	Clarified finish of exposed wood and veneer type in finish schedule.
15.	A-620 STOREFRONT ELEVATIONS
	Revised sheet title; re-organized drawings on sheet; clarified glazing types.
16.	A-621 STOREFRONT DETAILS
	Revised sheet title; clarified dimension and finish for FTR in detail 2.
17.	A-640 SIGNAGE & ROLLER SHADES
	Added symbols to show Roller shade locations; revised sheet title.
18.	A-800 FF&E PLAN
	Deleted 2 monitors in Collections area; added notes.

- 19. A-810 CIRCULATION DESK PLAN & DETAILS
 - Added veneer panel joint locations in Elevation 2; clarified veneer type.
- S-202 ROOF FRAMING PLAN Roof framing notes added for hanger connections at PSL girders and for existing roof truss to be hung from new roof framing.
- 21. <u>M-101</u> FLOOR PLAN DUCTWORK AND PIPING Revised thermostat locations, added general note 6 regarding supporting ductwork, piping, and equipment from structure.
- 22. <u>M-602</u> <u>MECHANICAL SCHEDULES</u> Added notes to electric baseboard heater regarding color and finish.
- 23. P-101 FLOOR PLAN SANITARY AND VENT Added general note 5 regarding supporting piping and equipment from structure.
 24. P-201 FLOOR PLAN - DOMESTIC WATER
- Added general note 2 regarding supporting piping and equipment from structure.
- 25. <u>P-501 PLUMBING DETAILS</u> Deleted Detail 2.
- 26. E-101 FLOOR PLAN POWER
 - Receptacles added/moved in rooms 106,106A, 107, outside of 113.
 - Occupancy Sensors removed from sheet.
 - Floor boxes in room 111 changed to quads.
 - Circuit added for BCC-1
- 27. E-201 FLOOR PLAN LIGHTING
 - A1 fixtures along the walkway outside of room 111 were adjusted for even spacing between fixtures.
 - Fixtures D1B & D2 locations were adjusted in room 106A
 - General note and drawing notes added to indicate mounting height for P3 type fixtures.
 - Locations of S2 fixtures in 106A adjusted.
- 28. E-301 FLOOR PLAN FIRE ALARM
 - Fire alarm devices relocated.
- 29. E-401 ELECTRICAL DETAILS
 - New sheet added for electrical details.
 - Pole base detail adjust to show B1 bollard at 42" tall.
- 30. E-601 ELECTRICAL SCHEDULES & SINGLE LINE
 - Single line adjusted feeders shown for panels RP1& RP2 to be 2-1/2"C.
 - Fixture schedule updated for type F2.
 - Inverter corrected to be Solar Inverter on Single Line
- 31. Sheet ES-101 ELECTRICAL SITE PLAN
 - Details moved to sheet E-401
 - Existing utility pole is now shown.

GENERAL ITEMS

Responses to solicitations received prior to the issuance of this addendum are as follows:

GENERAL INQUIRIES:

1. INQUIRY: T.O.C. -1, Table of Contents

RESPONSE: Missing Division 26 and 28 were attached to Addendum #1.

2. **INQUIRY:** 00 02 00 - Invitation to Bid, Article 1.7, Item A, Interpretation of Contract Documents Prior to Bidding

RESPONSE: No extension of time for bidder's RFI questions.

3. **INQUIRY:** 00 02 00 - Invitation to Bid, Article 1.10 Disadvantage and Local Business Participation

RESPONSE: DBE participation is 29% and LBE participation is 10%.

4. INQUIRY: 00 02 00 - Invitation to Bid, Article 1.11, Prevailing Wage Act

RESPONSE: Reference to PA – Act of 1961 has been removed, see attached revised Spec. 00 02 00.

5. INQUIRY: 00 02 00 - Invitation to Bid, Article 1.11 H., Construction Contract

RESPONSE: This project is not a multiple prime contract but is a General Construction Contract. Owner will only accept bids for General Construction.

6. INQUIRY: 00 02 00 - Invitation to Bid, Project Price Estimate

RESPONSE: There is no project price estimate available for bidders.

7. INQUIRY: 00 02 00 - Invitation to Bid, Article 1.7.A, Extension of time for questions

RESPONSE: No extension of time for Bidding RFIs can be given.

8. **INQUIRY:** 00 02 00 - Invitation to Bid, Article 1.8, Time Completion – Anticipated (NTP) Notice to Proceed Date

RESPONSE: It is anticipated that once the bids are received and reviewed, the owner will decide on award and issue an NTP shortly thereafter.

9. **INQUIRY:** 00 22 13 - Supplementary Instructions to Bidders, Part 1.3, Item B Licensed contractor

RESPONSE: Strike the word Pennsylvania and replace with Maryland.

10. INQUIRY: 00 41 13 - Bid Form, Article 1.2 Certification and Base Bid, regarding sales tax.

RESPONSE: Strike the word Excluded. This project shall <u>include</u> sales tax on material permanently incorporated into the work, see attached revised Section 004113.

11. **INQUIRY:** 00 41 13 – Bid Form, Article 1.5, Alternate 1. – Specification for polished concrete floor not provided.

RESPONSE: See attached new specification Section 03 35 43 "Polished concrete finishing".

12. **INQUIRY:** 00 41 13 – Bid Form, Article 1.5, Vinyl Graphic in Collections 106 – Specification Section not provided.

RESPONSE: Basis-of-Desin manufacturer is 3M. A full specification will be provided in Addendum #3.

 INQUIRY: 00 70 00 – General Conditions of the Contract for Construction AIA 201, 2007, Article 3.7; Status of Building, Site grading, Sediment and Erosion Control, and Trade Permits.

RESPONSE: Grading, SWM and other Site permit applications have been submitted 6/4/24. Building permit application has been submitted 8/5/24. The County has been contacted to give an expected date for building permit issuance, but M&D was unable to obtain a date by



the time this Addendum is issued. Trade and all other permits are the responsibility of the Contractor per AIA 201 – 3.7.1. However, the Owner has paid for the Permit fee to the County, who will generate trade permits for the Electrical and Plumbing trades to sign. Contractors may contact the County Permits and Inspections Division for more up-to-date information.



14. INQUIRY: 00 41 13 - Bid Form, Article 1.7 Time of Completion and owner's name

RESPONSE: Substantial Completion is 335 days, not 365 days as incorrectly noted. Contractor shall document inclement weather conditions that would extend the substantial completion date, through the AIA Document G701, Change Order form. Owner's name changed from Administration Building to Ruth Enlow Library, see attached revised Section 004113.

15. INQUIRY: 00 85 00 - Informational Wage Rates

RESPONSE: Wage rate found in the Project Manual are the only rates to be used by the bidders during the bid phase.

16. **INQUIRY:** 01 10 00 - Summary, Article 1.7.A.1 Work Restrictions for public streets and compliance with AHJ requirements.

RESPONSE: Contractor will need to contact the township – authorities having jurisdiction for any public street restrictions.

17. **INQUIRY:** 01 70 00 - Execution Requirements, Article 3.4, i., Hazardous Materials in existing structure.

RESPONSE: It is anticipated that there are no hazardous materials on site and within the building. An investigation has been performed and the report will be forwarded as soon as it is received by the Owner/Architect.

CIVIL INQUIRIES:

18. INQUIRY: 03 30 00 - Cast-in-Place Concrete, no specification for exterior slabs-on-grade.

RESPONSE: Refer to attached revised Section 033000 for requirements.

19. INQUIRY: 03 30 00 – Cast-in-Place Concrete, no specification for Stair Nosing.

RESPONSE: Refer to attached revised Sheet C-553.

20. **INQUIRY:** 03 30 00 – Cast-in-Place Concrete, potential settlement of Stone base under curb patch.

RESPONSE: Refer to attached revised Sheets C-551 and C-553.

ARCHITECTURAL INQUIRIES:

 INQUIRY: 06 40 23 – INTERIOR ARCHITECTURAL WOODWORK; "Salvaged Roof Truss" on drawing 3/A-402

RESPONSE: This truss is from a different building altogether, is currently stored by the Owner and access will be provided by the Owner when requested by the Contractor. Contractor will be responsible to provide adequate blocking as noted on drawing 3/A-122, attached with clarification on hanging hardware. Also refer to attached revised Sheet S-202.



23. **INQUIRY:** 09 31 00 - CERAMIC TILE; Please let us know where you found the floor and wall tile choices at for the Friendsville Branch Library project.

RESPONSE: Please contact Conestoga Tile Rep. Staphanie Adams for assistance: cell: 717-525-1981; email: stephanieadams@cctd.com

24. INQUIRY: 12 36 61 - COUNTERTOPS; SSM-2 selection is discontinued.

22. INQUIRY: 08 80 00 - GLAZING; Drawing 1/A-442; Glazing type GL-2

RESPONSE: A new selection has been made; refer to attached revised Spec. Section.

MEP RELATED INQUIRIES:

25. INQUIRY: Section 28 46 00 - Fire Alarm System Basis of Design manufacturer.

RESPONSE: Refer to Paragraph 284600 – 2.1.A.

26. INQUIRY: DRAWING ES-101 – Please provide a detail showing the (27) Type F1 lights.

RESPONSE: See equipment cut for Type F1 lights for details of daisy chaining fixtures.

27. **INQUIRY:** DRAWING E-601 – Please confirm the 3P 800A shown is the main in Panel DP-1 and not an enclosed circuit breaker.

RESPONSE: The 3P 800A shown is the main in Panel DP-1.

28. **INQUIRY:** DRAWING E-101 – Please confirm what is the L-1 shown in the mechanical room but not on the riser or circuited.

RESPONSE: L-1 is a louver. Tag has been removed on drawing, see attached E-101.

29. INQUIRY: DRAWING E-101 – Please confirm the (3) floor boxes shown in the Collection Area are part of the contract. They are ghosted out unlike the ones shown in the Meeting Room.

RESPONSE: The (3) floor boxes shown in the Collection Area are part of the contract.

30. INQUIRY: DRAWING ES-101 – Please provide a detail for the Utility Transformer Pad if you want Division 26 to install.

RESPONSE: Refer to drawing note 3 on drawing E-101.

31. INQUIRY: SPECIFICATIONS - Please confirm MC Cable will be allowed per NEC code.

RESPONSE: In ceilings and stud built walls, exposed cabling to be in conduit.

32. INQUIRY: Lighting Controls

RESPONSE: Contractor to contact lighting control vendor for lighting control riser.

LIST OF ATTACHMENTS

SPECIFICATIONS

- 1. 00 01 00 Table of Contents
- 2. 00 01 15 List of Drawings
- 3. 00 02 00 Invitation to Bid
- 4. 00 22 13 Supplementary Instructions to Bidders
- 5. 00 41 13 Bid Form
- 6. 01 50 00 Temporary Facilities and Controls
- 7. 03 30 00 Cast-in-place concrete
- 8. 03 35 43 Polished concrete finishing
- 9. 06 17 53 Shop-fabricated wood trusses
- 10. 06 40 23 Interior Architectural Woodwork
- 11. 07 61 00 Sheet metal roofing
- 12. 09 65 19 Resilient Flooring
- 13. 12 36 61 Countertops

DRAWINGS

- 1 CS-1 COVER SHEET & SHEET LIST
- 2 CS-4 CODE AND OCCUPANCY PLAN
- 3 C-551 GENERAL DETAILS
- 4 C-553 GENERAL DETAILS
- 5 A-102 FLOOR PLAN
- 6 A-103 ROOF PLAN
- 7 A-122 ENLARGED RCP & SECTIONS VESTIBULE
- 8 A-200 ELEVATIONS
- 9 A-302 WALL SECTIONS
- 10 A-402 INTERIOR ELEVATIONS
- 11 A-410 TOILET ROOMS PLANS & ELEVS
- 12 A-440 CASEWORK DETAILS
- 13 A-442 CHILDREN'S ROOM DETAILS
- 14 A-600 ROOM FINISH SCHEDULE & PLAN
- 15 A-620 STOREFRONT ELEVATIONS
- 16 A-621 STOREFRONT DETAILS
- 17 A-640 SIGNAGE & ROLLER SHADES
- 18 A-800 FF&E PLAN
- 19 A-810 CIRCULATION DESK PLAN & DETAILS
- 20 S-202 ROOF FRAMING PLAN
- 21 M-101 FLOOR PLAN DUCTWORK AND PIPING
- 22 M-602 MECHANICAL SCHEDULES
- 23 P-101 FLOOR PLAN SANITARY AND VENT
- 24 P-201 FLOOR PLAN DOMESTIC WATER
- 25 P-501 PLUMBING DETAILS
- 26 E-101 FLOOR PLAN POWER
- 27 E-201 FLOOR PLAN LIGHTING
- 28 E-301 FLOOR PLAN FIRE ALARM (ALTERNATE)
- 29 E-401 ELECTRICAL DETAILS
- 30 E-601 ELECTRICAL SCHEDULES & SINGLE LINE
- 31 ES-101 ELECTRICAL SITE PLAN

END OF ADDENDUM NO. 2



The arrangement of the Project Manual has been established on the MASTERFORMAT (2004 version) of the CONSTRUCTION SPECIFICATIONS INSTITUTE. The following Table of Contents lists certain Bidding and Contract Documents which are made part of this Project Manual by reference.

TABLE OF CONTENTS

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

- 00 01 00 TABLE OF CONTENTS
- 00 01 15 LIST OF DRAWINGS
- 00 02 00 INVITATION TO BID
- 00 10 00 INSTRUCTIONS TO BIDDERS
- 00 22 13 SUPPLEMENTARY INSTRUCTIONS TO BIDDERS
- 00 41 00 BID BOND
- 00 41 13 BID FORM
- 00 50 00 STANDARD FORM OF AGREEMENT
- 00 60 00 PERFORMANCE BOND
- 00 61 00 PAYMENT BOND
- 00 70 00 GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION
- 00 81 00 SUPPLEMENTARY CONDITIONS
- 00 85 00 PREVAILING WAGE RATES

DIVISION 01 – GENERAL REQUIREMENTS

- 01 10 00 SUMMARY
- 01 22 00 UNIT PRICES
- 01 23 00 ALTERNATES
- 01 25 00 CONTRACT MODIFICATION PROCEDURES
- 01 29 00 PAYMENT PROCEDURES
- 01 31 00 PROJECT MANAGEMENT AND COORDINATION
- 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION
- 01 33 00 SUBMITTAL PROCEDURES
- 01 40 00 QUALITY REQUIREMENTS
- 01 42 00 REFERENCES
- 01 50 00 TEMPORARY FACILITIES AND CONTROLS
- 01 56 39 TREE RETENTION AND PROTECTION
- 01 60 00 PRODUCT REQUIREMENTS
- 01 63 50 SUBSTITUTION PROCEDURES
- 01 70 00 EXECUTION REQUIREMENTS
- 01 77 00 CLOSEOUT PROCEDURES
- 01 78 10 PROJECT RECORD DOCUMENTS
- 01 78 20 OPERATION AND MAINTENANCE DATA
- DIVISION 02 EXISTING CONDITIONS
- 02 41 16 STRUCTURE DEMOLITION
- DIVISION 03 CONCRETE

03 30 00	CAST-IN-PLACE CONCRETE	STRUCTURAL
03 35 43	POLISHED CONCRETE FINISHING	

DIVISION 04 – MASONRY

04 20 00	UNIT MASONRY	STRUCTURAL
04 43 13	ADHERED STONE MASONRY VENEER	

DIVISION 05 - METALS

CIVIL

05 50 00	METAL FABRICATIONS	STRUCTURAL			
<u>DIVISION 06 –</u>	DIVISION 06 – WOOD, PLASTICS, AND COMPONENTS				
06 10 00	ROUGH CARPENTRY	STRUCTURAL			
06 16 00	SHEATHING	STRUCTURAL			
06 17 53	SHOP-FABRICATED WOOD TRUSSES	STRUCTURAL			
00 17 00					
		STRUCTURAL			
06 40 23	INTERIOR ARCHITECTURAL WOODWORK				
DIVISION 07 -	THERMAL AND MOISTURE PROTECTION				
07 21 00	THERMAL INSULATION				
07 26 00	VAPOR RETARDERS				
07 27 15	SELF-ADHERING SHEET AIR BARRIERS				
07 42 93	EXTERIOR ALUMINUM SOFFIT AND WALL PANELS				
07 46 00	RAIN SCREEN DRAINAGE MAT				
07 46 46	FIBER-CEMENT SIDING				
07 61 00	SHEET METAL ROOFING				
07 62 00	SHEET METAL FLASHING AND TRIM				
07 72 53	SNOW GUARDS				
07 92 00	JOINT SEALANTS				
DIVISION 08 -	<u>OPENINGS</u>				
08 11 13	HOLLOW METAL FRAMES				
08 14 16	FLUSH WOOD DOORS				
08 41 13	ALUMINUM-FRAMED ENTRANCES AND STOREFRO	DNTS			
08 71 00	DOOR HARDWARE				
08 80 00	GLAZING				
08 83 00	MIRRORS				
08 91 19	FIXED LOUVERS				
	FINISHES				
00 20 00					
09 29 00					
09 51 00					
09 51 13					
09 05 19					
09 65 30	RESILIENT BASE AND ACCESSORIES				
09 68 10					
09 84 36	SOUND-ABSORBING CEILING UNITS				
09 91 00	PAINTING AND TRANSPARENT FINISHING				
<u>DIVISION 10 –</u>	SPECIALTIES				
10 10 10	TACKBOARDS				
10 14 10	SIGNAGE				
10 28 00	TOILET ACCESSORIES				
10 31 07					
10 44 00					
10 44 16	FIRE EXTINGUISHERS AND CARINETS				
10 75 16					
107510	GIVUND-SET FLAGFULES				
<u>DIVISION 11 – EQUIPMENT</u>					
11 52 13 PROJECTION SCREENS					
	DIVISION 12 - EURNISHINGS				
12 24 12					

- 12 24 13MANUAL ROLLER WINDOW SHADES12 36 61COUNTERTOPS 12 24 13

DIVISION 22 - PLUMBING

- 22 05 17 SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
- 22 05 18 ESCUTCHEONS FOR PLUMBING PIPING
- 22 05 19 METERS AND GAGES FOR PLUMBING PIPING
- 22 05 23.12 BALL VALVES FOR PLUMBING PIPING
- 22 05 23.14 CHECK VALVES FOR PLUMBING PIPING
- 22 05 29 HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT
- 22 05 53 IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT
- 22 07 19 PLUMBING PIPING INSULATION
- 22 11 16 DOMESTIC WATER PIPING
- 22 11 19 DOMESTIC WATER PIPING SPECIALTIES
- 22 11 23.21 INLINE, DOMESTIC-WATER PUMPS
- 22 13 16 SANITARY WASTE AND VENT PIPING
- 22 13 19 SANITARY WASTE PIPING SPECIALTIES
- 22 13 19.13 SANITARY DRAINS
- 22 33 00 ELECTRIC, DOMESTIC-WATER HEATERS
- 22 42 13.13 COMMERCIAL WATER CLOSETS
- 22 42 16.13 COMMERCIAL LAVATORIES
- 22 42 16.16 COMMERCIAL SINKS
- 22 47 16 PRESSURE WATER COOLER

DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

- 23 05 13 COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT
- 23 05 17 SLEEVES AND SLEEVE SEALS FOR HVAC PIPING
- 23 05 29 HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
- 23 05 48 VIBRATION CONTROLS FOR HVAC
- 23 05 53 IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
- 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC
- 23 07 13 DUCT INSULATION
- 23 07 19 HVAC PIPING INSULATION
- 23 09 23.27 TEMPERATURE INSTRUMENTS
- 23 23 00 REFRIGERANT PIPING
- 23 31 13 METAL DUCTS
- 23 33 00 AIR DUCT ACCESSORIES
- 23 33 46 FLEXIBLE DUCTS
- 23 34 16 CENTRIFUGAL HVAC FANS
- 23 37 13.13 AIR DIFFUSERS
- 23 37 13.23 REGISTERS AND GRILLES
- 23 74 33 DEDICATED OUTDOOR-AIR UNITS
- 23 81 29 VARIABLE-REFRIGERANT-FLOW HVAC SYSTEMS
- 23 82 16.14 ELECTRIC-RESISTANCE AIR COILS
- 23 82 36 FINNED-TUBE RADIATION HEATERS
- 23 82 39 WALL AND CEILING UNIT HEATERS

DIVISION 26 - ELECTRICAL

- 26 05 19 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
- 26 05 26 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
- 26 05 29 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
- 26 05 33.13 CONDUIT FOR ELECTRICAL SYSTEMS
- 26 05 33.16 BOXES FOR ELECTRICAL SYSTEMS
- 26 05 53 IDENTIFICATION FOR ELECTRICAL SYSTEMS
- 26 09 23 LIGHTING CONTROL DEVICES
- 26 24 16 PANELBOARDS
- 26 27 26 WIRING DEVICES

Ruth Enlow Library of Garrett County Friendsville Branch Library Friendsville, Maryland

26 28 13	FUSES	
26 28 16.16	ENCLOSED SWITCHES	
26 29 13	ENCLOSED CONTROLLERS	
26 43 00	SURGE PROTECTIVE DEVICES	
26 51 00	INTERIOR LIGHTING	
26 56 00	EXTERIOR LIGHTING	
DIVISION 28	- ELECTRONIC SAFETY AND SECUR	ITY
28 46 00	FIRE DETECTION AND ALARM	
DIVISION 31	– EARTHWORK	
31 20 00	EARTH MOVING	CIVIL
DIVISION 32	- EXTERIOR IMPROVEMENTS	
32 12 16	ASPHALT PAVING	CIVIL
32 17 23	TACTILE WARNING SURFACES	CIVIL
32 92 00	TURF AND GRASSES	CIVIL
32 95 00	PLANTING	CIVIL
DIVISION 33	– UTILITIES	
33 10 00	WATER UTILITIES	CIVIL

33 10 00	WATER UTILITIES	CIVIL
33 30 00	SANITARY SEWER	CIVIL
33 41 00	STORM UTILITIES	CIVIL

END OF TABLE OF CONTENTS

SECTION 00 01 15 - LIST OF DRAWING SHEETS

1.1 LIST OF DRAWINGS

- A. Drawings: Drawings consist of the Contract Drawings and other drawings listed on the Table of Contents page of the separately bound drawing set titled Construction Documents / Bidding Package, dated April 17, 2017, as modified by subsequent Addenda and Contract modifications.
- B. List of **Contract** Drawings: <u>Drawings consist of the following Contract Drawings and other</u> drawings of type indicated:

GENERAL

- CS-1 COVER SHEET & SHEET LIST
- CS-2 SHEET LIST
- CS-3 CODE SUMMARY
- CS-4 CODE AND OCCUPANCY PLAN

CIVIL

- C-111 GENERAL NOTES & LEGENDS
- C-121 EXISTING SITE PLAN
- C-122 PRE-CONSTRUCTION LAND USE
- C-123 EXISTING SITE DEMOLITION PLAN
- C-124 POST CONSTRUCTION LAND USE
- C-125 POST CONSTRUCTION DRAINAGE PLAN
- C-211 SITE PLAN
- C-212 GRADING PLAN
- C-221 WALL PROFILES & DETAILS
- C-301 EROSION & SEDIMENTATION CONTROL PLAN
- C-321 EROSION & SEDIMENTATION CONTROL DETAILS & NOTES
- C-322 EROSION & SEDIMENTATION CONTROL DETAILS & NOTES
- C-323 MDE STANDARD SEEDING & MULCHING DETAILS & NOTES
- C-324 MDE STANDARD SEEDING & MULCHING DETAILS & NOTES
- C-325 VEGETATED BMP INSTALLATION & MAINTENANCE NOTES
- C-401 MICROBASIN STORM DRAIL DETAILS
- C-402 MICROBASIN STORM DRAIL DETAILS
- C-403 MICROBASIN STORM DRAIL DETAILS
- C-421 SANITARY PROFILE & DETAILS
- C-441 WATERLINE PROFILE & DETAILS
- C-551 GENERAL DETAILS
- C-552 GENERAL DETAILS
- C-553 GENERAL DETAILS
- L-1.0 LANSCAPE PLAN

ARCHITECTURAL

- A-100 OVERALL FLOOR PLAN
- A-102 FLOOR PLAN
- A-103 ROOF PLAN
- A-120 REFLECTED CEILING PLAN
- A-122 ENLARGED RCP & SECTIONS VESTIBULE

- A-200 ELEVATIONS
- A-300 BUILDING SECTIONS
- A-302 BUILDING & WALL SECTIONS
- A-310 WALL SECTIONS
- A-401 INTERIOR ELEVATIONS
- A-402 INTERIOR ELEVATIONS
- A-410 TOILET ROOM PLANS & ELEVATIONS
- A-440 CASEWORK DETAILS
- A-442 CHILDREN'S ROOM DETAILS
- A-500 EXTERIOR DETAILS
- A-502 PLAN DETAILS
- A-600 ROOM FINIH SCHEDULE & PLAN
- A-610 DOOR FRAME SCHEDULE
- A-620 WINDOW STOREFRONT ELEVATIONS
- A-621 WINDOW STOREFRONT DETAILS
- A-630 PARTITION TYPES
- A-640 SIGNAGE & ROLLER SHADES
- A-800 FF&E PLAN
- A-810 CIRCULATION DESK PLAN & DETAILS

STRUCTURAL

- S-101 STRUCTURAL NOTES
- S-201 FOUNDATION PLAN
- S-202 ROOF FRAMING PLAN
- S-301 FOUNDATION SECTIONS
- S-401 FRAMING SECTIONS
- S-601 TYPICAL FOUNDATION DETAILS
- S-602 TYPICAL FRAMING DETAILS
- S-603 TYPICAL SHEAR WALL DETAILS

MECHANICAL

- M-001 MECHANICAL LEGEND AND ABBREVIATIONS
- M-101 FLOOR PLAN DUCTWORK AND PIPING
- M-501 MECHANICAL DETAILS
- M-502 MECHANICAL DETAILS
- M-503 MECHANICAL DETAILS
- M-601 MECHANICAL SCHEDULES
- M-602 MECHANICAL SCHEDULES
- M-701 MECHANICAL CONTROLS
- M-702 MECHANICAL CONTROLS

PLUMBING

- P-001 PLUMBING LEGEND AND ABBBREVIATIONS
- P-101 FLOOR PLAN SANITARY AND VENT
- P-201 FLOOR PLAN DOMESTIC WATER
- P-501 PLUMBING DETAILS
- P-502 PLUMBING DETAILS
- P-601 PLUMBING SCHEDULES
- P-701 PLUMBING RISERS

ELECTRICAL

E-001 ELECTRICAL LEGEND AND ABBREVIATIONS
E-101 FLOOR PLAN - POWER
E-201 FLOOR PLAN - LIGHTING
E-301 FLOOR PLAN - FIRE ALARM (ALTERNATE)
E-401 ELECTRICAL DETAILS
E-601 ELECTRICAL SCHEDULES & SINGLE LINE DIAGRAM
ES-101 ELECTRICAL SITE PLAN

END OF SECTION 00 01 15

SECTION 00 02 00 - INVITATION TO BID

1.1 PROJECT INFORMATION

- A. Notice to Bidders: Bidders are invited to submit bids for Project as described in this Document according to the Instructions to Bidders.
- B. Project Identification: Ruth Enlow Library of Garrett County
- C. Project Location: Ruth Enlow Library of Garrett County
- D. Owner: Garrett County Library System, 6 North Second Street, Oakland, Maryland 21550
- E. Director of Libraries: Thomas Vose
- F. Architect: Murphy & Dittenhafer Architects. 805 North Charles Street, Baltimore, MD 21201.
- G. Project Description: New Friendsville Branch Library
- H. Construction Contract: Bids will be received for the following Work:
 - 1. General Construction Contract.
 - 2. Plumbing Construction Contract.
 - 3. Mechanical Construction Contract.
 - 4. Electrical Construction Contract.

1.2 TYPE OF BID

- A. Bids shall be on a Lump-Sum basis.
- B. Bids must be sealed and delivered as indicated below. Bids will not be received in any other manner. Bidders bear responsibility to insure bids are received by the indicated deadline. Awards will be made to the lowest responsive and responsible bidder after scope review.

1.3 BID SUBMITTAL AND OPENING

- A. Owner will receive sealed bids until the bid time and date at the location indicated below. Owner will consider bids prepared in compliance with the Instructions to Bidders issued by Owner, and delivered as follows:
 - 1. Bid Date: Friday, September 20, 2024.
 - 2. Bid Time: 2:00 p.m., local time.
 - 3. Location: 6 North Second Street, Oakland, Maryland 21550
- B. Bids will be opened in public.
 - 1. At said time and place, bids will be publicly opened.

1.4 BID SECURITY

- A. Bid security shall be submitted with each bid in the amount of [10%] ten percent of the bid amount. No bids may be withdrawn for a period of [90] ninety days after opening of bids. Owner reserves the right to reject any and all bids and to waive informalities and irregularities.
- B. AIA Document A310, "Bid Bond," is the recommended form for a bid bond. A bid bond acceptable to Owner, or other bid security as described in the Instructions to Bidders, is required to be attached to the Bid Form as a supplement.
- C. Copies of AIA standard forms may be obtained from The American Institute of Architects; www.aia.org/contractdocs/purchase/index.htm; email: docspurchases@aia.org; (800) 942-7732.

1.5 PREBID CONFERENCE

A. A non-mandatory prebid conference for all bidders will be held on site and via Zoom meeting August 23, 2024 at 11:00 AM, local time. Prospective bidders are not required to attend.

1.6 DOCUMENTS

- A. Contracting Documents: Obtain after August 08, 2024 by contacting Murphy & Dittenhafer Architects. Documents will be provided to prime bidders only; only complete sets of documents will be issued.
- B. Online Procurement and Contracting Documents: Project Architect will provide access to a secure website.
- C. Before submitting a bid, each bidder shall carefully examine the Drawings, read the Specifications and all other Contract Documents, and visit the site of the Work. Each bidder shall fully inform himself, prior to bidding, as to all existing conditions and limitations under which the Work is to be performed. He shall include in his bid a sum to cover all costs of all items necessary to perform the Work, as set forth in the Contract Documents. No allowance will be made to any bidder because of lack of such examination or knowledge. The submission of a bid shall be construed as conclusive evidence that the bidder has made such examinations.

1.7 INTERPRETATION OF CONTRACT DOCUMENTS PRIOR TO BIDDING

- A. If any person contemplating submitting a bid for construction of the Work is in doubt as to the true meaning of any of the Contract Documents, or finds discrepancies in, or omissions from, any part of the Contract Documents, he may submit to the Architect a written request for interpretation. Such requests will be accepted in the offices of Murphy & Dittenhafer Architects, directed to the attention of Ralph Muenstermann, at ram@murphdittarch.com until 5:00 p.m. on August 30, 2024. The person submitting the request shall be responsible for its prompt delivery.
- B. Any interpretation or correction of the Contract Documents will be made only by Addendum and will be issued to each bidder of record.

1.8 TIME OF COMPLETION

A. Bidders shall begin the Work on receipt of the Notice to Proceed and shall complete the Work within the Contract Time.

1.9 BIDDER'S QUALIFICATIONS

- A. The bidder's experience, necessary facilities, and financial resources, to furnish the items of this Contract, may be examined by the owner. The Owner reserves the right to reject the Proposal of any Bidder not possessing satisfactory qualifications as deemed by Owner in its sole discretion. The Owner reserves the right to waive any informalities or reject any, and all, bids. Owner may at its discretion accept and/or reject any or all alternates and use this acceptance and/or rejection as a basis for determining the low bidder. Each contractor submitting a proposal for the work shall submit with his Bid Form, if requested, resumes for all proposed project team members for the project.
- B. Bidders must be properly licensed under the laws governing their respective trades and be able to obtain insurance and bonds required for the Work. A Performance Bond, a separate Labor and Material Payment Bond, and Insurance in a form acceptable to Owner will be required of the successful Bidder.

1.10 DISADVANTAGED AND LOCAL BUSINESS PARTICIPATION

A. The Owner encourages participation by Disadvantaged Business Enterprises (DBE) and Local Business Enterprises (LBE) as either prime or subcontract.

1.11 PREVAILING WAGE ACT

A. The PA Prevailing Wage Act of 1961, including amendments and supplements thereto, is in effect for this project. Bidders shall prepare their bids after giving consideration to the applicability of the PA Prevailing Wage Act and to all other State, Federal, and Local laws and regulations applicable to this project. The Prime Contractors will be required to pay, and require any subcontractor to pay, each employee engaged on the project not less than the hourly rates prescribed in the issued rates. The Prime Contractors will be required to file with the Owner, via the Architect, four (4) copies of weekly and final certification of payroll on the latest PA Prevailing Wage Act forms for his employees and his subcontractors. The Prime Contractors' and subcontractors' certification concerning prevailing wage requirements form must be completed by the Prime Contractors and subcontractor and submitted with their bid.

NOTE: This invitation to Bid supersedes any provisions of the Instruction to Bidders (AIA Document A701) or Supplementary Instructions to the Bidders, whenever the same conflicts. The Owner reserves the right to waive any informalities, irregularities, defects, errors or incorrect submissions or reject any, or all, bid proposals, or any part thereof.

END OF SECTION 00 02 00

SECTION 00 22 13 - SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

1.1 INSTRUCTIONS TO BIDDERS

- A. Instructions to Bidders for Project consist of the following:
 - 1. AIA Document A701, "Instructions to Bidders".
 - 2. The following Supplementary Instructions to Bidders that modify and add to the requirements of the Instructions to Bidders.

1.2 SUPPLEMENTARY INSTRUCTIONS TO BIDDERS, GENERAL

A. The following supplements modify AIA Document A701, "Instructions to Bidders." Where a portion of the Instructions to Bidders is modified or deleted by these Supplementary Instructions to Bidders, unaltered portions of the Instructions to Bidders shall remain in effect.

1.3 ARTICLE 2 - BIDDER'S REPRESENTATIONS

- A. Add Section 2.1.3.1:
 - 1. 2.1.3.1 The Bidder has investigated all required fees, permits, and regulatory requirements of authorities having jurisdiction and has properly included in the submitted bid the cost of such fees, permits, and requirements not otherwise indicated as provided by Owner.
- B. Add Section 2.1.3.2:
 - 1. 2.1.5 The Bidder is a properly licensed Contractor according to the laws and regulations of Pennsylvania **Maryland** and meets qualifications indicated in the Procurement and Contracting Documents.
- C. Add Section 2.1.3.3:
 - 1. 2.1.6 The Bidder has incorporated into the Bid adequate sums for work performed by installers whose qualifications meet those indicated in the Procurement and Contracting Documents.

1.4 ARTICLE 3 - BIDDING DOCUMENTS

- A. 3.4 Addenda:
 - 1. Delete Section 3.4.3 and replace with the following:
 - a. 3.4.3 Addenda may be issued at any time prior to the receipt of bids.
 - 2. Add Section 3.4.4.1:
 - a. 3.4.4.1 Owner may elect to waive the requirement for acknowledging receipt of 3.4.4 Addenda as follows:

- 1) 3.4.4.1.1 Information received as part of the Bid indicates that the Bid, as submitted, reflects modifications to the Procurement and Contracting Documents included in an unacknowledged Addendum.
- 2) 3.4.4.1.2 Modifications to the Procurement and Contracting Documents in an unacknowledged Addendum do not, in the opinion of Owner, affect the Contract Sum or Contract Time.

1.5 ARTICLE 4 - BIDDING PROCEDURES

- A. 4.1 Preparation of Bids:
 - 1. Add Section 4.1.9:
 - a. 4.1.9 The Bid shall include unit prices when called for by the Procurement and Contracting Documents. Owner may elect to consider unit prices in the determination of award. Unit prices will be incorporated into the Contract.
 - 2. Add Section 4.1.10:
 - a. 4.1.10 Owner may elect to disqualify a bid due to failure to submit a bid in the form requested, failure to bid requested alternates or unit prices, failure to complete entries in all blanks in the Bid Form, or inclusion by the Bidder of any alternates, conditions, limitations or provisions not called for.
 - 3. Add Section 4.1.11:
 - a. 4.1.11 Bids shall include sales taxes for materials permanently incorporated into the construction.
- B. 4.4 Modification or Withdrawal of Bids:
 - 1. Add the following sections to 4.4.2:
 - a. 4.4.2.1 Such modifications to or withdrawal of a bid may only be made by persons authorized to act on behalf of the Bidder. Authorized persons are those so identified in the Bidder's corporate bylaws, specifically empowered by the Bidder's charter or similar legally binding document acceptable to Owner, or by a power of attorney, signed and dated, describing the scope and limitations of the power of attorney. Make such documentation available to Owner at the time of seeking modifications or withdrawal of the Bid.
 - b. 4.4.2.2 Owner will consider modifications to a bid written on the sealed bid envelope by authorized persons when such modifications comply with the following: the modification is indicated by a percent or stated amount to be added to or deducted from the Bid; the amount of the Bid itself is not made known by the modification; a signature of the authorized person, along with the time and date of the modification, accompanies the modification. Completion of an unsealed bid form, awaiting final figures from the Bidder, does not require power of attorney due to the evidenced authorization of the Bidder implied by the circumstance of the completion and delivery of the Bid.

1.6 ARTICLE 5 - CONSIDERATION OF BIDS

- A. 5.2 Rejection of Bids:
 - 1. Add Section 5.2.1:
 - a. 5.2.1 Owner reserves the right to reject a bid based on Owner's and Architect's evaluation of qualification information submitted following opening of bids. Owner's evaluation of the Bidder's qualifications will include: status of licensure and record of compliance with licensing requirements, record of quality of completed work, record of Project completion and ability to complete, record of financial management including financial resources available to complete Project and record of timely payment of obligations, record of Project site management including compliance with requirements of authorities having jurisdiction, record of and number of current claims and disputes and the status of their resolution.

1.7 ARTICLE 7 - PERFORMANCE BOND AND PAYMENT BOND

- A. 7.1 Bond Requirements:
 - 1. Add Section 7.1.1.1:
 - a. 7.1.1.1 Both a Performance Bond and a Payment Bond will be required, each in an amount equal to 100 percent of the Contract Sum.
- B. 7.2 Time of Delivery and Form of Bonds:
 - 1. Delete the first sentence of Section 7.2.1 and insert the following:
 - a. The Bidder shall deliver the required bonds to Owner no later than [10] ten days after the date of Notice of Intent to Award and no later than the date of execution of the Contract, whichever occurs first. Owner may deem the failure of the Bidder to deliver required bonds within the period of time allowed a default.
 - 2. Delete Section 7.2.3 and insert the following:
 - a. 7.2.3 Bonds shall be executed and be in force on the date of the execution of the Contract.

1.8 ARTICLE 9 - EXECUTION OF THE CONTRACT

- A. Add Article 9:
 - 1. 9.1.1 Subsequent to the Notice of Intent to Award, and within 10 ten days after the prescribed Form of Agreement is presented to the Awardee for signature, the Awardee shall execute and deliver the Agreement to Owner, in such number of counterparts as Owner may require.
 - 2. 9.1.2 Owner may deem as a default the failure of the Awardee to execute the Contract and to supply the required bonds when the Agreement is presented for signature within the period of time allowed.
 - 3. 9.1.3 Unless otherwise indicated in the Procurement and Contracting Documents or the executed Agreement, the date of commencement of the Work shall be the date of the

executed Agreement, or the date that the Bidder is obligated to deliver the executed Agreement and required bonds to Owner.

4. 9.1.4 - In the event of a default, Owner may declare the amount of the Bid security forfeited and elect to either award the Contract to the next responsible bidder or re-advertise for bids.

END OF SECTION 00 22 13

SECTION 00 41 13 – BID FORM- STIPULATED SUM

1.0 BID INFORMATION

- A. Project Name: Ruth Enlow Library of Garrett County
- B. Project Location: 315 Chestnut Street, Friendsville, Maryland 21531
- C. Owner: Garrett County Library System, 6 North Second Street, Oakland, Maryland 21550
- D. Bidder Name:
- E. Prime Contract: _____Construction (General, Plumbing, Mechanical and Electrical Construction Contract)

1.2 CERTIFICATION AND BASE BID

A. Base Bid, Multiple-Prime Contract for the above-named Prime Construction Contract Work: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by Murphy & Dittenhafer, Inc. and Architect's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment, and services, including all scheduled allowances, necessary to complete the above-named Contract Work for abovenamed Project, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum indicated below, which excludes includes sales tax on material permanently incorporated into the work:

	Dollars (\$).
(words)	(figures)

1.3 UNIT PRICES

A. Unit Price No. 1

Description: The Amount to be added to the total contract sum (per cubic yard), in connection with removing unsuitable materials to competent subgrade and furnishing/installing engineered fill to restore the impacted area to original subgrade.

Dollars (\$;)	per	unit.

1.4 ALTERNATES

- A. The undersigned Bidder proposes the amounts below be added to or deducted from the Base Bid if particular alternates are accepted by Owner. Amounts listed for each alternate include costs of related coordination, modification, or adjustment.
- B. If the alternate does not affect the Contract Sum, the Bidder shall indicate "NO CHANGE."
- C. If the alternate does not affect the Work of this Contract, the Bidder shall indicate "NOT APPLICABLE."
- D. The Bidder shall be responsible for determining from the Contract Documents the effects of each alternate on the Contract Time and the Contract Sum.
- E. Acceptance or non-acceptance of any alternates by the Owner shall have no effect on the Contract Time unless the "Schedule of Alternates" Article below provides a formatted space for the adjustment of the Contract Time.

1.5 DEDUCT and ADD ALTERNATE DESCRIPTIONS

<u>Deduct Alternate No. 1:</u> The Amount to be deducted from the total contract sum in connection with the removal of the tile flooring in the Lobby, provide stained and clear-sealed polished concrete; a mockup of this finish is required.

(words) Dollars (\$_______ figures)

<u>Deduct Alternate No.2</u>: The Amount to be deducted from the total contract sum in connection with the removal of the vinyl graphic in Collections 106.

	Dollars (\$).
(words)		(figures)	

<u>Add Alternate No.1</u>: The Amount to be added to the total contract sum in connection with providing a Fire Alarm system for the building.

	Dollars (\$	_).
(words)	(figures)	

1.6 BID GUARANTEE

A. The undersigned Bidder proposes and agrees, if this bid is accepted, to enter into an Agreement with Owner in the form included in the contract documents utilizing the AIA B105 Small Projects Owner-Contractor Agreement to complete all work as specified or indicated in the contract documents for the contract price and within the contract time indicated in this bid and in accordance with the contract documents.

- B. Bidder accepts all of the terms and conditions of the Instructions to Bidders. This Bid will remain open for ninety (90) days after the day of the bid opening. Bidder will sign the agreement and submit any other documents required by the contract documents within fifteen (15) days after the date of Owner's Notice of Award.
- C. In submitting this bid, bidder represents, as more fully set forth in the Bidding Documents That:
 - 1. Bidder has examined all Bidding Documents including or Invitation to Bid and the Instructions to Bidders;
 - 2. Bidder has examined the site and locality where the work is to be performed, the legal requirements (federal, state, and local laws, ordinances, rules, and regulations) and the conditions affecting cost, progress or performance of the work and has made such independent investigations as Bidder deems necessary; and
 - 3. This bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other bidder to submit a false or sham bid; Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for himself any advantage over any other Bidder or over Owner.

1.7 TIME OF COMPLETION

A. Bidder agrees that the work will proceed and be substantially completed in the following number of calendar days from the receipt of a Notice to Proceed from the Owner or the issuance of the building permit, whichever occurs later.

The construction of the new building and site work with utilities, per the limits shown on the construction documents.: Number of Days to Substantial Completion: 11 months, Three Hundred Thirty-Five (335) Calendar days from Notice To Proceed for construction of the Administration Building Ruth Enlow Library.

Liquidated Damages: It is understood that the bid price will be firm for a time period of ninety (90) calendar days from the bid opening date and that if the undersigned be notified of acceptance of this proposal within this time period, the firm shall complete the work within 395-335 calendar days from the issue date of Notice to Proceed". Each Prime Contractor will be liable for Liquidated Damages of \$1,500.00 per calendar day.

1.8 ACKNOWLEDGEMENT OF ADDENDA

- A. The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:
 - 1. Addendum No. 1, dated ______.
 - 2. Addendum No. 2, dated ______.
 - 3. Addendum No. 3, dated ______.
 - 4. Addendum No. 4, dated _____.

- 5. Addendum No. 5, dated _____.
- 6. Addendum No. 6 dated _____.

(receipt of all which is hereby acknowledged) and also the Invitation to Bid Letter.

1.9 SUBMISSION OF BID

- A. Communications concerning this bid shall be addressed to the address of Bidder indicated below.
- B. The terms used in this bid are defined in the Conditions of the Contract included as part of the Contract Documents.
- C. Communications concerning this bid shall be directed to the address of Bidder indicated below:

(The Bidder is) An Individual

Ву	_(Seal)	
(Individual's Name)		
doing business as		
Business address:		
Phone No.:		
A Partnership		
By(Firm Name)	_(Seal)	
(General Partner)	_	
Business address:		
Phone No.:		
A Corporation		

BID FORM

Ву_____

(Corporation Name)

(State of Incorporation)

Ву_____

(Name of Person Authorized to Sign)

(Title)

(Corporate Seal)

Attest

(Secretary)

Business address:_____

Phone No.:_____

END OF SECTION 00 41 13

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. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Sewers and drainage.
 - 2. Water service and distribution.
 - 3. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.
 - 4. Heating and cooling facilities.
 - 5. Ventilation.
 - 6. Electric power service.
 - 7. Lighting.
 - 8. Telephone service.
- C. Support facilities include, but are not limited to, the following:
 - 1. Temporary roads and paving.
 - 2. Dewatering facilities and drains.
 - 3. Project identification and temporary signs.
 - 4. Waste disposal facilities.
 - 5. Field offices.
 - 6. Storage and fabrication sheds.
 - 7. Lifts and hoists.
 - 8. Construction aids and miscellaneous services and facilities.
 - 9. Temporary Project Sign, refer to attachment at end of section.
- D. Security and protection facilities include, but are not limited to, the following:
 - 1. Environmental protection.
 - 2. Stormwater control.
 - 3. Security enclosure and lockup.
 - 4. Barricades, warning signs, and lights.
 - 5. Covered walkways.
 - 6. Temporary enclosures.
 - 7. Temporary partitions.
 - 8. Fire protection.
 - 9. Vehicle and pedestrian traffic control and signage.
 - 10. Temporary Project Sign at end of section.

E. Related Requirements:

- 1. Division 1 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
- 2. Division 1 Section "Execution Requirements" for progress cleaning requirements.
- 3. Divisions 2 through 33 for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.3 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weather tight; exterior walls are insulated and weather tight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

1.5 SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.6 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.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.7 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
 - 1. Keep temporary services and facilities clean and neat.
 - 2. Relocate temporary services and facilities as required by progress of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Chain-Link Fencing: Minimum 2-inch , 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top rails.
- B. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide concrete or galvanized-steel bases for supporting posts.
- C. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flamespread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- D. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.
- E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

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 office activities and to accommodate Project meetings specified in other Division 01 Sections. 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. Conference room of sufficient size to accommodate contractor meetings. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- (1.2-m-) square tack and marker boards.
 - 3. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 76 deg F (20 to 25 deg C).
 - 4. Lighting fixtures capable of maintaining average illumination of 50 fc (215 lx) at desk height.
- C. Owner & Architect Field Office: Structurally sound, secure, weather tight, with lighting, electrical outlets, heating, cooling, and ventilating equipment, and equipped with sturdy furniture, file cabinets, plan tables, plan racks, and bookcases, and of sufficient size to accommodate needs of Owner and Architect and to accommodate Project meetings specified in other Division 01 Sections; Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Construction: Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations with steps and landings at entrance doors. Maintain during progress of Work; remove at completion of work.

- 2. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy and storage requirements.
- 3. Exterior Materials: Weather resistant, finished.
- 4. Interior Materials in Offices: Sheet type materials for walls and ceilings, prefinished or painted; resilient floors and bases.
- 5. Lighting for Offices: Lighting fixtures capable of maintaining average illumination of 50 ft C at desk top height, exterior lighting at entrance doors.
- 6. Conference room of sufficient size to accommodate meetings of 12 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- (1.2-m-) square tack and marker boards with compatible marking tools / markers / erasers.
- 7. Provide separate private office, similarly equipped and furnished, for use of Owner.
- 8. Drinking water and private toilet.
- 9. Reserved.
- 10. Heating and cooling and ventilation automatic equipment, necessary to maintain a uniform indoor temperature of 68 to 76 deg F (20 to 25 deg C).
- 11. Field Offices shall be, at a minimum, swept daily and otherwise cleaned weekly, to include wet mopping to thoroughly remove dirt and debris from the floor finishes.
- 12. Owner Office:
 - a. Separate space for sole use of Owner, with separate entrance door with new lock and two keys.
 - b. Area: Minimum 150 sq ft, minimum dimension 8 ft.
 - c. Windows: Minimum three minimum total area of 10 percent of floor area, with operable sash and insect screens. Locate to provide views of construction area.
 - d. Electrical Distribution Panel: Two circuits minimum, 110 volt, 60 Hz service.
 - e. Minimum four 110 volt duplex convenience outlets, one on each wall.
 - f. Telephone: As specified in Section 01500 Temporary Facilities and Controls.
 - g. Sanitary Facilities: Convenient access to private lavatory toilet facilities.
 - h. Drinking Fountain and/or Bottled water Cooler: Convenient access by workers.
 - i. Provide printer, copier, scanner, ink, paper and data connection.
- 13. Owner And Architect/Engineer Office Furnishings:
 - a. One desk 54 x 30 inch, with three drawers.
 - b. One drafting table 36 x 72 inch, with one equipment drawer and full width parallel straight edge.
 - c. One metal, double-door storage cabinet under table.
 - d. Plan rack to hold working Drawings, shop drawings, and record documents.
 - e. One standard four-drawer legal size metal filling cabinet with locks and two keys for each lock.
 - f. Six linear feet of metal bookshelves.
 - g. Two swivel arm chairs.

- h. Two straight chairs (can be chairs shared with the conference room).
- i. One drafting table stool.
- j. One tackboard 36 x 30 inch.
- k. One waste basket for each desk and table.
- I. High speed internet connection. High Speed Internet Service: Provide, install, and maintain high speed internet service to the Field Office and Owner Office at the time of project mobilization for the duration of the project.
- m. Color printer, fax, scanner and copier; capable of printing, copying, processing 11" x 17" documents.
- n. Uninterruptable Power Supply, UPS. Shall be of a type that is appropriate and adequate to support the use of a laptop or desktop computer plus three minor electric/electronic devices (e.g. power transformers for cell phones).
- o. 8-1/2" x 11 size and 11"x17" size Xerographic paper to be supplied as needed.
- p. CDRW Compact Disks as needed.
- q. Toner or ink as needed; maintaining as supply at all times, for future use one toner/ink set or cartridge, etc.
- r. Hanging folders and racks and appurtenances compatible with the file cabinet and 1/4 tab folders as needed.
- s. Four (4) legal size cardboard file storage boxes.
- 14. Preparation: Fill and grade sites for temporary structures sloped for drainage away from buildings.
- 15. Installation: Install office spaces ready for occupancy upon mobilization or 15 days after date fixed in Notice to Proceed, whichever occurs earlier.
- 16. Parking: Four (4) stoned surfaced parking spaces for use by Owner (2 spaces) and Architect/Engineer, and County Representative connected to office by hard surfaced walk.
 - a. Provide signage reserving spaces for the specified representatives.
- D. Employee Residential Occupancy: Not allowed on Owner's property.
- E. Locate offices and sheds minimum distance of 30 feet from existing and new structures.
- F. Do not use permanent facilities for field offices or for storage.
- G. Storage and Fabrication Sheds / Spaces: Provide sheds / spaces sized, furnished, and equipped to accommodate materials and equipment for construction operations. Heating and ventilation as needed to maintain products in accordance with Contract Documents; lighting for maintenance and inspection of products.
 - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 - 1. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- F. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.

- a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
- b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
- 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dustproducing equipment. Isolate limited work within occupied areas using portable dustcontainment devices.
- 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filterequipped vacuum equipment.
- G. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
 - 1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- H. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- I. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 - 1. Install electric power service overhead unless otherwise indicated.
 - 2. Connect temporary service to Owner's existing power source, as directed by Owner.
- J. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
 - 2. Install lighting for Project identification sign.
- K. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line for each field office.
 - 1. Provide additional telephone lines for the following:
 - a. Provide a dedicated telephone line for each facsimile machine in each field office.
 - b. Provide one telephone line for Owner's use.
 - 2. At each telephone, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Contractor's emergency after-hours telephone number.
 - e. Architect's office.
 - f. Engineers' offices.
 - g. Owner's office.
 - h. Principal subcontractors' field and home offices.

3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
 - 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction period.
 - 1. Provide dust-control treatment that is nonpolluting and non-tracking. Reapply treatment as required to minimize dust.
- C. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
 - 1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 - 2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 2 Section "Earthwork."
 - 3. Recondition base after temporary use, including removing contaminated material, regrading, proof-rolling, compacting, and testing.
 - 4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Division 2 Section "Asphalt Paving."
- D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- E. Parking: Use designated parking areas for construction personnel.
- F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 - 2. Remove snow and ice as required to minimize accumulations.

- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Identification Signs: Provide one Project identification signs as Directed by Owner of durable construction mounted in an approved location on independent support framing, elevating the bottom of the sign to 6 feet.
 - a. Sign shall be 6'-6" wide x 4'-0" high
 - b. Sign shall be full-color
 - c. A digital file will be provided by Architect/Owner (reduced size is attached at the end of this Section)
 - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 - 3. Maintain and touchup signs so they are legible at all times.
- H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Division 1 Section "Execution Procedures."
- I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified in Division 1 Section "Summary."
- C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- D. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.
- E. Site Enclosure Fence: Before construction operations begin, furnish and install portable chain link enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
 - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

- 3. Alley access must be maintained.
- F. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- H. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- I. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.
 - 1. Construct covered walkways using scaffold or shoring framing.
 - 2. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
 - 3. Paint and maintain appearance of walkway for duration of the Work.
- J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- K. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - 2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 - 3. Insulate partitions to control noise transmission to occupied areas.
 - 4. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 - 5. Protect air-handling equipment.
 - 6. Provide walk-off mats at each entrance through temporary partition.
- L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 - 2. Keep interior spaces reasonably clean and protected from water damage.
 - 3. Periodically collect and remove waste containing cellulose or other organic matter.
 - 4. Discard or replace water-damaged material.
 - 5. Do not install material that is wet.
 - 6. Discard, replace, or clean stored or installed material that begins to grow mold.
 - 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 - 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 - 2. Use permanent HVAC system to control humidity.
 - 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsumbased products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
 - c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- B. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 1 Section "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, vapor barriers, mix designs, placement procedures, other accessory materials and finishes.
- B. Cast-in Place concrete includes but is not limited to the following:
 - 1. Footings and foundation walls
 - 2. Interior slabs-on-grade
 - 3. Equipment bases and foundations
 - 4. Exterior slabs-on-grade and sidewalks
- C. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans.

1.3 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. If mix water is to be withheld at the plant and later added at the Project site to provide the water to cement ratio of the design mix, <u>this must be clearly indicated on EVERY delivery ticket to the Project site.</u>
- C. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement". Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement.
- D. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
 - 1. Cementitious materials and aggregates.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Admixtures.

- 4. Curing materials.
- 5. Floor and slab treatments, when required by the Drawings.
- 6. Vapor barriers.
- 7. Semi-rigid joint filler.
- 8. Premolded expansion joint-filler strips.
- 9. Repair materials, when required for repair, and use of the repair is accepted by the Architect.
- 10. Epoxy for drilling and placing dowels into hardened concrete.
- E. Minutes of Pre-installation Conference.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed concrete Work 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.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
 - 1. Manufacturer must use Pennsylvania Department of Transportation certified materials.
- C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
 - 2. Refer to "Field Quality Control" Paragraph below for testing requirements.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- E. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel".
- F. ACI Publications: Comply with the following, unless more stringent provisions are indicated:
 - 1. ACI 301, "Specification for Structural Concrete".
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials".
 - 3. CRSI Concrete Reinforcing Steel Institute, "Manual of Standard Practice".
 - 4. ACI 306.1 "Standard Specification for Cold Weather Concreting"
 - 5. ACI 305 "Hot Weather Concreting"
- G. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings".
 - 1. Before submitting design mixes, review concrete mix design and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.

- b. Independent testing agency responsible for concrete design mixes.
- c. Ready-mix concrete producer.
- d. Concrete subcontractor.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage. Store reinforcement in a manner that prevents soil, mud, debris, or oil from adhering to the bars. If for any reason soil, mud, debris, oil or other deleterious material is on a bar, it shall be removed before the bar is installed.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1. Plywood, metal, or other approved panel materials that produce a smooth, formed finish are acceptable.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved materials are acceptable. Provide lumber dressed on at least two edges and one side for a tight fit.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 inch by 3/4 inch, minimum.
- D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of the exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes not larger than 1 inch in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.
- F. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Plain-Steel Welded Wire Fabric: ASTM A 1064, fabricated from as-drawn steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.
- B. Joint Dowel Bars: Plain-steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

2.4 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
 - 1. Fly Ash: Fly ash may be part of the concrete mix as follows.
 - a. Fly ash to be in accordance with ASTM C 618, Class C or F. Use only in concrete mixes for foundation footings, CMU wall grout fills and slabs-on-grade.
 - 2. Ground Granulated Blast-Furnace Slag
 - a. Use one brand of cement throughout project unless approved otherwise by Architect.
- B. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:
 - 1. Nominal Maximum Aggregate Size: One inch (3/4 inch where placement by pumping)
- C. Water: Potable and complying with ASTM C 94.

2.5 ADMIXTURES

- A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.
- B. Air-Entraining Admixture: ASTM C 260.
 - 1. Admixture shall be certified by manufacturer to be compatible with other admixtures.
- C. Water-Reducing Admixture: ASTM C 494, Type A.

- 1. Products: Subject to compliance with requirements, products include, but are not limited to, the following:
 - a. Eucon WR-75, Euclid Chemical Co.
 - b. Chemtard, ChemMasters Corp.
 - c. Plastocrete, 161, Sika Corp.
- D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
 - 1. Products: Subject to compliance with requirements, products include, but are not limited to, the following:
 - a. Super P, Anti-Hydro Co., Inc.
 - b. Eucon 37, Euclid Chemical Co.
 - c. Superslump, Metalcrete Industries
- E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
 - 1. Products: Subject to compliance with requirements, products include, but are not limited to, the following:
 - a. Accelguard 80, Euclid Chemical Co.
 - b. Accel-Set, Metalcrete Industries
 - c. Daraset, W.R. Grace & Co.
- F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
 - 1. Products: Subject to compliance with requirements, products include, but are not limited to, the following:
 - a. Eucon Retarder 75, Euclid Chemical Co.
 - b. Daratard-17, W. R. Grace & Co.
 - c. Plastiment, Sika Corporation

2.6 VAPOR BARRIER AND GRANULAR MATERIALS

- A. Vapor Barrier: ASTM E 1745, <u>Class A</u>, membrane that satisfies the following:
 - 1. Membrane shall not be less than 15 mils thick.
 - 2. Installation shall comply with the "Vapor Barrier and Granular Materials" Paragraph of this specification.
 - 3. Products: Subject to compliance with requirements, provide one of the following:
 - a. Stego Industries, LLC; Stego Wrap 15-mil Class A Vapor Barrier
 - b. Barrier-Bac, Inc.; VB-350 16 mil Class A Vapor Retarder
 - c. W. R. Meadows, Inc.; Sealtight Perminator 15 mil Class A Vapor Retarder
 - d. Insulation Solutions Inc.; Viper VaporCheck II 15 mil Class A Vapor Barrier
- B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel.

2.7 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Solvent-Borne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- G. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- H. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- I. Products: Subject to compliance with requirements, products to include, but are not limited to, the following:
 - 1. Evaporation Retarder:
 - a. Cimfilm; Axim Concrete Technologies.
 - b. Finishing Aid Concentrate; Burke Group, LLC (The).
 - c. Spray-Film; ChemMasters.
 - d. Aquafilm; Conspec Marketing & Manufacturing Co., Inc.
 - e. Sure Film; Dayton Superior Corporation.
 - f. Eucobar; Euclid Chemical Co.
 - g. Vapor Aid; Kaufman Products, Inc.
 - h. Lambco Skin; Lambert Corporation.
 - i. E-Con; L&M Construction Chemicals, Inc.
 - j. Confilm; Master Builders, Inc.
 - k. Waterhold; Metalcrete Industries.
 - I. Rich Film; Richmond Screw Anchor Co.
 - m. SikaFilm; Sika Corporation.
 - n. Finishing Aid; Symons Corporation.
 - o. Certi-Vex EnvioAssist; Vexcon Chemicals, Inc.
 - 2. Clear, Solvent-Borne, Membrane-Forming Curing Compound:
 - a. AH Clear Cure; Anti-Hydro International, Inc.
 - b. Spartan-Cote; Burke Group, LLC (The).
 - c. Spray-Cure & Seal 15; ChemMasters.
 - d. Conspec #1-15 percent solids; Conspec Marketing & Manufacturing Co., Inc.
 - e. Day-Chem Cure and Seal; Dayton Superior Corporation.
 - f. Diamond Clear; Euclid Chemical Co.
 - g. Nitocure S; Fosroc.
 - h. Lambco 120; Lambert Corporation.
 - i. L&M Dress & Seal 18; L&M Construction Chemicals, Inc.
 - j. CS-309; W. R. Meadows, Inc.
 - k. Seal N Kure; Metalcrete Industries.

- I. Rich Seal 14 percent UV; Richmond Screw Anchor Co.
- m. Kure-N-Seal; Sonneborn, Div. of ChemRex, Inc.
- n. Flortec 14; Sternson Group.
- o. Cure & Seal 14 percent; Symons Corporation.
- p. Clear Seal 150; Tamms Industries Co., Div. of LaPorte Construction Chemicals of North America, Inc.
- q. Acrylic Cure; Unitex.
- r. Certi-Vex AC 309; Vexcon Chemicals, Inc.
- 3. Clear, Waterborne, Membrane-Forming Curing Compound:
 - a. AH Clear Cure WB; Anti-Hydro International, Inc.
 - b. Klear Kote WB II Regular; Burke Chemicals.
 - c. Safe-Cure & Seal 20; ChemMasters.
 - d. High Seal; Conspec Marketing & Manufacturing Co., Inc.
 - e. Safe Cure and Seal; Dayton Superior Corporation.
 - f. Aqua Cure VOX; Euclid Chemical Co.
 - g. Cure & Seal 309 Emulsion; Kaufman Products Inc.
 - h. Glazecote Sealer-20; Lambert Corporation.
 - i. Dress & Seal WB; L&M Construction Chemicals, Inc.
 - j. Vocomp-20; W. R. Meadows, Inc.
 - k. Metcure; Metalcrete Industries.
 - I. Cure & Seal 150E; Nox-Crete Products Group, Kinsman Corporation.
 - m. Rich Seal 14 percent E; Richmond Screw Anchor Co.
 - n. Kure-N-Seal WB; Sonneborn, Div. of ChemRex, Inc.
 - o. Florseal W.B.; Sternson Group.
 - p. Cure & Seal 14 percent E; Symons Corporation.
 - q. Seal Cure WB 150; Tamms Industries Co., Div. of LaPorte Construction Chemicals of North America, Inc.
 - r. Hydro Seal; Unitex.
 - s. Starseal 309; Vexcon Chemicals, Inc.
- 4. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound:
 - a. Spray-Cure & Seal Plus; ChemMasters.
 - b. UV Super Seal; Lambert Corporation.
 - c. Lumiseal Plus; L&M Construction Chemicals, Inc.
 - d. CS-309/30; W. R. Meadows, Inc.
 - e. Seal N Kure 30; Metalcrete Industries.
 - f. Rich Seal 31 percent UV; Richmond Screw Anchor Co.
 - g. Cure & Seal 31 percent UV; Symons Corporation.
 - h. Certi-Vex AC 1315; Vexcon Chemicals, Inc.
- 5. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound:
 - a. Klear-Kote Cure-Sealer-Hardener, 30 percent solids; Burke Group, LLC (The).
 - b. Polyseal WB; ChemMasters.
 - c. UV Safe Seal; Lambert Corporation.
 - d. Lumiseal WB Plus; L&M Construction Chemicals, Inc.
 - e. Vocomp-30; W. R. Meadows, Inc.
 - f. Metcure 30; Metalcrete Industries.
 - g. Vexcon Starseal 1315; Vexcon Chemicals, Inc.

2.8 RELATED MATERIALS

- A. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Semi-rigid Joint Filler: Two-component, semi-rigid. 100 percent solids per ASTM D 2240.
- C. Epoxy-Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:
 - 1. Type: Class IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- D. Reglets: Fabricate reglets of not less than 0.0217-inch- thick galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

2.9 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 4,100 psi at 28 days when tested according to ASTM C 109/C 109M.
 - 5. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch.
 - a. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - b. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - c. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 - d. Compressive Strength: Not less than 5700 psi at 28 days when tested according to ASTM C 109.

2.10 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:
 - 1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301 and ACI 318-02.
 - 2. Under circumstances where laboratory trial mix or field test data are not available, the required average compressive strength of concrete produced with materials similar to those specified shall be at least 1,200 psi greater than the specified compressive strength. This alternative shall not be permitted if the specified compressive strength is greater than 4,000 psi.

- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.
- C. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash: 18 percent.
 - 2. Ground Granulated Blast-Furnace Slag: 50 percent.
- D. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus 1 or minus 1.5 percent, unless otherwise indicated:
 - 1. Air Content: 6 percent for 3/4-inch nominal maximum aggregate size.
- E. Do not air entrain concrete to trowel-finished interior floors and suspended slabs. Do not allow entrapped air content to exceed 3 percent.
- F. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- G. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings and Foundation/Retaining Walls: Proportion normal-weight concrete mix as follows:
 - 1. Minimum Compressive Strength (28 Days): 4000 psi.
 - 2. Select slump limits from subparagraphs below or revise to suit Project.
 - 3. Maximum Slump: 4 inches.
 - 4. Maximum Slump for Concrete Containing High-Range Water-Reducing Admixture: 8 inches after admixture is added to concrete with 2 to 4 inch slump.
- B. Interior Slabs-on-Grade: Proportion normal-weight concrete mix as follows:
 - 1. Minimum Compressive Strength (28 Days): 3500 psi.
 - 2. Select cementitious materials content from subparagraphs below or delete if ACI 301 default for floors is sufficient. ACI 302.1R recommends quantities in listed order below, for nominal maximum aggregate sizes 1-1/2, 1, and 3/4 inch (38, 25, and 19 mm). ACI 301 sets identical quantities, but for minimum cement rather than cementitious materials content.
 - 3. Minimum Cementitious Materials Content: 520 lb/cu. yd.
 - 4. Maximum Slump for Concrete Containing High-Range Water-Reducing Admixture: 8inches after admixture is added to concrete
 - 5. Interior slab mix is to contain a high-range, water-reducing admixture with a water cement ratio equal to 0.47.
 - 6. Produce a mix that has the minimum amount of water necessary to generate a 2 to 3 inch slump prior to the addition of any water reducing admixtures, as recommended in ACI

302.1R, "Concrete Floor and Slab Construction", Chapter 6, "Concrete Properties and Consistency".

- C. Exterior Slabs-on-Grade and Sidewalks: See Division 32 Section "Concrete Pavement." Proportion normal-weight concrete mix as follows:
 - 1. Minimum Compressive Strength (28 Days): 5000 psi.
 - 2. Fly Ash or Pozzolan: 25 percent
 - 3. Air Content: 5-1/2 percent plus or minus 1-1/2 percent
 - 4. Maximum Slump: 4 inches.
 - 5. Maximum W/C Ratio at Point of Placement: 0.45
- D. See structural drawings for exterior door landing slabs.
- 2.12 FABRICATING REINFORCEMENT
 - A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice".
- 2.13 CONCRETE MIXING
 - A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, and <u>furnish batch ticket information for EACH delivery to the Project site.</u>
 - When air temperature is between 85 and 90 deg. F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch for concrete exposed to view.
 - 2. Class B, 1/4 inch for all other concrete surfaces.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
 - 1. Do not use rust-stained steel form-facing material.

- E. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- G. Chamfer exterior corners and edges of permanently exposed concrete.
- H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor bolts, accurately located, to elevations required.
 - 2. Install reglets to receive top edge of foundation sheet waterproofing and to receive throughwall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that do not support the weight of concrete may be removed after cumulatively curing at not less than 50 deg. F for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 VAPOR BARRIER AND GRANULAR MATERIAL

- A. Vapor Barrier: Place, protect, and repair membrane according to ASTM E 1643, ASTM F 710 and manufacturer's written instructions. Contractor shall place the vapor barrier directly below the concrete slab and on top of granular fill. Lap joints 6 inches minimum and seal with manufacturer's recommended tape. Sheets to extend to interior face of foundation walls, turn up vertically and terminate flush with top of concrete floor slab. Adhere to foundation wall with manufacturer's recommended tape. Seal all penetrations with manufacturer's recommended tape.
- B. Granular Fill: Place a minimum of 4 inches compacted granular fill on top of subgrade to elevation tolerances of plus 0 inch or minus 1/2 inch.

3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 - 1. Shop- or field-weld reinforcement according to AWS D1.4, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in longest practicable lengths on bar supports spaced at 3'-0" maximum spacing to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
 - 3. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 4. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

- 5. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts or inserts.
 - 1. Grooved Joints Using Inserts: Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. After concrete has cured, remove inserts and clean groove of loose debris.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8 inch wide joints to a depth of one-third the slab thickness. Cut into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
 - 3. Clean all debris from joints.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
 - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 7 Section "Joint Sealants," are indicated.
 - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where indicated.
 - 1. Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Before placing concrete, water may not be added at Project site, <u>unless there is a specific written</u> indication on the delivery slip of how much water has not been added to the mix at the mixing <u>plant.</u>
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mix. The addition of fiber reinforcement to concrete for slab construction will reduce field tested concrete slumps. The lower slump values for concrete that contain fiber reinforcement will not reduce workability of the concrete. Per ACI 302, the workability of a concrete mixture is not directly proportional to the slump. The addition of water at the project site to increase slump will likely result in excessive bleed water during finishing operations and is not permitted. Contractor shall contact fiber reinforcement representative to address any concerns with concrete workability and field tested slumps.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section

cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.

- 1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
- 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.
- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When air temperature has fallen to, or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg. F and not more than 80 deg. F at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
- F. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg. F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.8 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch in height.
 - 1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
 - 2. Do not apply rubbed finish to smooth-formed finish.
- C. Rubbed Finish: Apply the following to smooth-formed finished concrete:
 - 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
 - 2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.9 WATERSTOPS

A. Flexible Waterstops: Install in construction joints and at other joints to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacture's written instructions.

3.10 FINISHING FLOORS AND SLABS

- A. General: Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Concrete placement conditions should satisfy the following requirements to reduce random slab cracking:
 - 1. The base shall be free of frost and should not contain standing water. If concrete is placed in hot, dry conditions, the base should be lightly damped with water in advance of concreting.

- 2. When slabs are placed on grade, there should be no more than 30 deg. F difference between the temperature of the base and concrete at the time of placement.
- 3. Ideally, concrete should be protected from sun and wind and be placed after floor or roof deck is installed.
- C. Requirements for finishing slabs with fiber reinforcement:
 - 1. The use of vibratory screeds per standard ACI recommendations is required.
 - 2. Consult fiber manufacturer representative if bleed water appears during finishing operations. Removing bleed water by any means other than natural evaporation will likely expose fibers in the finished surface.
 - 3. Conduct power trowel operations as late as possible per standard ACI recommendations.
- D. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bullfloated or darbied. Use stiff brushes, brooms, or rakes.
 - 1. Apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes.
- E. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- F. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system
 - 2. Finish surfaces to the following tolerances, measured within 24 hours according to ASTM E 1155 for a randomly trafficked floor surface:
 - a. Specified overall values of flatness, F(F) 35; and levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and levelness, F(L) 17; for slabs-on-grade.
 - b. Specified values of flatness shall be based on "10-ft straightedge method" for suspended slabs. Flatness shall be within 1/8-inch per 10-ft for four of five consecutive measurements. In addition, visually obvious faults in floor flatness shall be corrected at contractor's own expense.
- G. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.
- H. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiberbristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

2. All exterior slabs shall receive a Medium-to-Fine textured broom finish.

3.11 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.12 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods for unformed surfaces.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods:
 - 1. Moisture-Retaining-Cover Curing: Cover concrete surfaces with Plastic Sheet cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches. Cure for not less than 24 hours.
 - a. Cure concrete surfaces to receive floor coverings with a Plastic Sheet cover for 24 hours or a curing compound that the manufacturer recommends for use with floor coverings.
 - 2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.13 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semi-rigid epoxy joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Fill joint in a manner that provides a finish at the joint which is flush with the surrounding surface of the slab.
- D. Joint filling is not required for 1/8-inch wide control joints.

3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that

penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

- 2. After concrete has cured at least 14 days, correct high areas by grinding.
- 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
- 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
- 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
- 6. Repair defective areas, except random cracks less than 0.01 inch wide and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- 7. Repair random cracks less than 0.01 inch wide and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar. All removal and repairs shall be at Contractor's own expense.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval. All removal and repairs shall be at Contractor's own expense.

3.15 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 30 cu. yd. or fraction thereof.
 - 2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
 - 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 - 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.

- 5. Compression Test Specimens:
 - a. ASTM C 31; cast and laboratory (standard) cure one set of three standard cylinder specimens for each composite sample. Transport the cylinders to laboratory within 24 hours for final curing and testing.
 - b. ASTM C 31; cast and field cure one standard cylinder specimens for each composite sample. Field cure the cylinders for the first five (5) days, minimum, in the filed under the same conditions as the cast concrete. Transport the cylinders to the laboratory for continued curing and testing.
- 6. Compressive-Strength Tests:
 - a. ASTM C 39; test one laboratory (standard) cured specimen at 7 days and 2 specimens at 28 days.
 - b. ASTM C 39; test field cured specimen at 7 days.
- C. When strength of field-cured cylinders is less than 85 percent of companion cylinders that have been totally cured in the laboratory (no field curing), Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
- D. A 28 day compressive-strength test for concrete shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.
- E. Strength of concrete will be satisfactory if every average of sets of three consecutive compressive-strength tests at 28 days (total of 6 cylinders) equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- F. If time of concrete strength gain is affected by materials in the mix, such as fly ash, provide correlation information between the 28-day compressive strength and the final compressive strength prior to performing compressive strength tests.
- G. Non-destructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- H. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. The Contractor will be notified of the tests and the tests will be paid for by the Contractor. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

END OF SECTION 033000

SECTION 03 35 43 - POLISHED CONCRETE FINISHING (ALTERNATE)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes polished concrete finishing, including staining and scoring.
- B. Related Requirements:
 - 1. Section 03 30 00 "Cast-In-Place Concrete" for installation of concrete.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of product requiring color selection.

1.3 QUALITY ASSURANCE

- A. Field Sample Panels: After approval of samples, produce field sample panels to demonstrate the approved range of selections made under Sample submittals. Produce a minimum of (3) three sets of full-scale panels, approximately 48 by 48 inches (1200 by 1200 mm) minimum, to demonstrate the expected range of finish, color, and appearance variations.
 - 1. Locate panels as indicated or, if not indicated, as directed by Architect.
 - 2. Maintain field sample panels during construction in an undisturbed condition as a standard for judging the completed Work.
 - 3. Demolish and remove field sample panels when directed.

PART 2 - PRODUCTS

- A. Penetrating Liquid Floor Treatments for Polished Concrete Finish: Clear, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and is suitable for polished concrete surfaces. Available manufacturers include:
 - 1. H&C® Decorative Concrete Products; a brand of Sherwin-Williams Co. 101 W. Prospect Ave. 578 GH Building, Cleveland OH, 44115. Tel: 1-800-867-8246.
 - 2. Advanced Floor Products
 - 3. ARDEX Americas
 - 4. AWRC Corporation
 - 5. Euclid Chemical Company (RPM)
 - 6. Laticrete International, Inc.
 - 7. MAPEI Corporation
 - 8. Moxie International
 - 9. NewLook International, Inc.
 - 10. Nox-Crete Products Group

Ruth Enlow Library of Garrett County Friendsville Branch Library Friendsville, Maryland

- 11. PROSOCO, Inc
- 12. QuestMark
- 13. Vexcon Chemicals Inc.
- B. [PC-1] POLISHED CONCRETE
 - 1. Polish Gritt:
 - a. Location: Lobby Floor.

PART 3 - EXECUTION

- 3.1 POLISHING
 - A. Polish:
 - 1. Mockup 1: Level 2: Low sheen, 400 grit.
 - 2. Mockup 2: Level 3: High sheen, 800 grit.
 - B. Apply polished concrete finish system to cured and prepared slabs.
 - 1. Machine grind floor surfaces to receive polished finishes level and smooth.
 - 2. Apply reactive stain for polished concrete in polishing sequence and according to manufacturer's written instructions.
 - 3. Apply penetrating liquid floor treatment for polished concrete in polishing sequence and according to manufacturer's written instructions, allowing recommended drying time between successive coats.
 - 4. Apply penetrating stain for polished concrete in polishing sequence and according to manufacturer's written instructions.
 - 5. Continue polishing with progressively finer-grit diamond polishing pads to gloss level, to match approved mockup.
 - 6. Control and dispose of waste products produced by grinding and polishing operations.
 - 7. Neutralize and clean polished floor surfaces.

3.2 STAINING

- A. Newly placed concrete shall be at least 14 days old before staining.
- B. Prepare surfaces according to manufacturer's written instructions and as follows:
 - 1. Clean concrete thoroughly by scraping, applying solvents or stripping agents, sweeping and pressure washing, or scrubbing with a rotary floor machine and detergents recommended by stain manufacturer. Rinse until water is clear and allow surface to dry.
 - a. Do not use acidic solutions to clean surfaces.
 - 2. Test surfaces with droplets of water. If water beads and does not penetrate surface, or penetrates only in some areas, profile surfaces by acid etching, grinding, sanding, or abrasive blasting. Retest and continue profiling surface until water droplets immediately darken and uniformly penetrate concrete surfaces.
 - 3. Apply acidic solution to dampened concrete surfaces, scrubbing with uncolored, acidresistant nylon-bristle brushes until bubbling stops and concrete surface has texture of 120-

grit sandpaper. Do not allow solution to dry on concrete surfaces. Rinse until water is clear. Control, collect, and legally dispose of runoff.

- 4. Neutralize concrete surfaces and rinse until water is clear. Test surface for residue with clean white cloth. Test surface according to ASTM F 710 to ensure pH is between 7 and 8.
- C. Scoring: Score decorative jointing in concrete surfaces 1/16 inch (1.6 mm) deep with diamond blades to match pattern indicated. Rinse until water is clear. Score before staining.
 - 1. Joint Width: ¹/₄ inch.
- D. Allow concrete surface to dry before applying stain. Verify readiness of concrete to receive stain according to ASTM D 4263 by tightly taping 18-by-18-inch (450-by-450-mm), 4-mil- (0.1-mm-) thick polyethylene sheet to a representative area of concrete surface. Apply stain only if no evidence of moisture has accumulated under sheet after 16 hours.
- E. Reactive Stain: Apply reactive stain to concrete surfaces according to manufacturer's written instructions and as follows:
 - 1. Apply stain by uncolored bristle brush, roller, or high-volume, low-pressure sprayer and immediately scrub into concrete surface with uncolored, acid-resistant nylon-bristle brushes in continuous, circular motion. Do not spread stain after fizzing stops. Allow to dry four hours and repeat application of stain in sufficient quantity to obtain color consistent with approved mockup.
 - 2. Remove stain residue after four hours by wet scrubbing with commercial-grade detergent recommended by stain manufacturer. Rinse until water is clear. Control, collect, and legally dispose of runoff.
- F. Penetrating Stain: Apply penetrating stain to concrete surfaces according to manufacturer's written instructions and as follows:
 - 1. Apply first coat of stain to dry, clean surfaces by airless sprayer or by high-volume, lowpressure sprayer.
 - 2. Allow to dry four hours and repeat application of stain in sufficient quantity to obtain color consistent with approved mockup.
 - 3. Rinse until water is clear. Control, collect, and legally dispose of runoff.

END OF SECTION 03 35 43

SECTION 06 17 53 - SHOP-FABRICATED WOOD TRUSSES

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. Wood roof trusses.
 - 2. Wood girder trusses.
 - 3. Metal truss accessories.
 - 4. Open-web wood trusses

1.3 ALLOWANCES

A. Provide wood truss bracing under the Metal-Plate-Connected Truss Bracing Allowance as specified in Section 01 21 00 "Allowances."

1.4 DEFINITIONS

A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plateconnected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

1.5 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details for trusses.
 - 1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
 - 2. Indicate sizes, stress grades, and species of lumber.
 - 3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
 - 4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
 - 5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
 - 6. Show splice details and bearing details.
- B. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Include design of all temporary and permanent bracing, utilizing steel rods and or steel angles at parallel chord trusses.

C. Samples for exposed wood trusses:

- 1. 12-long material of wood truss chord.
- 2. Metal connector rod & fasteners

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For metal connector-plate manufacturer and fabricator.
- B. Material Certificates: For dimension lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.
- C. Product Certificates: For metal-plate-connected wood trusses, signed by officer of trussfabricating firm.
- D. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preservative-treated lumber.
 - 2. Metal-plate connectors.
 - 3. Metal truss accessories.

1.7 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
 - 1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
 - 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program, complies with quality-control procedures in TPI 1, and involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.
- C. Testing Agency Qualifications: For testing agency providing classification marking for fireretardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
 - 1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
 - 2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
 - 3. Provide for air circulation around stacks and under coverings.
- B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design metal-plate-connected wood trusses and open-web wood trusses.
- B. Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.
 - 1. Design Loads: As indicated.
 - 2. Maximum Deflection under Design Loads:
 - a. Roof Trusses: Vertical deflection of 1/360 of span.
 - b. Floor Trusses: Vertical deflection of 1/480 of span.
- C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.
- D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

2.2 DIMENSION LUMBER

- A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
 - 3. Provide dressed lumber, S4S.
 - 4. Provide dry lumber with 15 percent maximum moisture content at time of dressing.
- B. Minimum Chord Size for Roof Trusses: 2 by 4 inches nominal for both top and bottom chords.
- C. Minimum Specific Gravity for Top Chords: 0.50.
- D. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 06 10 00 "Rough Carpentry."

2.3 METAL CONNECTOR PLATES

- A. Fabricate connector plates to comply with TPI 1.
- B. Hot-Dip Galvanized-Steel Sheet: ASTM A653/A653M; Structural Steel (SS), high-strength lowalloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.
 - 1. Use for interior locations unless otherwise indicated.

- C. Hot-Dip Heavy-Galvanized-Steel Sheet: ASTM A653/A653M; Structural Steel (SS), highstrength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.
 - 1. Use for wood-preservative-treated lumber and where indicated.
- D. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, and not less than 0.035 inch thick.
 - 1. Use for exterior locations and where indicated.

2.4 FASTENERS

- A. Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
 - 2. Where trusses are exposed to weather, in ground contact, made from pressurepreservative treated wood, or in area of high relative humidity, provide fasteners with hotdip zinc coating complying with ASTM A153/A153M.
- B. Nails, Brads, and Staples: ASTM F1667.

2.5 METAL FRAMING ANCHORS AND ACCESSORIES

- A. Allowable design loads, as published by manufacturer, shall comply with or exceed all basis-ofdesign products. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.
- B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 coating designation.
 - 1. Use for interior locations unless otherwise indicated.
- C. Hot-Dip Heavy-Galvanized-Steel Sheet: ASTM A653/A653M; Structural Steel (SS), highstrength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.
 - 1. Use for wood-preservative-treated lumber and where indicated.
- D. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304
 - 1. Use for exterior locations and where indicated.
- E. Truss Tie-Downs: Bent strap tie for fastening roof trusses to wall studs below, 1-1/2 inches wide by 0.050 inch thick.
- F. Truss Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening roof trusses to wall studs below, 2-1/4 inches wide by 0.062 inch thick. Tie fits over top of truss and fastens to both sides of truss, top plates, and one side of stud below.

- G. Truss Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening roof trusses to wall studs below, 2-1/2 inches wide by 0.062 inch thick. Tie fits over top of truss and fastens to both sides of truss, inside face of top plates, and both sides of stud below.
- H. Roof Truss Clips: Angle clips for bracing bottom chord of roof trusses at non-load-bearing walls, 1-1/4 inches wide by 0.050 inch thick. Clip is fastened to truss through slotted holes to allow for truss deflection.
- I. Floor Truss Hangers: U-shaped hangers, full depth of floor truss, with 1-3/4-inch-long seat; formed from metal strap 0.062 inch thick with tabs bent to extend over and be fastened to supporting member.
- J. Roof Truss Bracing/Spacers: U-shaped channels, 1-1/2 inches wide by 1 inch deep by 0.040 inch thick, made to fit between two adjacent trusses and accurately space them apart, and with tabs having metal teeth for fastening to trusses.
- K. Drag Strut Connectors: Angle clip with one leg extended for fastening to the side of girder truss.
 - 1. Angle clip is 3 by 3 by 0.179 by 8 inches with extended leg 8 inches long. Connector has galvanized finish.
 - 2. Angle clip is 3 by 3 by 0.239 by 10-1/2 inches with extended leg 10-1/2 inches long. Connector has painted finish.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 92 percent zinc dust by weight.

2.7 FABRICATION

- A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.
- B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
 - 1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

2.8 SOURCE QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections.
 - 1. Provide special inspector with access to fabricator's documentation of detailed fabrication and quality-control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards.

- 2. Provide special inspector with access to places where wood trusses are being fabricated to perform inspections.
- B. Correct deficiencies in Work that special inspections indicate do not comply with the Contract Documents.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
- F. Space trusses as indicated; adjust and align trusses in location before permanently fastening.
- G. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- H. Securely connect each truss ply required for forming built-up girder trusses.
 - 1. Anchor trusses to girder trusses as indicated.
- I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
 - 1. Install bracing to comply with Section 06 10 00 "Rough Carpentry."
 - 2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.
- J. Install wood trusses within installation tolerances in TPI 1.
- K. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- L. Replace wood trusses that are damaged or do not comply with requirements.
 - 1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

3.2 REPAIRS AND PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- C. Repair damaged galvanized coatings on exposed surfaces according to ASTM A780/A780M and manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections to verify that temporary installation restraint/bracing and the permanent individual truss member restraint/bracing are installed in accordance with the approved truss submittal package.

END OF SECTION 06 17 53

SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior wood fixed glazing assemblies constructed of solid wood trim.
 - 2. Veneered wood paneling.
 - 3. Plastic laminate casework.

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Paneling products
 - 2. High-pressure laminates.
 - 3. Adhesive for bonding plastic laminate solid-surfacing material.
 - 4. Cabinet hardware and accessories
 - 5. Anchors.
- B. Shop Drawings:
 - 1. Include the following:
 - a. Dimensioned plans, elevations, and sections.
 - b. Attachment details.
 - 2. Show large-scale details.
 - 3. Show locations and sizes of furring, blocking, and hanging strips, including blocking and fasteners
- C. Samples: For each exposed product and for each shop-applied color and finish specified.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork.
- B. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.

1.4 FIELD CONDITIONS

A. Environmental Limitations with Humidity Control: Do not deliver or install interior architectural woodwork until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
- B. Wood Species and Cut for Transparent Finish
 - 1. Manufacturer: Sieling & Jones Inc., New Freedom, PA (Basis-of-Design)
 - 2. [WV-1]: Maple-Birdsey Medium Curly #460, Rotary-cut, Clear, Swirly grain. Grade: Custom, Color: cream to yellow to tan
 - a. Source region: United States and Canada
 - 3. **[WV-2]:** Maple-Birdsey Medium Eye #450, Rotary-cut, Clear, Swirly grain. Grade: Custom, Color: cream to yellow to tan
 - a. Source region: Lake States, Appalachians, NW US/Canada
 - 4. Location: Circulation Desk/wall. Refer to drawings.
- C. Wood Products: Comply with the following:
 - 1. Hardboard: AHA A135.4.
 - 2. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.
 - 3. Particleboard: ANSI A208.1, Grade M-2.
 - 4. Softwood Plywood: DOC PS 1.
 - 5. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.
- D. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.

2.2 INTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

- A. Architectural Woodwork Standards Grade: Custom.
- B. Hardwood Lumber:
 - 1. Wood Species and Cut: Birch, Quarter cut/quarter sawn. Grade: Custom a. Stain: none
 - b. Transparent finish: matte
 - 2. Wood Moisture Content: 5 to 10 percent.

2.3 PLASTIC-LAMINATE CABINETS

- A. Grade: Custom.
- B. AWI Type of Cabinet Construction: Flush overlay.
- C. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
 - 1. Horizontal Surfaces Other Than Tops: Grade HGS.
 - 2. Vertical Surfaces: Grade HGS.
 - 3. Edges: Grade HGS.
- D. Materials for Semiexposed Surfaces (inside of cabinets):
 - 1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels in same color as exposed surface.
 - a. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, Grade VGS .
 - 2. Drawer Sides and Backs: Thermoset decorative panels.
 - 3. Drawer Bottoms: Thermoset decorative panels.
- E. Concealed Backs of Panels with Exposed Plastic Laminate Surfaces: High-pressure decorative laminate, Grade BKL, in same color as exposed surfaces.
- F. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. As indicated in Basis-of-Design P-LAM Schedule below.

2.4 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 170 degrees of opening, self-closing. Provide one of the following:
 - 1. Grass America; G393.
 - 2. Salice; Series 200.
 - 3. Blum; Clip Top Press-In 71T6580

C. Cabinet Pulls: Provide the following Bar Pull or equal:

- a. Manufacturer: Amerock
- b. Finish: Brushed Stainless Steel
- c. Size: 5" x 3/8"
- d. Number: AME 08279
- D. Catches: Roller catches, BHMA A156.9, B03071.
- E. Drawer Locks: BHMA A156.11, E07041.

- 1. Knape and Vogt: 986 lock.
- 2. Timberline Lock, Ltd.: CB-280.
- F. Grommets for Cable Passage through Countertops: 2 1/2-inch(51-mm) OD, Metal, grommets and matching brushed nickel caps with slot for wire passage.
 - 1. Product: Subject to compliance with requirements, provide "PS series" by Doug Mockett & Company, Inc.
- G. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
 - 1. Satin Stainless Steel: BHMA 630.
- H. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.5 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Nailers: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Provide self-drilling screws for metal-framing supports, as recommended by metal-framing manufacturer.
- C. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage.
 - 1. Provide metal expansion sleeves or expansion bolts for post-installed anchors.
 - 2. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- D. Installation Adhesive: Product recommended by fabricator for each substrate for secure anchorage. Do not use adhesives that contain urea formaldehyde.
- E. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Wood Glues: 30 g/L.
 - 2. Contact Adhesive: 250 g/L.
- F. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement .1. Adhesive for Bonding Edges: Hot-melt adhesive.
- G. Plastic Seam Filler: Plastic seam and repair filler in color to match plastic laminate.
 1. Product: Seamfil, Kampel Enterprises, Inc.
- H. Colored Caulk: Acrylic latex caulk in color to match plastic laminate.
 1. Product: Colorflex, Kampel Enterprises, Inc.

2.6 FABRICATION

- A. Fabricate interior architectural woodwork to dimensions, profiles, and details indicated.
 - 1. Ease edges to radius indicated for the following:
- a. Edges of Solid-Wood (Lumber) Members: 1/16 inch (1.5 mm) unless otherwise indicated.
- b. Edges of Rails and Similar Members More Than 3/4 Inch (19 mm) Thick: 1/8 inch (3 mm).
- B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site.
 - 1. Disassemble components only as necessary for shipment and installation.
 - 2. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.
- C. Fill joints or seams between plastic laminate sheets with plastic seam filler.
- D. Install glass to comply with applicable requirements in Division 08 Section "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

2.7 SHOP PRIMING

- A. Preparations for Finishing: Comply with the Architectural Woodwork Standards for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing interior architectural woodwork, as applicable to each unit of work.
- B. Interior Architectural Woodwork for Opaque Finish: Shop prime with one coat of wood primer as specified in Section 099123 "Interior Painting."
 - 1. Backpriming: Apply one coat of primer, compatible with finish coats, to concealed surfaces of woodwork.
- C. Interior Architectural Woodwork for Transparent Finish: Shop-seal concealed surfaces with required pretreatments and first coat of finish as specified in Section 099300 "Staining and Transparent Finishing."
 - 1. Backpriming: Apply one coat of sealer, compatible with finish coats, to concealed surfaces of woodwork.

2.8 SHOP FINISHING

- A. Finish interior architectural woodwork with transparent finish at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.
- B. Preparation for Finishing: Comply with Architectural Woodwork Standards, Section 5 for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing interior architectural woodwork, as applicable to each unit of work.
 - 1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of interior architectural woodwork. Apply two coats to end-grain surfaces.
- C. Staining: Factory-formulated stain applied at spreading rate recommended by manufacturer.
 - 1. Sherwin-Williams; Wood Classics 250 VOC Satin, Basis of Design.
 - 2. Match approved sample for color.
- C. D. Transparent Finish:
 - 3. Architectural Woodwork Standards Grade: Premium.
 - 4. AWI Finish System 5: Varnish, Conversion.

- 5. Wash Coat for Closed-Grain Woods: Apply wash-coat sealer to woodwork made from closed-grain wood before staining and finishing.
- 6. Staining: Match approved sample for color.
- 7. Open Finish for Open-Grain Woods: Do not apply filler to open-grain woods.
- 8. Filled Finish for Open-Grain Woods: After staining, apply wash-coat sealer and allow to dry. Apply paste wood filler and wipe off excess. Tint filler to match stained wood.
- 9. Sheen: Satin, 31-45 gloss units measured on 60-degree gloss meter in accordance with ASTM D523.
- 2.9 P-LAM SCHEDULE (BASIS-OF-DESIGN)
 - A. PLAM-1
 - 1. Manufacturer: Wilsonart
 - 2. Number: 7909-80
 - 3. Color: Fusion Maple
 - 4. Finish: Matte
 - 5. Installation : Circulation Desk Casework
 - 6. Location : Circulation
 - B. PLAM-2
 - 1. Manufacturer: Wilsonart
 - 2. Number: 4885-38
 - 3. Color: Green Soapstone
 - 4. Finish: Fine Velvet Finish
 - 5. Installation: Circulation Desk Accent
 - 6. Location : Typical Casework: Circulation, Meeting Room, Staff Room
 - C. PLAM-3
 - 1. Manufacturer: Wilsonart
 - 2. Number: 1595-80
 - 3. Color: Black
 - 4. Finish: Matte Finish
 - 5. Installation: Circulation Desk Toe kick
 - 6. Location : Circulation
 - D. PLAM-4
 - 1. Manufacturer: Wilsonart
 - 2. Number: 4783-60
 - 3. Color: White Tigris
 - 4. Finish: Matte
 - 5. Installation: Sink Base
 - 6. Location: Restrooms

E. PLAM-5: TBD-

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition interior architectural woodwork to humidity conditions in installation areas for not less than 72 hours prior to beginning of installation.

B. Before installing interior architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming of concealed surfaces.

3.2 INSTALLATION

- A. Grade: Install interior architectural woodwork to comply with same grade as item to be installed.
- B. Assemble interior architectural woodwork and complete fabrication at Project site to the extent that it was not completed during shop fabrication.
- C. Install interior architectural woodwork level, plumb, true in line, and without distortion.
 - 1. Shim as required with concealed shims.
 - 2. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).
- D. Scribe and cut interior architectural woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Preservative-Treated Wood: Where cut or drilled in field, treat cut ends and drilled holes in accordance with AWPA M4.
- F. Fire-Retardant-Treated Wood: Install fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions, including those for adhesives used to install woodwork.
- G. Anchor interior architectural woodwork to anchors or blocking built in or directly attached to substrates.
 - 1. Secure with countersunk, concealed fasteners and blind nailing.
 - 2. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with interior architectural woodwork.
 - 3. For shop-finished items, use filler matching finish of items being installed.
- H. Standing and Running Trim:
 - 1. Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible.
 - 2. Do not use pieces less than [36 inches (900 mm)] [60 inches (1500 mm)] [96 inches (2400 mm)] long, except where shorter single-length pieces are necessary.
 - 3. Scarf running joints and stagger in adjacent and related members.
 - 4. Fill gaps, if any, between top of base and wall with plastic wood filler; sand smooth; and finish same as wood base if finished.
 - 5. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches (3 mm in 2400 mm).

END OF SECTION 06 40 23

SECTION 07 61 00 - SHEET METAL ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes custom-fabricated, standing-seam sheet metal roofing and underlayment.
- B. Related Requirements:
 - 1. Section 07 21 00 "Thermal Insulation" for roof insulation
 - 2. Section 07 62 00 "Sheet Metal Flashing and Trim" for gutters, downspouts, fasciae, and flashings.
 - 3. Section 07 72 53 "Snow Guards" for prefabricated devices designed to hold snow on the roof surface, allowing it to melt and drain off slowly.
 - 4. Section 07 92 00 "Joint Sealants" for field-applied sealants adjoining sheet metal roofing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For sheet metal roofing.
 - 1. Show installation layouts, expansion joint locations, fixed points, and keyed details. Distinguish between shop- and field-assembled work.
 - 2. Include pattern of seams and details of termination points, expansion joints, direction of expansion, roof penetrations, edge conditions, special conditions, and connections to adjoining work.
- C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranties.
- 1.4 CLOSEOUT SUBMITTALS
 - A. Maintenance data.

1.5 WARRANTY

- A. Special Warranty: Warranty in which Installer agrees to repair or replace components of sheet metal roofing that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.

- B. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal roofing that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 1. Finish Warranty Period: 20 years from date of Substantial Completion.
- C. Special Watertightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain watertight, including leaks, within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.
 - 2. Shop drawings must be provided to, reviewed, and approved by panel manufacturer prior to panel system installation.
 - 3. Inspections by panel system manufacturer technical representative are required. Perform first inspection when underlayment and flashing are in place and second inspection when the roof is complete.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Sheet metal roofing system including, but not limited to, metal roof panels, cleats, anchors and fasteners, sheet metal flashing integral with sheet metal roofing, fascia panels, trim, underlayment, and accessories, shall comply with requirements without failure due to defective manufacture, fabrication, or installation, or due to other defects in construction. Sheet metal roofing shall remain watertight.
- B. Sheet Metal Roofing Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or indicated on Drawings.
- C. Class A, B or C assembly in accordance with ASTM E108 or UL 790 per IBC 2603.4.1.5 and IBC 2603.6
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 ROOFING SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
 - 1. 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:
 - a. Englert, Inc. series A1301, mechanically seamed panel (Basis-of-Design)
 - b. PAC-CLAD; Petersen Aluminum Corporation; a Carlisle company.
 - c. Berridge Manufacturing Company Cee-Lock Panel

- B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface (no ribs).
 - 1. Thickness: 0.040 inch unless otherwise indicated.
 - 2. Panel seam height: 1 inch, 180 degree seam
 - 3. Panel width: **116** inches
 - 4. Factory Prime Coating: Where painting after installation is required, pretreat metal with white or light-colored, factory-applied, baked-on epoxy primer coat; minimum dry film thickness of 0.2 mil.
 - 5. Exposed Coil-Coated Finish:
 - a. Three-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 6. Color: As selected by Architect from manufacturer's full range (excluding metallic finishes).

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: <u>Minimum 30 mils thick</u>, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Carlisle Residential, a division of Carlisle Construction Materials; WIP 300HT.
 - b. Grace Construction Products, a unit of W. R. Grace & Co.-Conn.; Grace Ice and Water Shield HT.
 - c. Henry Company; Blueskin PE200 HT.
 - d. Kirsch Building Products, LLC; Sharkskin Ultra SA.
 - e. Polyguard Products, Inc.; Deck Guard HT.
 - f. Protecto Wrap Company; Protecto Jiffy Seal Ice & Water Guard HT.
 - g. SDP Advanced Polymer Products Inc; Palisade SA-HT.
 - h. Englert Inc; Metalman HT.
 - 2. Thickness: 40 mil minimum.
 - 3. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F or higher.
 - Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F or lower.
 - 5. High-Temperature Rating: 240° F.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete roofing system and as recommended by primary sheet metal manufacturer unless otherwise indicated.

- B. Fasteners: Wood screws, annular-threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
 - 1. General:
 - a. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed; with hex-washer head.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - 2. Concealed fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape 1/2 inch wide and 1/8 inch thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane, polysulfide, or silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal roofing and remain watertight, as recommended by manufacturer.
- E. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

2.5 ACCESSORIES

- A. Sheet Metal Accessories: Provide components required for complete sheet metal roofing assembly including trim, copings, fasciae, corner units, clips, flashings, sealants, gaskets, fillers, metal closures, closure strips, and similar items. Match material and finish of sheet metal roofing unless otherwise indicated.
 - 1. Cleats: Intermittent and continuous attachment devices for mechanically seaming into joints and formed from the following materials and thicknesses unless otherwise indicated:
 - a. Aluminum Roofing: as recommended by manufacturer.
 - 2. Expansion-Type Cleats: Cleats of a design that allows longitudinal movement of roof panels without stressing panel seams; of same material as other cleats.
 - 3. Backing Plates: Plates at roofing splices, fabricated from material recommended by SMACNA.
 - 4. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible-closure strips; cut or pre-molded to match sheet metal roofing profile. Provide closure strips where necessary to ensure weathertight construction.
 - 5. Flashing and Trim: Formed from same material and with same finish as sheet metal roofing, minimum 0.018 inch thick.

2.6 FABRICATION

- A. General: Custom fabricate sheet metal roofing to comply with details shown and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions (panel width and seam height), geometry, metal thickness, and other characteristics of installation. Fabricate sheet metal roofing and accessories in shop to greatest extent possible.
 - 1. Standing-Seam Roofing: Form standing-seam panels with finished seam height of 1 inch.

- B. Form exposed sheet metal work to fit substrates with little oil canning; free of buckling and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 1. Form and fabricate sheets, seams, strips, cleats, valleys, ridges, edge treatments, integral flashings, and other components of metal roofing to profiles, patterns, and drainage arrangements indicated on Drawings and as required for leakproof construction.
- C. Sheet Metal Accessories: Custom fabricate flashings and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item required. Obtain field measurements for accurate fit before shop fabrication.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that tops of fasteners are flush with surface.

3.2 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply at locations indicated on Drawings in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

- A. General: Install sheet metal roofing to comply with details shown and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to installation characteristics required unless otherwise indicated on Drawings. Install fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required for complete roofing system and as recommended by fabricator for sheet metal roofing.
 - 1. Install sheet metal roofing true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 - 2. Anchor sheet metal roofing and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 3. Field cutting of sheet metal roofing by torch is not permitted.
 - 4. Flash and seal sheet metal roofing with closure strips at eaves, rakes, and perimeter of all openings. Fasten with self-tapping screws.
 - 5. Locate and space fastenings in uniform vertical and horizontal alignment. Predrill panels for fasteners.
 - 6. Locate roofing splices over, but not attached to, structural supports. Stagger roofing splices and end laps to avoid four-panel lap splice condition. Install backing plates at roofing splices.
 - 7. Lap metal flashing over sheet metal roofing to direct moisture to run over and off roofing.

- B. Thermal Movement: Rigidly fasten metal roof panels to structure at only one location for each panel. Allow remainder of panel to move freely for thermal expansion and contraction.
 - 1. Avoid attaching accessories through roof panels in manner that inhibits thermal movement.
- C. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- D. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressuretreated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating, by applying self-adhering sheet underlayment to each contact surface, or by other permanent separation as recommended by sheet metal manufacturer or SMACNA.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

3.4 CUSTOM-FABRICATED SHEET METAL ROOFING INSTALLATION

- A. Fabricate and install work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves, and avoidable tool marks, considering metal temper and reflectivity. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant. Fold back sheet metal to form hem on concealed side of exposed edges unless otherwise indicated.
 - 1. Install cleats to hold sheet metal panels in position. Attach each cleat with at least two fasteners to prevent rotation.
 - 2. Space cleats not more than 12 inches o.c. Bend tabs over fastener head.
 - 3. Provide expansion-type cleats for roof panels that exceed 30 feet in length.
- B. Seal joints as required for watertight construction. For roofing with 3:12 slopes or less, use cleats at transverse seams. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.5 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting; and provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components required for complete sheet metal roofing assembly including trim, copings, seam covers, flashings, sealants, gaskets, fillers, metal closures, closure strips, and similar items.
- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and install units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

3.6 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal roofing is installed unless otherwise indicated in manufacturer's written installation instructions.

END OF SECTION 07 61 00

SECTION 09 65 19 - RESILIENT FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:1. Luxury Vinyl Tile (LVT).
- B. Related Sections include the following:1. Division 9 Section Resilient Wall Base and Accessories

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Maintenance Data: For resilient products to include in maintenance manuals.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide products identical to those tested for fire-exposure behavior per test method indicated by a testing and inspecting agency acceptable to authorities having jurisdiction.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store tiles on flat surfaces.

1.5 PROJECT CONDITIONS

- A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time periods:
- B. After postinstallation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg for more than 95 deg F.
- C. Close spaces to traffic during floor covering installation.
- D. Close spaces to traffic for 48 hours after floor covering installation.
- E. Install resilient products after other finishing operations, including painting, have been completed.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

PART 2 - PRODUCTS

- 2.1 LUXURY VINYL TILE: [LVT-1]
 - A. Manufacturer: Patcraft (Basis of Design)
 - 1. Type: Luxury Vinyl Tile (LVT)
 - 2. Collection: Graph 1713V
 - 3. Color: 00180-V2 Fawn Ash-V2 00530
 - 4. Size: 24" x 24"
 - 5. Total Thickness: 2.5mm
 - 6. Warranty: 15 years
 - 7. Installation: 1/3 Offset

2.2 MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic cement based formulation provided or approved by resilient product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
- C. Follow manufacturer's recommendations for approved products and installation methods to validate warranties.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.

- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - 3. Moisture Testing:
 - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
- C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.
- E. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
 - 1. Do not install resilient floor tile until product is same temperature as space where it is to be installed.
- F. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 TILE INSTALLATION

- A. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles square with room axis.
- B. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles with uniform grain direction.
- C. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.
- D. Extend tiles into toe spaces, door reveals, closets, and similar openings.
- E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

- F. Install tiles on covers for telephone and electrical ducts and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of tile installed on covers. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- G. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
 - a. Do not wash surfaces until after time period recommended by manufacturer.
- B. Protect resilient floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.
 - 1. Apply protective floor polish to surfaces that are free from soil, visible adhesive, and blemishes, if recommended in writing by manufacturer or required by owner.
 - 2. Cover products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.
 - 3. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION 09 65 19

SECTION 12 36 61 - COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Quartz agglomerate countertops.
 - 2. Solid surface material countertops.
 - 3. Countertop supports
- B. Related Requirements:
 - 1. Division 06 Section "Architectural Wood Casework" for custom architectural cabinets, cases, and fixtures.

1.2 ACTION SUBMITTALS

- A. Product Data: For countertop materials.
- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, method of attachment to other work, and cutouts for plumbing fixtures, grommets, etc.
 - 1. Show locations and details of joints and edge condition.
 - 2. Show direction of directional pattern, if any.
 - 3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - 4. Show locations and sizes of cutouts and holes for plumbing fixtures faucets soap dispensers and other items installed in architectural woodwork.
- C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator and Installer.
- B. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful inservice performance.
- B. Installer Qualifications: Fabricator of countertops.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.
- B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
- C. Keep finished surfaces of countertops covered with protective covering during handling and installation.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.8 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

1.9 WARRANTY

A. Provide manufacturer's standard (10) year Limited Warranty against material defects when fabricated and installed by a certified fabricator.

PART 2 - PRODUCTS

2.1 QUARTZ AGGLOMERATE COUNTERTOP MATERIALS

- A. Quartz Agglomerate: Solid sheets consisting of quartz aggregates bound together with a matrix of filled plastic resin and complying with ICPA SS-1, except for composition.
 - 1. Basis-of-Design Products: Subject to compliance with requirements, provide products listed below or comparable products by another manufacturer:
 - 2. [SSM-1]
 - a. Manufacturer: Corian Quartz
 - b. Color: Antique Pearl
 - c. Installation: Countertop
 - d. Location: Circulation Desk

- 3. [SSM-3]
 - a. Manufacturer: Corian Quartz
 - b. Color: Valente Pearl
 - c. Installation: Countertop & Back/Sidesplash
 - d. Location: Restrooms

2.2 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Continuously cast, non-porous, homogeneous solid sheets composed of acrylic polymer, aluminum trihydrate filler, and pigments that yield through-body color; not coated, laminated or of composite construction.
 - 1. Basis-of-Design Products: Subject to compliance with requirements, provide products listed below or comparable products by another manufacturer:
 - 2. [SSM-2]
 - a. Manufacturer: US Surface Warehouse: LivingStone Corian
 - b. Color: L717 Terra Nova Nova Serene Sage
 - c. Finish: Satin
 - d. Thicknesses: Not less than 1/2" for countertop and 3/4" for backsplash
 - e. Installation: Countertop & Back/Sidesplash
 - f. Location: Meeting Room countertop, Staff Room countertop, window sills
 - 3. [SSM-4]
 - a. Manufacturer: Corian
 - b. Color: Concrete
 - c. Finish: Satin
 - d. Thickness: 1/2"
 - e. Installation: Countertop
 - f. Location: Childrens Area

2.3 ACCESSORIES

- A. Wire-Management Grommets: Refer to Division 06 Section "Architectural Wood Casework".
 - 1. Locations:
 - a. Circulation Desk: (1) per chair (as shown on Furniture Plans) plus (1) additional at each desk end.
- B. Concealed Countertop Brackets: Heavy duty welded steel L-brackets.
 - 1. Basis-of-Design: "Concealed (2.0)" by A&M Hardware, Inc.
 - 2. Length: 3" less than countertop depth
 - 3. Color: Black powder coat.
 - 4. Installation: 32" o.c. or less if recommended by manufacturer
 - a. Include wood blocking at studs as required.

2.4 INSTALLATION MATERIALS

A. Adhesive: Product recommended by manufacturer.

B. Sealant for Countertops: Comply with applicable requirements in Division 07 Section "Joint Sealants."

2.5 COUNTERTOP FABRICATION

- A. Fabricate countertops according to manufacturer's written instructions and the AWI/AWMAC/WI's "Architectural Woodwork Standards."
 - 1. Grade: Custom, unless noted otherwise above.
- B. Configuration:
 - 1. Front: Straight, slightly eased at top, unless noted otherwise above.
 - 2. Backsplash: Straight, slightly eased at corner.
 - 3. End Splash: Matching backsplash.
- C. Countertops:
 - 1. Quartz Agglomerate: 30 mm-thick, with front edge built up with same material to the thickness indicated on Drawings.
 - 2. Solid Surfacing: 1/2-inch (12 mm)-thick, with front edge built up with same material to the thickness indicated on Drawings.
- D. Backsplashes and Sidesplashes:
 - 1. Quartz Agglomerate: 20 mm-thick
 - 2. Solid Surfacing: 3/4-inch (19 mm)-thick.
- E. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
 - 1. Fabricate with loose backsplashes for field assembly.
- F. Joints: Fabricate countertops without joints, unless length of countertop exceeds standard product dimensions.
 - 1. Joint Locations: Not within 18 inches of a sink and not where a countertop section less than 36 inches long would result.
- G. Cutouts and Holes:
 - 1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
 - a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.
 - 2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
 - 3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to receive countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of countertops.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install countertops level to a tolerance of 1/8 inch maximum. Do not exceed 1/64-inch (0.4-mm) difference between planes of adjacent units.
- B. Secure countertops to subtops with adhesive according to manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- C. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
 - 1. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
- D. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- E. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- F. Apply sealant to gaps at walls; comply with Division 07 Section "Joint Sealants."

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where not possible to repair, replace countertops. Adjust joinery for uniform appearance.
- B. Clean countertops on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.
- C. Protection: Provide Kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

END OF SECTION 12 36 61

ABBREVIATIONS

REFRIDGERATOR

REQUIRED

RIGHT HAND ROOM

SQUARE FEET

SLAB ON GRADE SEALANT SPECIFICATION STANDARD

STAINLESS STEEL

TONGUE & GROOVE

SHEET SIMILAR

STEEL

STORAGE

STRUCTURE SQUARE SUSPENDED

TEMPORARY THICK TOP OF SLAB TOP OF JOIST TOILET TYPICAL

UNLESS NOTED OTHERWISE

VERIFY IN FIELD

VERIFY IN FIELD WITH

VERTICAL

ARCHITECT

WITH WIDTH WALL BOARD WATER CLOSET

WOOD WITHOUT

VINYL COMPOSITION TILE

STRUCTURAL GLAZED TILE

ACT A/C ADJ AFF A B F	ACOUSTICAL CEILING TILE AIR CONDITIONING ADJUSTABLE ABOVE FINISHED FLOOR ABOVE BENCHMARK	REF. REQ'D R.H. RM
A.H.U. ALUM APPROX ARCH @	ELEVATION AIR HANDLING UNIT ALUMINUM APPROXIMATE ARCHITECTURAL AT	SF S.G.T. SHT. SIM. S.O.G. SNT. SPEC.
B.C. BD. BITUM. BLDG. BLK. BLKD. BLKG.	BASE CABINET BOARD BITUMINOUS BUILDING BLOCK BULKHEAD BLOCKING	STD. STL. S.S. STOR. STRUCT. SQ. SUSP.
C C.B. CLG. CMU COL CONC. CONT. C.J. CPT. C.T.	CENTER LINE CHALK BOARD CLOSET CEILING CONCRETE MASONRY UNIT COLUMN CONCRETE CONTINUOUS CONTROL JOINT CARPET CERAMIC TILE	T & G TEMP TH. T.O.S. T.O.J. TLT. TYP. U.N.O.
D. DEMO D.F. DIM. DN. DTL DIA DS DWG.	DEEP DEMOLITION DRINKING FOUNTAIN DIMENSION DOWN DETAIL DIAMETER DOWN SPOUT DRAWING	V.C.T. VERT. V.I.F. V.I.F.W.A. W/ W. W.B. W.B. W.C. WD.
E.J. EL. ELEC. ELEV. ETC E.T.R. EQUIP. EXIST. EXT	EXPANSION JOINT ELEVATOR ELECTRICAL ELEVATION ETCETERA EXISTING TO REMAIN EQUIPMENT EXISTING EXTERIOR	W/O
F.E.C. F.D. F.F.E. FIN FL. OR FLR. FOM FT F.V.W.A.	FIRE EXTINGUISHER CABINET FLOOR DRAIN FINISH FLOOR ELEVATION FINISH FLOOR FACE OF MASONRY FOOT, FEET FIELD VERIFY WITH ARCHITECT	
GA GALV GYP. BD. GSF GWB GT	GAUGE GALVINIZED GYSUM BOARD GROSS SQUARE FEET GYSUM WALL BOARD GLAZING TYPE	
h or ht hc h.m. horiz. hr hvac	HEIGHT HANDICAPPED HOLLOW METAL HORIZONTAL HOUR HEATING/VENTILATION, AIR CONDITIONING	
IN INSUL. INT.	INCH INSULATION INTERIOR	
JAN. JT	JANITOR JOINT	
L LAV. L.H.	LENGTH LAVATORY LEFT HAND	
MACH. MAT'L MAX. M.E. MECH. MEP MIN. MISC. M.O. MTD	MACHINE MATERIAL MAXIMUM MATCH EXISTING MECHANICAL MECHANICAL/ELECTRICAL/ PLUMBING MINIMUM MISCELLANEOUS MASONRY OPENING MOUNTED	
NO. OR # NOM. N.I.C. NSF N.T.S.	NUMBER NOMINAL NOT IN CONTRACT NET SQUARE FEET NOT TO SCALE	
O.C. OPNG.	ON CENTER OPENING	
P-LAM PLYWD P.T. PTD.	PLASTIC LAMINATE PLYWOOD PORCELAIN TILE PAINTED	

CIVIL ENGINEER BENNETT, BREWER & ASSOCIATES 223 E MAIN STREET, STE. 200 FROSTBURG, MARYLAND 21532

TEL. 301.687.0494

VICINITY MAP



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TEL. 717.290.7400

MEP ENGINEER RMF ENGINEERING, INC. 75 ACCO DRIVE, SUITE A-10 YORK, PA 17402

TEL. 717.814.5498

LOCATION MAP



	SHEET LIST		SHEET LIST				Ш
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C-111	GENERAL NOTES & LEGENDS	A-630	PARTITION TYPES		Z		
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C-122	PRE-CONSTRUCTION LAND USE	A-800	FF&E PLAN	_	\sim		LL
C-123	POST-CONSTRUCTION LAND USE	A-010	CIRCULATION DESK FLAN & DETAILS	_	E E		
C-125	POST-CONSTRUCTION DRAINAGE PLAN	STRUC	TURAL				Ь, Ч
C-211	SITE PLAN	S-101	STRUCTURAL NOTES		111		Шì
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C-221	WALL PROFILES & DETAILS	S-202	ROOF FRAMING PLAN			5	Ь, К
C-301	EROSION & SEDIMENT CONTROL PLAN	S-301	FOUNDATION SECTIONS		Ţ	U	
C-321	EROSION & SEDIMENT CONTROL DETAILS &	S-401	FRAMING SECTIONS		>		
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C-324	DETAILS & NOTES	M-001	MECHANICAL LEGEND AND ABBREVIATIONS		SIE	T	
C-325	VEGETATED BMP INSTALLATION & MAINTENANCE NOTES	M-501				F	ູ່ ເ
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L-10		P-001	PLUMBING LEGEND AND ABBREVIATIONS				
L-1.0		P-101	FLOOR PLAN - SANITARY AND VENT				
ARCHIT	ECTURAL	P-201	FLOOR PLAN - DOMESTIC WATER				
A-100	OVERALL ELOOR PLAN	P-501	PLUMBING DETAILS			S	7401 9 fax
A-102 FLOOR PLAN		P-502	PLUMBING DETAILS				a 17 244
A-103 ROOF PLAN		P-601	PLUMBING SCHEDULES			-	vanii 843-
A-120 REFLECTED CEILING PLAN		P-701	PLUMBING RISERS				nsyl 717-4
A-122	ENLARGED RCP & SECTIONS - VESTIBULE						Pen 3
A-200	ELEVATIONS	ELECTI	RICAL				ork, /oice
A-300	BUILDING SECTIONS	E-001	ELECTRICAL LEGEND AND ABBREVIATIONS				et, Y 27 \
A-302	WALL SECTIONS	E-101	FLOOR PLAN - POWER			U V	Stre 8-86
A-310	WALL SECTIONS	E-201	FLOOR PLAN - LIGHTING		2		rket 7-84
A-401	INTERIOR ELEVATIONS	E-301	FLOOR PLAN - FIRE ALARM (ALTERNATE)				t Ma 71
A-402	INTERIOR ELEVATIONS	{ E-401	ELECTRICAL DETAILS	<u></u> _∕A2∖	77 /		Nes
A-410	TOILET ROOMS PLANS & ELEVS	E-601	ELECTRICAL SCHEDOLES & SINGLE HINE				226 \
A-440	CASEWORK DETAILS	ES-101	ELECTRICAL SITE PLAN				()
A-442	CHILDREN'S ROOM DETAILS				o Th		
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> — DRAWING # DETAIL - SHEET #

> > NEW SUSP. A.C.T. CEILING & GRID

ELEVATION

ELEVATIONS

EXISTING DOOR (TO BE REMOVED)

EXISTING DOOR

NEW DOOR



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 \rightarrow

ROUGH WOOD

PLYWOOD

FINISHED WOOD

WINDOW TYPE (SEE WINDOW SCHEDULE) DOOR NUMBER (SEE DOOR SCHEDULE)

PARTITION TYPE

Σ - 0 ω 4 ά

PROJECT NO:

CHECKED BY:

DRAWN BY:

hereby certify that these documents were prepared approved by me and that I am a duly licensed Professional Architect under the laws of the State

_icence No. 6607 Exp. date 06/13/25

COVER SHEET

SHEET

CS-1

23130

MJP

RAM

RIGID INSULATION

BATT INSULATION

BRICK

EXISTING WALLS (TO BE REMOVED)

NEW PARTITION



	FRIENDSVILLE RRANCH		RUTH ENLOW LIBRARY	315 CHESTNUT STRFFT FRIENDSVILLE	MD 21531
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OCCUPANCY



ASSEMBLY CONCENTRATED (CHAIRS ONLY - NOT FIXED)

LIBRARY STACK AREAS

MECHANICAL EQUIPMENT ROOM

LIBRARY READING ROOMS





























SHEET

A-200



PANEL A	PANEL C — REVERSE	PANEL B	PANEL D	
$\rightarrow \downarrow \sim \sim$	\times		\times	



















MARK	Quantity	DE
M-1	1	MIRROR
M-2	1	MIRROR
CS-1	2	DIAPER CHAI
GB-18	2	18" GRAB BA
GB-36	2	36" GRAB BA
GB-42	2	42" GRAB BAI
PTD-1	2	PAPER TOWE
SD-1	2	SOAP DISPEN
SM-1	1	UTILITY SHEL HOLDERS & H
TT-1	2	MULTI-ROLL



















					ROOM	/ FINISH S	SCHEDULE	Ξ
		FLOOR	BASE		W	ALLS		
ROOM				NORTH	EAST	SOUTH	WEST	-
NUMBER	ROOM NAME	FINISH	FINISH	FINISH	FINISH	FINISH	FINISH	_
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100	LOBBY	CT-1	RB-1	-	PT-2	PT-2	PT-2	
101	STUDY	CPT-1	RB-1	PT-2	PT-2	PT-2	PT-2	
102	STAFF	LVT-1	RB-1	PT-2	PT-2	PT-2	PT-2	
103	OFFICE	CPT-2	RB-1	PT-2	PT-2	PT-2	PT-2	
104	MECH.	CONCRETE	RB-1	PT-2	PT-2	PT-2	PT-2	OPAQUE CONC. SEALER
105	ELEC./IT	CONCRETE	RB-1	PT-2	PT-2	PT-2	PT-2	ORAQUE CONC. SEALEI
106	COLLECTIONS	CPT-1/CPT-2	RB-1 A2	PT-2	PT-2	PT-2 A2	PT-2	WV-2 IN PORTIONS OF N RECEIVE NATURAL FINI
106A	CIRC. DESK	CP1-2	RB-1	[PI-3/WY-2]	PT-3		PI-3	WV-2 IN PORTIONS OF N
107	CHILDREN'S AREA	CPT-1	RB-1	PT-4	PT-4	PT-4	PT-4	
108	WC	CT-2		CT-3A,B,C,D	CT-3A,B,C,D	CT-3A,B,C,D	CT-2	
109	WC	CT-2		CT-3A,B,C,D	CT-3A,B,C,D	CT-2	CT-3A,B,C,D	
110	CORR.	CT-1	RB-1	PT-2	PT-2	PT-2	PT-2	
111	MEETING ROOM	CPT-3	RB-1	PT-6	PT-6	PT-5	PT-6	WOOD OF EXPOSED TR
112	FURN.STOR.	CPT-3	RB-1	PT-6	PT-6	PT-6	PT-6	poppon
113	UTILITY/JAN.	CONCRETE	RB-1	PT-2	PT-2	PT-2	PT-2	OPAQUE CONC. SEALER
114	VESTIBULE	CPT-4	RB-1	PT-2	PT-2	PT-2	PT-2	
115	STOR.	LVT-1	RB-1	PT-2	PT-2	PT-2	PT-2	



1) FIRST FLOOR FINISH PLAN - DD 1/8" = 1'-0"

REMARKS	
R ON FLOOR	
	~
NORTH WALL, SEE ELEVATION. WOOD OF EXPOSED TRUSSES TO SH W/ CLEARCOAT, EXPOSED GLULAM COLUMNIS TO BE STAINED AND \	
STIW/ GELARGOAT. EXI GOED GEGEAW GOEDWING TO BE GTAINED AND)
NORTH WALL, SEE ELEVATION.)
EAST WALL, SEE ELEVATION. INSIDE OF BOOTH PAINTED PT-5)
USSES TO RECEIVE NATURAL FINISH W/ CLEARCOAT.) A2	

ER ON FLOOR

FINISH TAG KEY

- WV- WOOD VENEER PANELING
 CT- TILE
 RB- RUBBER BASE
 LVT- LUXURY VINYL TILE
 CPT- CARPET TILE
 PT- WALL PAINT

ROOM FLOOR FINISH LEGEND



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Licence No. 6607 Exp. date 06/13/25 PROJECT NO: 23130 DRAWN BY: AEJ CHECKED BY: RAM ROOM FINISH SCHEDULE & PLAN SHEET A-600















2' - 7"

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W12 B

6 -

15





4' - 5 1/8"

6' - 2"

114)

W12B









4' - 5 1/8"



W13







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2 SILL DETAIL @ LOBBY 1 1/2" = 1'-0"





6 TYP. PLAN DETAIL @ CORNER MULLION 3" = 1'-0"

NOTE: SEE A-102 & 19/A-620 FOR STOREFRONT ANGLE DEGREES




| SIGNAGE SCHEDULE |          |              |  |  |  |  |
|------------------|----------|--------------|--|--|--|--|
| ROOM NAME        | ROOM NO. | SIGN TYPE(S) |  |  |  |  |
|                  |          |              |  |  |  |  |
| LOBBY            | 100      | 2, 3         |  |  |  |  |
| STUDY            | 101      | 2            |  |  |  |  |
| STAFF            | 102      | 2            |  |  |  |  |
| OFFICE           | 103      | 1            |  |  |  |  |
| MECH.            | 104      | 2            |  |  |  |  |
| ELEC./IT         | 105      | 2            |  |  |  |  |
| COLLECTIONS      | 106      | 2, 3, 5      |  |  |  |  |
| CIRC. DESK       | 106A     |              |  |  |  |  |
| CHILDREN'S AREA  | 107      | 2            |  |  |  |  |
| WC               | 108      | 4            |  |  |  |  |
| WC               | 109      | 4            |  |  |  |  |
| CORR.            | 110      |              |  |  |  |  |
| MEETING ROOM     | 111      | 2, 3, 5      |  |  |  |  |
| FURN.STOR.       | 112      | 2            |  |  |  |  |
| UTILITY/JAN.     | 113      | 2            |  |  |  |  |
| VESTIBULE        | 114      | 3            |  |  |  |  |
| STOR.            | 115      | 2            |  |  |  |  |



3 DOOR SIGN MOUNTING HEIGHTS 1/2" = 1'-0"











Щ BAKER, INGRAM, & ASSOCIATES STRUCTURAL ENGINEERS 1547 Oregon Pike Lancaster, PA 17601 Lancaster, Pennsylvania 717.290.7400 Ph Dover, Delaware 717.290.7402 Pax Newark, Delaware mail@bakeringram.com Haddon Heights, New Jersey Annapolis, Maryland PROJECT NO. L15245 FRIENDSVIL ARY BRANCH IBR Τm FRIENDSVILLE ×0 Э Щ MD 2  $\rightarrow$  (A) Z CHESTNUT Ш RUTH 15 S -( B S A) E N U litteru ш -, M™ υ , F 2 B ICTION 4 0 0 4 0 23130 PROJECT NO: JPC DRAWN BY: CHECKED BY: ITW ROOF FRAMING PLAN SHEET S-202





|        |         |                    |      | LC                            | DUVER \$                       | SCHEDU                 | LE         |                           |            |                                |       |
|--------|---------|--------------------|------|-------------------------------|--------------------------------|------------------------|------------|---------------------------|------------|--------------------------------|-------|
| DESIG. | TYPE    | SERVING            | CFM  | PRESSURE<br>DROP (IN.<br>WG.) | FREE AREA<br>VELOCITY<br>(FPM) | FREE AREA<br>(SQ. FT.) | WIDTH (IN) | DIMENSIONS<br>HEIGHT (IN) | DEPTH (IN) | BASIS OF<br>DESIGN             | NOTES |
| L-1    | INTAKE  | DOAS-1 OUTSIDE AIR | 1370 | 0.08                          | 500                            | 2.74                   | 24         | 42                        | 5          | CONSTRUCTION SPECIALTIES A2097 | 1,2   |
| L-2    | EXHAUST | EF-1 EXHAUST AIR   | 1200 | 0.08                          | 750                            | 1.6                    | 30         | 18                        | 5          | CONSTRUCTION SPECIALTIES A2097 | 1,2   |

<u>NOTES:</u> 1. COLORS AND FINISHES TO BE SELECTED AND APPROVED BY THE PROJECT ARCHITECT. 2. PROVIDE WITH INSECT SCREEN.



|      |    |               |          | Α        | IR DE         | VICE SCH | HEDULE                                 |                               |             |
|------|----|---------------|----------|----------|---------------|----------|----------------------------------------|-------------------------------|-------------|
| TYPE | No | DUTY          | CFM      | SIZE     | NECK<br>SIZE* | BLOW     | BASIS OF DESIGN<br>TITUS<br>(OR EQUAL) | DESCRIPTION                   | NOTES       |
| А    | 1  | SUPPLY        | 0-100    | -        | <b>6</b> "Ø   | -        | OMNI                                   | ARCHITECTURAL PLAQUE DIFFUSER | 1,2,3,4,5   |
| A    | 2  | SUPPLY        | 101-200  | -        | <b>8</b> "Ø   | -        | OMNI                                   | ARCHITECTURAL PLAQUE DIFFUSER | 1,2,3,4,5   |
| A    | 3  | SUPPLY        | 201-300  | -        | 10"Ø          | -        | OMNI                                   | ARCHITECTURAL PLAQUE DIFFUSER | 1,2,3,4,5   |
| A    | 4  | SUPPLY        | 301-400  | -        | 12"Ø          | -        | OMNI                                   | ARCHITECTURAL PLAQUE DIFFUSER | 1,2,3,4,5   |
| A    | 5  | SUPPLY        | 401-600  | -        | 14"Ø          | -        | OMNI                                   | ARCHITECTURAL PLAQUE DIFFUSER | 1,2,3,4,5   |
|      |    |               |          |          |               |          |                                        |                               |             |
| С    | 1  | SUPPLY        | 180-350  | -        | 18x8          | 2-WAY    | US300F                                 | SPIRAL DUCT MOUNT             | 1,2,3,4,5,6 |
| С    | 2  | SUPPLY        | 350-550  | -        | 18x10         | 2-WAY    | US300F                                 | SPIRAL DUCT MOUNT             | 1,2,3,4,5,6 |
|      |    |               |          |          |               |          |                                        |                               |             |
| D    | 1  | SLOT DIFFUSER | 0-200    | 48" LONG | <b>8</b> "Ø   | -        | TITUS/ML39                             | LINEAR 2-SLOT DIFFUSER        | 2           |
|      |    |               |          |          |               |          |                                        |                               |             |
| E    | 1  | RETURN        | 0-100    | -        | 6x6           | -        | PAR                                    | PERFORATED RETURN DIFFUSER    | 1,2,3,4,5   |
| E    | 2  | RETURN        | 100-250  | -        | 8x8           | -        | PAR                                    | PERFORATED RETURN DIFFUSER    | 1,2,3,4,5   |
| E    | 3  | RETURN        | 250-400  | -        | 10x10         | -        | PAR                                    | PERFORATED RETURN DIFFUSER    | 1,2,3,4,5   |
| E    | 4  | RETURN        | 400-500  | -        | 12x12         | -        | PAR                                    | PERFORATED RETURN DIFFUSER    | 1,2,3,4,5   |
| E    | 5  | RETURN        | 500-700  | -        | 15x15         | -        | PAR                                    | PERFORATED RETURN DIFFUSER    | 1,2,3,4,5   |
| E    | 6  | RETURN        | 700-1000 | -        | 18x18         | -        | PAR                                    | PERFORATED RETURN DIFFUSER    | 1,2,3,4,5   |
| E    | 7  | RETURN        | 0-2000   | -        | 22x22         | -        | PAR                                    | PERFORATED RETURN DIFFUSER    | 3,4,5,7     |
|      |    |               |          |          |               |          |                                        |                               |             |
| F    | 1  | EXHAUST       | 0-100    | -        | 6x6           | -        | 350R                                   | GRILLE                        | 1,2,3,4,5   |
| F    | 2  | EXHAUST       | 100-250  | -        | 8x8           | -        | PAR                                    | PERFORATED RETURN DIFFUSER    | 1,2,3,4,5   |
| F    | 3  | EXHAUST       | 250-400  | -        | 10x10         | -        | PAR                                    | PERFORATED RETURN DIFFUSER    | 1,2,3,4,5   |
| F    | 4  | EXHAUST       | 400-500  | -        | 12x12         | -        | PAR                                    | PERFORATED RETURN DIFFUSER    | 1,2,3,4,5   |
| F    | 5  | EXHAUST       | 500-700  | -        | 15x15         | -        | PAR                                    | PERFORATED RETURN DIFFUSER    | 1,2,3,4,5   |
| F    | 6  | EXHAUST       | 700-1000 | -        | 18x18         | -        | PAR                                    | PERFORATED RETURN DIFFUSER    | 1,2,3,4,5   |
| F    | 7  | EXHAUST       | 0-2000   | -        | 22x22         | -        | PAR                                    | PERFORATED RETURN DIFFUSER    | 3,4,5,7     |
|      |    |               |          |          |               |          |                                        |                               |             |
| G    | 1  | EXHAUST       | 0-150    | -        | 6x6           | -        | 350R                                   | GRILLE                        | 1,2,3,4,5   |
| G    | 2  | EXHAUST       | 151-250  | -        | 8x8           | -        | 350R                                   | GRILLE                        | 1,2,3,4,5   |
| G    | 3  | EXHAUST       | 251-400  | -        | 10x10         | -        | 350R                                   | GRILLE                        | 1,2,3,4,5   |
| G    | 4  | EXHAUST       | 401-500  | -        | 12x10         | -        | 350R                                   | GRILLE                        | 1,2,3,4,5   |
| G    | 5  | EXHAUST       | 501-800  | -        | 18x12         | -        | 350R                                   | GRILLE                        | 1,2,3,4,5   |

\* OR AS SHOWN ON THE DRAWINGS. NOTES:

PROVIDE BALANCING DAMPERS ON ALL SUPPLY AND RETURN DUCT TAKE-OFFS.
 VERIFY THE FINISHES OF ALL AIR DEVICES WITH ARCHITECT.

3. COORDINATE AND VERIFY AIR DEVICE FRAME TYPES WITH CEILING TYPES.

4. CONTRACTOR TO VERIFY QUANTITIES AND SIZES OF ALL AIR DEVICES.

|                                           | ELECTRIC WALL HEATER SCHEDULE |        |                 |            |    |                  |           |  |  |  |
|-------------------------------------------|-------------------------------|--------|-----------------|------------|----|------------------|-----------|--|--|--|
|                                           |                               |        |                 | ELECTRICAL |    |                  |           |  |  |  |
| i                                         | CFM                           | BTUH   | CONNECTED<br>KW | VOLTS      | PH | BASIS OF DESIGN  | NOTES     |  |  |  |
| E                                         | -                             | 10,000 | 3.0             | 208        | 1  | QMARK - CWH3404F | 1,2,3,4,5 |  |  |  |
| S - 2,500 1.0 120 1 QMARK - CWH1101 1,2,3 |                               |        |                 |            |    |                  |           |  |  |  |
| AL                                        | -                             | 5,000  | 1.5             | 120        | 1  | QMARK - CWH1151  | 1,2,3,4,5 |  |  |  |

PROVIDE THERMAL SAFETY CUTOUT WITH MANUAL RESET.
 PROVIDE SEMI-RECESSED MOUNTING KIT WITH REMOVABLE FRONT COVER.

| ΞLI | ELECTRIC BASEBOARD HEATER SCHEDULE |      |                 |       |    |            |       |  |  |  |
|-----|------------------------------------|------|-----------------|-------|----|------------|-------|--|--|--|
|     |                                    |      |                 |       |    |            |       |  |  |  |
| j   | LENGIH                             | BTUH | CONNECTED<br>KW | VOLTS | PH | (STERLING) | NOTES |  |  |  |
| ١G  | 5'-0"                              | 2500 | 0.75            | 208   | 1  | SB-5150    | 1,3   |  |  |  |
| ,   | 7'-0"                              | 2350 | 0.6             | 208   | 1  | SB-7100    | 1,2,3 |  |  |  |
| ,   | 4'-0"                              | 1700 | 0.5             | 208   | 1  | SB-4125    | 1,2,3 |  |  |  |
| ,   | 9'-0"                              | 3000 | 0.9             | 208   | 1  | SB-9100    | 1,2,3 |  |  |  |
| ,   | 4'-0"                              | 1700 | 0.5             | 208   | 1  | SB-4125    | 1,2,3 |  |  |  |
| ONS | 6'-0"                              | 3000 | 0.9             | 208   | 1  | SB-6150    | 1,3   |  |  |  |
| ONS | 7'-0"                              | 3500 | 1.05            | 208   | 1  | SB-7150    | 1,3   |  |  |  |
| /   | 4'-0"                              | 1300 | 0.4             | 208   | 1  | SB-4100    | 1,3   |  |  |  |
|     | 4'-0"                              | 1300 | 0.4             | 208   | 1  | SB-4100    | 1,3   |  |  |  |
|     | -                                  | -    | -               | -     | -  | -          | -     |  |  |  |

NOTES: 1. PROVIDE MANUFACTURER'S BUILT-IN CONTROLS WITH DISCONNECT AND THERMOSTAT. 2. PROVIDE BASEBOARD HEATER WITH FINISHED FRONT AND BACK.

CONTRACTOR TO COORDINATE ALL AIR DEVICE LOCATIONS WITH REFLECTED CEILING PLANS & SPRINKLER.
 PROVIDE WITH ASD.
 BACKPAN OMITTED.



RMF ENGINEERING, INC. 5520 RESEARCH PARK DRIVE SUITE 300 BALTIMORE, MD 21228 P: 410-576-0505 F: 410-385-0327

| RMF PROJECT NO. 01230712.A0 |  |
|-----------------------------|--|
|                             |  |

|                         |                             |                                            | DNANOT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                             | LIBRART                        |                    | I, FRIENUSVILLE                                                                                                     | 31               | - ) |
|-------------------------|-----------------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------|------------------|-----|
|                         |                             |                                            | L KIENDOVILLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |                                |                    | 315 CHEVINUL VIKEE                                                                                                  | MD 2150          |     |
|                         |                             |                                            | U HENNOREY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0                           | TECTS                          |                    | 226 West Market Street, York, Pennsylvania 17401<br>717-848-8627 voice 717-843-2449 fax                             |                  |     |
|                         |                             | NA. S. | OMIGAMA/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                             | ARCHI                          |                    | <ul> <li>800 North Charles Street, Battmore, Maryland 21201</li> <li>410-625-4823 voice 410-625-4674 fax</li> </ul> |                  |     |
|                         | Description                 | DESIGN DEVELOPMENT                         | 95% CONSTRUCTION NDOCUMENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | PERMIT SET                  | BID SET                        | ADDENDUM #2        |                                                                                                                     |                  |     |
|                         | Mark Date                   | 03/29/24                                   | 07/09/24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 07/26/24                    | 08/08/24                       | N2 09/05/24        |                                                                                                                     |                  |     |
| l h<br>ap               | ereby<br>oprove             | certify<br>d by n<br>onal e                | y that t<br>ne, and<br>nginee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | hese of<br>that I<br>r unde | docume<br>am a<br>er the la    | ents w<br>duly lic | ere pre<br>censed<br>the Sta                                                                                        | pared            | or  |
| I I I<br>ppr<br>M<br>Li | Date<br>Date<br>Date<br>PRC | DJEC                                       | <b>77/60/20</b><br>7 that the and mainteen and maint | 3 07/26/24                  | documma a a a r the la tion Da | A2 09/05/24        | ere pro<br>ensed<br>the Sta<br>1/2026                                                                               | pared ate of 313 | •   |

MFD

RWG

DRAWN BY:

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MECHANICAL

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SHEET

M-602









![](_page_118_Figure_0.jpeg)

![](_page_119_Figure_0.jpeg)

![](_page_120_Figure_0.jpeg)

![](_page_120_Figure_5.jpeg)

| MOUI<br>ENCL<br>M                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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DIAGF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| PANELBO<br>LOC/<br>MOUI<br>ENCL<br>M<br>PANEL N<br>PANEL N<br>2#12, #12G - 3/<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| PANELBO<br>LOC/<br>MOUI<br>ENCL<br>M<br>PANEL N<br>PANEL N<br>2#12, #12G - 3/<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/<br>2#12, #12G - 3/<br>2#12, #12G - 3/<br>2#12, #12G - 3/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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| PANELBO<br>LOC/<br>MOUI<br>ENCL<br>M<br>PANEL N<br>PANEL N<br>2#12, #12G - 3/<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/<br>2#12, #12G - 3/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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DESCRIPTION<br>REC<br>REC<br>VRF 5,6,7<br>EBH - 1<br>EBH - 3<br>EWH-2<br>REC<br>SPARE<br>SPARE<br>SPARE<br>REC<br>LTG<br>EF - 1<br>SPACE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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             | MLO<br>208/120<br>3<br>4<br>ED OTHE<br>1.08<br>4.32<br>0.25<br>0.25<br>0.90<br>0.90<br>0.90<br>0.82                                                                                                                                                                                        | Wye<br>RWISE<br>11.00<br>1.08<br>0.00<br>0.00<br>0.00<br>0.18<br>0.18<br>1.20<br>1.20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.54<br>0.38<br>0.25<br>0.25<br>0.00<br>0.00                                                                                                 | 3<br>111.00<br>0.30<br>0.30<br>0.00<br>0.72<br>0.72<br>0.72                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| PANELBO<br>LOC/<br>MOUI<br>ENCL<br>M<br>PANEL N<br>PANEL N<br>2#12, #12G - 3/<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/<br>2#12, #12G - 3/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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- 1<br>EBH - 3<br>EWH-2<br>REC<br>SPARE<br>SPARE<br>SPARE<br>REC<br>LTG<br>EF - 1<br>SPACE<br>SPACE<br>SPACE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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| PANELBO<br>LOC/<br>MOUI<br>ENCL<br>M<br>PANEL M<br>PANEL N<br>2#12, #12G - 3/<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/<br>2#12, #12G - 3/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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3<br>EWH-2<br>REC<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>REC<br>LTG<br>EF - 1<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| PANELBO<br>LOC/<br>MOUI<br>ENCL<br>M<br>PANEL M<br>PANEL N<br>2#12, #12G - 3/<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/<br>2#12, #12G - 3/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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3<br>EWH-2<br>REC<br>SPARE<br>SPARE<br>SPARE<br>REC<br>LTG<br>EF - 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<li>3</li></ul></td><td>AMPS:<br/>AMPS:<br/>AMPS:<br/>11.00<br/>0.30<br/>0.30<br/>0.30<br/>0.00<br/>1.08<br/>1.08<br/>1.20<br/>4.<br/>1.20<br/>4.<br/>4.<br/>5.<br/>6.<br/>7.<br/>6.<br/>7.<br/>7.<br/>8.<br/>KVA</td><td>225<br/>225<br/><b>CKT</b><br/>2<br/>4<br/>6<br/>8<br/>10<br/>12<br/>4<br/>6<br/>8<br/>10<br/>12<br/>14<br/>16<br/>18<br/>20<br/>22<br/>24<br/>26<br/>28<br/>30<br/>22<br/>24<br/>26<br/>28<br/>30<br/>32<br/>34<br/>36<br/>38<br/>40<br/>42<br/>5<br/>5<br/>5<br/>5<br/>5<br/>5<br/>5<br/>5<br/>5<br/>5<br/>5<br/>5<br/>5</td><td>TYPE</td><td>TRIP         40 A         20 A      <t< td=""><td>P<br/>3<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1</td><td>LOA<br/>DWH-1<br/>REC<br/>EBH - 2<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>C<br/>REC<br/>REC<br/>REC<br/>REC<br/>REC<br/>EWH-1<br/>CP-1<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE</td></t<></td></t<>                                             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0.00      < | 0.54<br>0.38<br>0.25<br>0.00<br>0.00<br>0.78<br>0.78<br>0.78<br>0.00                                                                         | 3<br>111.00<br>0.30<br>0.30<br>0.00<br>0.72<br>0.00<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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<li>2.1.20</li> <li>3.1.20</li> <li>3</li></ul> | AMPS:<br>AMPS:<br>AMPS:<br>11.00<br>0.30<br>0.30<br>0.30<br>0.00<br>1.08<br>1.08<br>1.20<br>4.<br>1.20<br>4.<br>4.<br>5.<br>6.<br>7.<br>6.<br>7.<br>7.<br>8.<br>KVA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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225<br>225<br><b>CKT</b><br>2<br>4<br>6<br>8<br>10<br>12<br>4<br>6<br>8<br>10<br>12<br>14<br>16<br>18<br>20<br>22<br>24<br>26<br>28<br>30<br>22<br>24<br>26<br>28<br>30<br>32<br>34<br>36<br>38<br>40<br>42<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5 | TYPE | TRIP         40 A         20 A <t< td=""><td>P<br/>3<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1</td><td>LOA<br/>DWH-1<br/>REC<br/>EBH - 2<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>C<br/>REC<br/>REC<br/>REC<br/>REC<br/>REC<br/>EWH-1<br/>CP-1<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE</td></t<>                     | P<br>3<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1      | LOA<br>DWH-1<br>REC<br>EBH - 2<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>C<br>REC<br>REC<br>REC<br>REC<br>REC<br>EWH-1<br>CP-1<br>SPACE<br>SPACE<br>SPACE<br>SPACE              |
| PANELBO<br>LOC/<br>MOUI<br>ENCL<br>M<br>PANEL N<br>PANEL N<br>2#12, #12G - 3/<br>2#12, #12G - 3/4"<br>C<br>2#12, #12G - 3/<br>2#12, #12G - 3/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ARD: RP2<br>ATION:<br>NTING: Surface<br>NEMA: Type 1<br>IN AIC: SEE ONE-LINE DIAGE<br>NOTES:<br>PROVIDE GROUND B<br>PROVIDE FULL SIZE<br>LOAD DESCRIPTION<br>REC<br>REC<br>VRF 5,6,7<br>EBH - 1<br>EBH - 1<br>EBH - 3<br>EWH-2<br>REC<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPAC     | RAM<br>BUS<br>NEUTF<br>P<br>1<br>1<br>2<br>2<br>2<br>2<br>2<br>2<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | TRIP         AMPS         20 A         20 A <t< td=""><td>UNILES     UNILES     UNILES</td><td>MAINS:<br/>/OLTS:<br/>PHASE:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>//<br/>//<br/>//<br/>//<br/>//<br/>//<br/>//<br/>//<br/>//<br/>/</td><td>MLO<br/>208/120<br/>3<br/>4<br/>ED OTHE<br/>1.08<br/>4.32<br/>0.25<br/>0.25<br/>0.90<br/>0.90<br/>0.90<br/>0.82<br/>0.82<br/>0.82<br/>0.90<br/>0.90<br/>0.82<br/>0.82<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.82<br/>0.82<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.9</td><td>Wye         Wye         RWISE         11.00         1.08         0.00         0.00         0.00         0.00         1.20         0.18         0.18         0.18         0.18         0.18         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00      &lt;</td><td>0.54<br/>0.54<br/>0.38<br/>0.25<br/>0.00<br/>0.78<br/>0.00<br/>0.78<br/>1.00<br/>0.78<br/>1.00<br/>0.78<br/>0.78<br/>0.78<br/>0.78<br/>0.78<br/>0.78<br/>0.78</td><td>3<br/>111.00<br/>0.30<br/>0.00<br/>0.72<br/>0.00<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0</td><td>I</td><td>AMPS:<br/>AMPS:<br/>AMPS:<br/>11.00<br/>0.30<br/>0.30<br/>0.30<br/>1.08<br/>1.08<br/>1.08<br/>4.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.</td><td>225<br/>225<br/>CKT<br/>2<br/>4<br/>6<br/>8<br/>10<br/>12<br/>14<br/>6<br/>8<br/>10<br/>12<br/>14<br/>6<br/>8<br/>10<br/>12<br/>14<br/>16<br/>18<br/>20<br/>22<br/>24<br/>26<br/>28<br/>30<br/>32<br/>34<br/>36<br/>38<br/>40<br/>42<br/>5<br/>5<br/>5<br/>5<br/>5<br/>5<br/>5<br/>5<br/>5<br/>5<br/>5<br/>5<br/>5</td><td></td><td>TRIP 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MAINS:<br>/OLTS:<br>PHASE:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>//<br>//<br>//<br>//<br>//<br>//<br>//<br>//<br>//<br>/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | MLO<br>208/120<br>3<br>4<br>ED OTHE<br>1.08<br>4.32<br>0.25<br>0.25<br>0.90<br>0.90<br>0.90<br>0.82<br>0.82<br>0.82<br>0.90<br>0.90<br>0.82<br>0.82<br>0.90<br>0.90<br>0.90<br>0.90<br>0.82<br>0.82<br>0.90<br>0.90<br>0.90<br>0.90<br>0.90<br>0.90<br>0.90<br>0.9                         | Wye         Wye         RWISE         11.00         1.08         0.00         0.00         0.00         0.00         1.20         0.18         0.18         0.18         0.18         0.18         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00      <  | 0.54<br>0.54<br>0.38<br>0.25<br>0.00<br>0.78<br>0.00<br>0.78<br>1.00<br>0.78<br>1.00<br>0.78<br>0.78<br>0.78<br>0.78<br>0.78<br>0.78<br>0.78 | 3<br>111.00<br>0.30<br>0.00<br>0.72<br>0.00<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0 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                                                         | AMPS:<br>AMPS:<br>AMPS:<br>11.00<br>0.30<br>0.30<br>0.30<br>1.08<br>1.08<br>1.08<br>4.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0. | 225<br>225<br>CKT<br>2<br>4<br>6<br>8<br>10<br>12<br>14<br>6<br>8<br>10<br>12<br>14<br>6<br>8<br>10<br>12<br>14<br>16<br>18<br>20<br>22<br>24<br>26<br>28<br>30<br>32<br>34<br>36<br>38<br>40<br>42<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5         |      | TRIP         40 A         20 A <t< td=""><td>P<br/>3<br/>1<br/>2<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1</td><td>LOA<br/>DWH-1<br/>REC<br/>EBH - 2<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>REC<br/>REC<br/>REC<br/>REC<br/>ITG<br/>EWH-1<br/>CP-1<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE</td></t<>                               | P<br>3<br>1<br>2<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | LOA<br>DWH-1<br>REC<br>EBH - 2<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>REC<br>REC<br>REC<br>REC<br>ITG<br>EWH-1<br>CP-1<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE                            |
| PANELBO         LOC/         MOUI         ENCL         M         PANEL N         PANEL N         WIRE SIZE         2#12, #12G - 3/         2#12, #12G - 3/4"         C         2#12, #12G - 3/4"         C         2#12, #12G - 3/4"         C         2#12, #12G - 3/4"         2#12, #12G - 3/         C <td>ARD: RP2<br/>ATION:<br/>NTING: Surface<br/>NEMA: Type 1<br/>IN AIC: SEE ONE-LINE DIAGE<br/>IOTES:<br/>PROVIDE GROUND B<br/>PROVIDE FULL SIZE<br/>LOAD DESCRIPTION<br/>REC<br/>REC<br/>VRF 5,6,7<br/>EBH - 1<br/>EBH - 1<br/>EBH - 3<br/>EWH-2<br/>REC<br/>SPARE<br/>SPARE<br/>SPARE<br/>REC<br/>LTG<br/>EF - 1<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SP</td> <td>RAM<br/>BUS<br/>NEUTF<br/>P<br/>1<br/>1<br/>2<br/>2<br/>2<br/>2<br/>2<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1</td> <td>TRIP         AMPS         20 A         20 A      <t< td=""><td>S UNLES</td><td>MAINS:<br/>/OLTS:<br/>PHASE:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>//<br/>//<br/>//<br/>//<br/>//<br/>//<br/>//<br/>//<br/>//<br/>/</td><td>MLO<br/>208/120<br/>3<br/>4<br/>ED OTHE<br/>1.08<br/>4.32<br/>0.25<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.82<br/>0.90<br/>0.82<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.9</td><td>Wye         Wye         RWISE         11.00         1.08         0.00         0.00         0.00         0.00         1.08         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00      &lt;</td><td>0.54<br/>0.38<br/>0.25<br/>0.00<br/>0.00<br/>0.00<br/>0.78<br/>0.00<br/>0.00<br/>0.78<br/>0.00<br/>0.00</td><td>3<br/>111.00<br/>0.30<br/>0.30<br/>0.00<br/>0.72<br/>0.72<br/>0.00<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0</td><td>■</td><td>AMPS:<br/>AMPS:<br/>AMPS:<br/>11.00<br/>0.30<br/>0.30<br/>0.30<br/>0.00<br/>1.08<br/>1.08<br/>1.20<br/>4.1<br/>0.00<br/>0.00<br/>0.00<br/>1.08<br/>4.1<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.0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        40 A         20 A      <t< td=""><td>P<br/>3<br/>1<br/>1<br/>2<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1</td><td>LOA<br/>DWH-1<br/>REC<br/>EBH - 2<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>COT<br/>EWH-1<br/>CP-1<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE</td></t<></td></t<></td> | ARD: RP2<br>ATION:<br>NTING: Surface<br>NEMA: Type 1<br>IN AIC: SEE ONE-LINE DIAGE<br>IOTES:<br>PROVIDE GROUND B<br>PROVIDE FULL SIZE<br>LOAD DESCRIPTION<br>REC<br>REC<br>VRF 5,6,7<br>EBH - 1<br>EBH - 1<br>EBH - 3<br>EWH-2<br>REC<br>SPARE<br>SPARE<br>SPARE<br>REC<br>LTG<br>EF - 1<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SP | RAM<br>BUS<br>NEUTF<br>P<br>1<br>1<br>2<br>2<br>2<br>2<br>2<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | TRIP         AMPS         20 A         20 A <t< td=""><td>S UNLES</td><td>MAINS:<br/>/OLTS:<br/>PHASE:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>/MRES:<br/>//<br/>//<br/>//<br/>//<br/>//<br/>//<br/>//<br/>//<br/>//<br/>/</td><td>MLO<br/>208/120<br/>3<br/>4<br/>ED OTHE<br/>1.08<br/>4.32<br/>0.25<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.82<br/>0.90<br/>0.82<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.9</td><td>Wye         Wye         RWISE         11.00         1.08         0.00         0.00         0.00         0.00         1.08         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00      &lt;</td><td>0.54<br/>0.38<br/>0.25<br/>0.00<br/>0.00<br/>0.00<br/>0.78<br/>0.00<br/>0.00<br/>0.78<br/>0.00<br/>0.00</td><td>3<br/>111.00<br/>0.30<br/>0.30<br/>0.00<br/>0.72<br/>0.72<br/>0.00<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0.20<br/>0</td><td>■</td><td>AMPS:<br/>AMPS:<br/>AMPS:<br/>11.00<br/>0.30<br/>0.30<br/>0.30<br/>0.00<br/>1.08<br/>1.08<br/>1.20<br/>4.1<br/>0.00<br/>0.00<br/>0.00<br/>1.08<br/>4.1<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.00<br/>0.0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        40 A         20 A      <t< td=""><td>P<br/>3<br/>1<br/>1<br/>2<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1</td><td>LOA<br/>DWH-1<br/>REC<br/>EBH - 2<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>COT<br/>EWH-1<br/>CP-1<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE</td></t<></td></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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MAINS:<br>/OLTS:<br>PHASE:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>/MRES:<br>//<br>//<br>//<br>//<br>//<br>//<br>//<br>//<br>//<br>/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | MLO<br>208/120<br>3<br>4<br>ED OTHE<br>1.08<br>4.32<br>0.25<br>0.90<br>0.90<br>0.90<br>0.90<br>0.82<br>0.90<br>0.82<br>0.90<br>0.90<br>0.90<br>0.90<br>0.90<br>0.90<br>0.90<br>0.9                                                                                                         | Wye         Wye         RWISE         11.00         1.08         0.00         0.00         0.00         0.00         1.08         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00      <  | 0.54<br>0.38<br>0.25<br>0.00<br>0.00<br>0.00<br>0.78<br>0.00<br>0.00<br>0.78<br>0.00<br>0.00                                                 | 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| 225<br>225<br>CKT<br>2<br>4<br>6<br>8<br>10<br>12<br>14<br>16<br>18<br>20<br>22<br>24<br>26<br>28<br>30<br>22<br>24<br>26<br>28<br>30<br>32<br>34<br>36<br>38<br>40<br>42<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5                                   |      | TRIP         40 A         20 A <t< td=""><td>P<br/>3<br/>1<br/>1<br/>2<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1</td><td>LOA<br/>DWH-1<br/>REC<br/>EBH - 2<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>COT<br/>EWH-1<br/>CP-1<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE</td></t<>                                 | P<br>3<br>1<br>1<br>2<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | LOA<br>DWH-1<br>REC<br>EBH - 2<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>COT<br>EWH-1<br>CP-1<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE                             |
| PANELBO           LOC/<br>MOUI<br>ENCL           M           PANEL N           PANEL N           2#12, #12G - 3/           2#12, #12G - 3/4"           2#12, #12G - 3/           C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ARD: RP2<br>ATION:<br>NTING: Surface<br>NEMA: Type 1<br>IN AIC: SEE ONE-LINE DIAGE<br>IOTES:<br>PROVIDE GROUND B<br>PROVIDE FULL SIZE<br>LOAD DESCRIPTION<br>REC<br>REC<br>VRF 5,6,7<br>EBH - 1<br>EBH - 1<br>EBH - 3<br>EWH-2<br>REC<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>REC<br>LTG<br>EF - 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OTHE<br/>1.08<br/>4.32<br/>0.25<br/>0.90<br/>0.90<br/>0.90<br/>0.82<br/>0.82<br/>0.82<br/>0.82<br/>0.82<br/>0.90<br/>0.90<br/>0.90<br/>0.82<br/>0.82<br/>0.82<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.90<br/>0.9</td><td>Wye         Wye         RWISE         11.00         1.08         0.00         0.00         0.00         0.00         1.08         0.00         0.00         0.18         0.18         0.18         0.18         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00      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        40 A         20 A      <t< td=""><td>P<br/>3<br/>1<br/>2<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1</td><td>LOAI<br/>DWH-1<br/>PARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>REC<br/>REC<br/>REC<br/>REC<br/>ITG<br/>EWH-1<br/>CP-1<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE</td></t<></td></t<>                                                                                                                                                                                                                                                             | S UNLES                                                                                                                                                                                                                                                                                                                                  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| MLO<br>208/120<br>3<br>4<br>ED OTHE<br>1.08<br>4.32<br>0.25<br>0.90<br>0.90<br>0.90<br>0.82<br>0.82<br>0.82<br>0.82<br>0.82<br>0.90<br>0.90<br>0.90<br>0.82<br>0.82<br>0.82<br>0.90<br>0.90<br>0.90<br>0.90<br>0.90<br>0.90<br>0.90<br>0.9                                                 | Wye         Wye         RWISE         11.00         1.08         0.00         0.00         0.00         0.00         1.08         0.00         0.00         0.18         0.18         0.18         0.18         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00      <  | 0.54<br>0.38<br>0.25<br>0.00<br>0.00<br>0.78<br>0.00<br>0.78<br>0.00<br>0.78<br>0.00<br>0.78<br>0.00<br>0.00                                 | 3<br>111.00<br>0.30<br>0.30<br>0.00<br>0.72<br>0.72<br>0.00<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0.20<br>0 | ■                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | AMPS:<br>AMPS:<br>AMPS:<br>11.00<br>0.30<br>0.30<br>0.30<br>0.30<br>1.08<br>1.08<br>1.20<br>4.1<br>0.30<br>0.00<br>1.08<br>4.1<br>0.30<br>0.30<br>0.00<br>1.08<br>4.1<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.30<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00  | 225<br>225<br>CKT<br>2<br>4<br>6<br>8<br>10<br>12<br>14<br>16<br>18<br>20<br>22<br>24<br>26<br>28<br>30<br>22<br>24<br>26<br>28<br>30<br>32<br>34<br>36<br>38<br>40<br>42<br>5<br>5<br>5<br>6<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7               |      | TRIP         40 A         20 A <t< td=""><td>P<br/>3<br/>1<br/>2<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1<br/>1</td><td>LOAI<br/>DWH-1<br/>PARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>SPARE<br/>REC<br/>REC<br/>REC<br/>REC<br/>ITG<br/>EWH-1<br/>CP-1<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE<br/>SPACE</td></t<> | P<br>3<br>1<br>2<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>1 | LOAI<br>DWH-1<br>PARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>SPARE<br>REC<br>REC<br>REC<br>REC<br>ITG<br>EWH-1<br>CP-1<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE<br>SPACE |

| DESCRIPTION | WIRE SIZE              |
|-------------|------------------------|
|             | 3#6, #10G - 3/4" (     |
|             |                        |
|             | 3#1, #6G - 1 1/4"<br>C |
|             | 4#4/0, 4G - 1 1/4<br>C |
|             |                        |
| PV          | 2#12,#12G-3/4"C        |
|             |                        |
|             |                        |
|             |                        |
|             |                        |
|             |                        |
|             |                        |
|             |                        |

| nel  | Totals     |
|------|------------|
|      |            |
| ad:  | 159.09 kVA |
| nd:  | 156.66 kVA |
| ent: | 441.59 A   |
| ent: | 434.85 A   |
|      |            |
|      |            |
|      |            |

| DESCRIPTION | WIRE SIZE                         |
|-------------|-----------------------------------|
|             | 3#4, #8G - 1"C                    |
|             | 2#12, #12G - 3/                   |
|             | 2#12, #12G - 3/4"<br>C            |
|             |                                   |
|             |                                   |
|             |                                   |
|             |                                   |
|             | 2#12, #12G - 3/                   |
|             | 2#12, #12G - 3/                   |
|             | 2#12, #12G - 3/<br>2#12 #12G - 3/ |
|             | 2#12, #12G - 3/4"<br>C            |
|             | 2#12, #12G - 3/                   |
|             |                                   |
|             |                                   |
|             |                                   |
|             |                                   |
|             |                                   |
|             |                                   |

| el  | Totals    |
|-----|-----------|
|     |           |
| d:  | 57.47 kVA |
| d:  | 57.47 kVA |
| nt: | 159.52 A  |
| nt: | 159.52 A  |
|     |           |
|     |           |

## PANELBOARD: RP1

LOCATION: MOUNTING: Surface ENCL NEMA: Type 1 MIN AIC: SEE ONE-LINE DIAGRAM

## MAINS: MLO VOLTS: 208/120 Wye **PHASE:** 3 WIRES: 4

PANEL NOTES:

PROVIDE GROUND BUS PROVIDE FULL SIZE NEUTRAL BUS UNLESS NOTED OTHERWISE

TRIP WIRE SIZE LOAD DESCRIPTION P AMPS TYPE CKT Α С CKT TYP B 2#12, #12G - 3/... REC 20 A 1 1.44 0.72 2 1 4 2#12, #12G - 3/... REC 1 20 A 1.44 0.90 3 1.62 1.08 6 2#12, #12G - 3/... REC 1 20 A 5 \_\_\_\_\_ 2#12, #12G - 3/4" VRF 1,2,3,4 7 2.49 0.36 8 2 20 A 9 2.49 0.45 10 С \_\_\_\_\_ 2#12, #12G - 3/4" EBH - 5 14 2 20 A С 16 \_\_\_\_\_ 15 0.45 0.53 \_\_\_\_\_ 2#12, #12G - 3/4" EBH - 6 2 20 A 0.45 0.53 18 17 С 20 \_\_\_\_\_ 19 0.00 0.84 2#12, #12G - 3/... LTG 1 20 A 21 0.54 0.20 22 2#12, #12G - 3/... REC 1 20 A 2#12, #12G - 3/4" EBH - 9 0.20 0.20 24 23 2 20 A 26 ---С 25 0.20 0.50 2#12, #12G - 3/... EWH-3 1 20 A 27 1.20 0.50 28 0.00 0.00 30 ---2#12, #12G - 3/... LTG(FIXTURE F1) 1 20 A 29 2#12, #12G - 3/... FACP 1 20 A 31 0.80 0.00 3#12, #12G - 3/4" LTG INVERTER 34 1.50 0.00 33 2 20 A С 35 1.50 0.00 36 --1 -- -- 37 -- --38 --SPACE --40 --SPACE 1 -- -- 39 ---- -- | 1 -- -- 41 
 - 41
 - - 42
 - 

 TOTAL LOAD:
 7.96 kVA
 10.19 kVA
 6.28 kVA
 - 42
 - --SPACE

BREAKER TYPE KEYS: LO - INDICATES C.B. EQUIPPED WITH "LOCK-ON" DEVICE

GF - INDICATES C.B. IS GROUND FAULT TYPE (5mA FOR PERSONNEL)

ST - INDICATES C.B. EQUIPPED WITH SHUNT TRIP DEVICE

HT - INDICATES C.B. EQUIPPED WITH 30mA GROUND FAULT FOR EQUIPMENT

| Load Classification | Connected Load | Demand Factor | Estimated Demand | Panel                      | Totals    |
|---------------------|----------------|---------------|------------------|----------------------------|-----------|
| LTG                 | 14.16          | 100.00%       | 14.16            |                            |           |
| Power               | 0.80           | 100.00%       | 0.80             | Total Conn. Load:          | 24.42 kVA |
| REC                 | 8.46           | 100.00%       | 8.46             | Total Est. Demand:         | 24.42 kVA |
|                     |                |               |                  | Total Conn. Current:       | 67.79 A   |
|                     |                |               |                  | Total Est. Demand Current: | 67.79 A   |
|                     |                |               |                  |                            |           |
|                     |                |               |                  |                            |           |

|        |             |                                  |         |         | LIC    | GHTI | NG SCHE           | DULE         | NOTE: ALL FINISHES TO BE CONFIRMED BY ARCHITECT.                 |
|--------|-------------|----------------------------------|---------|---------|--------|------|-------------------|--------------|------------------------------------------------------------------|
|        | DESIGNATION | DESCRIPTION                      | WATTAGE | VOLTAGE |        |      | MANUFACTURER      | MOUNTING     | MODEL NUM.                                                       |
|        | A1          | PATH LIGHT                       | 13.1W   | MVOLT   | 30K    | 136  | KIM LIGHTING      | SURFACE      | EL817/9L3KUV                                                     |
|        | B1          | 42" LED BOLLARD                  | 20W     | MVOLT   | 40K    | 1116 | LITHONIA LIGHTING | FLOOR        | KBC8-LED-16C-350-40K-SYM-MVOLT-PE-SF-DNAXD                       |
|        | D1A         | 6" OPEN WALLWASH LED DOWNLIGHT   | 44.3W   | MVOLT   | 35K    | 4000 | LITHONIA LIGTHING | RECESSED     | LDN6-35K-40LM-L06-TRRALTBD-LSS-TRRALTBD-MVOLT                    |
|        | D1B         | 6" OPEN WALLWASH LED DOWNLIGHT   | 44.3W   | MVOLT   | 35K    | 4000 | LITHONIA LIGTHING | RECESSED     | LDN6-35K-40LM-L06-WR-LSS-TRW-MVOLT                               |
| $^{-}$ | D2          | 6" OPEN WALLWASH LED             | 44.3W   | MVOLT   | 35K    | 2000 | LITHONIA LIGTHING | RECESSED     | LDN6-35K-20LM-LW6-WR-LSS-TRW-MVOLT                               |
|        | FI          | COLOR CHANGING LED LUMINAIRE     | 1000W \ | 48V     | ¥30K V |      |                   | SURFACE      | LOGN-8W-48V-48-RGBW3ØK-WW-CL-WAMN2-SI-UCTL-CRC-UL                |
| Ę      | F2          | CORNER SURFACE MOUNTED           | -       | -       | -      | -    | QTL               | SURFACE      | ARKA-ST-SST-DF-NI NOTE: PAIR HOUSING WITH STATIC WHITE LED STRIP |
|        | FP          | GASKETED LED FLAG POLE FIXTURE   | 70 W    | 120 V   | 5000K  | 6638 | EAGLE MOUNTAIN    | ADJ KNUCKLE  | AGLED02-6638-70W-120V-5000K-3X3-ADJUSTABLE KNUCKLE               |
|        | P1          | 20" DIMMABLE CYLINDRICAL PENDANT | 12W     | 120V    | 35K    | 1259 | SOLERA            | PENDANT      | SRBP-O-4-4X20-1259-3500K-UNV-P24-OAL-EG-D-DM-WH                  |
|        | P3          | 18" DIAMETER CYLINDRICAL PENDANT | 59W     | MVOLT   | 35K    | 2000 | MARK              | PENDANT      | MGLP-18IN-90CRI-35K-2000LM-90-I35K-I1000LM                       |
|        | R1          | 2x2 DIMMABLE FLUORESCENT FIX.    | 30W     | 120V    | 35K    | 3750 | PLT SOLUTIONS     | RECESSED     | PLT-90250-30-3500K                                               |
|        | R2          | 2X4 DIMMABLE FLUORESCENT FIX.    | 38W     | 120V    | 35K    | 4864 | PLT SOLUTIONS     | RECESSED     | PLT-90251-2X4-38-3500K                                           |
|        | S1          | VAPOR-TIGHT LED LUMINAIRE        | 38W     | 120V    | 35K    | 5168 | PREMIUMSPEC       | CEILING      | PLTS-40079-38-3500K                                              |
|        | S2          | DIMMABLE LIGHTING CHANNEL        | 20W     | 120V    | 35K    | 3760 | DALS              | RECESSED     | LNR48-CC-48-40W-3760LM-90-3500-120V,TRIAC DIMMING-120V-WHITE     |
|        | W1          | 24" SWITCHABLE CYLINDER VANITY   | 27W     | MVOLT   | 35K    | 1690 | LITHONIA LIGHTING | WALL         | FMVCCLS-24IN-MVOLT-35K-90CRI-BN-M6                               |
|        | Х           | LED ALUMINUM EXIT SIGN           | -       | 120V    | -      | -    | LITHONIA LIGHTING | CEILING/WALL | LE-P-R                                                           |

![](_page_121_Figure_18.jpeg)

# SINGLE LINE DIAGRAM

120/208V INPUT 3KW 2: 1P-20A OUTPUT CIRCUIT BREAKER

**AMPS:** 225

| PE | TRIP<br>AMPS | Р   | LOAD DESCRIPTION | WIRE SIZE              |
|----|--------------|-----|------------------|------------------------|
|    | 20 A         | 1   | REC              | 2#12, #12G             |
|    | 20 A         | 1   | REC              | 2#12, #12G             |
|    | 20 A         | 1   | REC              | 2#12, #12G             |
|    | 20 A         | 1   | REC              | 2#12, #12G             |
|    | 20 A         | 2   | EBH - 4          | 2#12, #12G - 3/4"<br>C |
|    | 20 A         | 1   | REC              | 2#12, #12G             |
|    | 20 A         | 2   | EBH - 7          | 2#12, #12G - 3/4"<br>C |
|    | 20 A         | 1   | LTG              | 2#12, #12G             |
|    | 20 A         | 2   | EBH - 8          | 2#12, #12G - 3/4"<br>C |
|    | 20 A         | 1   | FLAG-POLE LTG    | <b></b> (              |
|    | 20 A         | 1   | CØNTROL CIRCUIT  | $\checkmark$           |
|    | 20 A         | 1   | BCC-1            |                        |
|    | 20 A         | _2^ | AC 1             |                        |
|    | 20 A         | 1   | SPARE            |                        |
|    |              | 1   | SPACE            |                        |
|    |              | 1   | SPACE            |                        |
|    |              | 1   | SPACE            |                        |

/A2

| LIGHTING CONTROLS SCENARIO |                                                                                                                                               |  |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--|
| LCS                        | DESCRIPTION                                                                                                                                   |  |
| LCS - 1                    | 3 DIMMABLE CONTROL SWITCHES WITH MANUAL<br>ON/OFF CONTROL OCCUPANCY SENSORS<br>SELECTING TO BE ON INVERTERS AND<br>CONTROLLED BY 924 RELAY.   |  |
| LCS - 2                    | 1 DIMMABLE CONTROL SWITCH WITH 1 MANUAL<br>ON/OFF CONTROL OCCUPANCY SENSORS<br>SELECTING TO BE ON INVERTERS AND<br>CONTROLLED BY 924 RELAY.   |  |
| LCS - 3                    | 2 DIMMABLE CONTROL SWITCHES WITH MANUAL<br>ON/OFF CONTROL OCCUPANCY SENSORS<br>SELECTING TO BE ON INVERTERS AND<br>CONTROLLED BY 924 RELAY.   |  |
| LCS - 4                    | 3 DIMMABLE CONTROL SWITCHES WITH 3<br>MANUAL ON/OFF CONTROL OCCUPANCY<br>SENSORS SELECTING TO BE ON INVERTERS AND<br>CONTROLLED BY 924 RELAY. |  |

![](_page_121_Picture_25.jpeg)

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![](_page_121_Picture_27.jpeg)

#4G - 2 1/2" (

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![](_page_122_Figure_0.jpeg)

## **DRAWING NOTES**

- 1 MOUNT IN CONCRETE 3" ALL ROUND. ROUTE CIRCUIT THROUGH DIMMER SWITCH LOCATED IN ELECTRICAL ROOM.
- 2 LIGHTING FIXTURES TO BE CONNECTED TO A PHOTOCELL (OR) AND TIME CLOCK (CLOCK).

![](_page_122_Picture_6.jpeg)

![](_page_122_Picture_7.jpeg)

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