PROJECT MANUAL FOR:

Johnson Family Livestock Facility Generator Installation

MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA

August 13, 2021

PPA No. 21-0049

SET NO.:

MONTANA STATE UNIVERSITY
CAMPUS PLANNING,
DESIGN AND CONSTRUCTION
BOZEMAN, MONTANA
PHONE: (406) 994-5413 FAX: (406) 994-5665

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MONTANA
STATE UNIVERSITY

CAMPUS PLANNING, DESIGN & CONSTRUCTION
Sixth Avenue and Grant Street • P.O. Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

PERMIT NOTICE

The drawings and specifications for this project have been submitted to the city of Bozeman for review. The contractor will pay all permit fees. The owner shall pay for plan review fee and the impact fee required for this project. The building permit must be appropriately displayed at the project site before construction may begin. The contractor shall contact the city of Bozeman for further clarification at the following:

CITY OF BOZEMAN
BUILDING INSPECTION DIVISION
DEPARTMENT OF PUBLIC WORKS
20 EAST OLIVE STREET, SUITE 208
PO BOX 640
BOZEMAN, MONTANA 59771-0640
(406) 582-2300

CAMPUS PLANNING, DESIGN & CONSTRUCTION
Sixth Avenue and Grant Street
P.O. Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

INVITATION TO BID

Sealed bids will be received until **2:00 PM** on **Thursday, September 9, 2021,** and will be publicly opened and read aloud in the offices of **MSU Campus Planning, Design and Construction, Plew Building, 6th & Grant, Bozeman, Montana**, for: **Johnson Family Livestock Facility Generator Installation, PPA No. 21-0049.**

Bids shall be submitted on the form provided within the Contract Documents. Contract documents may be obtained at the offices of:

Montana State University
Campus Planning, Design and Construction
Plew Building, 6th & Grant
PO Box 172760
Bozeman, Montana 59717-2760

On the web at:
http://www.montana.edu/pdc/bids.html

A PRE-BID WALK-THROUGH IS SCHEDULED FOR Tuesday, August 24, 2021, AT 1:30 PM PARTICIPANTS SHOULD MEET AT: The Project Site (parking lot at West End of Lincoln Street, West of 19th Avenue). ATTENDANCE IS STRONGLY RECOMMENDED. Bidders should thoroughly review the contract documents before the pre-bid conference.

Bids must be accompanied by a bid security meeting the requirements of the State of Montana in the amount of 10% of the total bid. After award, the successful bidder must furnish an approved Performance Security and a Labor & Material Payment Security each in the amount of 100% of the contract for contracts equal to or greater than $50,000.

No bidder may withdraw his bid for at least thirty (30) calendar days after the scheduled time for receipt of bids except as noted in the Instructions to Bidders.

The Owner reserves the right to reject any or all bids and to waive any and all irregularities or informalities and the right to determine what constitutes any and all irregularities or informalities.

Time of Completion
Bidder agrees to commence work immediately upon receipt of the Notice to Proceed and to substantially complete the project **within one hundred twenty (120) consecutive calendar days**.

The State of Montana makes reasonable accommodations for any known disability that may interfere with an applicant's ability to compete in the bidding and/or selection process. In order for the state to make such accommodations, applicants must make known any needed accommodation to the individual project managers or agency contacts listed in the contract documents.

State of Montana - Montana State University

Facilities Services Campus Planning, Design and Construction

CAMPUS PLANNING, DESIGN & CONSTRUCTION
Sixth Avenue and Grant Street
PO Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

INSTRUCTIONS TO BIDDERS

1. Table of Contents

For most current Montana Prevailing Wage Rates applicable to this project download from this site: http://erd.dli.mt.gov/labor-standards/state-prevailing-wage-rates

2. Viewing of Contract Documents

2.1. The Contract Documents may be viewed at the following locations:

Builders Exchange of Billings
2050 Broadwater STE A
Billings MT 59102
406/652-1311
bbx@billingsplanroom.com

Bozeman Builders Exchange
1105 Reeves RD W STE 800
Bozeman MT 59718
406/586-7653
exchange@bozemanplanroom.com

Butte Builders Exchange
4801 Hope Road
Butte MT 59701
406/782-5433
butteplans@gmail.com

NW MT - Flathead Builders Exchange
2303 Hwy 2 E
Kalispell, MT 59901
406/755-5888
planex@kalcopy.com

Great Falls Builders Exchange
202 2ND Avenue S
Great Falls MT 59401
406/453-2513
gfbe@greatfallsplans.com

Helena Plans Exchange
1530 Cedar Street Suite C
Helena MT 59601
406/457-2679
helenaplanex@helenacopycenter.com

Missoula Plans Exchange
201 N Russell ST
Missoula MT 59801
406/549-5002
mpe@vemcoinc.com

3. Borrowing of Documents: Up to two hard copy sets may be obtained for General Contractors. Additionally, Contract Documents will be available electronically. If shipping of hard copies is required, it will be at the contractor's expense.

3.1. Contract Documents may be obtained at the office of:
MONTANA STATE UNIVERSITY
CAMPUS PLANNING, DESIGN & CONSTRUCTION
PLEW BUILDING 1st FLOOR
6TH AND GRANT
BOZEMAN, MONTANA 59717-2760
406/994-5413

3.2. All borrowed Contract Documents shall be returned to Campus Planning, Design & Construction within ten (10) calendar days after the bid opening for the deposit refund (if deposit was required). However, if the Contract Documents are not in a condition where they can be reused by the Owner to construct the

project, the Owner may at its sole discretion may retain the deposit or levy costs to contractor in order to reproduce a replacement set.

4. Visits to Site

4.1. Prospective bidders are requested to contact the following for inspection of the site:

Loras O'Toole, Project Manager
Montana State University
Campus Planning, Design & Construction
6th and Grant, PO Box 172760
Bozeman, Montana 59717-2760
Ph: 406/994-7092; Fax: 406/994-5665

4.2. Failure to visit site will not relieve the Contractor of the conditions of the contract.

5. Requests for Substitution

5.1 Any requests for product substitutions must be submitted on the "Substitution Request" Form 099, to the Architect/Engineer at least ten (10) days prior to the date of the bid opening for consideration by the Architect/Engineer. Any request for substitution made after this time restriction, including those made after award during project construction may be rejected without consideration by either the Architect/Engineer or the Owner.

6. Bids/Proposals

6.1. The bidder shall submit his bid on the Bid Proposal Form furnished with the Contract Documents.

6.2. DO NOT send the Contract Documents with the Proposal. The Contract Documents shall be returned as noted in Article 3.2 of the Instructions to Bidders.

6.3. If the project is funded by any portion of federal funds, the following may apply: on Federally-funded projects, a "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion" form must be submitted with the bid proposal. If the debarment form is not included within the Construction Documents, federal funds (if included) do not require the form or are not included in the project and the debarment form is not required.

6.4. Proposals shall be in a sealed envelope and addressed to:

STATE OF MONTANA, MONTANA STATE UNIVERSITY
CAMPUS PLANNING, DESIGN & CONSTRUCTION
PLEW BUILDING 1ST FLOOR
6TH AND GRANT
PO BOX 172760, BOZEMAN, MONTANA 59717-2760

6.5. The envelope shall state that it contains a "BID PROPOSAL" and indicate the following information:

Name of Project:	**Johnson Family Livestock Facility Generator Installation**
Location:	**Montana State University Bozeman Campus**
MSU PPA Project Number:	**21-0049**
Name of Bidder:	_____
Acknowledge Addendum Number:	__, __, __, __

6.6. It is the bidder's responsibility to deliver or ensure delivery of the bid proposal to Montana State University, Campus Planning, Design, and Construction. Proposals received after the scheduled closing time for bids by either the bidder, a delivery service (e.g. Federal Express, U.S. Postal Service, United Parcel Service, etc.), or the state's own mail delivery system, will be rejected. Proposals entitled for consideration must be time-stamped in the Owner's office prior to the closing time for receipt of bids. The official time clock for receipt of bids and fax modifications is the Owner's time and date stamp clock located in the reception area of the Owner's office. No other clocks, calendars or timepieces are recognized. All bidders are responsible to ensure all bids and fax modifications are received in the Owner's office prior to the scheduled closing time.

6.7. If requested on the Bid Proposal, any person making a bid to perform the Work shall, as a requirement of a responsible bid, set forth the name of each subcontractor specified in the "List of Subcontractors"

which is part of the bid proposal. The bidder shall list only one subcontractor for each such portion or work listed. The bidder whose bid is accepted shall not:

6.7.1. Substitute any other subcontractor in place of the subcontractor listed in the original bid, except by specific consent of the Owner. The Owner, at its sole discretion, may grant substitution with consent of the originally listed subcontractor, or in consideration of other factor(s) involved if deemed relevant to the successful performance of the Contract.
6.7.2. Permit any such subcontract to be voluntarily assigned, transferred or allow it to be performed by any party other than the subcontractor listed in the original bid without the consent of the Owner.

6.8. Bid Proposals entitled to consideration shall be made in accordance with the following instructions:

6.8.1. Made upon form provided;
6.8.2. All blank spaces properly filled;
6.8.3. All numbers stated in both writing and in figures;
6.8.4. Shall contain no additions, conditional or alternate bids, erasures or other irregularities;
6.8.5. Shall acknowledge receipt of all addenda issued.

6.9. Bid Proposals entitled to consideration shall be signed by the proper representative of the firm submitting the proposal as follows:

6.9.1. The principal of a single owner firm;
6.9.2. A principal of a partnership firm;
6.9.3. An officer of an incorporated firm, or an agent whose signature is accompanied by a certified copy of the resolution of the Board of Directors authorizing that agent to sign; or,
6.9.4. Other persons signing for a single-owner firm or a partnership shall attach a power-of-attorney evidencing his authority to sign for that firm.

6.10. Unit Prices: When a Bid Proposal Form contains unit prices, any errors discovered in the extension of those unit prices will be corrected by the Owner using the unit price figures. The adjusted extended amount will then be used to determine the correct total bid. Only after the amounts have been checked and adjusted, if necessary, will the valid low bid be determined.

6.11. Estimated Quantities: All estimated quantities stipulated in the Bid Proposal and other Contract Documents are approximate and are to be used only as a basis for estimating the probable cost of the work and for the purpose of comparing proposals submitted for the work. It is understood and agreed that the actual amounts of work done, and materials furnished under unit price items may vary from such estimated quantities. The actual quantities will depend on the conditions encountered at the time the work is performed.

6.12. Any bidder may modify his bid by fax communication only.
6.12.1 It is the bidder's responsibility to ensure that the entire modification is received at the bid opening location prior to the scheduled closing time for receipt of bids. The modification shall not reveal the bid price but shall only provide the ADDITION or SUBTRACTION from the original proposal.

6.12.2 The Owner is not responsible for the performance of the facsimile/printer machine, maintaining adequate paper levels, toner levels, the telephone connection, quality of the facsimile, or any other factors affecting receipt of the fax. Unreadable or difficult-to-read facsimiles may be rejected at the sole discretion of the Owner.
6.12.3 Changes in the listed subcontractors, if any, shall also be provided.
6.12.4 Bid modifications must be verified by hard copy provided to the Owner within two (2) business days after the bid opening.
6.12.5 Bid modifications shall be directed to fax phone (406) 994-5665.
6.12.6 All facsimiles shall be date and time stamped on the same time-stamp clock in the Owner's office that is used for receipt of bids in order to be considered valid. The Owner may also use the date and time on the automatically-generated email notification of facsimile receipt as generated by the State's system. Any date and time indicated at the top of the facsimile on either the bidder's or the Owner's facsimile/printer machine will not be used in determining time of arrival of the modification.

6.13. The Owner reserves the sole right to reject any or all bids and to waive any irregularities or informalities. The Owner also reserves the sole right to determine what constitutes irregularities or informalities and/or what is material and/or immaterial to the bids received.

7. Bid Security

7.1. IF THE PROJECT COST IS LESS THAN $25,000, AT ITS SOLE DISCRETION THE STATE OF MONTANA MAY OR MAY NOT REQUIRE BID SECURITY (18-2-302 MCA).

7.2. All proposals shall be accompanied by a bid security in the amount of 10% of the bid price, as evidence of good faith (18-2-302 MCA). (**MSU does not waive bid security**.)

7.3. Bid security shall be in the form of lawful moneys of the United States, cashier's check, certified check, bank money order or bank draft, bid bond or bonds payable to the State of Montana (18-2-302 MCA).

7.4. If the bidder, to whom a contract is awarded, fails to enter into and execute the proposed contract within fifteen (15) calendar days of award, the bidder shall forfeit the bid security (18-1-204 MCA).

7.5. The bid security of unsuccessful bidders will be returned when the contract has been awarded to the successful bidder or when all bids have been rejected (18-1-205 MCA).

7.6. Execution of and entering into a contract includes providing all necessary insurance certificates, bonds, signed contract and current copy of the construction contractor registration certificate.

7.7. **NOTE: PER STATE POLICY, IF CASH, CHECK, MONEY ORDER, OR BANK DRAFT ARE PROVIDED AS BID SECURITY, IT WILL BE DEPOSITED IN THE TREASURY. UNSUCCESSFUL BIDDERS WILL HAVE THEIR SECURITY RETURNED UPON CONTRACT AWARD. THE SUCCESSFUL BIDDER'S SECURITY MAY BE RETURNED UPON ISSUANCE OF NOTICE TO PROCEED.**

8. Withdrawal of Bids

8.1. Any bidder may withdraw his bid proposal at any time prior to the scheduled closing time for the receipt of bids.

8.2. Once the closing time for the receipt of bids is reached, a bid may not be withdrawn for a period of thirty (30) calendar days.

9. Interpretation of Contract Documents

9.1. Bidders shall promptly notify the Architect/Engineer of any ambiguity, inconsistency, or error which they may discover upon examination of the Contract Documents or of the site and local conditions.

9.2. Bidders requiring clarification or interpretation of the Contract Documents shall request, in writing, clarification from the Architect/Engineer at least ten (10) calendar days prior to the date set for receipt of bids.

9.3. Any interpretations, corrections, or change in the Contract Documents prior to the bid opening will be made by written addendum issued by the Architect/Engineer. The Architect/Engineer will endeavor to notify all plan holders of any addenda issued but it shall be the responsibility of the individual bidders to insure they have received all addenda prior to the submission of their bid.

9.4. All written addenda issued by the Architect/Engineer will become part of the Contract Documents and all bidders shall be bound by such addenda whether or not received and/or acknowledged by the bidder. No oral or telephone modifications of the Contract Documents will be considered or allowed.

10. Award of Bids

10.1. All bids received by the stated hour will be opened and publicly read aloud.

10.2. The Owner reserves the right to reject any and all bids and to waive any informality or irregularity in any bid received. Owner reserves the right to determine what constitutes material and/or immaterial informalities and/or irregularities.

10.3. The low bid shall be determined on the basis of the lowest Base Bid or the lowest combination of Base Bid and Alternate Bids, accepted in consecutive order.

10.4. The Owner shall award such contract to the lowest responsible bidder (18-1-102 MCA).

10.4.1. The Owner may make such investigations as it deems necessary to determine whether or not any or all bidders are responsible.

10.4.2. The term "responsible" does not refer to pecuniary ability only, nor the ability to tender sufficient performance and payment bonds.

10.4.3. The term "responsible" includes, but is not limited to:

10.4.3.1. Having adequate financial resources to perform the contract or the ability to obtain them;

10.4.3.2. Being able to comply with the required delivery, duration, and performance schedule;

10.4.3.3. Having a satisfactory record of integrity and business ethics;

10.4.3.4. Having the necessary organization, experience, accounting, and operational controls;

10.4.3.5. Having the necessary production, construction, technical equipment, and facilities; and,

10.4.3.6. Having the technical skill, ability, capacity, integrity, performance, experience, lack of claims and disputes, lack of actions on bonds, lack of mediations, arbitrations and/or lawsuits related to construction work or performance, and such like.

10.4.4. Bidders shall furnish to the Owner all information and data for this purpose as the Owner may request.

10.4.5. The Owner reserves the right to reject any bid if the investigation or evidence of any Bidder fails to satisfy the Owner that such Bidder is properly and adequately qualified to suitably perform and satisfactorily execute the obligations of the Contract and Work defined in the Contract Documents.

10.5. The Owner shall award such contract to the lowest responsible bidder without regard to residency except on a reciprocal basis: a resident bidder will be allowed a preference on a contract against the bid of any non-resident bidder from any state or country that enforces a preference for resident bidders. The preference given to resident bidders of the State of Montana must be equal to the preference given in the other state or country (18-1-102, MCA). This does not apply when prohibited by Federal requirements.

10.6. The State of Montana may negotiate deductive changes, not to exceed 7% of the total cost of the project, with the lowest responsible bidder when the lowest responsible bids causes the project cost to exceed the appropriation; or with the lowest responsible bidders if multiple contracts will be awarded on the projects when the total of the lowest responsible bids causes the project cost to exceed the appropriation. A bidder is not required to negotiate his bid but is required to honor his bid for the time specified in the bidding documents. The Owner may terminate negotiations at any time (18-2-105(7) MCA).

11. Contract

11.1. The sample Standard Form of Contract between Contractor and Owner, as issued by the Owner, will be used as the contracting instrument and is bound within the Contract Documents.

11.2. The form shall be signed by a proper representative of the bidder as defined above in these instructions.

11.3. The contractor shall also complete and return a federal form W-9 with the Contract.

12. Performance, Labor and Material Payment Security

12.1. IF THE PROJECT COST IS LESS THAN $25,000, AT ITS SOLE DISCRETION THE STATE OF MONTANA MAY OR MAY NOT REQUIRE A PERFORMANCE OR LABOR AND MATERIAL PAYMENT SECURITY (18-2-201 MCA). (**MSU REQUIRES BONDS ON ALL PROJECTS ABOVE $50,000.)**

12.2. THE CONTRACTOR SHALL PROVIDE BOTH SECURITIES FOR THIS PROJECT AS SPECIFIED BELOW, UNLESS SPECIFICALLY DIRECTED THAT THIS REQUIREMENT HAS BEEN WAIVED ELSEWHERE IN THESE DOCUMENTS.

12.3. The Owner shall require the successful bidder to furnish a Performance Bond in the amount of 100% of the contract price as security for the faithful performance of his contract (18-2-201, MCA).

12.4. The Owner shall require the successful bidder to furnish a Labor and Material Payment Bond in the amount of 100% of the contract price as security for the payment of all persons performing labor and furnishing materials in connection therewith (18-2-201 MCA).

12.5. The bonds shall be executed on forms furnished by the Owner. No other forms will be acceptable.

12.6. The bonds shall be signed in compliance with State statutes (33-17-111 MCA).

12.7. Bonds shall be secured from a State licensed bonding company.

12.8. Power of Attorney

12.8.1. Attorneys-in-fact who sign contract bonds must file with each bond a certified and effectively dated copy of their power of attorney;
12.8.2. One original copy shall be furnished with each set of bonds.
12.8.3. Others furnished with a set of bonds may be copies of that original.

13. Notice To Proceed

13.1. The successful bidder who is awarded the contract for construction will not be issued a Notice to Proceed until there is a signed Contract, the specified insurance certificates and a copy of the bidder's current Construction Contractor Registration Certificate in the Owner's possession. All items are required within fifteen (15) calendar days of contract award made by the Owner.

14. Laws and Regulations

14.1. The bidders' attention is directed to the fact that all applicable federal and state laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over the project shall apply to the contract throughout and will be deemed to be included in this contract as if bound herein in full.

15. Payments

15.1. NOTICE OF APPROVAL OF PAYMENT REQUEST PROVISION. Per Title 28, Chapter 2, Part 21, this contract allows the Owner to change the number of days to approve a Contractor's payment request. This contract allows the Owner to approve the Contractor's payment request within thirty-five (35) calendar days after it is received by the Owner without being subject to the accrual of interest.

16. Buy Safe Montana Provisions

16.1. The successful bidder who is awarded the contract for construction shall provide their incident rate, experience modification ratio (EMR) and loss ratio via the Buy-Safe Montana form with the Award documents.

17. Time of Completion

17.1. Bidder agrees to commence work immediately upon receipt of the Notice to Proceed and to substantially complete the project within one hundred twenty (120) consecutive calendar days.

17.2. Actual damages may be assessed pursuant to the General Conditions. The Contractor acknowledges and understands that the Owner may suffer loss for every day of delay Final Acceptance is not achieved. Nothing contained in this waiver of liquidated damages shall be deemed to preclude an award of actual damages in accordance with Paragraphs 4.3 through 4.6 of the General Conditions of the Contract for Construction.

17.3. If liquidated damages are assessed for exceeding the completion date, they shall accrue at the rate of **ONE HUNDRED AND NO/100 ($0.00) DOLLARS** per calendar day. Liquidated damages charges will be deducted from the amount due the Contractor

~END OF INSTRUCTIONS~

CAMPUS PLANNING, DESIGN & CONSTRUCTION
Sixth Avenue and Grant Street • P.O. Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

BID PROPOSAL

Johnson Family Livestock Facility Generator Installation
PPA No. 21-0049

TO:
State of Montana, Montana State University
Campus Planning, Design, and Construction
Attn: Julie Brown, Contract Administrator
Plew Building, 6th & Grant, PO Box 172760
Bozeman, Montana 59717-2760

Prospective Bidders:

The undersigned, having familiarized themselves with the Contract Documents, site, location, and conditions of the Work as prepared by **GPD PC Consulting Engineers, 524 1ST AVENUE SOUTH, GREAT FALLS, MT 59401,406/452-955** or **CAMPUS PLANNING, DESIGN, AND CONSTRUCTION** by submission of this Bid Proposal, hereby agrees to provide all materials, systems, equipment and labor necessary to complete the Work for the total sum as follows:

BASE BID:

_____ and ____ /100 DOLLARS.
(ALPHA notation)

$_____
(NUMERIC notation)

This bidder acknowledges receipt of the following addenda:

ADDENDUM No.: _____ Dated: _____
ADDENDUM No.: _____ Dated: _____
ADDENDUM No.: _____ Dated: _____

By signing below, the bidder agrees to all terms specified and AGREES TO fulfill the requirements of the CONTRACT in strict accordance with the bidding documents.

Company Name: _____

Signature: _____

Print Name: _____

Title: _____

Business Address: _____

_____

_____

Construction Contractor Registration No.: _____

Phone No.: _____

Fax No.: _____

Email: _____

Date: _____

MONTANA
STATE UNIVERSITY

CAMPUS PLANNING, DESIGN & CONSTRUCTION
Sixth Avenue and Grant Street
PO Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

STANDARD FORM OF CONTRACT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION

THIS CONTRACT IS SUBJECT TO ARBITRATION PURSUANT TO THE UNIFORM ARBITRATION ACT, MCA TITLE 27, CHAPTER 5

This **CONTRACT** is made as of: (date)

BETWEEN:

[FIRM NAME]
[ADDRESS]
[CITY, STATE, ZIP]
[PHONE, FAX]

Herein after identified as the "**CONTRACTOR**" and the State of Montana, acting through its Director, Campus Planning, Design, and Construction, hereinafter identified as the "**OWNER**":

State of Montana
Montana State University
Campus Planning, Design, and Construction
Plew Building 6th & Grant, PO Box 172760
Bozeman, Montana 59717-2760

WITNESSETH that the Contractor and the Owner, for the consideration hereinafter named, agree as follows:

ARTICLE 1 – SCOPE OF WORK
The Contractor shall perform all Work as shown in the Contract Documents entitled:

[PROJECT NAME]

PPA NO.: ***[PPA NO.]***

Bid Documents Dated: (alpha date)

As prepared by:

[FIRM NAME]
[ADDRESS]
[CITY, STATE, ZIP]
[PHONE, FAX]

Hereinafter identified as the "**ARCHITECT/ENGINEER**."

ARTICLE 2 – TIME OF COMPLETION
As time is of the essence in performance, coordination, and completion of the Work contemplated under this Contract, the Work to be performed shall commence on a date set forth by the Owner in a written "Notice To Proceed" and shall be completed Within or by:
CONSECUTIVE CALENDAR DAYS.

If the Work is not completed within the time specified, the Owner may assess liquidated damages in the amount of:

[DOLLARS IN ALPHA] DOLLARS ($numeric) PER CALENDAR DAY.

ARTICLE 3 – CONTRACT SUM
The Owner shall pay the Contractor for performance of the Work, subject to additions and/or deductions by Change Order or damages as provided in the Contract Documents, the Contract Sum of:

[DOLLARS IN ALPHA] DOLLARS ($(dollars in numeric)).

ARTICLE 4 – PROGRESS PAYMENTS
The Owner shall make payments on account in accordance with the Contract Documents as follows: Ninety-Five (95%) of the portion of the Contract Sum for labor, materials, and equipment incorporated in the Work and for materials suitable stored. The Contractor shall be aware that the Owner has thirty-five (35) calendar days upon receipt in which to make approval and payment without being in

violation of statute or being subject to the accrual of interest shall, or the need to make written notice or justification to deny payment in whole or in part. The Contractor shall, within seven (7) calendar days following receipt of payment from the Owner, make payment to subcontractor(s).

ARTICLE 5 – FINAL PAYMENT

Final Payment, constituting the entire unpaid balance of the Contract Sum, shall be paid by the Owner to the Contractor when: 1) the Work is completed in accordance with the Contract Documents; 2) the Contract fully performed; 3) a final Form 101, Periodic Estimate for Partial Payment showing the final correct amounts is approved by the Architect/Engineer; 4) a Form 106, "Contractor's Affidavit of Completion, Payment of Debts and Claims, and Release of Liens" is completed and submitted; and 5) a Form 103, "Consent of Surety Company To Final Payment" if required, is completed and submitted.

ARTICLE 6 – CONTRACT DOCUMENTS

The Contract Documents, together with this Contract, form the entire Contract and Agreement between the Contractor and Owner. The Contract Documents, which are totally and completely a part of this Contract as if attached hereto or repeated herein, are enumerated in the General Conditions of the Contract for Construction inclusive of Wage Rates, Reports, and all other items bound with the Specifications and/or Project Manual(s).

ARTICLE 7 – PREVAILING WAGE SCHEDULE

The Contractor and all subcontractors at any tier or level shall, as a minimum, pay the standard prevailing rate of wages schedule (including per diem, fringe benefits for health, welfare, and pension contributions and travel allowance) in effect and as applicable to the district in which the Work is being performed.

ARTICLE 8 – VENUE

In the event of any mediation, arbitration, or litigation concerning any matter or dispute arising out of or related to the Contract, venue shall be the Eighteenth Judicial District in and for the County of Gallatin, Montana. The Contract shall be interpreted and subject to the laws of the State of Montana.

ARTICLE 9 – MISCELLANEOUS PROVISIONS

Other documents if any forming part of these contract documents are as follows:
Addendum #1 dated: ____ Addendum #2 dated: ____ Addendum #3 dated: ____

Contractor's Bid Proposal dated: ____
Contractor's Revised Proposal dated: ____

EXECUTION OF THIS CONTRACT

This Contract is entered into as of the day and year first written above:

CONTRACTOR: **(COMPANY)**
(ADDRESS)
(CITY, STATE, ZIP)
(PHONE, FAX)

_____
(Signature)

_____
(Print Name)

_____
(Title)

_____
(Date)

Contractor's Registration Certificate No. _____

Federal Tax Identification No. _____

Incorporated? _____ No _____ yes

Please refer to PPA No. in all correspondence.

OWNER: STATE OF MONTANA
MONTANA STATE UNIVERSITY
CAMPUS PLANNING, DESIGN, AND CONSTRUCTION
6TH & GRANT AVENUE, P.O. Box 172760
BOZEMAN, MONTANA 59717-2760

_____
John How, Director

_____
(Date)

GENERAL CONDITIONS
OF THE CONTRACT FOR CONSTRUCTION

State of Montana Version
(Form Revision Date: 5/2021)

FRONT PAGE HIGHLIGHTS

Note: This list of items is not an exhaustive or all-inclusive list of the contractor's responsibilities for the Project but is provided solely for convenience and reference.

ITEM	REFERENCE	GENERAL CONDITIONS
Prevailing Wage Rates	Article 3.4.4	The Commissioner of The Montana Department of Labor and Industry (DOLl) has established the standard prevailing rate of wages in accordance with 18-2-401 and 18-2-402, MCA.
Warranty	Article 3.5.2	The warranty period shall be defined as commencing with Substantial Completion (or with each Substantial Completion if there is more than one) of the Project, or any portion thereof, and continuing for one (1) calendar year from the date of Final Acceptance of the entire project.
Schedule	Article 3.10.1	The Contractor's schedule shall be in the "Critical Path Method" and shall be in a form that is acceptable to the Owner and meet all the conditions of 3.10.
Time Limit on Claims	Article 4.3.1.1	Claims by either party must be initiated within 21 calendar days after occurrence of the event giving rise to such claim.
Weather Delays	Article 4.3.5.2	If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the current critical- path scheduled construction activities.
Waiver of Consequential Damages	Article 4.3.6	The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract.
Mediation & Arbitration	Article 4.5 & 4.6	The parties shall endeavor to resolve their Claims by mediation unless the parties mutually agree otherwise. Claims not resolved by mediation shall be decided by arbitration.
Changes	Article 7	Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive, or order for a minor change in the Work subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.
Change Order Allowable Costs	Article 7.2.2.1	As described with a 5% allowance for overhead and a 10% allowance for profit.
Time	Article 8	Time is of the essence in performance, coordination, and completion of the Work contemplated herein.
Liquidated Damages	Article 8.1.6	The Contractor and his surety shall be liable for and shall pay to the Owner the sums stipulated as liquidated damages for each calendar day of delay until the Work is substantially complete.
Contract Duration/Milestones/Phases	Article 8.1.9	All Work shall reach Substantial Completion by the date(s) listed or within the consecutive calendar days indication after the start date on the written Notice To Proceed.
Applications for Payment	Article 9.3.2	The Owner has thirty-five (35) calendar days after receipt for approval of the Contractor's Pay Request without being subject to the accrual of interest.
Retainage	Article 9.3.7	Until the Work is complete, the Owner will pay 95% of the amount due the Contractor on account of progress payments. If the Work and its progress are not in accordance with all or any part, piece, or portion of the Contract Documents, the Owner may, at its sole discretion and without claim by the Contractor, increase the amount held as retainage to whatever level deemed necessary to effectuate performance and progress of the Work.
Safety & Protection	Article 10	The Contractor shall be solely responsible for initiating, maintaining and supervising all safety, safety precautions, and safety programs in connection with the performance of the Contract.
Indemnification and Insurance Requirements	Article 11	The Contractor shall indemnify the Owner against the Contractor's negligence. The Contractor shall least carry Workers' Comp, General Liability, Automobile/Equipment, and Property (all-risk) Insurance Coverages as identified. State of Montana shall be listed as an additional insured with copy of ENDORSEMENT provided along with certificates of insurance. No waivers of subrogation shall be accepted.
Performance & Payment Bonds	Article 11.7	The Contract shall furnish a Performance Bond in the amount of 100% of the contract price as security for the faithful performance of his contract. The Contractor shall also furnish a Labor and Material Payment Bond in the amount of 100% of the contract price as security for the payment of all persons performing labor and furnishing materials in connection therewith.
Payroll & Basic Records	Article 13.8	Payrolls and basic records pertaining to the project shall be kept on a generally recognized accounting basis and shall be available to the Owner, Legislative Auditor, the Legislative Fiscal Analyst or his authorized representative at mutually convenient times. Accounting records shall be kept by the Contractor for a period of three years after the date of the Owner's Final Acceptance of the Project.

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GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

(Form Revision Date: MSU 5/2021)

1. ARTICLE 1 – GENERAL PROVISIONS

1.1. BASIC DEFINITIONS

1.1.1. CONTRACT DOCUMENTS. The Contract Documents consist of the Contract between Owner and Contractor (hereinafter the "Contract"), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Contract and Modifications issued after execution of the Contract. A Modification is: (1) a written amendment to the Contract signed by both parties; (2) a Change Order; (3) a Construction Change Directive; or, (4) a written order for a minor change in the Work issued by the Architect/Engineer. The Contract Documents shall include the bidding documents and any alterations made thereto by addenda. In the event of a conflict, discrepancy, contradiction, or inconsistency within the Contract Documents and for the resolution of same, the following order of hierarchy and control shall apply and prevail:

1) Contract; 2) Addenda; 3) Supplementary General Conditions; 4) General Conditions; 5) Specifications; 6) Drawings; 7) Instructions to Bidders; 8) Invitation To Bid; 9) Sample Forms.

1.1.1.1. If a conflict, discrepancy, contradiction, or inconsistency occurs within or between the Specifications and the Drawings, resolution shall be controlled by the following:

1.1.1.1.1. As between figures, dimensions, or numbers given on drawings and any scaled measurements, the figures, dimensions, or numbers shall govern;
1.1.1.1.2. As between large scale drawings and small scale drawings, the larger scale drawings shall govern;
1.1.1.1.3. As between the technical specifications and drawings; the technical specifications shall govern.
1.1.1.1.4. Shop Drawings and Submittals: Shop drawings and other submittals from the Contractor, subcontractors, or suppliers do not constitute a part of the Contract Documents.

1.1.1.2. The Contractor acknowledges, understands and agrees that the Contract Documents cannot be changed except as provided herein by the terms of the Contract. No act(s), action(s), omission(s), or course of dealing(s) by the Owner or Architect/Engineer with the Contractor shall alter the requirements of the Contract Documents and that alteration can be accomplished only through a written Modification process defined herein.

1.1.2. THE DRAWINGS. The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, intent, location, and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

1.1.3. THE SPECIFICATIONS. The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

1.1.4. THE CONTRACT. The entire Contract for Construction is formed by the Contract Documents. The

Contract represents the entire, complete, and integrated agreement between the Owner and Contract hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between: (1) the Architect/Engineer and Contractor; (2) the Owner and any Subcontractor, Sub-subcontractor, or Supplier; (3) the Owner and Architect/Engineer; or, (4) between any persons or entities other than the Owner and Contractor. However, the Architect/Engineer shall at all times be permitted and entitled to performance and enforcement of its obligations under the Contract intended to facilitate performance of the Architect/Engineer's duties.

1.1.5. THE WORK. The term “Work” means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to completely fulfill the Contract and the Contractor's obligations. The Work may constitute the whole or a part of the Project.

1.1.6. THE PROJECT. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner or by separate contractors.

1.1.7. TIME. Time is of the essence in performance, coordination, and completion of the Work contemplated herein. The Owner may suffer damages if the Work is not completed as specified herein. When any duration or time period is referred to in the Contract Documents by days, the first day of a duration or time period shall be determined as the day following the current day of any event or notice starting a specified duration. All durations in the Contract Documents are calendar days unless specifically stated otherwise.

1.2. CORRELATION, INTER-RELATIONSHIP, AND INTENT OF THE CONTRACT DOCUMENTS

1.2.1. The intent of the Contract Documents is to include all items and all effort necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary and inter-related, and what is required by one shall be as binding as if required by all. Performance by the Contractor shall be required to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

1.2.2. Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade. It is the Contractor’s responsibility to control the Work under the Contract.

1.2.3. Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

1.3. CAPITALIZATION

1.3.1. Terms capitalized in these General Conditions include those which are: (1) specifically defined; and, (2) the titles of numbered articles and identified references to Paragraphs, Subparagraphs and Clauses in the document.

1.4. INTERPRETATION

1.4.1. In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

1.5. EXECUTION OF THE CONTRACT AND CONTRACT DOCUMENTS

1.5.1. The Contract shall be signed by the Owner and Contractor. Execution of the Contract by the Contractor constitutes the complete and irrevocable binding of the Contractor and his Surety to the Owner for complete performance of the Work and fulfillment of all obligations. By execution of the Contract, the Contractor acknowledges that it has reviewed and familiarized itself with all aspects of the Contract Documents and agrees to be bound by the terms and conditions contained therein.

1.5.2. Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

1.5.3. The Contractor acknowledges that it has taken all reasonable actions necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to: (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, gas, electric power, phone service, and roads; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation, topography, and conditions of the ground; and, (5) the character of equipment and facilities needed for performance of the Work. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory geotechnical work done by the Owner, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the action described and acknowledged in this paragraph will not relieve the Contractor from responsibility for properly ascertaining and estimating the difficulty and cost of successfully performing the Work or for proceeding to successfully perform the Work without additional expense to the Owner.

1.5.4. The Owner assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the Owner, nor does the Owner assume responsibility for any understanding reached or representation made by any of its officers, agents, or employees concerning conditions which can affect the Work unless that understanding or representation is expressly stated in the Contract Documents.

1.5.4.1. Performance of any portion of the Work beyond that required for complying with the specifications and all other requirements of the Contract, shall be deemed to be for the convenience of the Contractor and shall be at the Contractor's sole expense.

1.5.4.2. There shall be no increase in the contract price or time allowed for performance which is for the convenience of the Contractor.

1.6. OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS, AND OTHER INSTRUMENTS OF SERVICE

1.6.1. The Drawings, Specifications and other documents, including those in electronic form, prepared by the Architect/Engineer and the Architect/Engineer's consultants are Instruments of Service through which the Work to be executed by the Contractor is described. The Contractor may retain one record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect/Engineer or the Architect/Engineer's consultants. Unless otherwise indicated, the Architect/Engineer and the Architect/Engineer's consultants shall be deemed the authors of them and will retain all common law, statutory and other reserved rights, in addition to the copyrights except as defined in the Owner's Contract with the Architect/Engineer. All copies of Instruments of Service, except the Contractor's record set, shall be returned or suitably accounted for to the Architect/Engineer upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect/Engineer and the Architect/Engineer's consultants, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect/Engineer, and the Architect/Engineer's consultants. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect/Engineer and the Architect/Engineer's consultants appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the Drawings Specifications and other documents prepared by the Architect/Engineer and the Architect/Engineer's consultants. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect/Engineer's or Architect/Engineer's consultants' copyrights or other reserved rights.

1.6.2. Owner's Disclaimer of Warranty: The Owner has requested the Architect/Engineer prepare the Contract Documents for the Project which are adequate for bidding and constructing the Project. However, the Owner makes no representation, guarantee, or warranty of any nature whatsoever to the Contractor concerning such documents. The Contractor hereby acknowledges and represents that it has not, does not, and will not rely upon any such representation, guarantee, or warranty concerning the Contract Documents as no such representation, guarantee, or warranty have been or are hereby made.

2. ARTICLE 2 – THE OWNER

2.1. THE STATE OF MONTANA

2.1.1. The Owner is the State of Montana and is the sole entity to be identified as Owner in the Contract and as referred to throughout the Contract Documents as if singular in number.

2.1.2. Except as otherwise provided in Subparagraph 4.2.1, the Architect/Engineer does not have authority to bind the Owner. The observations and participations of the Owner or its authorized representative do not alleviate any responsibility on the part of the Contractor. The Owner reserves the right to observe the work and make comment. Any action or lack of action by the Owner shall not be construed as approval of the Contractor's performance.

2.1.3. The Owner reserves the right to require the Contractor, all sub-contractors and material suppliers to provide lien releases at any time. The Owner reserves the right to withhold progress payments until such lien releases are received for all work for which prior progress payments have been made. Upon the Owner's demand for lien releases (either verbally or written), the Contractor, all sub-contractors and material suppliers shall provide such releases with every subsequent application for payment through Final Acceptance of the Project.

2.1.4. Except for permits and fees, including those required under Subparagraph 3.7.1, which are the responsibility of the Contractor under the Contract Documents, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

2.1.5. Information or services required of the Owner by the Contract Documents shall be furnished by the Owner with reasonable promptness. Any other information or services relevant to the Contractor's performance of the Work under the Owner's control shall be furnished by the Owner after receipt from the Contractor of a written request for such information or services.

2.1.6. Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, such copies of Drawings and Specifications as are reasonably necessary for execution of the Work.

2.2. OWNER'S RIGHT TO STOP WORK

2.2.1. If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents as required by Paragraph 12.2 or persistently fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated. However, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Subparagraph 6.1.3. The issuance of a stop work order by the Owner shall not give rise to a claim by the Contractor or any subcontractor for additional cost, time, or other adjustment.

2.3. OWNER'S RIGHT TO CARRY OUT THE WORK

2.3.1. If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may after such seven-day period give the Contractor a second written notice to correct such deficiencies within a three-day period. If the Contractor within such three-day period after receipt of such second notice fails to commence and continue to correct any deficiencies, the Owner may, without prejudice to other remedies

the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and increased costs, and compensation for the Architect/Engineer's additional services made necessary by such default, neglect, or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

2.4. OWNER'S RIGHT TO PERSONNEL

2.4.1. The Owner reserves the right to have the Contractor and/or subcontractors remove person(s) and/or personnel from any and all work on the project with cause but without cost to the Owner. Such requests from the Owner may be made verbally or in writing and may be done directly with the Contractor or indirectly through the Architect/Engineer. Cause may be, but not limited to, any of the following: incompetence, poor workmanship, poor scheduling abilities, poor coordination, disruption to the facility or others, poor management, causes delay or delays, disruption of the Project, will not strictly adhere to facility procedures and Project requirements either knowingly or unknowingly, insubordination, drug/alcohol use, possession of contraband, belligerent acts or actions, etc. The Contractor shall provide replacement person(s) and/or personnel acceptable to the Owner at no cost to the Owner.

2.4.2. Any issue or circumstance relating to or resulting out of this clause shall not be construed or interpreted to be interference with or impacting upon the Contractor's responsibilities and liabilities under the Contract Documents.

2.4.3. Person(s) and/or personnel who do not perform in accordance with the Contract Documents, shall be deemed to have provided the Owner with cause to have such persons removed from any and all involvement in the Work.

2.4.4. The Contractor agrees to indemnify and hold harmless the Owner from any and all causes of action, demands, claims, damages, awards, attorneys' fees, and other costs brought against the Owner and/or Architect/Engineer by any and all person(s) or personnel as a result of actions under this clause.

3. ARTICLE 3 – THE CONTRACTOR

3.1. GENERAL

3.1.1. The Contractor is the person or entity identified as such in the Contract and is referred to throughout the Contract Documents as if singular in number. The term "Contractor" means the Contractor or the Contractor's authorized representative.

3.1.2. Construction Contractor Registration: The Contractor is required to be registered with the Department of Labor and Industry under 39-9-201 and 39-9-204 MCA prior to the Contract being executed by the Owner. A bidder must demonstrate that it has registered or promises that it will register immediately upon notice of award and prior to the commencement of any work. If the prevailing bidder cannot or does not register in time for the Owner to execute the Contract within fifteen (15) days of the date on the notice of award, the Owner may award, at its sole discretion, to the next lowest responsible bidder who meets this requirement. The Owner will not execute a contract for construction nor issue a Notice to Proceed to a Contractor who is not registered per 39-9-401(a) MCA. It is solely the Contractor's responsibility to ensure that all Subcontractors are registered in accordance with Title 39, Chapter 9, MCA.

3.1.3. The Owner's engagement of the Contractor is based upon the Contractor's representations by submission of a bid to the Owner that it:

3.1.3.1. has the requisite skills, judgment, capacity, expertise, and financial ability to perform the Work;

3.1.3.2. is experienced in the type of labor and services the Owner is engaging the Contractor to perform;

3.1.3.3. is authorized, licensed and registered to perform the type of labor and services for which it is being engaged in the State and locality in which the Project is located;

3.1.3.4. is qualified, willing and able to perform the labor and services for the Project in the manner and scope defined in the Contract Documents; and,

3.1.3.5. has the expertise and ability to provide labor and services that will meet the Owner's objectives, intent and requirements, and will comply with the requirements of all governmental, public, and quasi-public authorities and agencies having or asserting jurisdiction over the Project.

3.1.4. The Contractor shall perform the Work in accordance with the Contract Documents.

3.1.5. The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect/Engineer in the Architect/Engineer's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

3.1.6. Quality Control (i.e. ensuring compliance with the Contract Documents) and Quality Assurance (i.e. confirming compliance with the Contract Documents) are the responsibility of the Contractor. Testing, observations, and/or inspections performed or provided by the Owner are solely for the Owner's own purposes and are for the benefit of the Owner. The Owner is not liable or responsible in any form or fashion to the Contractor regarding quality assurance or extent of such assurances. The Contractor shall not, under any circumstances, rely upon the Owner's testing or inspections as a substitute or in lieu of its own Quality Control or Assurance programs.

3.1.7. Buy-Safe Montana Provision: The Owner shall review the Buy-Safe Montana Form provided by the Bidder under Articles 16 of the Instructions to Bidders. To promote a safe work environment, the Owner encourages an incidence rate less than the latest average for non-residential building construction for Montana as established by the federal Bureau of Labor Statistics for the prior year; an experience modification rating (EMR) less than 1.0; and a loss ratio of less than 100%. The Contractor with a greater-than-average incidence rate, an EMR greater than 1.0, and a loss ratio of more than 100% shall schedule and obtain a Comprehensive Safety Consultation from the Montana Department of Labor & Industry, Employment Relations Division, Safety Bureau before the Owner grants Substantial Completion of the Work. For assistance in obtaining the Comprehensive Safety Consultation, visit http://erd.dli.mt.gov/safety-health/onsite-consultation.

3.2. REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

3.2.1. Since the Contract Documents are complementary and inter-related, before starting each portion of the Work, the Contractor shall carefully study and compare the various Drawings and other Contract Documents relative to that portion of the Work, shall take field measurements of any existing conditions related to that portion of the Work and shall observe any conditions affecting the Work. These obligations are for the purpose of facilitating construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents. However, any errors, inconsistencies or omissions discovered by the Contractor shall be reported promptly to the Architect/Engineer as a request for information in such form as the Architect/Engineer may require.

3.2.2. Any errors or omissions noted by the Contractor during this review shall be reported promptly to the Architect/Engineer, but it is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents.

3.2.3. If the Contractor believes that additional cost or time is involved because of clarifications or instructions issued by the Architect/Engineer in response to the Contractor's notices or requests for information pursuant to Subparagraphs 3.2.1 and 3.2.2, the Contractor shall make Claims as provided in Subparagraphs 4.3.4 and 4.3.5. If the Contractor fails to perform the obligations of Subparagraphs 3.2.1 and 3.2.2, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. The Contractor shall not be liable to the Owner or Architect/Engineer for damages resulting from errors, inconsistencies, or omissions in the Contract Documents or for differences between field measurements or conditions and the Contract Documents unless the Contractor recognized such error, inconsistency, omission or difference and failed to report it to the Architect/Engineer.

3.2.4. Except as otherwise expressly provided in this Contract, the Contractor assumes all risks, liabilities, costs, and consequences of performing any effort or work in accordance with any written or oral order (including but not limited to direction, instruction, interpretation, or determination) of a person not authorized in writing by the Owner to issue such an order.

3.2.5. By entering into this Contract, the Contractor acknowledges that it has informed itself fully regarding the requirements of the Drawings and Specifications, the General Conditions, the Supplementary General Conditions, all other documents comprising a part of the Contract Documents and all applicable laws, building codes, ordinances and regulations. Contractor hereby expressly acknowledges, guarantees, and warrants to the Owner that:

3.2.5.1. the Contract Documents are sufficient in detail and scope to enable Contractor to construct the finished project;

3.2.5.2. no additional or further work should be required by Owner at the time of Owner's acceptance of the Work; and,

3.2.5.3. when the Contractor's work is finished and the Owner accepts, the Work will be complete and fit for the purpose intended by the Contract Documents. This acknowledgment and guarantee does not imply that the Contractor is assuming responsibilities of the Architect/Engineer.

3.2.6. Sufficiency of Contract Documents: Prior to submission of its bid, and in all events prior to and upon signing the Contract, the Contractor certifies, warrants and guarantees that it has received, carefully reviewed, and evaluated all aspects of the Contract Documents and agrees that said Documents are adequate, consistent, coordinated, and sufficient for bidding and constructing the Work requested, intended, conceived, and contemplated therein.

3.2.6.1. The Contractor further acknowledges its continuing duty to review and evaluate the Contract Documents during the performance of its services and shall immediately notify the Architect/Engineer of any problems, conflicts, defects, deficiencies, inconsistencies, errors, or omissions it discovers in the Contract Documents and the Work to be constructed; and, any variances it discovers between the Contract Documents and applicable laws, statutes, building codes, rules or regulations.

3.2.6.2. If the Contractor performs any Work which it knows or should have known due to its experience, ability, qualifications, and expertise in the construction industry, that involves problems, conflicts, defects, deficiencies, inconsistencies, errors, or omissions in the Contract Documents and the Work to be constructed and, any variances between the Contract Documents and applicable laws, statutes, building codes, rules or regulations, without prior written notification to the Architect/Engineer and without prior authorization to proceed from the Architect/Engineer, the Contractor shall be responsible for and bear the costs and delays (including costs of any delay) of performing such Work and all corrective actions as directed by the Architect/Engineer.

3.2.6.3. Any and all claims resulting from the Contractor’s failure, including those of any subcontractor or supplier, to carefully review, evaluate, and become familiar with all aspects of the Contract Documents shall be deemed void and waived by the Contractor.

3.2.7. Sufficiency of Site Conditions: Prior to submission of its bid, and in all events prior to and upon signing the Contract, the Contractor certifies, warrants and guarantees that it has visited, carefully reviewed, evaluated, and become familiar with all aspects of the site and local conditions at which the Project is to be constructed. The Contractor agrees that the Contract Documents are an adequate, consistent, coordinated, and sufficient representation of the site and local conditions for the Work.

3.2.7.1. The Contractor has reviewed and become familiar with all aspects with the Site Survey and Geotechnical Report for the Project and has a full understanding of the information provided therein.

3.2.7.2. If the Work involves modifications, renovations, or remodeling of an existing structure(s) or other man-made feature(s), the Contractor certifies, warrants and guarantees that it has

reviewed, evaluated, and become familiar with all available as-built and record drawings, plans and specifications, and has thoroughly inspected and become familiar with the structure(s) or man-made feature(s).

3.2.7.3. Any and all claims resulting from the Contractor's failure, including those of any subcontractor or supplier, to visit, carefully review, evaluate, and become familiar with all aspects of the site, available geotechnical information, and local conditions at which the Project is to be constructed shall be deemed void and waived by the Contractor.

3.3. SUPERVISION AND CONSTRUCTION PROCEDURES

3.3.1. The Contractor shall supervise and direct the Work using the Contractor's best skill and attention recognizing that time and quality are of the essence of the Work. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. It is the responsibility of and incumbent upon the Contractor to ensure, confirm, coordinate, inspect and oversee all Work (which is inclusive of but not limited to all submittals, change orders, schedules, workmanship, and appropriate staffing with enough competent and qualified personnel) so that the Work is not impacted in terms of any delays, costs, damages, or additional time, or effort on the part Architect/Engineer or Owner. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect/Engineer and shall not proceed with that portion of the Work without further written instructions from the Architect/Engineer. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Architect/Engineer or Owner as appropriate shall be solely responsible for any resulting loss or damage. The Contractor will be required to: review any specified construction or installation procedure; advise the Architect/Engineer if the specified procedure deviates from good construction practice; to advise the Architect/Engineer if following the procedure will affect any warranties, including the Contractor's general warranty, or of any objections the Contractor may have to the procedure and shall propose any alternative procedure which the Contractor will warrant and guarantee. The Contractor is required to: review any specified construction or installation procedure; advise the Architect/Engineer if the specified procedure deviates from good construction practice; to advise the Architect/Engineer if following the procedure will affect any warranties, including the Contractor's general warranty, or of any objections the Contractor may have to the procedure and to propose any alternative procedure which the Contractor will warrant.

3.3.2. The Contractor shall furnish management, supervision, coordination, labor and services that: (1) expeditiously, economically, and properly completes the Work; (2) comply with all requirements of the Contract Documents; and, (3) are performed in a quality workmanlike manner and in accordance with the standards currently practiced by persons and entities performing or providing comparable management, supervision, labor and services on projects of similar size, complexity, cost, and nature to this Project. However, the standards currently practiced within the construction industry shall not relieve the Contractor of the responsibility to perform the Work to the level of quality, detail, and excellence defined and intended by the Contract Documents as interpreted by the Architect/Engineer.

3.3.3. All services and labor rendered by the Contractor, including any subcontractors or suppliers, shall be performed under the immediate supervision at the site of persons possessing expertise and the requisite knowledge in the discipline or trade of service being rendered. The Contractor shall maintain such supervision and personnel at all times that the Contractor's personnel, subcontractors, and/or suppliers are at the site. The Contractor shall never be absent from the site during performance of any portion of the Work by any entity under the supervision and direction of the Contractor. Full time attendance by the Contractor from Notice to Proceed through Final Acceptance is an explicit requirement of this Contract.

3.3.4. The Contractor shall be responsible to the Owner for acts, damages, errors, and omissions of the Contractor's employees, subcontractors and their agents and employees, and other persons or entities performing portions of the Work for or on behalf of the Contractor or any of its Subcontractors.

3.3.5. The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

3.4. LABOR, WAGES, AND MATERIALS

3.4.1. Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, permits, licenses, goods, products, equipment, tools, construction equipment and machinery, water, heat, all utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work in accordance with the Contract Documents, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

3.4.2. The Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect/Engineer and in accordance with a Change Order. This opportunity to request substitutions does not negate or waive any requirement for the Contractor to follow a pre-bidding “prior approval” requirement nor obligate the Owner to approve any substitution request.

3.4.3. The Contractor shall enforce strict discipline, appropriate behavior, and good order among the Contractor's employees, subcontractors at every tier and level, and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

3.4.4. Prevailing Wages and Montana Residents.

3.4.4.1. The Contractor and all subcontractors at any level or tier of the Work shall give preference to the employment of bona fide Montana residents in the performance of the Work and shall pay the standard prevailing rate of wages, including fringe benefits for health and welfare and pension contributions and travel allowance provisions in effect and applicable to the county or locality in which the work is being performed. (18-2-403, MCA)

3.4.4.2. At least 50% of the workers, as defined by the Department of Labor & Industry (DOLI), must be bona fide Montana residents. (18-2-401, 18-2-402, MCA)

3.4.4.3. Indian Employment Preference within the Boundaries of an Indian Reservation. All contractors that are awarded a state agency construction contract within the exterior boundaries of an Indian Reservation shall extend a hiring preference to qualified Indians as provided herein:

3.4.4.3.1. “State agency” means a department, office, board, bureau, commission, agency, or other instrumentality of the executive or judicial branches of the government of this State. “Indian” means a person who is enrolled or who is a lineal descendent of a person enrolled in an enrollment listing of the Bureau of Indian Affairs or in the enrollment listing of a recognized Indian tribe domiciled in the United States.

3.4.4.3.2. Qualified Indians – Employment Criteria: An Indian shall be qualified for employment in a permanent, temporary, or seasonal position if he or she has substantially equal qualifications for any position and resides on the reservation where the construction contract is to be performed.

3.4.4.3.3. Non-Applicability: The Indian Employment Preference Policy does not apply to a project partially funded with federal-aid money from the United States Department of Transportation or when residency preference laws are specifically prohibited by federal law. It does not apply to independent contractors and their employees, student interns, elected officials, or appointed positions.

3.4.4.4. The Commissioner of The Montana Department of Labor and Industry (DOLI) has established the standard prevailing rate of wages in accordance with 18-2-401 and 18-2-402, MCA. A copy of the Rates entitled "State of Montana, Prevailing Wage Rates" are bound herein. The Commissioner of the Montana DOLI has established the resident requirements in accordance with 18-2-409, MCA. The Contractor and all subcontractors at any level or tier of the Work

shall direct any and all questions concerning prevailing wage and Montana resident issues for all aspects of the Work to DOLI.

3.4.4.5. The Contractor and all subcontractors at any tier or level of the Work, and as determined by the Montana DOLI, shall classify all workers in the project in accordance with the State of Montana, Prevailing Wage Rates. In the event the Contractor is unable to classify a worker in accordance with these rates he shall contact DOLI for a determination of the classification and the prevailing wage rate to be paid.

3.4.4.6. The Contractor and all subcontractors at any tier or level of the Work shall be responsible for obtaining wage rates for all workers prior to their performing any work on the project. The Contractor is required to pay and insure that its subcontractors at any tier or level and others also pay the prevailing wage determined by the DOLI, insofar as required by Title 18 of the MCA and the pertinent rules and standards of DOLI.

3.4.4.7. It is not the responsibility of the Owner to determine who classifies as a subcontractor, sub-subcontractor, material man, supplier, or any other person involved in any aspect of the Work at any tier or level. All such determinations shall be the sole responsibility of the Contractor, subcontractors, sub-subcontractors, material men, suppliers and others involved in the project at any tier or level. The Contractor, subcontractors, sub-subcontractors, material men, suppliers and others involved in the project shall indemnify and hold harmless the Owner from all claims, attorneys' fees, damages and/or awards involving prevailing wage or Montana resident issues. Any changes to wages or penalties for failure to pay the correct wages will be the sole responsibility of the Contractor and/or his subcontractors and no further charges or claims shall be made to the Owner. If the parties mutually agree or an arbitrator or court determines that any change in wages is due and any part is attributable to the Owner, the Owner's sole liability shall be for the amount of wages ordered only and not for other expenses, charges, penalties, overhead, profit or other mark-ups.

3.4.4.8. In accordance with 18-2-422(1) MCA, each job classification's standard prevailing wage rate, including fringe benefits, that the contractors and employers shall pay during construction of the project is included herein by both reference to DOLI's "Building" or 'Heavy/Highway" schedules and as part of these Contract Documents.

3.4.4.9. The Contractor and every employer, including all subcontractors at any tier or level, is required by 18-2-422(2) MCA to maintain payroll records in a manner readily capable of being certified for submission under 18-2-423 MCA, for a period of not less than 3 years after the contractor's, subcontractor's, or employer's completion of work on the project or the Final Acceptance by the Owner, whichever is later.

3.4.4.10. Each contractor is required by 18-2-422(3) MCA to post in a visible and accessible location a statement of all wages and fringe benefits in compliance with 18-2-423.

3.5. WARRANTY AND GUARANTEE

3.5.1. The Contractor warrants to the Owner and Architect/Engineer that materials and equipment furnished under the Contract will be new and of good quality unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective and rejected. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect/Engineer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

3.5.2. The Contractor shall and does hereby warrant and guarantee all work, workmanship, and materials for the full warranty period as specified in the Contract Documents. The warranty period shall be defined as commencing with Substantial Completion (or with each Substantial Completion if there is more than one) of the Project, or any portion thereof, and continuing for one (1) calendar year from the date of Final Acceptance of the entire project by the Owner. The date of Final Acceptance shall be the date of the

Architect/Engineer's signature on the final request for payment unless otherwise agreed upon in writing for the entire project or any portion thereof, by the Owner, Architect/Engineer and Contractor.

3.5.3. In addition to the one (1) calendar year warranty and guarantee specified in this herein above, the Contractor warrants and guarantees all materials and workmanship for the roofing system for a period of two (2) calendar years from the date of Final Acceptance. This warranty shall cover all labor and materials for roof and roofing finish systems (e.g. flashing, terminations, parapet caps, etc.) repairs from moisture penetration and/or defects in workmanship.

3.5.4. Manufacturer and product warranties and guarantees, as provided by the manufacturer or as specified in the Contract Documents, are in addition to the Contractor's warranty.

3.6. TAXES

3.6.1. The Contractor is responsible for and shall pay all sales, consumer, use, and similar taxes for the Work provided by the Contractor which are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

3.6.2. In compliance with 15-50-206 MCA, the Contractor will have 1% of his gross receipts withheld by the Owner from all payments due and sent to the Montana Department of Revenue. Each subcontractor who performs work greater than $5,000 shall have 1% of its gross receipts withheld by the Contractor and sent to the Montana Department of Revenue. The Contractor shall notify the Department of Revenue on the Department's prescribed form.

3.7. PERMITS, FEES, AND NOTICES

3.7.1. Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract, including but not limited to, the building permit fee, electrical, plumbing, sewer connection fee and mechanical permit fee, and any required impact fees and which are legally required when bids are received or negotiations concluded.

3.7.2. The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities applicable to performance of the Work.

3.7.3. If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations, and does so without providing notice to the Architect/Engineer and Owner, the Contractor shall assume responsibility for such Work and shall bear the costs attributable to correction. The Contractor shall be solely responsible to insure that all work it performs is in full compliance with all prevailing and applicable codes and regulations.

3.7.4. Incident Reporting: The Contractor shall immediately notify the Owner and Architect/Engineer, both orally and in writing, of the nature and details of all incidents which may adversely affect the quality or progress of the Work, including, but not limited to, union disputes, accidents, delays, damages to Work, and other significant occurrences. Such notices are in addition to any other notices required regarding claims.

3.8. ALLOWANCES

3.8.1. The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct.

3.8.2. Unless otherwise provided in the Contract Documents:

3.8.2.1. allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

3.8.2.2. Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included by the Contractor in the Contract Sum but not in the allowances;

3.8.2.3. whenever costs are more than or less than stated allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect: (1) the difference between actual costs and the allowances under Clause 3.8.2.1; and, (2) changes in Contractor's costs under Clause 3.8.2.2.

3.8.3. Materials and equipment under an allowance shall be selected by the Owner.

3.9. CONTRACTOR'S PERSONNEL

3.9.1. The Contractor shall employ competent personnel, supervisors, project managers, project engineers, project superintendent, and all others who shall be assigned to the Work throughout its duration. Contractor's personnel extend to those employed by the Contractor whether at the site or not. The Owner shall have right to review and approve or reject all replacement of Contractor's personnel. All personnel assigned by the Contractor to the Work shall possess the requisite experience, skills, abilities, knowledge, and integrity to perform the Work.

3.9.2. The superintendent and others as assigned shall be in attendance at the Project site during the performance of any and all Work. The superintendent shall represent the Contractor. All communications given to the Contractor's personnel such as the project manager or the superintendent, whether verbal, electronic or written, shall be as binding as if given to the Contractor.

3.9.3. It is the Contractor's responsibility to appropriately staff, manage, supervise and direct the Work which is inclusive of the performance, acts, and actions of his personnel and subcontractors. As such, the Contractor further agrees to indemnify and hold harmless the Owner and the Architect/Engineer, and to protect and defend both from and against all claims, attorneys' fees, demands, causes of action of any kind or character, including the cost of defense thereof, arising in favor of or against the Owner, Architect/Engineer, Contractor, their agents, employees, or any third parties on account of the performance, behavior, acts or actions of the Contractor's personnel or subcontractors.

3.9.4. Prior to the commencement of any work, the Contractor shall prepare and submit a personnel listing and organizational chart in a format acceptable to the Owner which lists by name, phone number (including cell phone), job category, and responsibility the Contractor's key/primary personnel who will work on the Project. The Contractor shall promptly inform the Owner in writing of any proposed replacements, the reasons therefore, and the name and qualifications of any proposed replacements. The Owner shall have the right to reject any proposed replacements without cost or claim being made by the Contractor. The chart shall be provided to the Owner at the time of the pre-construction conference.

3.9.5. The Contractor shall immediately remove for the duration of the Project, any person making an inappropriate racial, sexual, or ethnic comment, statement, joke, or gesture toward any other individual.

3.9.6. The Contractor shall immediately remove for the duration of the Project, any person who is incompetent, careless, disruptive, or not working in harmony with others.

3.10. CONSTRUCTION SCHEDULES

3.10.1. The Contractor shall, promptly after being awarded the Contract, prepare and submit for the Owner's and Architect/Engineer's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and per the requirements of the Contract Documents, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The Contractor's schedule shall be in the "Critical Path Method" and shall show the Critical Path of the Work in sufficient detail to evaluate the Contractor's progress. A request for time extension by the Contractor will not be allowed unless a change in the Work is approved by the Owner and materially affects the Critical Path. It is the Contractor's responsibility to demonstrate that any time extensions requests materially affect the Critical Path.

3.10.2. The Contractor shall prepare and keep current, for the Architect/Engineer's approval, a schedule of submittals which is coordinated with the Contractor's Construction Schedule and allows the Architect/Engineer reasonable time to review submittals.

3.10.3. The Contractor shall perform the Work in accordance with the most recent schedule submitted to the Owner and Architect/Engineer.

3.10.4. The Contractor's operations (including but not limited to the Contractor's forces employed, sequences of operations, and methods of operation) at all times during the performance of the contract shall be: (a) subject to the review of the Owner or the Architect/Engineer; and, (b) sufficient to insure the completion of the Work within the specified performance period.

3.10.5. The Critical Path Method Construction Schedule prepared by the Contractor must be in a form that is acceptable to both the Architect/Engineer and the Owner.

3.10.5.1. The Schedule shall show the estimated progress of the entire Project through the individual time periods allowed for completion of each discipline, trade, phase, section, and aspect of the Work. The Contractor shall provide written reports of all logic and resource loading data with the Schedule and with all updates to the Schedule.

3.10.5.2. The Schedule shall show percent complete, progress to date, project work, and projected time to complete the work for all activities. The percent complete and minor schedule changes, including additions of activities, change orders, construction change directives, changes to sequences of activities and significant changes in activity demands must be shown by a revised Schedule. A written report providing details about the changes and what actions are anticipated to get the work completed in the contractual time period shall be submitted with the revised schedule.

3.10.5.3. The Construction Schedule shall include coordinate dates for performance of all divisions of the Work, including shipping and delivery, off-site requirements and tasks, so the Work can be completed in a timely and orderly fashion consistent with the required dates of Substantial Completion and Final Acceptance.

3.10.5.4. The Construction Schedule shall include: (i) the required commencement date, the required dates of Substantial Completion(s) and Final Acceptance for the complete Project and all phases (if any); (ii) any guideline and milestone dates required by the Owner or the Contract Documents; (iii) subcontractor and supplier schedules; (iv) a submittal schedule which allows sufficient time for review and action by the Architect/Engineer; (v) the complete sequence of all construction activities with start and completion dates; and, (vi) required decision dates.

3.10.5.5. By receiving, reviewing, and/or commenting on the Construction Schedule or any portion thereof (including logic and resource loading), neither the Owner or Architect/Engineer assume any of the Contractor’s responsibility or liability that the Schedule be coordinated or complete, or for timely and orderly completion of the Work.

3.10.5.6. Receiving, reviewing, and/or commenting on the Schedule, any portion thereof, or any revision thereof, does not constitute an approval, acknowledgement, or acceptance of any duration, dates, milestones, or performance indicated therein.

3.10.5.7. A printout of the Schedule’s logic showing all activities and all resource loading is required with the Schedule and with all updates to the Schedule.

3.10.6. The Contractor shall review and compare, at a minimum on a weekly basis, the actual status of the Work against its Construction Schedule.

3.10.7. The Contractor shall routinely, frequently, and periodically (but not less than monthly) update and/or revise its Construction Schedule to show actual progress of the Work through the date of the update or revision, projected level of completion of each remaining activity, activities modified since the previous update or revision, and major changes in scope or logic. The updated/revised Schedule shall be accompanied by a narrative report which: (1) states and explains any modifications of the critical path, if

any, including any changes in logic; (2) defines problem areas and lists areas of anticipated delays; (3) explains the anticipated impact the change in the critical path or problems and delays will have on the entire Schedule and the completion of the Work; (4) provides corrective action taken or proposed; and, (5) states how problems or delays will be resolved in order to deliver the Work by the required phasing milestones (if any), Substantial Completion(s), and Final Acceptance dates.

3.10.8. Delay in Performance: If at any time the Contractor anticipates that performance of the Work will be delayed or has been delayed, the Contractor shall: (1) immediately notify the Architect/Engineer by separate and distinct correspondence of the probable cause and effect of the delay, and possible alternatives to minimize the delay; and, (2) take all corrective action reasonably necessary to deliver the Work by the required dates. Nothing in this paragraph or the Contract Documents shall be construed by the Contractor as a granting by the Architect/Engineer or Owner of constructive acceleration. The results of failure to anticipate delays, or to timely notify the Owner and Architect/Engineer of an anticipated or real delay, are entirely the responsibility of the Contractor whether compensable or not.

3.10.9. Early Completion: The Contractor may attempt to achieve Substantial Completion(s) on or before the date(s) required in the Contract. However, such early completion shall be for the Contractor's sole convenience and shall not create any real or implied additional rights to Contractor or impose any additional obligations on the Owner or Architect/Engineer. The Owner will not be liable for nor pay any additional compensation of any kind to the Contractor for achieving Substantial Completion(s) or Final Acceptance prior to the required dates as set forth in the Contract. The Owner will not be liable for nor pay any additional compensation of any kind should there by any cause whatsoever that the Contractor is not able to achieve Substantial Completion(s) earlier than the contractually required dates of Substantial Completion(s) or Final Acceptance.

3.10.10. Float in Schedule. Any and all float time in the Contractor's schedule, regardless of the path or activity, shall accrue to the benefit of the Owner and the Work, and not to the Contractor. Float also includes any difference shown between any early completion dates shown on the Contractor's Schedule for any phasing milestone(s), Substantial Completion(s) or Final Acceptance and the dates or durations as required by the Contract Documents.

3.10.11. Modification of Required Substantial Completion(s) or Final Acceptance Dates: Modification of the required dates shall be accomplished only by duly authorized, accepted, and approved change orders stating the new date(s) with specificity on the change order form. All rights, duties, and obligations, including but not limited to the Contractor's liability for actual, delay, and/or liquidated damages, shall be determined in relation to the date(s) as modified.

3.11. DOCUMENTATION AND AS-BUILT CONDITIONS AT THE SITE

3.11.1. The Contractor shall maintain at the site for the Owner one record copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and accurately marked to record current field changes and selections made during construction, and one record copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect/Engineer or Owner at any time and shall be delivered to the Architect/Engineer for submittal to the Owner upon completion of the Work.

3.11.2. The Owner shall not be required to process final payment until all documentation and data required by the Contract Documents is submitted to and approved by the Architect/Engineer including, but not limited to, the As-Built Drawings. The Owner will not process any final request for payment until the Architect/Engineer has received and verified that the Contractor has performed the requirements pertaining to the as-built drawings.

3.11.3. The as-built drawings shall be neatly and clearly marked during construction to record all deviations, variations, changes, and alterations as they occur during construction along with such supplementary notes and details necessary to clearly and accurately represent the as-built condition. The as-built drawings shall be available at all times to the Owner, Architect/Engineer and Architect/Engineer's consultants.

3.12. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

3.12.1. Definitions:

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

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

3.12.1.3. Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

3.12.2. Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required by the Contract Documents the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review by the Architect/Engineer is subject to the limitations of Subparagraph 4.2.7. Informational submittals upon which the Architect/Engineer is not expected to take responsive action may be so identified in the Contract Documents. Submittals which are not required by the Contract Documents may be returned by the Architect/Engineer without action.

3.12.3. The Contractor shall review, approve, and submit to the Architect/Engineer, Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents within sixty (60) calendar days of being issued the Notice To Proceed unless noted otherwise and shall do so in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Any and all items submitted by the Contractor which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor, or in the opinion of the Architect/Engineer, have not been reviewed for compliance by the Contractor even if marked as such, may be returned by the Architect/Engineer without action and shall not result in any accusation or claim for delay or cost by the Contractor. Any submittal that, in the opinion of the Architect/Engineer, is incomplete in any area or detail may be rejected and returned to the Contractor. It is the responsibility of and incumbent upon the Contractor to ensure and confirm that all submittals are complete, accurate, and in conformance to the Contract Documents prior to submission.

3.12.4. By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents and guarantees to the Architect/Engineer and Owner that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

3.12.5. The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect/Engineer. Should the Contractor, Subcontractors or Sub-subcontractors install, construct, erect or perform any portion of the Work without approval of any requisite submittal, the Contractor shall bear the costs, responsibility, and delay for removal, replacement, and/or correction of any and all items, material, and /or labor.

3.12.6. The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect/Engineer's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect/Engineer in writing of such deviation at the time of submittal and: (1) the Architect/Engineer has given written approval to the specific deviation as a minor change in the Work; or, (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect/Engineer's approval thereof.

3.12.7. The Contractor shall direct specific attention, in writing or on re-submitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect/Engineer on previous submittals. In the absence of such written notice the Architect/Engineer's approval of a re-submission shall not apply to such revisions.

3.12.8. The Contractor shall not be required to provide professional services which constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect/Engineer will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect/Engineer. The Owner and the Architect/Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided the Owner and Architect/Engineer have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this subparagraph, the Architect/Engineer will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents but shall be responsible and held liable for review and verification of all performance or design criteria as required by Paragraph 3.2.

3.12.9. Unless noted otherwise in the Contract Documents, the Contractor shall submit to the Architect/Engineer within sixty (60) days from the date of the Notice To Proceed a minimum of six (6) complete copies of all shop/setting drawings, schedules, cut sheets, products, product data, and samples required for the complete Work. Copies shall be reviewed, marked, stamped and approved on each and every copy by the Contractor prior to submission to the Architect/Engineer or they shall be returned without review or action. The Architect/Engineer shall review with reasonable promptness, making corrections, rejections, or other actions as appropriate. The Architect/Engineer's approval or actions on shop/setting drawings, schedules, cut sheets, products, product data, or samples shall not relieve the Contractor from responsibility for, nor deviating from, the requirements of the plans and specifications. Any deviations from the plans and specifications requested or made by the Contractor shall be brought promptly to the attention of the Architect/Engineer.

3.12.10. Cost for Re-Submissions: the Contractor is responsible for ensuring that all shop drawings, product data, samples, and submittals contain all information required by the Contract Documents to allow the Architect/Engineer to take action. The Contractor shall pay the Architect/Engineer's cost for any re-submission of any rejected item. Such costs shall be deducted from the contract sum by Change Order. The Contractor agrees that any action taken by the Architect/Engineer is solely in the Architect/Engineer's discretion and is non-negotiable for the purposes of the Architect/Engineer's cost recovery for multiple (i.e. more than one) review.

3.13. USE OF SITE

3.13.1. The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

3.13.2. The Contractor shall not damage, endanger, compromise or destroy any part of the Project or the site, including but not limited to work performed by others, monuments, stakes, bench marks, survey points, utilities, existing features or structures. The Contractor shall be fully and exclusively responsible for and bare all costs and delays (including and costs of delay) for any damage, endangerment, compromise, or destruction of any part of the Project or site.

3.14. CUTTING AND PATCHING

3.14.1. The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

3.14.2. The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

3.15. CLEAN UP AND SITE CONTROL

3.15.1. The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract during performance of the Work and at the direction of the Owner or Architect/Engineer. At completion of the Work, the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials.

3.15.2. If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

3.16. ACCESS TO WORK

3.16.1. The Contractor shall provide the Owner and Architect/Engineer access to the Work at all times wherever located.

3.17. ROYALTIES, PATENTS AND COPYRIGHTS

3.17.1. The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect/Engineer harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect/Engineer. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect/Engineer.

3.18. INDEMNIFICATION

3.18.1. To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect/Engineer, Architect/Engineer's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Paragraph. The Contractor agrees that it will defend, protect, indemnify and save harmless the State of Montana and the Owner against and from all claims, liabilities, demands, causes of action, judgments (including costs and reasonable attorneys' fees), and losses from any cause whatever (including patent, trademark and copyright infringement) except the Owner's sole or partial negligence. This includes any suits, claims, actions, losses, costs, damages of any kind, including the State and Owner's legal expenses, arising out of, in connection with, or incidental to the Contract, but does not include any such suits, claims, actions, losses, costs or damages which are the result of the negligent acts, actions, losses, costs, or damages which are acts, omissions or misconduct of the Owner if they do not arise out of, depend upon or relate to a negligent act, omission or misconduct of the Contractor in whole or in part.

3.18.2. In claims against any person or entity indemnified under this Paragraph 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Subparagraph 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

4. ARTICLE 4 – ADMINISTRATION OF THE CONSTRUCTION CONTRACT

4.1. THE ARCHITECT/ENGINEER

4.1.1. The Architect/Engineer is the person lawfully licensed to practice or an entity lawfully practicing identified as such in the Agreement with the Owner and is referred to throughout the Contract Documents as if singular in number. The term "Architect/Engineer" means the Architect/Engineer's duly authorized representative.

4.1.2. Duties, responsibilities and limitations of authority of the Architect/Engineer as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner.

4.1.3. If the employment of the Architect/Engineer is terminated, the Owner shall employ a new Architect/Engineer at the sole choice and discretion of the Owner, whose status under the Contract Documents shall be that of the former Architect/Engineer.

4.2. ARCHITECT/ENGINEER'S ADMINISTRATION OF THE CONSTRUCTION CONTRACT

4.2.1. The Architect/Engineer will provide administration of the Contract as described in the Contract Documents, and will be an Owner's representative throughout the complete duration of the Project, including the warranty period. The Architect/Engineer will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with the Architect/Engineer Contract.

4.2.2. The Architect/Engineer, as a representative of the Owner, will visit the site at intervals appropriate to the stage of the Contractor's operations to: (1) become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the Work completed; (2) endeavor to guard the Owner against defects and deficiencies in the Work; and, (3) to determine in general if the Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Owner and Architect/Engineer will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Contractor's Work. The Owner and Architect/Engineer will neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences or procedures, for the safety of any person involved in the work, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

4.2.3. The Architect/Engineer will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect/Engineer will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

4.2.4. Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect/Engineer about matters arising out of or relating to the Contract. Communications by and with the Architect/Engineer's consultants shall be through the Architect/Engineer. Communications by and with Subcontractors and material suppliers shall be through the Contractor to the Architect/Engineer. Communications by and with separate contractors shall be through the Owner to the Architect/Engineer.

4.2.5. Based on the Architect/Engineer's evaluations of the Contractor's Applications for Payment, the Architect/Engineer will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts. The Contractor is fully aware that the Owner (i.e. the State of Montana) has established a billing cycle for processing payments in Article 9 of these General Conditions. The Contractor and all Subcontractors are subject to all provisions of Title 28, Chapter 2, Part 21 MCA regarding all aspects of the Work.

4.2.6. The Architect/Engineer will have authority to reject Work that does not conform to the Contract Documents. Whenever the Architect/Engineer considers it necessary or advisable, the Architect/Engineer

will have authority to require inspection or testing of the Work in accordance with the General Conditions and any applicable technical specification requirements, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect/Engineer nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect/Engineer to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

4.2.7. The Architect/Engineer will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect/Engineer's action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time in the Architect/Engineer's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect/Engineer's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Paragraphs 3.3, 3.5 and 3.12. The Architect/Engineer's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect/Engineer, of any construction means, methods, techniques, sequences or procedures. The Architect/Engineer's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

4.2.8. The Architect/Engineer will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Paragraph 7.4.

4.2.9. The Architect/Engineer will conduct inspections to determine the date or dates of Substantial Completion(s) and the date of Final Acceptance, will receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment upon compliance with the requirements of the Contract Documents.

4.2.10. If the Owner and Architect/Engineer agree, the Architect/Engineer will provide one or more project representatives to assist in carrying out the Architect/Engineer's responsibilities. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in the Owner’s Agreement with the Architect/Engineer.

4.2.11. The Architect/Engineer will interpret and decide matters concerning performance under and requirements of the Contract Documents on written request of either the Owner or Contractor. The Architect/Engineer's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If no agreement is made concerning the time within which interpretations required of the Architect/Engineer shall be furnished in compliance with this Paragraph 4.2, then delay shall not be recognized on account of failure by the Architect/Engineer to furnish such interpretations until 15 days after written request is made for them.

4.2.12. Interpretations and decisions of the Architect/Engineer will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and initial decisions, the Architect/Engineer will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will render such interpretations and decisions in good faith.

4.2.13. The Architect/Engineer's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

4.2.14. The Architect/Engineer's or Owner's observations or inspections do not alleviate any responsibility on the part of the Contractor. The Architect/Engineer and the Owner reserves the right to observe and inspection the work and make comment. Action or lack of action following observation or inspection is not to be construed as approval of Contractor's performance.

4.3. CLAIMS AND DISPUTES

4.3.1. Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extensions of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes, controversies, and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be initiated by written notice. The responsibility to substantiate Claims shall rest solely with the party making the Claim.

4.3.1.1. Time Limits on Claims. Claims by either party must be initiated within 21 calendar days after occurrence of the event giving rise to such claim. The following shall apply to the initiation of a claim:

4.3.1.1.1. A written notice of a claim must be provided to the Architect/Engineer and the other party within 21 calendar days after the occurrence of the event or the claim is waived by the claiming party and void in its entirety.

4.3.1.1.2. Claims must be initiated by separate, clear, and distinct written notice within the 21 calendar day time frame to the Architect/Engineer and the other party and must contain the notarized statement in Sub-Paragraph 4.3.1.5 when the claim is made by the Contractor. Discussions in any form with the Architect/Engineer or Owner, whether at the site or not, do not constitute initiation of a claim. Notes in project meeting minutes, email correspondence, change order proposals, or any other form of documentation does not constitute initiation of a claim. The written notice must be a separate and distinct correspondence provided in hardcopy to both the Architect/Engineer and Owner and must delineate the specific event and outline the causes and reasons for the claim whether or not cost or time have been fully determined. Written remarks or notes of a generic nature are invalid in their entirety. Comments made at progress meetings, project site visits, inspections, emails, voice mails, and other such communications do not meet the requirement of providing notice of claim.

4.3.1.1.3. Physical Injury or Physical Damage. Should the Owner or Contractor suffer physical injury or physical damage to person or property because of any error, omission, or act of the other party or others for whose acts the other party is legally and contractually liable, claim will be made in writing to the other party within a reasonable time of the first observance of such physical injury or physical damage but in no case beyond 30 calendar days of the first observance. The notice shall provide sufficient detail to enable the other party to investigate the matter. The provisions of this paragraph shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose. In all such cases, the indemnification provisions of the Contract shall be effectual and the Contractor’s insurance shall be primary and in full effect.

4.3.1.2. All Claims must contain sufficient justification and substantiation with the written notice or they may be rejected without consideration by the Architect/Engineer or other party with no additional impact or consequence to the Contract Sum, Contract Time, or matter(s) in question in the Claim.

4.3.1.3. If additional compensation is claimed, the exact amount claimed and a breakdown of that amount into the following categories shall be provided with each and every claim:

4.3.1.3.1. Direct costs (as listed in Subparagraph 7.3.9.1 through 7.3.9.5);
4.3.1.3.2. Indirect costs (as defined in Paragraph 7.2.5); and,
4.3.1.3.3. Consequential items (i.e. time extensions, credits, logic, reasonableness, impacts, disruptions, dilution) for the change.

4.3.1.4. If additional time is claimed the following shall be provided with each and every claim:

4.3.1.4.1. The specific number of days and specific dates for which the additional time is sought;
4.3.1.4.2. The specific reasons, causes, and/or effects whereby the Contractor believes that additional time should be granted; and,

4.3.1.4.3. The Contractor shall provide analyses, documentation, and justification of its claim for additional time in accordance with the latest Critical Path Method schedule in use at the time of event giving rise to the claim.

4.3.1.5. With each and every claim, the Contractor shall submit to the Architect/Engineer and Owner a notarized statement containing the following language:

"Under penalty of law (including perjury and/or false/fraudulent claims against the State), the undersigned,

_____, _____
(Name) (Title)

Of _____ _____
(Company) (Date)

hereby certifies, warrants, and guarantees that this claim made for Work on this Contract is a true statement of the costs, adjustments and/or time sought and is fully documented and supported under the contract between the parties.

_____, _____
(Signature) (Date)"

4.3.2. Continuing Contract Performance.

4.3.2.1. Pending final resolution of a Claim except as otherwise agreed in writing or as provided in Subparagraph 9.7.1 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents on the portion of the Work not involved in a Claim.

4.3.3. Claims for Cost or Time for Concealed or Unknown Conditions.

4.3.3.1. If conditions are encountered at the site which are: (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents; or, (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the other party promptly before conditions are disturbed.

4.3.3.2. The Architect/Engineer will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect/Engineer determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect/Engineer shall so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 21 days after the date of the Architect/Engineer's decision.

4.3.3.3. If the conditions encountered are materially different, the Contract Sum and Contract Time shall be equitably adjusted, but if the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Architect/Engineer for initial determination, subject to further proceedings pursuant to Paragraph 4.4.

4.3.3.4. Nothing in this paragraph shall relieve the Contactor of its obligation to adequately and sufficiently investigate, research, and examine the site, the site survey, topographical information, and the geotechnical information available whether included by reference or fully incorporated in the Contract Documents.

4.3.4. Claims for Additional Cost.

4.3.4.1. If the Contractor wishes to make Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Paragraph 10.6.

4.3.4.2. If the Contractor believes additional cost is involved for reasons including but not limited to: (1) a written interpretation from the Architect/Engineer; (2) an order by the Owner to stop the Work solely for the Owner's convenience or where the Contractor was not at least partially at fault; (3) a written order for a minor change in the Work issued by the Architect/Engineer; (4) failure of payment by the Owner per the terms of the Contract; (5) termination of the Contract by the Owner; or, (6) other reasonable grounds, Claim must be filed in accordance with this Paragraph 4.3.

4.3.5. Claims for Additional Time

4.3.5.1. If the Contractor wishes to make Claim for an increase in the Contract Time, written notice as specified in these General Conditions shall be provided along with the notarized certification. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay for the same event or cause only one Claim is necessary. However, separate and distinct written notice is required for each separate event.

4.3.5.2. Weather Delays:

4.3.5.2.1. If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction activities.

4.3.5.2.2. Inclement or adverse weather shall not be a prima facie reason for the granting of an extension of time, and the Contractor shall make every effort to continue work under prevailing conditions. The Owner may grant an extension of time if an unavoidable delay occurs as a result of inclement/severe/adverse weather and such shall then be classified as a "Delay Day". Any and all delay days granted by the Owner are and shall be non-compensable in any manner or form. The Contractor shall comply with the notice requirements concerning instances of inclement/severe/adverse weather before the Owner will consider a time extension. Each day of inclement/severe/adverse weather shall be considered a separate instance or event and as such, shall be subject to the notice requirements.

4.3.5.2.3. An "inclement", "severe", or "adverse" weather delay day is defined as a day on which the Contractor is prevented by weather or conditions caused by weather resulting immediately there from, which directly impact the current controlling critical-path operation or operations, and which prevent the Contractor from proceeding with at least 75% of the normal labor and equipment force engaged on such critical path operation or operations for at least 60% of the total daily time being currently spent on the controlling operation or operations.

4.3.5.2.4. The Contractor shall consider normal/typical/seasonal weather days and conditions caused by normal/typical/seasonal weather days for the location of the Work in the planning and scheduling of the Work to ensure completion within the Contract Time. No time extensions will be granted for the Contractor's failure to consider and account for such weather days and conditions caused by such weather for the Contract Time in which the Work is to be accomplished.

4.3.5.2.5. A "normal", "typical", or "seasonal" weather day shall be defined as weather that can be reasonably anticipated to occur at the location of the Work for each particular month involved in the Contract Time. Each month involved shall not be considered individually as it relates to claims for additional time due to inclement/adverse/severe weather but shall consider the entire Contract Time as it compares to normal/typical/seasonal weather that is reasonably anticipated to occur. Normal/typical/seasonal weather days shall be based upon U.S. National

Weather Service climatic data for the location of the Work or the nearest location where such data is available.

4.3.5.2.6. The Contractor is solely responsible to document, prepare and present all data and justification for claiming a weather delay day. Any and all claims for weather delay days shall be tied directly to the current critical-path operation or operations on the day of the instance or event which shall be delineated and described on the Critical-Path Schedule and shall be provided with any and all claims. The Contractor is solely responsible to indicate and document why the weather delay day(s) claimed are beyond those weather days which are reasonably anticipated to occur for the Contract Time. Incomplete or inaccurate claims, as determined by the Architect/Engineer or Owner, may be returned without consideration or comment.

4.3.5.3. Where the Contractor is prevented from completing any part of the Work with specified durations or phases due to delay beyond the control of both the Owner and the Contractor, an extension of the contract time or phase duration in an equal amount to the time lost due to such delay shall be the Contractor's sole and exclusive remedy for such delay.

4.3.5.4. Delays attributable to and/or within the control of subcontractors and suppliers are deemed to be within the control of the Contractor.

4.3.5.5. In no event shall the Owner be liable to the Contractor, any subcontractor, any supplier, Contractor's surety, or any other person or organization, for damages or costs arising out of or resulting from: (1) delays caused by or within the control of the Contractor which include but are not limited to labor issues or labor strikes on the Project, federal, state, or local jurisdiction enforcement actions related directly to the Contractor's Work (e.g. safety or code violations, etc.); or, (2) delays beyond the control of both parties including but not limited to fires, floods, earthquakes, abnormal weather conditions, acts of God, nationwide material shortages, actions or inaction by utility owners, emergency declarations by federal, state, or local officials enacted in the immediate vicinity of the project, or other contractors performing work for the Owner.

4.3.6. Claims for Consequential Damages

4.3.6.1. The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes:

4.3.6.1.1. damages incurred by the Owner for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and,

4.3.6.1.2. damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, income, and for loss of profit.

4.3.6.2. This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this waiver of consequential damages shall be deemed to preclude an award of liquidated or actual damages, when applicable, in accordance with the requirements of the Contract Documents.

4.4. RESOLUTION OF CLAIMS, DISPUTES, AND CONTROVERSIES

4.4.1. Decision of Architect/Engineer. Claims, including those alleging an error or omission by the Architect/Engineer, shall be referred initially to the Architect/Engineer for decision. A decision by the Architect/Engineer shall be required as a condition precedent to mediation, arbitration or litigation of all Claims between the Contractor and Owner arising prior to the date of Final Acceptance, unless 30 days have passed after the Claim has been referred to the Architect/Engineer with no decision having been rendered by the Architect/Engineer. The Architect/Engineer will not decide disputes between the Contractor and persons or entities other than the Owner. Any Claim arising out of or related to the Contract, except those already waived in Subparagraphs 4.3.6, 7.2.6, 7.3.8, 9.10.4 and 9.10.5 shall, pending compliance with Subparagraph 4.4.5, be subject to mediation, arbitration, or the institution of

legal or equitable proceedings. Claims waived in Subparagraphs 4.3.6, 7.2.6, 7.3.8, 9.10.4, and 9.10.5 are deemed settled, resolved, and completed.

4.4.2. The Architect/Engineer will review Claims and within ten (10) days of the receipt of the Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party; (2) reject the Claim in whole or in part; (3) approve the Claim; (4) suggest a compromise; or (5) advise the parties that the Architect/Engineer is unable to resolve the Claim if the Architect/Engineer lacks sufficient information to evaluate the merits of the Claim or if the Architect/Engineer concludes that, in the Architect/Engineer's sole discretion, it would be inappropriate for the Architect/Engineer to resolve the Claim.

4.4.3. If the Architect/Engineer requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond within ten (10) days after receipt of such request and shall either provide a response on the requested supporting data, advise the Architect/Engineer when the response or supporting data will be furnished, or advise the Architect/Engineer that no supporting data will be furnished. Upon either no response or receipt of the response or supporting data, the Architect/Engineer will either reject or approve the Claim in whole or in part.

4.4.4. The Architect/Engineer will approve or reject Claims by written decision, which shall state the reasons therefore and which shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Architect/Engineer shall be final and binding on the parties but subject to mediation and arbitration.

4.4.5. When 30 days have passed upon submission of a Claim without decision or action by the Architect/Engineer, or the Architect/Engineer has rendered a decision or taken any of the actions identified in Subparagraph 4.4.2, a demand for arbitration of a Claim covered by such decision or action must be made within 30 days after the date of expiration of Subparagraph 4.4.1 or within 30 days of the Architect/Engineer's decision or action. Failure to demand arbitration within said 30 day period shall result in the Architect/Engineer's decision becoming final and binding upon the Owner and Contractor whenever such decision is rendered.

4.4.6. If the Architect/Engineer renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence but shall not supersede arbitration proceedings unless the decision is acceptable to all parties concerned.

4.4.7. Upon receipt of a Claim against the Contractor or at any time thereafter, the Architect/Engineer or the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Architect/Engineer or the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

4.4.8. A Claim subject to or related to liens or bonds shall be governed by applicable law regarding notices, filing deadlines, and resolution of such Claim prior to any resolution of such Claim by the Architect/Engineer, by mediation, or by arbitration, except for claims made by the Owner against the Contractor's bonds.

4.5. MEDIATION

4.5.1. Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Subparagraphs 4.3.6, 7.2.6, 7.3.8, 9.10.4 and 9.10.5 shall, after initial decision by the Architect/Engineer or 30 days after submission of the Claim to the Architect/Engineer, be subject to mediation as a condition precedent to arbitration or the institution of legal or equitable proceedings by either party.

4.5.2. The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect and/or those rules specified in the contract documents or separately agreed upon between the parties. Construction Industry Mediation Rule M-2 (filing with AAA) is void. The parties shall mutually agree upon a mediator who shall then take the place of AAA in the Construction Industry Mediation Rules. The parties must mutually agree to use AAA and no filing of a request for mediation shall be made to AAA by either party until such mutual agreement has been made.

Request for mediation shall be filed in writing with the other party to the Contract and with the American Arbitration Association. The request may be made concurrently with the filing of a demand for arbitration but, in such event, mediation shall proceed in advance of arbitration or legal or equitable proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

4.5.3. The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

4.6. ARBITRATION

4.6.1. Any controversy or Claim arising out of or related to this Contract or the breach thereof shall be settled by arbitration in accordance with the Montana Uniform Arbitration Act (MUAA). To the extent it does not conflict with the MUAA, the Construction Industry Arbitration Rules of the American Arbitration Association shall apply except as modified herein. The parties to the arbitration shall bear their own costs and expenses for participating in the arbitration. Costs of the Arbitration panel shall be borne equally between the parties except those costs awarded by the Arbitration panel (including costs for the arbitration itself).

4.6.2. Prior to the arbitration hearing all parties to the arbitration may conduct discovery subject to the provisions of Montana Rules of Civil Procedure. The arbitration panel may award actual damages incurred if a party fails to provide full disclosure under any discovery request. If a party claims a right of information privilege protected by law, the party must submit that claim to the arbitration panel for a ruling, before failing to provide information requested under discovery or the arbitration panel may award actual damages.

4.6.3. The venue for all arbitration proceedings required by this Contract shall be the seat of the county in which the work occurs or the First Judicial District, Lewis & Clack County, as determined solely by the Owner. Arbitration shall be conducted by a panel comprised of three members with one selected by the Contractor, one selected by the Owner, and one selected by mutual agreement of the Owner and the Contractor.

4.6.4. Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Subparagraphs 4.3.6, 7.2.6, 7.3.8, 9.10.4 and 9.10.5, shall, after decision or action by the Architect/Engineer or 30 days after submission of the Claim to the Architect/Engineer, be subject to arbitration provided a demand for arbitration is made within the time frame provided in Subparagraph 4.4.5. If such demand is not made with the specified time frame, the Architect/Engineer's decision or action is final. Prior to arbitration, the parties shall endeavor to resolve disputes by mediation in accordance with the provisions of Paragraph 4.5.

4.6.5. Claims not resolved by mediation shall be decided by arbitration which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association currently in effect and/or those rules specified in the Contract Documents or separately agreed upon between the parties. Construction Industry Arbitration Rule R-3 (filing with AAA) is void. The parties shall mutually agree upon an arbitrator or arbitrators who shall then take the place of AAA in the Construction Industry Arbitration Rules. The parties must mutually agree to use AAA and no filing of a demand for arbitration shall be made to AAA by either party until such mutual agreement has been made. The demand for arbitration shall be filed in writing with the other party to the Contract and a copy shall be filed with the Architect/Engineer.

4.6.6. A demand for arbitration shall be made within the time limits specified in Subparagraphs 4.4.5 and in no event shall it be made after the date when institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations as determined pursuant to Paragraph 13.7.

4.6.7. Pending final resolution of a Claim including arbitration, unless otherwise mutually agreed in writing, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract on Work or amounts not in dispute.

4.6.8. **Limitation on Consolidation or Joinder**. Arbitration arising out of or relating to the Contract may include by consolidation or joinder the Architect/Engineer, the Architect/Engineer's employees or consultants,

except by written consent containing specific reference to the Agreement and signed by the Architect/Engineer, Owner, Contractor and any other person or entity sought to be joined. No arbitration shall include, by consolidation or joinder or in any other manner, parties other than the Owner, Architect/Engineer, Contractor, a separate contractor as described in Article 6 and other persons substantially involved in a common question of fact or law whose presence is required if complete relief is to be accorded in arbitration. No person or entity other than the Owner, Architect/Engineer, Contractor or a separate contractor as described in Article 6 shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

4.6.9. **Claims and Timely Assertion of Claims**. The party filing a demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

4.6.10. **Judgment on Final Award**. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof. The parties agree that the costs of the arbitrator(s') compensation and expenses shall be borne equally. The parties further agree that the arbitrator(s) shall have authority to award to either party some or all of the costs and expenses involved, including attorney's fees.

5. ARTICLE 5 – SUBCONTRACTORS

5.1. DEFINITIONS

5.1.1. A Subcontractor is a person or entity who has a direct or indirect contract at any tier or level with the Contractor or any Subcontractor to the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

5.2. AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.1. Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract and in no instance later than (30) days after award of the Contract, shall furnish in writing to the Owner through the Architect/Engineer the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect/Engineer will promptly reply to the Contractor in writing stating whether or not the Owner or the Architect/Engineer, after due investigation, has reasonable objection to any such proposed person or entity.

5.2.2. The Contractor shall not contract with a proposed person or entity to which the Owner or Architect/Engineer has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

5.2.3. If the Owner or Architect/Engineer has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect/Engineer has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

5.2.4. The Contractor shall not change a Subcontractor, person or entity previously selected if the Owner or Architect/Engineer makes reasonable objection to such substitute. The Contractor shall not change or substitute for a Subcontractor who was required to be listed on the bid without first getting the approval of the Owner.

5.2.5. Buy-Safe Montana Provision: Before commencement of each subcontractor's portion of the Work, the Contractor shall obtain each subcontractor's incidence rate, experience modification rate, and loss ratio. The Contractor shall endeavor--but is not required--to use subcontractors whose incidence rate is less than the latest average for non-residential building construction for Montana as established by the Federal Bureau of Labor Statistics for the prior year; whose experience modification rating (EMR) is less than 1.0; and whose loss ratio is less than 100%. Contractor shall require any of its subcontractors who, based on the safety information that the Contractor obtains, have greater-than-average incidence rate, an EMR greater than 1.0, and a loss ratio of more than 100%, to schedule and obtain a Comprehensive Safety Consultation from the Montana Department of Labor & Industry, Employment Relations Division, Safety Bureau before substantial completion of each such subcontractor's portion of the Work. For assistance in obtaining the Comprehensive Safety Consultation, visit http://erd.dli.mt.gov/safety-health/onsite-consultation.

5.3. SUBCONTRACTUAL RELATIONS

5.3.1. By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect/Engineer. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect/Engineer under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement which may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

5.3.2. Upon written request by the Owner, the Contractor shall require its subcontractors to provide to it performance and payment securities for their portion of the Work in the types and form defined in statute (18-2-201 and 18-2-203 MCA) for all sub-contractual agreements.

5.3.3. The Contractor shall prepare a Subcontractors' and Suppliers' chart in CSI division format acceptable to the Owner which lists by name, all contact information, job category, and responsibility the Contractor's Subcontractors (at all tiers or levels) and Suppliers with a pecuniary interest in the Project of greater than $5,000.00. The Contractor shall not enter into any agreement with any subcontractor or supplier to which the Owner raises a timely objection. The Contractor shall promptly inform the Owner in writing of any proposed replacements, the reasons therefore, and the name and qualifications of any proposed replacements. The Owner shall have the right to reject any proposed replacements without cost or claim being made by the Contractor. The chart shall be provided to the Owner at the time of the pre-construction conference but no less than 30 days after award of the Contract.

5.3.4. All Contractors and Subcontractors to this contract must comply with all Montana Department of Labor and Industry requirements, regulations, rules, and statutes.

5.3.5. In accordance with 39-51-1104 MCA, any Contractor who is or becomes an employer under the provisions of Title 39, Chapter 51 of Montana Code Annotated, who contracts with any Subcontractor who also is or becomes an employer under the provisions of Title 39, Chapter 51 of Montana Code Annotated, shall withhold sufficient money on the contract to guarantee that all taxes, penalties, and interest are paid upon completion of the contract.

5.3.5.1. It is the duty of any Subcontractor who is or becomes an employer under the provisions of Title 39, Chapter 51 of Montana Code Annotated, to furnish the Contractor with a certification issued by the Montana Department of Labor and Industry, prior to final payment stating that said

Subcontractor is current and in full compliance with the provisions of Montana Department of Labor and Industry.

5.3.5.2. Failure to comply shall render the Contractor directly liable for all taxes, penalties, and interest due from the Subcontractor, and the Montana Department of Labor and Industry has all of the remedies of collection against the Contractor under the provisions of Title 39, Chapter 51 of Montana Code Annotated, as though the services in question were performed directly for the Contractor.

5.3.6. In compliance with state statutes, the Contractor will have the 1% Gross Receipts Tax withheld from all payments. Each "Public Contractor" includes all Subcontractors with contracts greater than $5,000 each. The Contractor and all Subcontractors will withhold said 1% from payments made to all Subcontractors with contracts greater than $5,000.00 and make it payable to the Montana Department of Revenue. The Contractor and all Subcontractors shall also submit documentation of all contracts greater than $5,000.00 to the Montana Department of Revenue on the Department's prescribed form.

5.3.7. Construction Contractor Registration: All Subcontractors at any tier or level are required to be registered with the Department of Labor and Industry under 39-9-201 and 39-9-204 MCA prior to the Contract being executed by the Owner. Subcontractors shall demonstrate to the Contractor that it has registered or promises that it will register immediately upon notice of award and prior to the commencement of any work.

5.4. CONTINGENT ASSIGNMENT OF SUBCONTRACTS

5.4.1. Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner provided that:

5.4.1.1. assignment is effective only after termination of the Contract by the Owner for cause pursuant to Paragraph 14.2 and only for those subcontract agreements which the Owner accepts by notifying the Subcontractor and Contractor in writing; and,

5.4.1.2. assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

5.4.2. Upon such assignment, if the Work has been suspended for more than 30 days as a result of the Contractor's default, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension. Such adjustment shall be at the expense of the Contractor.

5.4.3. The Contractor shall engage each of its subcontractors and suppliers with written contracts that preserve and protect the rights of the Owner and include the acknowledgement and agreement of each subcontractor and supplier that the Owner is a third-party beneficiary of their sub-contractual and supplier agreements. The Contractor's agreements shall require that in the event of default by the Contractor or termination of the Contractor, and upon request of the Owner, the Contractor's subcontractors and suppliers will perform services for the Owner.

5.4.4. Construction Contractor Registration: All Subcontractors at any tier or level are required to be registered with the Department of Labor and Industry under 39-9-201 and 39-9-204 MCA prior to the Contract being executed by the Owner. Subcontractors shall demonstrate to the Contractor that it has registered or promises that it will register immediately upon notice of award and prior to the commencement of any work.

6. ARTICLE 6 – CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.1. OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

6.1.1. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims

that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Paragraph 4.3.

6.1.2. When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

6.1.3. The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

6.1.4. Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights which apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

6.2. MUTUAL RESPONSIBILITY

6.2.1. The Contractor shall afford the Owner and separate contractors reasonable opportunity' for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

6.2.2. If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect/Engineer apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

6.2.3. The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a separate contractor because of delays, improperly timed activities or defective construction of the Contractor. The Owner shall be responsible to the Contractor for costs incurred by the Contractor because of delays, improperly timed activities, damage to the Work or defective construction of a separate contractor.

6.2.4. The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors as provided in Paragraph 12.2.

6.2.5. The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Subparagraph 3.14.

6.3. OWNER'S RIGHT TO CLEAN UP

6.3.1. If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect/Engineer will determine the responsibility of those involved and allocate the cost accordingly.

7. ARTICLE 7 – CHANGES IN THE WORK

7.1. GENERAL

7.1.1. Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive, or order for a minor change in the Work subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents. Minor changes as ordered by the Architect/Engineer has the definition provided in Paragraph 7.4

7.1.2. A Change Order shall be based upon agreement among the Owner, Contractor, and Architect/Engineer; a Construction Change Directive requires agreement by the Owner and Architect/Engineer and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect/Engineer alone.

7.1.3. Changes in the Work shall be performed under applicable provisions of the Contract Documents and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

7.1.4. No act, omission, or course of dealing, shall alter the requirement that Change Orders or Construction Change Directives shall be in writing and signed by the Owner, and that Change Orders and Construction Change Directives are the exclusive method for effecting any adjustment to the Contract. The Contractor understands and agrees that neither the Contract Sum nor the Contract Time can be changed by implication, oral agreement, verbal directive, or unsigned Change Order.

7.2. CHANGE ORDERS

7.2.1. A Change Order is a written instrument prepared by the Architect/Engineer and signed by the Owner, Contractor and Architect/Engineer, stating their agreement upon all of the following:

7.2.1.1. change in the Work;

7.2.1.2. the amount of the adjustment, if any, in the Contract Sum; and,

7.2.1.3. the extent of the adjustment, if any, in the Contract Time.

7.2.2. The cost or credit to the Owner resulting from a change in the Work shall be determined as follows:

7.2.2.1. Per the limitations of this Subparagraph, plus a 5% allowance for overhead and a 10% allowance for profit. The allowances for overhead and for profit are limited to the percentages as specified herein unless they are determined to be unreasonable by the Architect/Engineer (not the Contractor) per Subparagraph 7.3.9 for each Change Order or Construction Change Directive; or,

7.2.2.2. By one of the methods in Subparagraph 7.3.4, or as determined by the Architect/Engineer per Subparagraph 7.3.9, plus a 5% allowance for overhead and a 10% allowance for profit. The allowances for overhead and for profit are limited to the percentages as specified herein unless they are determined to be unreasonable by the Architect/Engineer (not the Contractor) per Subparagraph 7.3.9 for each Change Order or Construction Change Directive.

7.2.2.3. The Contractor's proposed increase or decrease in cost shall be limited to costs listed in Subparagraph 7.3.9.1 through 7.3.9.5.

7.2.3. The Contractor shall not submit any Change Order, response to requested cost proposals, or requested changes which are incomplete and do not contain full breakdown and supporting documentation in the following three areas:

7.2.3.1. Direct costs (only those listed in Subparagraph 7.3.9.1 through 7.3.9.5 are allowable);

7.2.3.2. Indirect costs (limited as a percentage on each Change Order per Supplementary General Conditions, Paragraph 7.2.2); and

7.2.3.3. Consequential items (e.g. time extensions, credits, logic, reasonableness, impacts, disruptions, dilution).

7.2.4. Any Change Order, responses to requested proposals, or requested changes submitted by the Contractor which, in the opinion of the Architect/Engineer, are incomplete, may be rejected and returned to the Contractor without comment. It is the responsibility of and incumbent upon the Contractor to ensure and confirm that all Change Orders, responses to requested proposals, or requested changes are complete prior to submission.

7.2.5. Overhead, applicable to all areas and sections of the Contract Documents, means "Indirect Costs" as referenced in Subparagraph 7.2.3.2. Indirect costs are inclusive of, but not limited to, the following: home office overhead; off-site supervision; home office project management; change order and/or proposal preparation, design, research, negotiation and associated travel; effects of disruption and dilution of management and supervision off-site; time delays; coordination of trades; postage and shipping; and, effective increase in guarantee and warranty durations. Indirect costs applicable to any and all changes in the work, either through Change Order or Construction Change Directive, are limited to the percentage allowance for overhead in Subparagraph 7.2.2.

7.2.6. By signature on any Change Order, the Contractor certifies that the signed Change Order is complete and includes all direct costs, indirect costs and consequential items (including additional time, if any) and is free and clear of all claims or disputes (including, but not limited to, claims for additional costs, additional time, disruptions, and/or impacts) in favor of the Contractor, subcontractors, material suppliers, or other persons or entities concerning the signed change order and on all previously contracted Work and does release the Owner from such claims or demands.

7.2.7. Any and all changes or adjustments to the Contract Time requested or claimed by the Contractor as a result of a Change Order shall require documentation and justification for the adjustment by a Critical Path Method analysis of the Contractor's most recent Critical Path Schedule in use prior to the change. Changes which affect or concern activities containing float or slack time (i.e. not on the critical path) and which can be accomplished within such float or slack time, shall not result in an increase in the Contract Time.

7.2.8. Supervision means on-site, field supervision and not home office overhead, off-site management or off-site supervision.

7.2.9. Labor means those persons engaged in construction occupations as defined in Montana Prevailing Wage Rates for Building Construction or Heavy/Highway as bound in the Contract Documents and does not include design, engineering, superintendence, management, on-site field supervision, home office or other off-site management, off-site supervision, office or clerical work.

7.3. CONSTRUCTION CHANGE DIRECTIVES

7.3.1. A Construction Change Directive is a written order prepared by the Architect/Engineer directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

7.3.2. Any and all changes or adjustments to the Contract Time requested or claimed by the Contractor as a result of a Construction Change Directive, shall require documentation and justification for the adjustment by a Critical Path Method analysis of the Contractor's most recent Critical Path Schedule in use prior to the change. Changes that affect or concern activities containing float or slack time (i.e. not on the critical path) and which can be accomplished within such float or slack time shall not result in an increase in the Contract Time.

7.3.3. A Construction Change Directive shall be used in the absence of agreement on the terms of a Change Order.

7.3.4. If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

7.3.4.1. mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

7.3.4.2. unit prices stated in the Contract Documents or subsequently agreed upon;

7.3.4.3. cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee;

7.3.4.4. By actual cost as shown by the Contractor's and Subcontractor's itemized invoices; or

7.3.4.5. as provided in Subparagraph 7.3.9.

7.3.5. Costs shall be limited to the following: cost of materials, including cost of delivery; cost of labor, including social security, old age and unemployment insurance and fringe benefits under collective bargaining agreements; workers' compensation insurance; bond premiums; and rental value of power tools and equipment.

7.3.6. Overhead and profit allowances shall be limited on all Construction Change Directives to those identified in 7.2.2.

7.3.7. Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect/Engineer of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

7.3.8. A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

7.3.9. If the Contractor does not respond or disagrees with the method for adjustment in the Contract Sum in writing within seven (7) calendar days, the method and the adjustment made shall be determined by the Architect/Engineer on the basis of reasonable expenditures and/or savings of those performing the Work directly attributable to the change including, in the case of an increase in the Contract Sum, plus an allowance for overhead and profit as listed under Subparagraph 7.2.2. In such case, and also under Clause 7.3.4.3, the Contractor shall keep and present, in such form as the Architect/Engineer may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Subparagraph 7.3.9 shall be limited to the following:

7.3.9.1. costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance as determined by the Prevailing Wage Schedules referenced in the Contract Documents;

7.3.9.2. costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;

7.3.9.3. rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

7.3.9.4. costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and

7.3.9.5. additional costs of field supervision and field office personnel directly attributable to the change.

7.3.10. The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect/Engineer. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

7.3.11. Pending final determination of the total cost of a Construction Change Directive to the Owner, amounts not in dispute for such changes in the Work shall be included in Applications for Payment accompanied

by a Change Order indicating the parties' agreement with part or all of such costs. For any portion of such cost that remains in dispute, the Architect/Engineer will make an interim determination for purposes of monthly certification for payment for those costs. That determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a claim in accordance with Article 4.

7.3.12. When the Owner and Contractor agree with the determination made by the Architect/Engineer concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order.

7.4. MINOR CHANGES IN THE WORK

7.4.1. The Architect/Engineer will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

8. ARTICLE 8 – TIME

8.1. DEFINITIONS

8.1.1. Time is of the essence in performance, coordination, and completion of the Work contemplated herein. The Owner may suffer damages if the Work is not completed as specified herein. When any duration or time period is referred to in the Contract Documents by days, the first day shall be determined as the day following the current day of any event or notice starting a specified duration.

8.1.2. Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

8.1.3. The date of commencement of the Work is the date established in the NOTICE TO PROCEED AS ISSUED BY THE OWNER.

8.1.4. The date the Contractor reaches Substantial Completion is the date certified by the Architect/Engineer in accordance with Paragraph 9.8.

8.1.5. The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

8.1.6. Liquidated Damages. The Owner may suffer loss if the project is not substantially complete on the date set forth in the contract documents. The Contractor and his surety shall be liable for and shall pay to the Owner the sums hereinafter stipulated as liquidated damages for each calendar day of delay until the work is substantially complete: **See Instructions to Bidders.**

8.1.7. The Contractor shall not be charged liquidated or actual damages when delay in completion of the Work is due to:

8.1.7.1. Any preference, priority or allocation order issued by the government;

8.1.7.2. Unforeseeable cause beyond the control and without the fault or negligence of the Contractor, such as acts of God or of the public enemy, fires, floods, epidemics, quarantine restrictions, freight embargoes, and unusually severe weather. All such occurrences resulting in delay must be documented and approved by Change Order; or,

8.1.7.3. Any delays of Subcontractors or suppliers occasioned by any of the causes specified in 8.1.7.1 and 8.1.7.2 of this article.

8.1.8. The Contractor is completely obligated and responsible to provide written notice of each day of delay as provided for in Paragraph 4.3.

8.1.9. Contract Time. All work shall reach Substantial Completion by: **See Instructions to Bidders.** The Owner will issue a written NOTICE TO PROCEED and finalized contract.

8.2. PROGRESS AND COMPLETION

8.2.1. Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Contract, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

8.2.2. The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the date on the Notice to Proceed and in no case prior to the effective date of insurance required by Article 11 to be furnished by the Contractor. The date of commencement of the Work shall not be changed by the effective date of such insurance.

8.2.3. The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

8.2.4. If the Contractor falls behind the latest construction schedule by more than 14 calendar days through its own actions or inaction, neglect, inexperience, lack of oversight and management of the Work including that of any Subcontractors, written notice to the Owner and Architect/Engineer shall be provided within three (3) days with explanation of how the Contractor intends to get back on schedule. Response to getting back on schedule consists of providing a sufficient number of qualified workers and/or proper materials or an acceptably reorganized schedule to regain the lost time in a manner acceptable to the Owner.

8.3. DELAYS AND EXTENSIONS OF TIME

8.3.1. If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect/Engineer, or of an employee of either, or of a separate contractor employed by the Owner, or by changes ordered in the Work, or by fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control, or by delay authorized by the Owner pending mediation and arbitration, or by other causes which the Architect/Engineer determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect/Engineer may determine.

8.3.2. Claims relating to time shall be made in accordance with applicable provisions of Paragraph 4.3.

8.3.3. This Paragraph 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

9. PAYMENTS AND COMPLETION

9.1. CONTRACT SUM

9.1.1. The Contract Sum is stated in the Contract and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

9.2. SCHEDULE OF VALUES

9.2.1. Before the first Application for Payment, the Contractor shall submit to the Architect/Engineer a schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Architect/Engineer may require. This schedule, unless objected to by the Architect/Engineer, shall be used as a basis for reviewing the Contractor's Applications for Payment.

9.3. APPLICATIONS FOR PAYMENT

9.3.1. The Contractor shall submit to the Architect/Engineer an itemized Application for Payment for operations completed in accordance with the Schedule of Values. Such application shall be signed and supported by such data substantiating the Contractor's right to payment as the Owner or Architect/Engineer may

require, such as copies of requisitions from Subcontractors and material suppliers, and reflecting retainage if provided for in the Contract Documents.

9.3.2. NOTICE OF APPROVAL OF PAYMENT REQUEST PROVISION. Per Title 28, Chapter 2, Part 21, this contract allows the Owner to change the number of days to approve a Contractor's payment request. This contract allows the Owner to approve the Contractor's payment request within thirty-five (35) calendar days after it is received by the Owner without being subject to the accrual of interest.

9.3.3. As provided in Subparagraph 7.3.11, such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives, or by interim determinations of the Architect/Engineer, but not yet included in Change Orders.

9.3.4. Applications for payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay to a Subcontractor or material supplier.

9.3.5. Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

9.3.6. The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

9.3.7. Until the work is complete, the Owner will pay 95% of the amount due the Contractor on account of progress payments.

9.3.7.1. If the Work and its progress are not in accordance with all or any part, piece, or portion of the Contract Documents, the Owner may, at its sole discretion and without claim by the Contractor, increase the amount held as retainage to whatever level deemed necessary to effectuate performance and progress of the Work, for anticipated repairs, warranties or completion of the Work by the Contractor or through the letting of other contracts. The Contractor will not be entitled to additional costs, expenses, fees, time, and such like, in the event the Owner increases the amount held as retainage due to non-compliance and/or non-performance with all or any part, piece, or portion of the Contract Documents.

9.3.7.2. Prior to the first application for payment, the Contractor shall submit the following information on the appropriate forms:

9.3.7.2.1. Schedule of Amounts for Contract Payment (Form 100): This form shall contain a breakdown of the labor, material and other costs associated with the various portions of the work and shall be the basis for the progress payments to the Contractor. The use of electronic method shall be in the Owner's format.

9.3.7.2.2. Project/Progress Schedule: If no Schedule (or revised Schedule) is provided with each and every Periodic Estimates for Partial Payment, the Architect/Engineer and/or Owner may return the pay request, or hold it, and may choose not pay for any portion of the Work until the appropriate Schedule, indicating all changes, revisions and updates, is provided. No claim for additional costs or interests will be made by the Contractor or any subcontractor on account of holding or non-payment of the Periodic Estimate for Partial Payment request.

9.3.7.3. Progress Payments

9.3.7.3.1. Periodic Estimates for Partial Payment shall be on a form provided by the Owner (Form 101) and submitted to the Architect/Engineer for payment by the Owner. Payment shall be requested for the labor and material incorporated in the work to date and for materials suitably stored, less the aggregate of previous payments, the retainage, and the 1% gross receipts tax.

9.3.7.3.2. The Contractor, by submission of any partial pay request, certifies that every request for partial payment is correct, true and just in all respects and that payment or credit had not previously been received. The Contractor further warrants and certifies, by submission of any partial pay request, that all previous work for which payment has been received is free and clear of all liens, disputes, claims, security interests, encumbrances, or causes of action of any type or kind in favor of the Contractor, subcontractors, material suppliers or other persons or entities and does release the Owner from such.

9.3.7.3.3. Progress payments do not constitute official acceptance of any portion of the work or materials whether stored on or off-site.

9.3.7.3.4. In compliance with 15-50-206 MCA, the Contractor will have 1% of his gross receipts withheld by the Owner from all payments due. Each subcontractor who performs work greater than $5,000 shall have 1% of its gross receipts withheld by the Contractor. The Contractor shall notify the Department of Revenue on the department's prescribed forms.

9.3.7.4. The Contractor may submit obligations/securities in a form specified in 18-1-301 Montana Code Annotated (MCA) to be held by a Financial Institution in lieu of retainage by the Owner. The Owner will establish the amount that would otherwise be held as retainage. Should the Contractor choose to submit obligations/securities in lieu of retainage, the Owner will require the Financial Institution to execute the Owner's "Account Agreement for Deposit of Obligations Other Than Retainage" (Form 120) prior to submission of any obligations/securities in accordance with 18-1-302 MCA. The Contractor must extend the opportunity to participate in all obligations/securities in lieu of retainage on a pro rata basis to all subcontractors involved in the project and shall be solely responsible for the management and administration of same. The Owner assumes no liability or responsibility from or to the Contractor or Subcontractors regarding the latter's participation.

9.3.7.5. The Contractor shall maintain a monthly billing cycle.

9.4. CERTIFICATES FOR PAYMENT

9.4.1. The Architect/Engineer will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect/Engineer determines is properly due, or notify the Contractor and Owner in writing of the Architect/Engineer's reasons for withholding certification in whole or in part as provided in Subparagraph 9.5.1. For the purposes of this paragraph regarding certification of payment, electronic mail and/or notes provided through the use of an electronic approval system shall constitute written notice.

9.4.2. The issuance of a Certificate for Payment will constitute a representation by the Architect/Engineer to the Owner, based on the Architect/Engineer's evaluation of the Work and the data comprising the Application for Payment, that the Work has progressed to the point indicated and that, to the best of the Architect/Engineer's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect/Engineer. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect/Engineer has: (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences or procedures; (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or, (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

9.5. DECISIONS TO WITHHOLD CERTIFICATION

9.5.1. The Architect/Engineer may withhold or reject a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect/Engineer's opinion the representations to the Owner required by Subparagraph 9.4.2 cannot be made. If the Architect/Engineer is unable to certify payment in the amount of the Application, the Architect/Engineer will notify the Contractor and Owner as provided in Subparagraph 9.4.1. If the Contractor and Architect/Engineer cannot agree on a revised amount, the Architect/Engineer will promptly issue a Certificate for Payment for the amount for which the Architect/Engineer is able to make such representations to the Owner. The Architect/Engineer may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect/Engineer's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Subparagraph 3.3.4, because of:

9.5.1.1. defective Work not remedied;

9.5.1.2. third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;

9.5.1.3. failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;

9.5.1.4. reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

9.5.1.5. damage to the Owner or another contractor;

9.5.1.6. reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or,

9.5.1.7. persistent failure to carry out the Work in accordance with the Contract Documents.

9.5.2. When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

9.5.3. Owner’s Right to Refuse Payment: The Architect/Engineer’s approval, or partial approval, of the Contractor’s request for payment shall not preclude or prevent the Owner from exercising any of its remedies under this Contract. The Owner shall have right to refuse to make payment(s) to the Contractor due to:

9.5.3.1. the Contractor’s failure to perform the Work in compliance with the Contract Documents;

9.5.3.2. the Contractor’s failure to correct any defective or damaged Work;

9.5.3.3. the Contractor’s failure to accurately represent the Work performed in the pay request;

9.5.3.4. the Contractor’s performance of its Work at a rate or in a manner that, in the Owner’s opinion, is likely to result in the Work, or any portion thereof, to be delayed;

9.5.3.5. the Contractor’s failure to use funds previously paid to it by the Owner to pay for the Contractor’s Work-related obligations including, but not limited to, subcontractors and suppliers on this Project;

9.5.3.6. claims made, or anticipated by the Owner to be made, against the Owner or its property;

9.5.3.7. inclusion in the pay request of any amounts in dispute or part of a claim;

9.5.3.8. Damage or loss caused by the Contractor, including its subcontractors and suppliers; or,

9.5.3.9. The Contractor's failure or refusal to perform its obligations to the Owner.

9.6. PROGRESS PAYMENTS

9.6.1. After the Architect/Engineer has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents or the Owner may take any action the Owner deems necessary under Subparagraph 9.5.3.

9.6.2. The Contractor shall promptly pay each Subcontractor in accordance with Title 28, Chapter 2, Part 21, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

9.6.3. The Contractor is prohibited from holding higher amounts in retainage on any Subcontractor than the Owner is holding from the Contractor.

9.6.4. The Architect/Engineer will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect/Engineer and Owner on account of portions of the Work done by such Subcontractor.

9.6.5. Neither the Owner nor Architect/Engineer shall have an obligation to pay, or to see to the payment of, money to a Subcontractor except as may otherwise be required by law.

9.6.6. Payment to material suppliers shall be treated in a manner similar to that provided in Subparagraphs 9.6.2, 9.6.3, 9.6.4, and 9.6.5.

9.6.7. A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

9.6.8. Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

9.7. FAILURE OF PAYMENT

9.7.1. If the Owner does not approve payment to the Contractor within thirty-five (35) calendar days after the receipt of a certified Application for Payment, then the Contractor may, upon seven additional days' written notice to the Owner and Architect/Engineer, suspend the Work until payment of the amount owing has been received. Nothing in the Subparagraph shall limit the Owner's rights and options as provided in Subparagraph 9.5.3. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

9.8. SUBSTANTIAL COMPLETION

9.8.1. Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

9.8.2. When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect/Engineer a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item

on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

9.8.3. Upon receipt of the Contractor's list, the Architect/Engineer will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect/Engineer's Inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect/Engineer. In such case, the Contractor shall then submit a request for another inspection by the Architect/Engineer to determine Substantial Completion.

9.8.4. The Contractor shall ensure the project is substantially complete prior to requesting any inspection by the Architect/Engineer so that no more than one (1) inspection is necessary to determine Substantial Completion for all or any portion of the Work. If the Contractor does not perform adequate inspections to develop a comprehensive list as required in Subparagraph 9.8.2 and does not complete or correct such items upon discovery or notification, the Contractor shall be responsible and pay for the costs of the Architect/Engineer's additional inspections to determine Substantial Completion.

9.8.5. When the Work or designated portion thereof is substantially complete, the Architect/Engineer will prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion and which shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance. After issuance of the Certificate of Substantial Completion, the Contractor shall finish and complete all remaining items within thirty (30) calendar days of the date on the Certificate. The Architect/Engineer shall identify and fix the time for completion of specific items which may be excluded from the thirty (30) calendar day time limit. Failure to complete any items within the specified time frames may be deemed by the Owner as default of the contract on the part of the Contractor.

9.8.6. The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety if there are claims or past payment issues, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

9.9. PARTIAL OCCUPANCY OR USE

9.9.1. The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect/Engineer as provided under Subparagraph 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect/Engineer.

9.9.2. Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect/Engineer shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work. Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

9.9.3. Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

9.10. FINAL COMPLETION AND FINAL PAYMENT

9.10.1. Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect/Engineer will promptly make such inspection and, when the Architect/Engineer finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect/Engineer will approve the Contractor's final Certificate for Payment stating that to the best of the Architect/Engineer's knowledge, information and belief, and on the basis of the Architect/Engineer's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect/Engineer's signature on the Contractor's final Certificate for Payment will constitute a further representation that conditions listed in Subparagraph 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

9.10.2. Neither final payment nor any remaining retainage shall become due until the Contractor submits to the Architect/Engineer:

9.10.2.1. completed Contractor's Affidavit of Completion, Payment of Debts and Claims, and Release of Liens (Form 106) that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied;

9.10.2.2. a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner;

9.10.2.3. a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents

9.10.2.4. Consent of Surety Company to Final Payment (Form 103); and,

9.10.2.5. if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner.

9.10.3. The Contractor and his surety accepts and assumes responsibility, liability, and costs for and agrees to defend and hold harmless the Owner for and against any and all actions as a result of the Owner making final payment.

9.10.4. By submitting any Application for Payment to the Architect/Engineer the Contractor and his surety certify and declare that all bills for materials, supplies, utilities and for all other things furnished or caused to be furnished by the Contractor and all Subcontractors and used in the execution of the Contract will be fully paid upon receipt of Final Payment and that there are no unpaid obligations, liens, claims, security interests, encumbrances, liabilities and/or demands of State Agencies, subcontractors, suppliers, mechanics, laborers or any others resulting from or arising out of any work done, caused to be done or ordered to be done by the Contractor under the contract.

9.10.5. In consideration of the prior payments and the final payment made and all payments made for authorized changes, the Contractor releases and forever discharges the Owner from any and all obligations, liens, claims, security interests, encumbrances and/or liabilities arising by virtue of the contract and authorized changes between the parties, either verbal or in writing, and any and all claims and demands of every kind and character whatsoever against the Owner, arising out of or in any way relating to the contract and authorized changes.

9.10.6. The date of Final Payment by the Owner shall constitute Final Acceptance of the Work. The determining date for the expiration of the warranty period shall be as specified in Paragraphs 3.5 and 12.2.2.

9.10.7. If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect/Engineer so confirms, the Owner shall, upon application by the Contractor and certification by the Architect/Engineer, and without terminating the Contract, make payment of the balance due for that

portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect/Engineer prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

9.10.8. The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

9.10.8.1. liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;

9.10.8.2. failure of the Work to comply with the requirements of the Contract Documents; or,

9.10.8.3. terms of special warranties required by the Contract Documents.

9.10.9. Acceptance of final payment by the Contractor, a Subcontractor, or material supplier, shall constitute a waiver of any and all obligations, liens, claims, security interests, encumbrances and/or liabilities against the Owner except those previously made in writing per the requirements of Paragraph 4.3 and as yet unsettled at the time of submission of the final Application for Payment.

9.10.10. The Owner's issuance of Final Payment does not constitute a waiver or release of any kind regarding any past, current, or future claim the Owner may have against the Contractor and/or the surety.

10. ARTICLE 10 – PROTECTION OF PERSONS AND PROPERTY

10.1. SAFETY

10.1.1. **Importance of Safety**. The Contractor and all Subcontractors (at any tier or level) recognize that safety is paramount at all times. The Contractor shall perform the work in a safe manner with the highest regard for safety of its employees and all other individuals and property at the work site. Contractor shall maintain its tools, equipment, and vehicles in a safe operating condition and take all other actions necessary to provide a safe working environment for performance of work required under this Contract. The Contractor is solely responsible for the means, methods, techniques, sequences and procedures for coordinating and constructing the Work, including all site safety, safety precautions, safety programs, and safety compliance with OSHA and all other governing bodies.

10.1.2. **Particular Safeguards**. (a). The Contractor shall erect and maintain, as required by Paragraphs 10.1.1 and 10.1.3, safeguards for safety and protection, including posting danger signs and other warnings against hazards, installing suitable barriers and lighting, promulgating safety regulations, and providing notification to all parties who may be impacted by the Contractor's operations. (b) When use or storage of explosives or other Hazardous Materials/Substances (defined below) or equipment are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel. (c) The Contractor shall not encumber or load or permit any part of the construction site to be encumbered or loaded so as to endanger the safety of any person(s).

10.1.3. **Compliance with Safety Laws**. Contractor represents and warrants to Owner that it knows and understands all federal, state and local safety statutes, rules, and regulations (Laws) related to the work under this Contract. Contractor shall comply with these Laws. Contractor shall keep all material data safety sheets on site and available at all times.

10.1.4. **Remedy property damage**. The Contractor shall promptly remedy damage and loss to property caused in whole or in part by the Contractor, a Subcontractor of any tier or level, or anyone employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 3.18.

10.1.5. **Designation of Safety Representative.** Unless the Contractor designates, in writing to the Owner and the Architect/Engineer, another responsible member of the Contractor's organization as the Safety Representative, the Contractor's superintendent is the Safety Representative. The Safety Representative is defined as that member of the Contractor's organization responsible for all safety under this Contract.

10.1.6. **Release/Indemnity of Owner and Architect/Engineer**. The Contractor agrees that the Owner and Architect/Engineer are not responsible for safety at the work site and releases them from all obligations and liability regarding safety at the work site The Contractor shall indemnify and defend the Owner and the Architect/Engineer against and from all claims, liabilities, fines, penalties, orders, causes of action, judgments, losses, costs and expenses (including but not limited to court costs and reasonable attorney fees), arising from injuries and death to any persons and damage to real and personal property arising from, in connection with, or incidental to Contractor's safety responsibilities under this Contract.

10.2. HAZARDOUS MATERIALS/SUBSTANCES

10.2.1. "Hazardous Materials/Substances" means any substance: (a) the presence of which requires investigation, or remediation under any federal, state or local statute, rule, regulation, ordinance, order, policy or common law; (b) that is or becomes defined as "hazardous waste," "hazardous substance," pollutant, or contaminant under any federal, state or local statute, rule, regulation, or ordinance or amendments thereto; (c) that is toxic, explosive, corrosive flammable, or otherwise hazardous and is or becomes regulated by any government authority, agency, board, commission or instrumentality of the United States, the state of Montana or any political subdivision thereof; (d) gasoline, diesel fuel or other petroleum hydrocarbons; (e) containing contains polychlorinated biphenyls (PCBs) or asbestos; or (f) the presence of which causes or threatens to cause a nuisance or trespass on the work site or adjacent property.

10.2.2. The Contractor is solely responsible for all compliance with all regulations, requirements, and procedures governing Hazardous Materials/Substances at the Work Site or that Contractor brings on the site. The Contractor is solely responsible for remediation, costs, damages, loss, and/or expenses for all Hazardous Materials/Substances brought to the site. The Contractor shall not and is strictly prohibited from purchasing and/or installing any asbestos-containing materials or products as part of the Work. Should the Contractor do so, the Contractor shall be solely responsible for the immediate remediation and all costs, damages, loss, and/or expenses per Paragraphs 10.1.6, 10.2.2, 10.2.3, and 10.2.4.

10.2.3. If the Contractor encounters Hazardous Materials/Substances during the course of the Work, whether or not identified in the Contract Documents, Work, the Contractor agrees that:

10.2.3.1. Encountering any Hazardous Materials/Substances during performance of the Work does not necessarily mean a change in conditions has occurred, nor is it evidence that the Contractor is due additional Contract Time or an increase in the Contract Sum. If encountering Hazardous Materials/Substances is determined to be a change in conditions to the Contract Documents, Paragraph 4.3 and Article 7 apply in determining any additional compensation or extension of time claimed by the Contractor.

10.2.3.2. The Contractor is solely responsible for securing the Work in accordance with this Article 10 involving any Hazardous Materials/Substances against unlawful, unregulated, or improper intrusion, disturbance, or removal. The Contractor shall implement protections and take protective actions throughout the performance of the Work to prevent exposure to workers, occupants, and contamination of the site or area.

10.2.3.3. If the Contractor is unable to or fails to properly secure the Work against unlawful, unregulated, or improper intrusion, disturbance, or removal of Hazardous Materials/Substances, the Contractor shall immediately implement protections and take protective actions, up to and including stopping Work in the area or on the item affected, to prevent exposure to workers, occupants, and contamination of the site or area. The Contractor shall immediately notify the Owner and Architect in writing giving details of the failure and the corrective actions taken. If the condition is an emergency and notice cannot be provided in writing, then Contractor shall orally and immediately notify the Owner and Architect/Engineer of the condition followed by a full written explanation. In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss.

10.2.3.4. If the Contractor notifies the Owner and takes precautions in accordance with this Article 10 upon encountering materials/substances suspected of containing asbestos or polychlorinated biphenyls that are unidentified in the Contract Documents, the Owner shall verify if the

unidentified material or substance contains asbestos or polychlorinated biphenyls and shall arrange for the removal or other measures as necessary to allow the Contractor to proceed with the Work. The Contract Time may be extended as appropriate if the Work affected is on the critical path and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs as provided in Article 7. Should the Contractor fail to notify the Owner upon encountering asbestos, polychlorinated biphenyls, or materials/substances suspected of containing asbestos or polychlorinated biphenyls, that are unidentified in the Contract Documents, the Contractor is solely responsible for all mitigation in accordance with Paragraphs 10.1.6, 10.2.2, 10.2.3, and 10.2.4.

10.2.4. The Contractor shall indemnify, hold harmless, and defend the Owner from and against all claims, liabilities, fines, penalties, orders, causes of action, judgments, losses, costs and expenses, including but not limited to court costs and reasonable attorneys' fees, arising from, in connection with, or incidental to the Contractor's handling, disposal, encountering, or release of Hazardous Materials/Substances.

10.3. UTILITIES

10.3.1. Underground Utilities: Buried utilities, including, but not limited to, electricity, gas, steam, air, water, telephone, sewer, irrigation, broadband coaxial computer cable, and fiber optic cables are very vulnerable and damage could result in loss of service. The telephone, broadband and fiber optic cables are especially sensitive and the slightest damage to these components will result in disruption of the operations of the campus.

10.3.2. "One Call" must be notified by phone and in writing at least 72 hours (3 business days) prior to digging to arrange and assist in the location of buried utilities in the field. (Dial 811). The Contractor shall mark the boundary of the work area. The boundary area shall be indicated with white paint and white flags. In winter, pink paint and flags will be accepted.

10.3.3. After buried utilities have been located, the Contractor shall be responsible for any utilities damaged while digging. Such responsibility shall include all necessary care including hand digging. Contractor's responsibility shall also include maintaining markings after initial locate. The area for such responsibility, unless otherwise indicated, shall extend 24 inches to either side of the marked center line of a buried utility line.

10.3.4. The Contractor's responsibility shall include repair or replacement of damaged utilities. The Contractor will also be responsible for all costs associated with reterminations and recertification.

10.3.5. Any buried utilities exposed by the operations of the Contractor shall be marked on the plans and adequately protected by the Contractor. If any buried utilities not located are exposed, the Contractor shall immediately contact the Owner and the Architect/Engineer. If, after exposing an unlocated buried utility, the Contractor continues digging without notifying Owner and Architect/Engineer and further damages the utility, the Contractor will be fully and solely responsible.

10.3.6. Damage to irrigation systems during seasons of no irrigation that are not immediately and adequately repaired and tested will require the Contractor to return when the system is in service to complete the repair.

10.3.7. In the event of a planned interruption of any existing utility service, the Contractor shall make arrangements with Owner at least 72 hours (3 business days) in advance. Shutdowns of the broadband or fiber optic cables will normally require 5 working days' notice to the Owner. The Contractor shall bear all costs associated with the interruptions and restorations of service.

11. ARTICLE 11 - INSURANCE AND BONDS

11.1. CONTRACTOR'S LIABILITY INSURANCE

11.1.1. The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the State of Montana with a rating no less than "A-", such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the

Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

11.1.1.1. claims under workers' compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;

11.1.1.2. claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

11.1.1.3. claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;

11.1.1.4. claims for damages insured by usual personal injury liability coverage;

11.1.1.5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting there from;

11.1.1.6. claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;

11.1.1.7. claims for bodily injury or property damage arising out of completed operations; and,

11.1.1.8. claims involving contractual liability insurance applicable to the Contractor's obligations under Paragraph 3.18.

11.1.2. The insurance required by Subparagraph 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until termination of any coverage required to be maintained after final payment.

11.1.3. Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These certificates and the insurance policies required by this Paragraph 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire at any time prior to Final Acceptance and then not until at least 30 days' prior written notice has been given to the Owner. If any of the foregoing insurance coverages are required to remain in force after final payment, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by Subparagraph 9.10.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.

11.1.4. At the request of the Owner, the Contractor shall provide copies of all insurance policies to the Owner.

11.2. INSURANCE, GENERAL REQUIREMENTS

11.2.1. The Contractor shall maintain for the duration of the contract, at its cost and expense, insurance against claims for injuries to persons or damages to property, including contractual liability, which may arise from or in connection with the performance of the Work by the Contractor, its agents, employees, representatives, assigns, or subcontractors. The Contractor is responsible for all deductibles regardless of policy or level of coverage. The Owner reserves the right to demand, and the Contractor agrees to provide, copies of any and all policies at any time.

11.2.2. Hold Harmless and Indemnification: The Contractor shall protect, defend, and save the state, its elected and appointed officials, agents, and employees, while acting within the scope of their duties as such, harmless from and against all claims, liabilities, demands, causes of action, and judgments whatsoever (including the cost of defense and reasonable attorney fees): 1) arising in favor of or asserted by third parties on account of damage to property, personal injury, or death which injury, death, or damage; or, 2) arising out of or resulting from performance or failure to perform, or omissions of services, or in any way results from the negligent acts or omissions of the Contractor, its agents, agents, or subcontractors.

11.2.3. Contractor's Insurance: insurance required under all sections herein shall be in effect for the duration of the contract that extends through the warranty period. Insurance required herein shall be provided by insurance policies issued only by insurance companies currently authorized to do business in the state of Montana. No Contractor or Sub-contractor shall commence any Work under this contract until all required insurance has been obtained. During the term of this contract, the Contractor shall, not less than thirty days prior to the expiration date of any policy for which a certificate of insurance is required, deliver to the Owner a certificate of insurance with respect to the renewal insurance policy. The Contractor shall furnish one copy of insurance certificates of insurance herein required, which shall specifically set forth evidence of all coverage required by these contract documents and which shall be signed by authorized representatives of the insurance company or companies evidencing that insurance as required herein is in force and will not be canceled, limited or restricted without thirty days' written notice by certified mail to the contractor and the Owner. The Contractor shall furnish to the Owner copies of any endorsements that are subsequently issued amending coverage or limits. Additionally, all certificates shall include the project name and A/E project number.

11.2.4. Certificates of Insurance and Endorsements. All certificates of insurance and the additional insured endorsements are to be received by the state prior to issuance of the Notice to Proceed. The contractor is responsible to ensure that all policies and coverages contain the necessary endorsements for the State being listed as an additional insured. The state reserves the right to require complete copies of all insurance policies at any time to verify coverage. The contractor shall notify the state within 30 days of any material change in coverage.

11.3. WORKERS' COMPENSATION INSURANCE

11.3.1. The Contractor shall carry **Workers' Compensation Insurance**. Such Workers' Compensation Insurance shall protect the Contractor from claims made by his own employees, the employees of any Sub-contractor, and also claims made by anyone directly or indirectly employed by the Contractor or Sub-contractor. The Contractor shall require each Sub-contractor similarly to provide Workers' Compensation Insurance.

11.4. COMMERCIAL GENERAL LIABILITY INSURANCE

11.4.1. Each Contractor shall carry per occurrence coverage **Commercial General Liability Insurance** including coverage for premises; operations; independent contractor's protective; products and completed operations; products and materials stored off-site; broad form property damage and comprehensive automobile liability insurance with not less than the following limits of liability:

11.4.1.1. **$1,000,000 per occurrence; aggregate limit of $2,000,000**;

11.4.2. The **Commercial General and Automobile Liability Insurance** shall provide coverage for both bodily injury, including accidental death, sickness, disease, occupational sickness or disease, personal injury liability coverage and property damage which may arise out of the work under this contract, or operations incidental thereto, whether such work and operations be by the Contractor or by any Subcontractor or by anyone directly or indirectly employed by the Contractor or by Sub-contractor, or by anyone for whose acts any of them may be liable. The Contractor shall maintain the liability insurance required herein for a period of not less than one year after final payment or anytime the Contractor goes on to the location of the project.

11.4.3. The Contractor's liability insurance policies shall list the STATE OF MONTANA as an additional insured. **AN ADDITIONAL INSURED ENDORSEMENT DOCUMENT SHALL BE SUBMITTED WITH THE CERTIFICATES OF INSURANCE**. The STATE OF MONTANA includes its officers, elected and appointed officials, employees and volunteers and political subdivisions thereof. Should the Contractor not be able to list the state as an additional insured, the Contractor shall purchase a per occurrence Owner's/Contractor's Protective Policy (OCP) with the STATE OF MONTANA as the insured party in the same occurrence and aggregate limits as that indicated above for the Contractor's Commercial General Liability Policy.

11.4.4. Property damage liability insurance shall be written without any exclusion for injury to or destruction of any building, structure, wires, conduits, pipes, or other property above or below the surface of the ground

arising out of the blasting, explosion, pile driving, excavation, filling, grading or from the moving, shoring, underpinning, raising, or demolition of any building or structure or structural support thereof.

11.4.5. The Contractor's insurance coverage shall be PRIMARY insurance as respects the State, its officers, elected and appointed officials, employees and volunteers. Any insurance or self-insurance maintained by the state, its officers, elected and appointed officials, employees and volunteers shall be excess of the Contractor's insurance and shall not contribute to it. NO WAIVERS OF SUBROGATION OR ENDORSEMENTS LIMITING, TRANSFERRING, OR OTHERWISE INDEMNIFYING LIABLE OR RESPONSIBLE PARTIES OF THE CONTRACTOR OR ANY SUBCONTRACTOR WILL BE ACCEPTED.

11.5. PROPERTY INSURANCE (ALL RISK)

11.5.1. New Construction (for projects involving new construction): At its sole cost and expense, the contractor shall keep the building and all other improvements on the premises insured throughout the term of the agreement against the following hazards:

11.5.1.1. Loss or damage by fire and such other risks (including earthquake damage for those areas with a shaking level at 10g or above as indicated on the seismic map, http://rmtd.mt.gov/Portal/62/aboutus/publications/files/NEHRP.pdf in an amount sufficient to permit such insurance to be written at all times on a replacement cost basis. This may be insured against by attachment of standard form extended coverage endorsement to fire insurance policies. Certificates of Insurance MUST indicate earthquake coverage if coverage is required per the above referenced map.

11.5.1.2. Loss or damage from leakage or sprinkler systems now or hereafter installed in any building on the premises.

11.5.1.3. Loss or damage by explosion of steam boilers, pressure vessels, and oil or gasoline storage tanks, or similar apparatus now or hereafter installed in a building or buildings on the premises.

11.5.2. Building Renovation (for projects involving building renovation or remodeling):

11.5.2.1. The contractor shall purchase and maintain Builder's Risk/Installation insurance on a "special causes of loss" form (so called "all risk") for the cost of the work and any subsequent modifications and change orders. The contractor is not responsible for insuring the existing structure for Builder's Risk/Installation insurance.

11.5.2.2. At its sole cost and expense, the contractor shall insure all property construction on the premises throughout the term of the agreement against the following hazards:

11.5.2.2.1. Loss or damage by fire and such other risks (including earthquake damage for those areas with a shaking level at 10g or above as indicated on the seismic map at http://rmtd.mt.gov/Portal/62/aboutus/publications/files/NEHRP.pdf in an amount sufficient to permit such insurance to be written at all times on a replacement cost basis. This may be insured against by attachment of standard form extended coverage endorsement to fire policies. Certificates of Insurance MUST indicate earthquake coverage if coverage is required per the above referenced map.

11.5.2.2.2. Loss or damage from leakage or sprinkler systems now or hereafter installed in any building on the premises.

11.5.2.2.3. Loss or damage by explosion of steam boilers, pressure vessels, oil or gasoline storage tanks, or similar apparatus now or hereafter installed in a building or buildings on the premises.

11.6. ASBESTOS ABATEMENT INSURANCE

11.6.1. If Asbestos Abatement is identified as part of the Work under this contract, the Contractor or any subcontractor involved in asbestos abatement shall purchase and maintain **Asbestos Liability Insurance** for coverage of bodily injury, sickness, disease, death, damages, claims, errors or omissions regarding the asbestos portion of the work ***in addition to*** the CGL Insurance by reason of any negligence

in part or in whole, error or omission committed or alleged to have been committed by the Contractor or anyone for whom the Contractor is legally liable.

11.6.2. Such insurance shall be in "per occurrence" form and shall clearly state on the certificate that asbestos work is included in the following limits:

11.6.2.1. **$1,000,000 per occurrence; aggregate limit of $2,000,000.**

11.6.3. Asbestos Liability Insurance as carried by the asbestos abatement subcontractor in these limits in lieu of the Contractor's coverage is acceptable provided the Contractor and the State of Montana are named as additional insureds and that the abatement subcontractor's insurance is PRIMARY as respects both the Owner and the Contractor. If the Contractor or any other subcontractor encounters asbestos, all operations shall be suspended until abatement with the associated air monitoring clearances are accomplished. The certificate of coverage shall be provided by the asbestos abatement subcontractor to both the Contractor and the Owner.

11.7. PERFORMANCE BOND AND LABOR & MATERIAL PAYMENT BOND (BOTH ARE REQUIRED ON THIS PROJECT)

11.7.1. For contracts equal to or greater than $50,000 The Contract shall furnish a Performance Bond in the amount of 100% of the contract price as security for the faithful performance of his contract (18-2-201 MCA). The Contractor shall also furnish a Labor and Material Payment Bond in the amount of 100% of the contract price as security for the payment of all persons performing labor and furnishing materials in connection therewith (18-2-201MCA). The bonds shall be executed on forms furnished by the Owner and no other forms or endorsements will be acceptable. The bonds shall be signed in compliance with state statutes (33-17-1111 MCA). Bonds shall be secured from a state licensed bonding company. Power of Attorney is required with each bond. Attorneys-in-fact who sign contract bonds must file with each bond a certified and effectively dated copy of their power of attorney:

11.7.1.1. one original copy shall be furnished with each set of bonds.

11.7.1.2. Others furnished with a set of bonds may be copies of that original.

11.7.2. The Owner reserves the right at any time during the performance of Work to require bonding of Subcontractors provided by the General Contractor. Should this occur, the Owner will cover the direct cost. This shall not be construed as to in any way affect the relationship between the General Contractor and his Subcontractors.

11.7.3. Surety must have an endorsement stating that their guarantee of Contractor's performance automatically covers the additional contract time added to a Contractor's contract by Change Order.

11.7.4. A change in the Contractor's organization shall not constitute grounds for Surety to claim a discharge of their liability and requires an endorsement from Surety so stating.

11.7.5. Except as noted below, the Contractor is required to notify Surety of any increase in the contract amount resulting from a Change Order within 48 hours of signing and submitting a Change Order and shall submit a copy of Surety's written acknowledgment and consent to Owner before a Change Order can be approved. The Surety's written acknowledgment and consent on the Change Order form shall also satisfy this consent requirement.

11.7.5.1. Surety consent shall not be required on Change Order(s) which, in the aggregate total amount of all Changes Orders, increase the original contract amount by less than 10%. However, the Contractor is still required to notify Surety of any increase in contract amount resulting from a Change Order(s) within 48 hours of signing and submitting every Change Order.

11.7.5.2. Surety is fully obligated to the Owner for the full contract amount, inclusive of all Change Orders, regardless of whether or not written acknowledgement and consent is received and regardless of whether or not the aggregate total of all Change Orders is more or less than 10% of the original contract amount.

11.7.5.3. A fax with hard copy to follow of Surety's written acknowledgment and consent is acceptable. If hard copy is not received by Owner before Application for Payment on any portion or all of said Change Order, it will not be accepted by Owner for payment.

11.7.6. The Surety must take action within 30 days of notice of default on the part of the Contractor or of any claim on bonds made by the Owner or any Subcontractor or supplier.

12. ARTICLE 12 - UNCOVERING AND CORRECTION OF WORK

12.1. UNCOVERING OF WORK

12.1.1. If a portion of the Work is covered contrary to the Architect/Engineer's request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Architect/Engineer, be uncovered for the Architect/Engineer's examination and be replaced at the Contractor's expense without change in the Contract Time.

12.1.2. If a portion of the Work has been covered which the Architect/Engineer has not specifically requested to examine prior to it being covered, the Architect/Engineer may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

12.2. CORRECTION OF WORK

12.2.1. **BEFORE OR AFTER SUBSTANTIAL COMPLETION**

12.2.1.1. The Contractor shall promptly correct Work that fails to conform to the requirements of the Contract Documents or that is rejected by the Architect/Engineer, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections and compensation for the Architect/Engineer's services and expenses made necessary thereby, shall be at the Contractor's expense. The Contractor is responsible to discover and correct all defective work and shall not rely upon the Architect/Engineer's or Owner's observations.

12.2.1.2. Rejection and Correction of Work in Progress. During the course of the Work, the Contractor shall inspect and promptly reject any Work that:

12.2.1.2.1. does not conform to the Construction Documents; or,
12.2.1.2.2. does not comply with any applicable law, statute, building code, rule or regulation of any governmental, public and quasi-public authorities, and agencies having jurisdiction over the Project.

12.2.1.3. The Contractor shall promptly correct or require the correction of all rejected Work, whether observed before or after Substantial Completion. The Contractor shall bear all costs of correcting such Work, including additional testing, inspections, and compensation for all services and expenses necessitated by such corrective action.

12.2.2. **AFTER SUBSTANTIAL COMPLETION AND AFTER FINAL ACCEPTANCE**

12.2.2.1. In addition to the Contractor's obligations under Paragraph 3.5, if, within one year after the date of Final Acceptance of the Work or designated portion thereof or after the date for commencement of warranties, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives

the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect/Engineer, the Owner may correct it in accordance with Paragraph 2.3.

12.2.2.1.1. The Contractor shall remedy any and all deficiencies due to faulty materials or workmanship and pay for any damage to other work resulting there from, which shall appear within the period of Substantial Completion through one (1) year from the date of Final Acceptance in accordance with the terms and conditions of the Contract and with any special guarantees or warranties provided in the Contract Documents. The Owner shall give notice of observed deficiencies with reasonable promptness. All questions, claims or disputes arising under this Article shall be decided by the Architect/Engineer. All manufacturer, product and supplier warranties are in addition to this Contractor warranty.

12.2.2.1.2. The Contractor shall respond within seven (7) days after notice of observed deficiencies has been given and he shall proceed to immediately remedy these deficiencies.

12.2.2.1.3. Should the Contractor fail to respond to the notice or not remedy those deficiencies; the Owner shall have this work corrected at the expense of the Contractor.

12.2.2.1.4. Latent defects shall be in addition to those identified above and shall be the responsibility of the Contractor per the statute of limitations for a written contract (27-2-208 MCA) starting from the date of Final Acceptance.

12.2.2.2. The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work.

12.2.2.3. The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Paragraph 12.2.

12.2.3. The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

12.2.4. The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

12.2.5. Nothing contained in this Paragraph 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the one-year period for correction of Work as described in Subparagraph 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

12.3. ACCEPTANCE OF NONCONFORMING WORK

12.3.1. If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

13. ARTICLE 13 - MISCELLANEOUS PROVISIONS

13.1. GOVERNING LAW

13.1.1. The Contract shall be governed by the laws of the State of Montana and venue for all legal proceedings shall be the First Judicial District, Lewis & Clark County.

13.2. SUCCESSORS AND ASSIGNS

13.2.1. The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempt to make such assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

13.3. WRITTEN NOTICE

13.3.1. Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice.

13.4. RIGHTS AND REMEDIES

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

13.4.2. No action or failure to act by the Owner, Architect/Engineer or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

13.5. TESTS AND INSPECTIONS

13.5.1. Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect/Engineer timely notice of when and where tests and inspections are to be made so that the Architect/Engineer may be present for such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded.

13.5.2. If the Architect/Engineer, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Subparagraph 13.5.1, the Architect/Engineer will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect/Engineer of when and where tests and inspections are to be made so that the Architect/Engineer may be present for such procedures. Such costs, except as provided in Subparagraph 13.5.3 shall be at the Owner's expense.

13.5.3. If such procedures for testing, inspection or approval under Subparagraphs 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect/Engineer's services and expenses shall be at the Contractor's expense.

13.5.4. Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect/Engineer.

13.5.5. If the Architect/Engineer is to observe tests, inspections or approvals required by the Contract Documents, the Architect/Engineer will do so promptly and, where practicable, at the normal place of testing.

13.5.6. Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

13.6. INTEREST

13.6.1. Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

13.7. COMMENCEMENT OF STATUTORY LIMITATION PERIOD

13.7.1. As between the Owner and Contractor:

13.7.1.1. **Before Substantial Completion.** As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;

13.7.1.2. **Between Substantial Completion and Final Certificate for Payment.** As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment; and,

13.7.1.3. **After Final Payment.** As to acts or failures to act occurring after the relevant date of issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any Warranty provided under Paragraph 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Paragraph 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.

13.8. PAYROLL AND BASIC RECORDS

13.8.1. Payrolls and basic records pertaining to the project shall be kept on a generally recognized accounting basis and shall be available to the Owner, Legislative Auditor, the Legislative Fiscal Analyst or his authorized representative at mutually convenient times. Accounting records shall be kept by the Contractor for a period of three years after the date of the Owner's Final Acceptance of the Project.

14. ARTICLE 14 – TERMINATION OR SUSPENSION OF THE CONTRACT

14.1. TERMINATION BY THE CONTRACTOR

14.1.1. The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

14.1.1.1. issuance of an order of a court or other public authority having jurisdiction which requires all Work to be stopped; or,

14.1.1.2. an act of government, such as a declaration of national emergency which requires all Work to be stopped.

14.1.2. The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Paragraph 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

14.1.3. If one of the reasons described in Subparagraph 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect/Engineer, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead and profit but not damages.

14.1.4. If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has persistently failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect/Engineer, terminate the Contract and recover from the Owner as provided in Subparagraph 14.1.3.

14.2. TERMINATION BY THE OWNER FOR CAUSE

14.2.1. The Owner may terminate the Contract if the Contractor:

14.2.1.1. persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

14.2.1.2. fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

14.2.1.3. persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or,

14.2.1.4. otherwise is guilty of any breach of a provision of the Contract Documents.

14.2.2. When any of the above reasons exist, the Owner, upon certification by the Architect/Engineer that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

14.2.2.1. take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

14.2.2.2. accept assignment of subcontracts pursuant to Paragraph 5.4; and,

14.2.2.3. finish the Work by whatever reasonable method the Owner may deem expedient. Upon request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

14.2.3. When the Owner terminates the Contract for one of the reasons stated in Subparagraph 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

14.2.4. If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect/Engineer's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect/Engineer, upon application, and this obligation for payment shall survive termination of the Contract.

14.3. SUSPENSION BY THE OWNER FOR CONVENIENCE

14.3.1. The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

14.3.2. The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Subparagraph 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

14.3.2.1. that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or,

14.3.2.2. that an equitable adjustment is made or denied under another provision of the Contract.

14.4. TERMINATION BY THE OWNER FOR CONVENIENCE

14.4.1. The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

14.4.2. Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall:

14.4.2.1. cease operations as directed by the Owner in the notice;

14.4.2.2. take actions necessary, or that the Owner may direct, for the protection and preservation of the Work, and;

14.4.2.3. except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

14.4.3. In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed. The Contractor shall provide a full and complete itemized accounting of all costs.

15. ARTICLE 15 – EQUAL OPPORTUNITY

15.1. The Contractor and all Sub-contractors shall not discriminate against any employee or applicant for employment because of race, color, sex, pregnancy, childbirth or medical conditions related to pregnancy or childbirth, political or religious affiliation or ideas, culture, creed, social origin or condition, genetic information, sexual orientation, gender identity or expression, national origin, ancestry, age, disability, military service or veteran status, or marital status, or physical or mental disability and shall comply with all Federal and State laws concerning fair labor standards and hiring practices. The Contractor shall ensure that applicants are employed, and that employees are treated during employment, without regard to race, color, sex, pregnancy, childbirth or medical conditions related to pregnancy or childbirth, political or religious affiliation or ideas, culture, creed, social origin or condition, genetic information, sexual orientation, gender identity or expression, national origin, ancestry, age, disability, military service or veteran status, or marital status, or physical or mental disability.

15.2. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places available to employees and applicants for employment, notices setting forth the policies of non-discrimination.

15.3. The Contractor and all Sub-contractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, color, sex, pregnancy, childbirth or medical conditions related to pregnancy or childbirth, political or religious affiliation or ideas, culture, creed, social origin or condition, genetic information, sexual orientation, gender identity or expression, national origin, ancestry, age, disability, military service or veteran status, or marital status, or physical or mental disability.

[END OF GENERAL CONDITIONS]

MONTANA STATE UNIVERSITY

CAMPUS PLANNING, DESIGN & CONSTRUCTION
Sixth Avenue and Grant Street • P.O. Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

SUPPLEMENTAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

(REVISED OCTOBER 2019)

FOR STATE OF MONTANA GENERAL CONDITIONS

ARTICLE 1 – GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.3 SPECIFICATIONS

1.1.3.1 ADD: "Approved": When used to convey Architect's/Engineer's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's/Engineer's duties and responsibilities as stated in the Conditions of the Contract.

1.1.3.2 ADD: "Directed": A command or instruction by Architect/Engineer. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

1.1.3.3 ADD: "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

1.1.3.4 ADD: "Regulations": Laws ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

1.1.3.5 ADD: "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

1.1.3.6 ADD: "Install": Operations at Project site including unloading, temporarily shoring, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

1.1.3.7 ADD: "Provide": Furnish and install, complete and ready for the intended use.

1.1.3.8 ADD: "Project site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land or portion of the building on which the Project is to be built.

1.6.1 Insert in the sixth line: "All documents which constitute the instruments of service are the property of the Owner." In lieu of the phrase "Unless otherwise indicated, the Architect/Engineer and the Architect/Engineer's consultants shall be deemed the authors of them… except as defined in the Owner's Contract with the Architect/Engineer."

ARTICLE 2 – THE OWNER

2.1 THE STATE OF MONTANA

2.1.1.1 ADD: The State of Montana includes its officers, elected and approved officials, employees and volunteers, and political subdivisions thereof. The State of Montana and Montana State University are synonymous throughout the contract documents.

ARTICLE 3 – THE CONTRACTOR

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

3.3.6 ADD: PRODUCT DELIVERY, STORAGE AND HANDLING

3.3.6.1 ADD: Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

3.3.6.2 ADD: DELIVERY AND HANDLING:

3.3.6.2.1 ADD: Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.

3.3.6.2.2 ADD: Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3.3.6.2.3 ADD: Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

3.3.6.2.4 ADD: Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and property protected.

3.3.6.3 ADD: STORAGE

3.3.6.3.1 ADD: Store products to allow for inspection and measurement of quantity or counting of units

3.3.6.3.2 ADD: Store materials in a manner that will not endanger Project structure.

3.3.6.3.3 ADD: Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.

3.3.6.3.4 ADD: Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.

3.3.6.3.5 ADD: Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

3.3.6.3.6 ADD: Protect stored products from damage and liquids from freezing.

3.10 CONSTRUCTION SCHEDULES

3.10.1.1 ADD: A pre-construction meeting will be held at a time mutually agreed upon by the Owner, Architect/Engineer and Contractor at Campus Planning, Design and Construction, Montana State University, Bozeman, Montana. The contractor shall confirm the Contractor's Construction Schedule for the Work. Coordination of operating requirements of the affected buildings, and surrounds, schedule of activities and Owner requirements will be discussed, as well as the order in which the Contractor intends to pursue the work. This schedule will be reviewed and must be mutually agreed upon by the Architect, Contractor and Owner.

3.11 DOCUMENTATION AND AS-BUILT CONDITIONS AT THE SITE

3.11.4 ADD: The contractor shall maintain at the site two (2) construction reference sets of all specifications, drawings, approved shop drawings, change orders and other modifications, addenda, schedules and instructions, in good order.

3.11.4.1 ADD: The record drawings shall be two (2) sets of black (or blue) and white prints of the drawings on which the contractor must record all "red line" changes during the course of construction and will include references to change order numbers, field directives, etc., and their dates. This record set shall be maintained separate and apart from documents used for construction reference. This set will be available for review by the project consultant, architect, engineer and MSU project manager at all times.

3.11.4.2 ADD: All as-built conditions shall be kept current and the contractor shall not permanently conceal or cover any work until all required information has been recorded.

3.11.4.3 ADD: All survey and exterior underground utilities shall be recorded using the spatial reference, Montana State Plane, NAD 83, CORS 96, Lambert Conformal Conic. The National Geodetic Survey publishes NAD 83

coordinates in the metric system (i.e., meters). The conversion factor that should be used to convert between English and metric systems is the international conversion factor of 1 ft. = 0.3048 m. coordinate system.

3.11.4.4 ADD: In marking any as-built conditions, the contractor shall ensure that such drawings indicate by measured dimension to building corners or other permanent monuments the exact locations of all piping, conduit or utilities concealed in concrete slabs, behind walls or ceilings or underground. Record drawings shall be made to scale and shall also include exact locations of valves, pull boxes and similar items as required for maintenance or repair service.

3.11.4.5 ADD: The contractor shall prepare and maintain a binder with all project warranty information. This will be provided to the project consultant, architect or engineer at final acceptance.

3.12.1 DEFINITIONS:

3.12.1.4 ADD: Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

3.12.1.5 ADD: Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.

3.12.1.6 ADD: New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.

3.12.1.7 ADD: Comparable Products: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

3.12.1.8 ADD: Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specifications.

3.13. <u>USE OF SITE</u>

3.13.3 ADD: MSU BOZEMAN Vehicle Regulations state:

"All students, faculty, staff, and visitors must register any motor vehicle they park on the University campus, for any reason. A visitor is anyone not defined as student, staff or faculty."

All Contractor and Contractor employees shall comply with Montana State University parking regulations. MSU parking permits can be purchased at the Huffman Building at Seventh Avenue and Kagy Boulevard. Contractor should call University Police at 994-2121 for permit information. Violators of MSU Bozeman Vehicle Regulations may be ticketed and towed.

Unless otherwise indicated on the drawings, all Contractor and Contractor employee vehicles on campus shall be parked in designated parking lots. If allowed on the drawings, vehicles to a maximum number stated, may be parked in project site areas designated and shall only be Contractor vehicles with company signs clearly visible. No personal vehicles shall be parked at the project site in any case. If a driver of a vehicle not allowed to be parked at the project site must unload equipment, tools, or materials, the vehicle must be immediately thereafter moved to a designated lot or leave campus. Vehicles parked in the project site, other than those allowed on the drawings, may be ticketed and towed.

Access to the project site shall be only by the route designated on the drawings. In cases where a different route must be used for a specific purpose, permission must be obtained from MSU Facilities Services. In no case will vehicles be used on the Centennial Mall paving. Access routes are for delivery of equipment, tools, and not for parking.

Site staging areas for materials and equipment if permitted, will be designated on the drawings if permitted. If not designated, staging is intended to be in the construction area boundaries. Staged materials and equipment must be secured on the ground surface or in trailers. Site staging areas shall be fenced.

3.13.4 ADD: The Contractor shall coordinate his operations with the Owner in order that the Owner will have maximum use of existing facilities surrounding the area of the Work, as agreed upon, at all times during normal working hours. Contractor further agrees to coordinate his operations so as to avoid interference with the Owner's normal operations to as great an extent as possible.

3.13.5 ADD: By acceptance of MSU Building Keys the Contractor agrees with the following: University keys are the property of Montana State University. Fabricating, duplicating or modifying University keys is prohibited. Doors must remain locked at all times. The use of these keys to allow unauthorized persons to enter the above areas is prohibited. Loss of any key must be reported immediately to the Director, Office of Facilities Services and University Police, if the loss of keys results in re-keying costs, these costs will be charged to the Contractor. **See attached Estimated Re-Keying Costs per Building.**

3.13.6 ADD: The Montana Legislature decreed that the "right to breath smoke-free air has priority over the desire to smoke" (MCA 20-40-102). It is the policy of MSU to promote the health, wellness and safety of all employees, students, guests, visitors, and contractors while on campus. Therefore, the campus will be free of tobacco-use effective August 1, 2012. The use of tobacco (including cigarettes, cigars, pipes, smokeless tobacco and all other tobacco products) by students, faculty, staff, guests, visitors, and contractors is prohibited on all properties owned or leased by MSU.

Littering any university property, whether owned or leased, with the remains of tobacco products is prohibited.

All university employees, students, visitors, guests, and contractors are required to comply with this policy, which shall remain in effect at all times. Refusal to comply with this policy may be cause for disciplinary action in accordance with employee and student conduct policies. Refusal to comply with the policy by visitors, guests and contractors may be grounds for removal from campus. (http://www2montana.edu/policy/smoking_facilities/)

3.13.7 ADD: The Contractor may use the University's toilet facilities only as directed by the Owner.

ARTICLE 4 – ADMINISTRATION OF THE CONSTRUCTION CONTRACT

4.6. ARBITRATION

4.6.3 Insert in the second line "the Eighteenth Judicial District, Gallatin County" in lieu of "First Judicial District, Lewis & Clark County."

4.6.11 ADD: In responding to a claim brought by a Contractor, the Owner shall have a minimum of forty-five (45) days in which to respond to a revised claim prior to the arbitration hearing.

ARTICLE 7 – CHANGES IN WORK

7.2 CHANGE ORDERS

7.2.2.1 Insert the word "maximum" before "5%" and insert the word "maximum" before "10%".

7.2.2.4 ADD: Total Change Order markup shall not exceed (cost of the work) x 1.15.

7.2.3.1 Insert at the beginning of the first sentence the word "Itemized".

7.2.3.2 Insert at the beginning of the first sentence the word "Itemized".

7.2.3.3 Insert at the beginning of the first sentence the word "Itemized".

7.2.3.4 ADD: The Contractor shall provide a complete description summarizing all work involved.

ARTICLE 8 - TIME

8.1. DEFINITIONS

8.1.8.1 ADD: The Owner will issue a written Notice to Proceed on satisfactory receipt of the signed Contract and all required bonds, insurance and other required submittals. Work commenced before receipt of the Notice to Proceed will be entirely at the Contractor's risk.

8.2. PROGRESS AND COMPLETION

8.2.5 ADD: Completion of the work within the stated time and/or by the date stated on the Notice to Proceed is of the essence of this Contract and failure to complete, without approved time extension, may be considered default of the Contract. At the time for completion as stated on the Notice to Proceed or as extended by approved change order, if the work is not substantially complete, the Owner may notify the Contractor and the Contractor's surety company in writing of the recourse the Owner intends to take, within the Contract, to assess liquidated damages and /or cause the work to be completed.

8.3. DELAYS AND EXTENSIONS OF TIME

8.3.4 ADD: By the act of signing the Contract, the Contractor signifies that he/she and all subcontractors can perform the work within the stated schedule and that subcontractors, manufacturers, suppliers, and deliverers are known to be able to support the schedule. Time extension may be granted for unforeseen conditions or events out of the Contractor's control causing delay in delivery of materials or causing delay in the Contractor's ability to perform the work within the Contract Documents. The Contractor is expected to take all possible measures and bear all reasonable costs in order to anticipate, control, counteract, and expedite such delay-causing conditions, including finding alternative sources of materials, equipment, shipping, and labor. Notification of any claim for schedule delay must be made in writing to the Owner within one week of the causing event or of first knowledge of a known delay causing condition with supporting documentation as required by the Owner. The Owner will respond in writing within one week to claims of delay. No claims of delay will be entertained after the date of completion as stated on the Notice to Proceed or as extended by previously approved delay claims.

ARTICLE 9 – PAYMENTS AND COMPLETION

9.3. APPLICATIONS FOR PAYMENT

9.3.7.2.1. Insert in the first line "Schedule of Values" in lieu of "Schedule of Amounts for Contract Payment".

9.3.7.2.3 ADD: Subcontractor's List: The Contractor shall list all subcontractors doing work in excess of $5,000.

9.8. SUBSTANTIAL COMPLETION

9.8.4.1 ADD: Prior to the inspection, the Contractor shall complete the final clean-up of the project site which, unless otherwise stated in the Contract Documents, shall consist of:

9.8.4.1.1 Removal of all debris and waste. All construction debris and waste shall be removed from the campus grounds. Use of the University trash containers will not be permitted.

9.8.4.1.2 Removal of all stains, smears, marks of any kind from surfaces including existing surfaces if said damage is the result of the work.

9.8.4.1.3 Removal of all temporary structures and barricades.

9.10. FINAL COMPLETION AND FINAL PAYMENT

9.10.2.4 Insert in the first line after the word "(Form 103)": "for contracts greater than or equal to $25,000"

ARTICLE 10 – PROTECTIONS OF PERSONS AND PROPERTY

10.1. SAFETY

10.1.2 Insert in the second line before the word "safeguards": "and as approved by Owner,"

10.1.2.1 ADD: The Contractor recognizes that the Work will be conducted in and around buildings and areas that are occupied and will continue to function for the purposes of the University. The Contractor shall conduct a project safety meeting prior to the start of the Work, with the Owner's representative and all others that the Owner's representative deems necessary. The purpose of the meeting shall be to produce project specific rules and guidelines pertaining to but not restricted to: safety of persons in and around the area of the Work including type and location of fencing, guards, signage, etc.; closing of existing campus circulation routes and designation of alternate routes,

including creation of temporary routes of access as required; creation and location of temporary signage as required to maintain accessible routes for handicapped access to and around the site of the Work. The Contractor shall be solely responsible for implementing all required means and methods for site safety and security that may be agreed upon in this meeting.

10.1.2.2 ADD: Contractor shall notify Owner any time his operations will disrupt use of and access to existing accessible routes. Contractor is solely responsible for maintaining existing accessible routes in the area of the project with the exception of temporary interruptions lasting one day or less. Contractor is responsible for erecting signage identifying temporary re-routing of accessible routes. Such re-routing shall be coordinated with Owner in advance.

10.3. UTILITIES

10.3.1 ADD: Underground Utilities: Buried utilities, including, but not limited to, electricity, gas, steam, air, water, telephone, sewer, irrigation, broadband coaxial computer cable, and fiber optic cables are very vulnerable and damage could result in loss of service. The telephone, broadband and fiber optic cables are especially sensitive and the slightest damage to these components will result in disruption of the operations of the campus.

10.3.2 ADD: "One Call" must be notified by phone and in writing at least 72 hours (3 business days) prior to digging to arrange and assist in the location of buried utilities in the field. (Dial 811). The Contractor shall mark the boundary of the work area. The boundary area shall be indicated with white paint and white flags. In winter, pink paint and flags will be accepted.

10.3.3 ADD: After buried utilities have been located, the Contractor shall be responsible for any utilities damaged while digging. Such responsibility shall include all necessary care including hand digging. Contractor's responsibility shall also include maintaining markings after initial locate. The area for such responsibility, unless otherwise indicated, shall extend 24 inches to either side of the marked center line of a buried utility line. In cases of multiple or overlapping utilities or inconclusive electronic locating signals, MSU Project Manager may specifically indicate a wider area for Contractor's responsibility.

10.3.4 ADD: The Contractor's responsibility shall include repair or replacement of damaged utilities. In the event of damage to the 15 KV electrical distribution system, the broadband or fiber optic cables, repair will consist of replacement from termination to termination. Facilities Services and the MSU Information Technology Center will verify repair and recertification. The Contractor will also be responsible for all costs associated with re-terminations and recertification.

10.3.5 ADD: Any buried utilities exposed by the operations of the Contractor shall be marked on the plans and adequately protected by the Contractor. If any buried utilities not located are exposed, the Contractor shall immediately contact Facilities Services at the numbers above. If, after exposing an unlocated buried utility, the Contractor continues digging without notifying Facilities Services and further damages the utility, the Contractor will be responsible.

10.3.6 ADD: Damage to irrigation systems during seasons of no irrigation that are not immediately and adequately repaired and tested will require the Contractor to return when the system is in service to complete the repair.

10.3.7 ADD: In the event of a planned interruption of any existing utility service, the Contractor shall make arrangements with Facilities Services at least 72 hours (3 business days) in advance. Shutdowns of the broadband or fiber optic cables will normally require 5 working days notice to Facilities Services and the Information Technology Center. The Contractor shall bear all costs associated with the interruptions and restorations of service.

10.3.8 ADD: The Owner allows the contractor to use the Owner's utilities (water, heat, electricity) services without charge for procedures necessary for the completion of the work.

ARTICLE 11 - INSURANCE AND BONDS

11.4. COMMERCIAL GENERAL LIABILITY INSURANCE

11.4.1.3. Insert in the first line after "State of Montana": ", Montana State University".

11.7. PERFORMANCE BOND AND LABOR & MATERIAL PAYMENT BOND (BOTH ARE REQUIRED ON THIS PROJECT)

11.7.1. Insert in the first line at the beginning of the sentence "For contracts equal to or greater than $25,000".

11.8. CANCELLATION

11.8 ADD All Certificates shall contain a provision that coverage provided by the policies will not be cancelled without at least thirty (30) days prior notice to the Owner.

ARTICLE 13 – MISCELLANEOUS PROVISIONS

13.1. GOVERNING LAW

13.1.1. Insert in the second line "The Eighteenth Judicial District, Gallatin County" in lieu of "First Judicial District, Lewis and Clark County".

13.9 EMERGENCY AND PUBLIC SAFETY

Montana State University has an Emergency and Public Safety Alert System that warns the campus community in the event of an emergency or public safety event. Because contractors, consultants, and vendors are considered members of the campus community when working on campus, they must be familiar with the alert system and understand when the system is used. Montana State University requires all contractors, consultants, vendors, and their employees working on or entering the MSU-Bozeman campus to register for the Emergency and Public Safety Alert System. The link to register is: http://www.montana.edu/msualert/.

END OF SUPPLEMENTARY GENERAL CONDITIONS

MONTANA
STATE UNIVERSITY

FACILITIES SERVICES
PO BOX 172760, BOZEMAN, MONTANA 59717-2760
406/994-5413 FAX 406/994-5665

Cost Estimate to Re-key Buildings

Building	Core #	Cut keys	Budget
AJM Johnson	112	448	$13,000.00
Animal BioScience	109	436	$13,000.00
ARC	122	488	$14,000.00
Athletics (Fieldhouse etc.)	500	2,000	$52,000.00
Cheever Hall	136	544	$18,000.00
Chem Building	229	916	$30,000.00
Chem Modular	16	64	$3,000.00
Cobleigh Hall	380	1,520	$41,000.00
Cooley Lab	99	396	$12,000.00
Creative Arts Complex	368	1,472	$50,000.00
Culbertson Hall	171	684	$23,000.00
Haynes Hall	113	452	$16,000.00
Howard Hall	119	476	$16,000.00
Huffman	39	156	$6,000.00
EPS	408	1,632	$45,000.00
EPS Complex	928	3,712	$106,000.00
Gaines Hall	175	700	$23,000.00
Grad Art	6	24	$2,000.00
Hamilton Hall	99	396	$16,000.00
Heat Plant	17	68	$3,000.00
Herrick Hall	118	472	$16,000.00
Kellog Center	35	140	$5,000.00
Leon Johnson Hall	313	1,252	$37,000.00
Lewis Hall	163	652	$21,000.00
Linfield Hall	295	1,180	$34,000.00
Marga Hosaeus	134	536	$18,000.00
Marsh Lab	187	748	$24,000.00
McCall Hall	52	208	$9,000.00
Molecular Bean	5	20	$2,000.00
Montana Hall	156	624	$22,000.00
Museum of the Rockies	166	664	$25,000.00
OutDoor Rec	16	64	$3,000.00
Plant BioScience	112	448	$16,000.00
Plant Growth	152	608	$20,000.00
Reid Hall	302	1,208	$36,000.00
Renne Library	255	1,020	$32,000.00
Roberts Hall	140	560	$20,000.00
Romney	98	392	$15,000.00
Swingle Health Center	137	548	$18,000.00
Taylor Hall	56	224	$10,000.00
Traphagen Hall	148	592	$21,000.00
Univ. Record Storage	9	36	$2,000.00
VisComm (Black Box)	144	576	$21,000.00
Wilson Hall	325	1,300	$38,000.00
Mech Room	501	2,004	$30,000.00

MONTANA STATE UNIVERSITY

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Phone: (406) 994-5413 • Fax: (406) 994-5665

PROJECT CLOSEOUT CHECKLIST

PROJECT TITLE: _____ PPA No. _____
CONTRACTOR: _____ DATE: _____
CONSULTANT _____

*** In absence of a Consultant, responsibilities will be determined at Pre-construction meeting*

To be submitted with Application of Final Payment			
Contract Requirements	**Date PM Verified**	**Date Completed**	**Required Documentation:**
			Contractors Affidavit of Completion, MSU Form106 (all contracts)
			Final application for payment (all contracts)
			Certificate of Substantial Completion - MSU Form 107 (over $25K)
			Certificate of Final Acceptance - MSU Form118 (over $25K)
			Consent of Surety to final payment MSU Form103 (if over $25K)

MSU PM			Verification of All Change Orders & Final Amounts with Contract amounts
Contractor to submit all deliverables to the Consultant *To be submitted with Application of Final Payment*			
Contractor Requirements			Building keys returned to Owner
			Final walk through and instructions to Owner
			As-built "red lined" drawings (PDF Color Scan of Redlined Construction Set)
			Complete set of project shop drawings/Product Data (3Sets)
			Demonstration & Training
			City of Bozeman Building Permits: ☐ Fire Suppression test & Certificate ☐ Fire Alarm test & Certificate ☐ Elevator Inspection ☐ Plumbing & HVAC test & Inspection ☐ Electrical Inspection ☐ Temporary certificate of occupancy ☐ Final certificate of occupancy
			Final project inspection
			Notification of completion of punch list
			Copy of warranty Binder

Contractor Signature _____ Consultant Signature _____

Submit at Record Document Stage/Consultant shall submit Contractor Deliverables to Owner			
Consultant Requirements			Complete set of record drawings (PDF & AutoCAD) 1 Paper set
			Operation & Maintenance Manuals: including warrantees or guarantees for all equipment (1 copy each – PDF & Paper): ☐ HVAC ☐ Plumbing ☐ Electrical ☐ Elevator ☐ Fire Alarm ☐ Roof ☐ Project Manual (Divisions 1-13)

Consultant Signature _____ Project Manager _____

MONTANA
PREVAILING WAGE RATES FOR BUILDING CONSTRUCTION SERVICES 2021

Effective: January 1, 2021

Steve Bullock, Governor
State of Montana

Brenda Nordlund, Acting Commissioner
Department of Labor & Industry

To obtain copies of prevailing wage rate schedules, or for information relating to public works projects and payment of prevailing wage rates, visit ERD at www.mtwagehourbopa.com or contact:

Employment Relations Division
Montana Department of Labor and Industry
P. O. Box 201503
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The department welcomes questions, comments, and suggestions from the public. In addition, we'll do our best to provide information in an accessible format, upon request, in compliance with the Americans with Disabilities Act.

MONTANA PREVAILING WAGE REQUIREMENTS

The Commissioner of the Department of Labor and Industry, in accordance with Sections 18-2-401 and 18-2-402 of the Montana Code Annotated (MCA), has determined the standard prevailing rate of wages for the occupations listed in this publication.

The wages specified herein control the prevailing rate of wages for the purposes of Section 18-2-401, et seq., MCA. It is required each employer pay (as a minimum) the rate of wages, including fringe benefits, travel allowance, zone pay and per diem applicable to the district in which the work is being performed as provided in the attached wage determinations.

All Montana Prevailing Wage Rates are available on the internet at www.mtwagehourbopa.com or by contacting the department at (406) 444-6543.

In addition, this publication provides general information concerning compliance with Montana's Prevailing Wage Law and the payment of prevailing wages. For detailed compliance information relating to public works contracts and payment of prevailing wage rates, please consult the regulations on the internet at www.mtwagehourbopa.com or contact the department at (406) 444-6543.

BRENDA NORDLUND
Acting Commissioner
Department of Labor and Industry
State of Montana

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MONTANA PREVAILING WAGE REQUIREMENTS:

WAGE RATES:

A. Date of Publication January 4, 2021

B. Definition of Building Construction

For the purposes of Prevailing Wage, the Commissioner of Labor and Industry has determined that building construction occupations are defined to be those performed by a person engaged in a recognized trade or craft, or any skilled, semi-skilled, or unskilled manual labor related to the construction, alteration, or repair of a public building or facility, and does not include engineering, superintendence, management, office or clerical work.

The Administrative Rules of Montana (ARM), 24.17.501(2) – 2(a), states *"Building construction projects generally are the constructions of sheltered enclosures with walk-in access for housing persons, machinery, equipment, or supplies. It includes all construction of such structures, incidental installation of utilities and equipment, both above and below grade level, as well as incidental grading, utilities and paving.*

Examples of building construction include, but are not limited to, alterations and additions to buildings, apartment buildings (5 stories and above), arenas (closed), auditoriums, automobile parking garages, banks and financial buildings, barracks, churches, city halls, civic centers, commercial buildings, court houses, detention facilities, dormitories, farm buildings, fire stations, hospitals, hotels, industrial buildings, institutional buildings, libraries, mausoleums, motels, museums, nursing and convalescent facilities, office buildings, out-patient clinics, passenger and freight terminal buildings, police stations, post offices, power plants, prefabricated buildings, remodeling buildings, renovating buildings, repairing buildings, restaurants, schools, service stations, shopping centers, stores, subway stations, theaters, warehouses, water and sewage treatment plants (buildings only), etc."

C. Definition of Public Works Contract

Section 18-2-401(11)(a), MCA defines "public works contract" as *"…a contract for construction services let by the state, county, municipality, school district, or political subdivision or for nonconstruction services let by the state, county, municipality, or political subdivision in which the total cost of the contract is in excess of $25,000…"*.

D. Prevailing Wage Schedule

This publication covers only Building Construction occupations and rates. These rates will remain in effect until superseded by a more current publication. Current prevailing wage rate schedules for Heavy Construction, Highway Construction, and Nonconstruction Services occupations can be found on the internet at www.mtwagehoubopa.com or by contacting the department at (406) 444-6543.

E. Rates to Use for Projects

ARM, 24.17.127(1)(c), states *"The wage rates applicable to a particular public works project are those in effect at the time the bid specifications are advertised."*

F. Wage Rate Adjustments for Multiyear Contracts

Section 18-2-417, MCA states:

"(1) Any public works contract that by the terms of the original contract calls for more than 30 months to fully perform must include a provision to adjust, as provided in subsection (2), the standard prevailing rate of wages to be paid to the workers performing the contract.

(2) The standard prevailing rate of wages paid to workers under a contract subject to this section must be adjusted 12 months after the date of the award of the public works contract. The amount of the adjustment must be a 3% increase. The adjustment must be made and applied every 12 months for the term of the contract.

(3) Any increase in the standard rate of prevailing wages for workers under this section is the sole responsibility of the contractor and any subcontractors and not the contracting agency."

G. Fringe Benefits

Section 18-2-412, MCA states:

"(1) To fulfill the obligation...a contractor or subcontractor may:

(a) pay the amount of fringe benefits and the basic hourly rate of pay that is part of the standard prevailing rate of wages directly to the worker or employee in cash;

(b) make an irrevocable contribution to a trustee or a third person pursuant to a fringe benefit fund, plan, or program that meets the requirements of the Employee Retirement Income Security Act of 1974 or that is a bona fide program approved by the U. S. department of labor; or

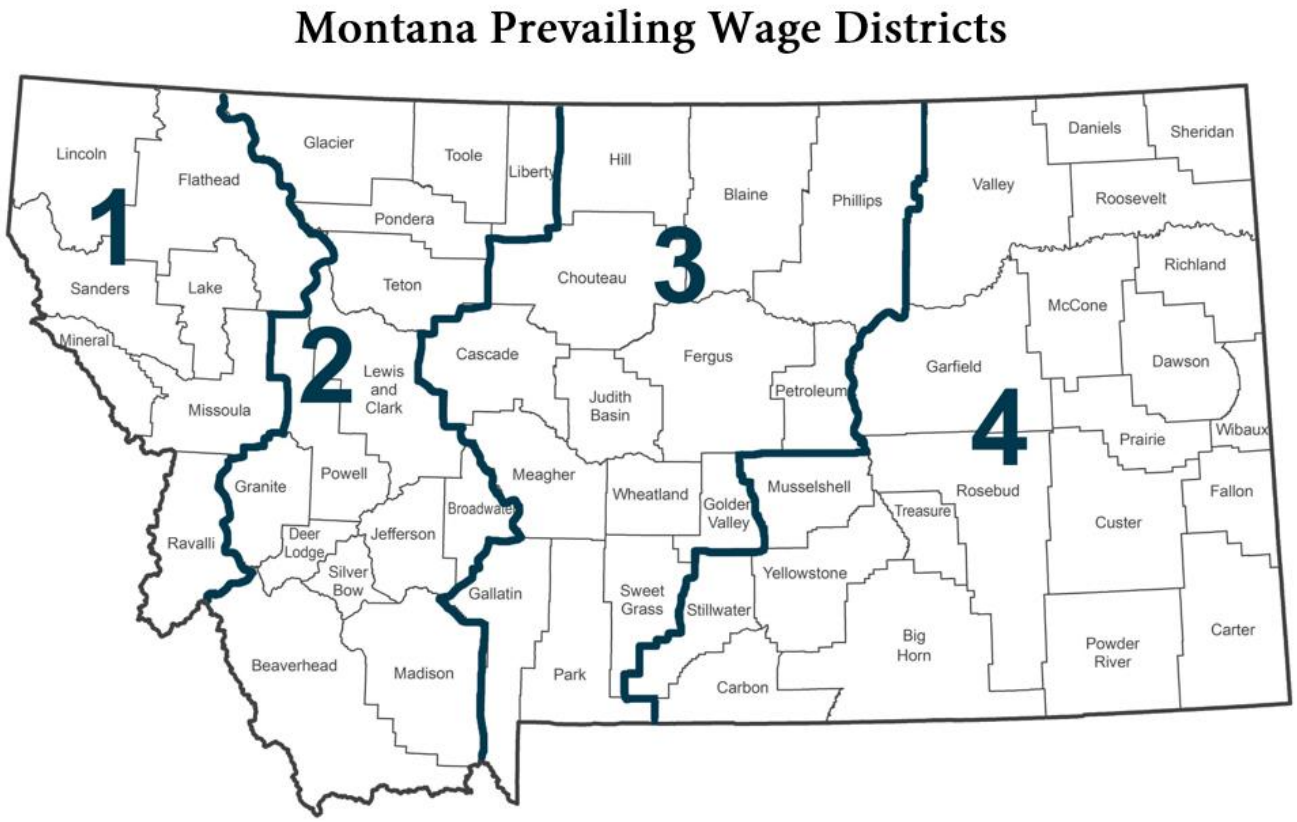
(c) make payments using any combination of methods set forth in subsections (1)(a) and (1)(b) so that the aggregate of payments and contributions is not less than the standard prevailing rate of wages, including fringe benefits and travel allowances, applicable to the district for the particular type of work being performed.

(2) The fringe benefit fund, plan, or program described in subsection (1)(b) must provide benefits to workers or employees for health care, pensions on retirement or death, life insurance, disability and sickness insurance, or bona fide programs that meet the requirements of the Employee Retirement Income Security Act of 1974 or that are approved by the U. S. department of labor."

Fringe benefits are paid for all hours worked (straight time and overtime hours). However, fringe benefits are not to be considered a part of the hourly rate of pay for calculating overtime, unless there is a collectively bargained agreement in effect that specifies otherwise.

H. Prevailing Wage Districts

Montana counties are aggregated into 4 districts for the purpose of prevailing wage. The prevailing wage districts are composed of the following counties:



I. Dispatch City

ARM, 24.17.103(11), defines dispatch city as *"…the courthouse in the city from the following list which is closest to the center of the job: Billings, Bozeman, Butte, Great Falls, Helena, Kalispell, and Missoula."* A dispatch city shall be considered the point of origin only for jobs within the counties identified in that district (as shown below):

District 1 – Kalispell and Missoula: includes Flathead, Lake, Lincoln, Mineral, Missoula, Ravalli, and Sanders;
District 2 – Butte and Helena: includes Beaverhead, Broadwater, Deer Lodge, Glacier, Granite, Jefferson, Lewis and Clark, Liberty, Madison, Pondera, Powell, Silver Bow, Teton, and Toole;
District 3 – Bozeman and Great Falls: includes Blaine, Cascade, Chouteau, Fergus, Gallatin, Golden Valley, Hill, Judith Basin, Meagher, Park, Petroleum, Phillips, Sweet Grass, and Wheatland;
District 4 – Billings: includes Big Horn, Carbon, Carter, Custer, Daniels, Dawson, Fallon, Garfield, McCone, Musselshell, Powder River, Prairie, Richland, Roosevelt, Rosebud, Sheridan, Stillwater, Treasure, Valley, Wibaux, and Yellowstone.

J. Zone Pay

Zone pay is not travel pay. ARM, 24.17.103(24), defines zone pay as *"…an amount added to the base pay; the combined sum then becomes the new base wage rate to be paid for all hours worked on the project. Zone pay must be determined by measuring the road miles one way over the shortest practical maintained route from the dispatch city to the center of the job."* See section I above for a list of dispatch cities.

K. Computing Travel Benefits

ARM, 24.17.103(22), states *" 'Travel pay,' also referred to as 'travel allowance,' is and must be paid for travel both to and from the job site, except those with special provisions listed under the classification. The rate is determined by measuring the road miles one direction over the shortest practical maintained route from the dispatch city or the employee's home, whichever is closer, to the center of the job."* See section I above for a list of dispatch cities.

L. Per Diem

ARM, 24.17.103(18), states *" 'Per diem' typically covers costs associated with board and lodging expenses. Per diem is paid when an employee is required to work at a location outside the daily commuting distance and is required to stay at that location overnight or longer."*

M. Apprentices

Wage rates for apprentices registered in approved federal or state apprenticeship programs are contained in those programs. Additionally, Section 18-2-416(2), MCA states *"…The full amount of any applicable fringe benefits must be paid to the apprentice while the apprentice is working on the public works contract."* Apprentices not registered in approved federal or state apprenticeship programs will be paid the appropriate journey level prevailing wage rate when working on a public works contract.

N. Posting Notice of Prevailing Wages

Section 18-2-406, MCA provides that contractors, subcontractors and employers who are *"…performing work or providing construction services under public works contracts, as provided in this part, shall post in a prominent and accessible site on the project or staging area, not later than the first day of work and continuing for the entire duration of the project, a legible statement of all wages and fringe benefits to be paid to the employees."*

O. Employment Preference

Sections 18-2-403 and 18-2-409, MCA requires contractors to give preference to the employment of bona fide Montana residents in the performance of work on public works contracts.

P. Projects of a Mixed Nature

Section 18-2-408, MCA states:

"(1) The contracting agency shall determine, based on the preponderance of labor hours to be worked, whether the public works construction services project is classified as a highway construction project, a heavy construction project, or a building construction project.

(2) Once the project has been classified, employees in each trade classification who are working on that project must be paid at the rate for that project classification"

Q. Occupations Definitions

You can find definitions for these occupations on the following Bureau of Labor Statistics website:
http://www.bls.gov/oes/current/oes_stru.htm

R. Welder Rates

Welders receive the rate prescribed for the craft performing an operation to which welding is incidental.

S. Foreman Rates

Rates are no longer set for foremen. However, if a foreman performs journey level work, the foreman must be paid at least the journey level rate.

WAGE RATES

BOILERMAKERS

	Wage	Benefit
District 1	$33.15	$31.15
District 2	$33.15	$31.15
District 3	$33.15	$31.15
District 4	$33.15	$31.15

Duties Include:
Construct, assemble, maintain, and repair stationary steam boilers, boiler house auxiliaries, process vessels, and pressure vessels.

Travel:
All Districts
0-120 mi. free zone
>120 mi. federal mileage rate/mi.

Special Provision:
Travel is paid only at the beginning and end of the job.

Per Diem:
All Districts
0-70 mi. free zone
>70-120 mi. $65.00/day
>120 mi. $80.00/day

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BRICK, BLOCK, AND STONE MASONS

	Wage	Benefit
District 1	$30.55	$15.75
District 2	$30.55	$15.75
District 3	$30.55	$15.75
District 4	$30.55	$15.75

Duties Include:
Lays out, lays, cuts, installs, and finishes all brick, structural tile, refractory materials, precast units, concrete, cinder, glass, gypsum, terra cotta block, and all other natural and artificial masonry products to construct or repair walls, partitions, stacks, furnaces, or other structures.
Sets stone to build stone structures such as piers, walls, and abutments, and lays walks, curbstones, or special types of masonry for vats, tanks, and floors. May set, cut, and dress ornamental and structural stone in buildings.
This classification is tended by Tender to Masons Trades: Brick and Stonemason, Mortar Mixer, Hod Carrier

Travel:
All Districts
0-70 mi. free zone
>70-90 mi. $60.00/day
>90 mi. $80.00/day

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CARPENTERS

	Wage	Benefit
District 1	$25.00	$13.57
District 2	$25.00	$13.86
District 3	$25.00	$13.57
District 4	$25.00	$13.57

Duties Include:
Install roll and batt insulation, and hardwood floors.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $4.00/hr.
>60 mi. base pay + $6.00/hr.

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CARPET INSTALLERS

No Rate Established

Duties Include:
Lay and install carpet from rolls or blocks on floors. Install padding and trim flooring materials.

Travel and Per Diem:
All Districts
No travel or per diem established.

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CEMENT MASONS AND CONCRETE FINISHERS

	Wage	Benefit
District 1	$25.61	$10.40
District 2	$24.74	$10.40
District 3	$25.31	$10.40
District 4	$25.36	$10.40

Duties Include:
Smooth and finish surfaces of poured concrete, such as floors, walks, sidewalks, or curbs. Align forms for sidewalks, curbs, or gutters.

Zone Pay:
All Districts
0-25 mi. free zone
>25-50 mi. base pay + $2.50/hr.
>50 mi. base pay + $3.00/hr.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 1

	Wage	Benefit
District 1	$27.91	$13.67
District 2	$27.91	$13.67
District 3	$27.91	$13.67
District 4	$27.91	$13.67

This group includes but is not limited to:
Air Compressor; Auto Fine Grader; Belt Finishing; Boring Machine (Small); Cement Silo; Crane, A-Frame Truck Crane; Crusher Conveyor; DW-10, 15, and 20 Tractor Roller; Farm Tractor; Forklift; Form Grader; Front-End Loader, under 1 cu. yd; Oiler, Heavy Duty Drills; Herman Nelson Heater; Mucking Machine; Oiler, All Except Cranes/Shovels; Pumpman.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 2

	Wage	Benefit
District 1	$26.69	$12.18
District 2	$28.70	$13.67
District 3	$28.70	$13.67
District 4	$28.70	$13.67

This group includes but is not limited to:
Air Doctor; Backhoe\Excavator\Shovel, up to and incl. 3 cu. yds; Bit Grinder; Bitunimous Paving Travel Plant; Boring Machine, Large; Broom, Self-Propelled; Concrete Travel Batcher; Concrete Float & Spreader; Concrete Bucket Dispatcher; Concrete Finish Machine; Concrete Conveyor; Distributor; Dozer, Rubber-Tired, Push, & Side Boom; Elevating Grader\Gradall; Field Equipment Serviceman; Front-End Loader, 1 cu. yd up to and incl. 5 cu. yds; Grade Setter; Heavy Duty Drills, All Types; Hoist\Tugger, All; Hydralift Forklifts & Similar; Industrial Locomotive; Motor Patrol (except finish); Mountain Skidder; Oiler, Cranes\Shovels; Pavement Breaker, EMSCO; Power Saw, Self-Propelled; Pugmill; Pumpcrete\Grout Machine; Punch Truck; Roller, other than Asphalt; Roller, Sheepsfoot (Self-Propelled); Roller, 25 tons and over; Ross Carrier; Rotomill, under 6 ft; Trenching Machine; Washing /Screening Plant.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 3

	Wage	Benefit
District 1	$29.45	$13.67
District 2	$29.45	$13.67
District 3	$29.45	$13.67
District 4	$29.45	$13.67

This group includes but is not limited to:
Asphalt Paving Machine; Asphalt Screed; Backhoe\Excavator\Shovel, over 3 cu. yds; Cableway Highline; Concrete Batch Plant; Concrete Curing Machine; Concrete Pump; Cranes, Creter; Cranes, Electric Overhead; Cranes, 24 tons and under; Curb Machine\Slip Form Paver; Finish Dozer; Front-End Loader, over 5 cu. yds; Mechanic\Welder; Pioneer Dozer; Roller Asphalt (Breakdown & Finish); Rotomill, over 6 ft; Scraper, Single, Twin, or Pulling Belly-Dump; YO-YO Cat.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 4

	Wage	Benefit
District 1	$30.45	$13.67
District 2	$30.45	$13.67
District 3	$30.45	$13.67
District 4	$30.45	$13.67

This group includes but is not limited to:
Asphalt\Hot Plant Operator; Cranes, 25 tons up to and incl. 44 tons; Crusher Operator; Finish Motor Patrol; Finish Scraper.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 5

	Wage	Benefit
District 1	$31.45	$13.67
District 2	$31.45	$13.67
District 3	$31.45	$13.67
District 4	$31.45	$13.67

This group includes but is not limited to:
Cranes, 45 tons up to and incl. 74 tons.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 6

	Wage	Benefit
District 1	$32.45	$13.67
District 2	$32.45	$13.67
District 3	$32.45	$13.67
District 4	$32.45	$13.67

This group includes but is not limited to:
Cranes, 75 tons up to and incl. 149 tons; Cranes, Whirley (All).

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 7

	Wage	Benefit
District 1	$33.45	$13.67
District 2	$33.45	$13.67
District 3	$33.45	$13.67
District 4	$33.45	$13.67

This group includes but is not limited to:
Cranes, 150 tons up to and incl. 250 tons; Cranes, over 250 tons—add $1.00 for every 100 tons over 250 tons; Crane, Tower (All); Crane Stiff-Leg or Derrick; Helicopter Hoist.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

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CONSTRUCTION LABORERS GROUP 1/FLAG PERSON FOR TRAFFIC CONTROL

	Wage	Benefit
District 1	$22.10	$11.27
District 2	$22.10	$11.27
District 3	$22.10	$11.27
District 4	$22.10	$11.27

Zone Pay:
All Districts
0-15 mi. free zone
>15-30 mi. base pay + $0.65/hr.
>30-50 mi. base pay + $0.85/hr.
>50 mi. base pay + $1.25/hr.

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CONSTRUCTION LABORERS GROUP 2

	Wage	Benefit
District 1	$21.16	$ 8.80
District 2	$23.32	$11.27
District 3	$21.78	$ 7.18
District 4	$22.56	$11.27

This group includes but is not limited to:
General Labor; Asbestos Removal; Burning Bar; Bucket Man; Carpenter Tender; Caisson Worker; Cement Mason Tender; Cement Handler (dry); Chuck Tender; Choker Setter; Concrete Worker; Curb Machine-lay Down; Crusher and Batch Worker; Heater Tender; Fence Erector; Landscape Laborer; Landscaper; Lawn Sprinkler Installer; Pipe Wrapper; Pot Tender;
Powderman Tender; Rail and Truck Loaders and Unloaders; Riprapper; Sign Erection; Guardrail and Jersey Rail; Spike Driver; Stake Jumper; Signalman; Tail Hoseman; Tool Checker and Houseman and Traffic Control Worker.

Zone Pay:
All Districts
0-15 mi. free zone
>15-30 mi. base pay + $0.65/hr.
>30-50 mi. base pay + $0.85/hr.
>50 mi. base pay + $1.25/hr.

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CONSTRUCTION LABORERS GROUP 3

	Wage	Benefit
District 1	$23.10	$11.27
District 2	$23.10	$11.27
District 3	$23.10	$11.27
District 4	$23.10	$11.27

This group includes but is not limited to:
Concrete Vibrator; Dumpman (Grademan); Equipment Handler; Geotextile and Liners; High-Pressure Nozzleman; Jackhammer (Pavement Breaker) Non-Riding Rollers; Pipelayer; Posthole Digger (Power); Power Driven Wheelbarrow; Rigger; Sandblaster; Sod Cutter-Power and Tamper.

Zone Pay:
All Districts
0-15 mi. free zone
>15-30 mi. base pay + $0.65/hr.
>30-50 mi. base pay + $0.85/hr.
>50 mi. base pay + $1.25/hr.

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CONSTRUCTION LABORERS GROUP 4

	Wage	Benefit
District 1	$23.15	$11.27
District 2	$23.15	$11.27
District 3	$23.15	$11.27
District 4	$23.15	$11.27

This group includes but is not limited to:
Hod Carrier***; Water Well Laborer; Blaster; Wagon Driller; Asphalt Raker; Cutting Torch; Grade Setter; High-Scaler; Power Saws (Faller & Concrete) Powderman; Rock & Core Drill; Track or Truck Mounted Wagon Drill and Welder incl. Air Arc.

Zone Pay:
All Districts
0-15 mi. free zone
>15-30 mi. base pay + $0.65/hr.
>30-50 mi. base pay + $0.85/hr.
>50 mi. base pay + $1.25/hr.

***Hod Carriers will receive the same amount of travel and/or subsistence pay as bricklayers when requested to travel.

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DRYWALL APPLICATORS

	Wage	Benefit
District 1	$25.00	$13.57
District 2	$25.00	$13.86
District 3	$25.00	$13.57
District 4	$25.00	$13.57

Duties Include:
Drywall and ceiling tile installation.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $4.00/hr.
>60 mi. base pay + $6.00/hr.

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ELECTRICIANS: INCLUDING BUILDING AUTOMATION CONTROL

	Wage	Benefit
District 1	$32.22	$14.98
District 2	$31.65	$16.33
District 3	$32.00	$15.27
District 4	$34.59	$15.71

Duties Include:
Electrical wiring; equipment and fixtures; street lights; electrical control systems. Installation and/or adjusting of building automation controls also during testing and balancing, commissioning and retro-commissioning.

Travel:
District 1

No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-15 mi. free zone
>15-45 mi. $0.585/mi. in excess of the free zone.
>45 mi. $75.00/day

District 2
No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-10 mi. free zone
>10-55 mi. federal mileage rate/mi.
>55 mi. $66.00/day

District 3
No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-08 mi. free zone
>08-50 mi. federal mileage rate/mi. in excess of the free zone.
>50 mi. $66.00/day

District 4
No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-18 mi. free zone
>18-60 mi. federal mileage rate/mi.
>60 mi. $75.00/day

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ELEVATOR CONSTRUCTORS

	Wage	Benefit
District 1	$55.86	$39.71
District 2	$55.86	$39.71
District 3	$55.86	$39.71
District 4	$55.86	$39.71

Travel:
All Districts
0-15 mi. free zone
>15-25 mi. $44.73/day
>25-35 mi. $89.46/day
>35 mi. $84.90/day or cost of receipts for hotel and meals, whichever is greater.

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FLOOR LAYERS

No Rate Established

Duties Include:
Apply blocks, strips, or sheets of shock-absorbing, sound-deadening, or decorative coverings to floors.

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GLAZIERS

	Wage	Benefit
District 1	$18.54	$2.50
District 2	$18.54	$2.50
District 3	$19.47	$2.64
District 4	$20.52	$2.76

Travel and Per Diem:
All Districts
No travel or per diem established.

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HEATING AND AIR CONDITIONING

	Wage	Benefit
District 1	$30.92	$17.33
District 2	$30.84	$19.38
District 3	$30.84	$19.38
District 4	$30.84	$19.38

Duties Include:
Testing and balancing, commissioning and retro-commissioning of all air-handling equipment and duct work.

Travel:
All Districts
0-50 mi. free zone
>50 mi.
- $0.25/mi. in employer vehicle.
- $0.65/mi. in employee vehicle.

Per Diem:
All Districts
$70/day

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INSULATION WORKERS - MECHANICAL (HEAT AND FROST)

	Wage	Benefit
District 1	$35.37	$19.87
District 2	$35.37	$19.87
District 3	$35.37	$19.87
District 4	$35.37	$19.87

Duties Include:
Insulate pipes, ductwork or other mechanical systems.

Travel:
All Districts
0-30 mi. free zone
>30-40 mi. $25.00/day
>40-50 mi. $35.00/day
>50-60 mi. $50.00/day
>60 mi. $60.00/day plus
- $0.56/mi. if transportation is not provided.
- $0.20/mi. if in company vehicle.

>60 mi. $95.00/day on jobs requiring an overnight stay plus
- $0.56/mi. if transportation is not provided.
- $0.20/mi. if in company vehicle.

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IRONWORKERS - STRUCTURAL STEEL AND REBAR PLACERS

	Wage	Benefit
District 1	$29.15	$27.05
District 2	$28.24	$23.19
District 3	$28.24	$23.19
District 4	$28.24	$23.19

Duties Include:
Structural steel erection; assemble prefabricated metal buildings; cut, bend, tie, and place rebar; energy producing windmill type towers; metal bleacher seating; handrail fabrication and ornamental steel.

Travel:
District 1
0-45 mi. free zone
>45-60 mi. $45.00/day
>60-100 mi. $70.00/day
>100 mi. $90.00/day

Special Provision:
When the employer provides transportation, travel will not be paid. However, when an employee is required to travel over 70 miles one way, the employee may elect to receive the travel pay in lieu of the transportation.

Districts 2, 3 & 4
0-45 mi. free zone
>45-85 mi. $70.00/day
>85 mi. $100.00/day

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MILLWRIGHTS

	Wage	Benefit
District 1	$36.97	$14.02
District 2	$36.97	$14.02
District 3	$36.97	$14.02
District 4	$36.97	$14.02

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $4.00/hr.
>60 mi. base pay + $6.00/hr.

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PAINTERS: INCLUDING PAPERHANGERS

	Wage	Benefit
District 1	$19.57	$0.00
District 2	$19.57	$0.00
District 3	$19.57	$0.00
District 4	$19.57	$0.00

Travel and Per Diem:
All Districts
No travel or per diem established.

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PILE BUCKS

	Wage	Benefit
District 1	$32.00	$13.57
District 2	$32.00	$13.86
District 3	$32.00	$13.57
District 4	$32.00	$13.57

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $4.00/hr.
>60 mi. base pay + $6.00/hr.

Duties Include:
All pile driving, bridge, wharf, building, and caisson work, on both land and water. General pile driving work includes all labor employed in the barking, shoeing, splicing, form building, heading, centering, placing, driving, staying, framing, fastening, demo, tooling of the cutter head, Lagging, automatic pile threading, pulling, and/or cutting off of all piling, to include all pile of any make and material as well as similar pre-cast structural shapes or units the setting of which is performed with a pile driver, derrick, crane, or similar power equipment. Fabrication, forming, handling, and setting of all such pre-cast, pre-stressed and post- stressed shapes that are an integral part of any heavy structure, rafting, boring, reeving, dogging, or booming of piles or other material. This includes the unloading of piling of all types together with the wailing and bracing included.

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PLASTERERS

No Rate Established

Travel and Per Diem:
All Districts
No travel or per diem established.

Duties Include:
All materials beyond the substrate, such as a moisture barrier, any type of drainage installation between the moisture barrier and insulation or EPS board, the attachment of the EPS board, installation of fiberglass mesh embedded in the base coat, any water-resistant coat that is applied on top of the insulation to serve as a weather barrier, and the application of the finish coat.

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PLUMBERS, PIPEFITTERS, AND STEAMFITTERS

	Wage	Benefit
District 1	$33.38	$15.56
District 2	$34.35	$16.00
District 3	$34.35	$16.00
District 4	$32.74	$19.50

Duties Include:
Assemble, install, alter, and repair pipe-lines or pipe systems that carry water, steam, air, other liquids or gases. Testing of piping systems, commissioning and retro-commissioning. Workers in this occupation may also install heating and cooling equipment and mechanical control systems.

Travel:
District 1
0-30 mi. free zone
>30-50 mi. $30.00/day
>50-75 mi. $45.00/day
>75 mi. $85.00/day

Special Provision
If transportation is not provided, mileage at $0.35/mi. with a separate free zone of 20 miles is added to the amounts above. However, if the employee is traveling more than 75 miles/day, only subsistence is required.

Districts 2 & 3
0-40 mi. free zone
>40-80 mi. $50.00/day
>80 mi. $100.00/day

Special Provision:
If employer provides transportation, travel pay will be ½ of the amounts listed above unless the employee stays overnight. If the employee chooses to stay overnight, the employee will receive the full amount of travel listed above even if the employer furnishes transportation.

District 4
0-70 free zone
>70 mi.

- On jobs when employees do not work consecutive days: $0.55/mi. if employer doesn't provide transportation. Not to exceed two trips.

- On jobs when employees work any number of consecutive days: $105.00/day.

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ROOFERS

	Wage	Benefit
District 1	$25.61	$12.49
District 2	$25.61	$12.49
District 3	$21.60	$ 7.66
District 4	$22.72	$ 5.67

Duties Include:
Metal roofing. Excludes prefabricated metal buildings.

Travel:
District 1
0-50 mi. free zone
>50 mi. $0.35/mi.

District 2 and 3
0-35 mi. free zone
>35 mi. $0.30/mi only when employer doesn't provide transportation.

District 4
0-25 mi. free zone
>25 mi. $0.30/mi only when employer doesn't provide transportation.

Per Diem:
District 1
$60.00/day

District 2 and 3
Employer pays for room + $26.50/day.

District 4
Employer pays for room + $25.00/day.

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SHEET METAL WORKERS

	Wage	Benefit
District 1	$30.84	$19.38
District 2	$30.84	$19.38
District 3	$30.84	$19.38
District 4	$30.84	$19.38

Duties Include:
Testing and balancing, commissioning and retro-commissioning of all air-handling equipment and duct work. Manufacture, fabrication, assembling, installation, dismantling, and alteration of all HVAC systems, air conveyer systems, and exhaust systems. All lagging over insulation and all duct lining.

Travel:
All Districts
0-50 mi. free zone
>50 mi.
- $0.25/mi. in employer vehicle
- $0.65/mi. in employee vehicle

Per Diem:
All Districts
$70.00/day

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SOLAR PHOTOVOLTAIC INSTALLERS

	Wage	Benefit
District 1	$32.22	$14.98
District 2	$31.65	$16.33
District 3	$32.00	$15.27
District 4	$34.59	$15.71

Travel:
District 1

No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-15 mi. free zone
>15-45 mi. $0.585/mi. in excess of the free zone.
>45 mi. $75.00/day

District 2
No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-10 mi. free zone
>10-55 mi. federal mileage rate/mi.
>55 mi. $66.00/day

District 3
No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-08 mi. free zone
>08-50 mi. federal mileage rate/mi. in excess of the free zone.
>50 mi. $66.00/day

District 4
No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-18 mi. free zone
>18-60 mi. federal mileage rate/mi.
>60 mi. $75.00/day

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SPRINKLER FITTERS

	Wage	Benefit
District 1	$34.35	$23.00
District 2	$34.35	$23.00
District 3	$34.35	$23.00
District 4	$34.35	$23.00

Duties Include:
Duties Include but not limited to any and all fire protection systems: Installation, dismantling, inspection, testing, maintenance, repairs, adjustments, and corrections of all fire protection and fire control systems, including both overhead and underground water mains, all piping, fire hydrants, standpipes, air lines, tanks, and pumps used in connection with sprinkler and alarm systems.

Travel
All Districts

The following travel allowance is applicable when traveling in employee's vehicle.

0-60 mi. free zone
>60-80 mi. $19.00/day
>80-100 mi. $29.00/day
>100 mi. $105.00/day.

Special Provision
When traveling >100 miles, mileage at $0.54/mi. + $8.59 for every 15 miles traveled at beginning and end of job.

The following travel allowance is applicable when traveling in employer's vehicle.

0-100 mi. free zone
>100 mi. $105.00/day

Special Provision
When traveling >100 miles, $8.59 for every 15 miles traveled, at beginning and end of job.

Per Diem:
All Districts

No per diem is applicable when traveling in employee's vehicle

The following per diem is applicable when traveling in employer's vehicle.

0-100 mi. free zone
>100 mi. $105.00/day

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TAPERS

No Rate Established

Travel and Per Diem:
All Districts
No travel or per diem established.

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TELECOMMUNICATIONS EQUIPMENT INSTALLERS

	Wage	Benefit
District 1	$22.11	$ 3.48
District 2	$24.33	$10.85
District 3	$24.42	$ 9.22
District 4	$22.76	$..8.37

Duties Include:
Install voice; sound; vision and data systems. This occupation includes burglar alarms, fire alarms, fiber optic systems, and video systems for security or entertainment.

Travel:
All Districts
The federal mileage rate/mi. in effect when travel occurs if using own vehicle.

Per Diem:
All Districts
Employer pays for meals and lodging up to $75.00/day. When jobsite is located in Big Sky, West Yellowstone, and Gardiner, lodging and meals will be provided by the employer for all actual and reasonable expenses incurred.

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TERRAZZO WORKERS AND FINISHERS

No Rate Established

Duties Include:
Finish work on hard tile, marble, and wood tile to floors, ceilings, and roof decks

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TILE AND STONE SETTERS

No Rate Established

Duties Include:
Apply hard tile, stone, and comparable materials to walls, floors, ceilings, countertops, and roof decks.

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TRUCK DRIVERS

Pilot Car Driver	**No Rate Established**
Truck Driver	**No Rate Established**

Truck drivers include but are not limited to:
Combination Truck & Concrete Mixer; Distributor Driver; Dry Batch Trucks; DumpTrucks & Similar Equipment; Flat Trucks; Lowboys, Four-Wheel Trailers, Float Semitrailer; Powder Truck Driver (Bulk Unloader Type); Servicemen; Service Truck Drivers, Fuel Truck Drivers, Tiremen; Trucks with Power Equipment; Truck Mechanic; Water Tank Drivers, Petroleum Product Drivers..

Zone Pay:
All Districts
No zone pay established.

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MONTANA STATE UNIVERSITY

CAMPUS PLANNING, DESIGN & CONSTRUCTION
Sixth Avenue and Grant Street
PO Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: _____ PPA No: __-____
Location: _____

Owner: **MONTANA STATE UNIVERSITY** Bidder (Sub-): _____

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

The material, system, or equipment defined by this Substitution Request is proposed as a replacement for the material, system, or equipment originally specified and defined as follows:

SECTION	PARAGRAPH	SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows:

_____
_____

- What are the differences between the specified material, system, or equipment and the proposed substitution?

_____

- Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/N)
- Does the proposed substitution require changes to the Work of other trades? (Y/N)
- Is the warranty for the proposed substitution comparable with that of the specified product? (Y/N)

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivilent or superior to the specified material, system, or equipment.

By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.

_____ _____ _____
SUBMITTED BY (BIDDER / SUB-BIDDER) AUTHORIZED AGENT DATE

Received: _____
DATE

Architect's Action: ☐ Rejected ☐ Rejected – For reasons as follows:

_____
_____
_____

☐ Approved ☐ Approved as noted:

_____
_____
_____

_____ _____ _____
REVIEWED BY (ARCHITECT) AUTHORIZED AGENT DATE

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STATE UNIVERSITY

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PO Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

SCHEDULE OF VALUES

Project Title: _____ PPA No.: _____
Location: _____ Date: _____
Contractor: _____
Address: _____

DIV. NO.	DESCRIPTION	LABOR COSTS	MATERIAL COSTS	OTHER COSTS	TOTAL ITEM COST
	TOTAL COST THIS SHEET				
	TOTAL COST - ADDITIONAL SHEETS				
	TOTAL PROJECT COST				

This Schedule of Values is a statement made by the Contractor to the Architect/Engineer and Owner that allocates the contract sum among the various portions of the Work and shall form the basis for review of the Contractor's Payment Requests.

Submitted by: _____ _____ _____
(Company/Contractor) (Name) (Date)

Reviewed by: _____ _____ _____
(Architect/Engineer) (Name) (Date)

Approved by: Montana State University _____ _____
Campus Planning, Design & Construction (Name) (Date)

MONTANA STATE UNIVERSITY
Mountains & Minds

CAMPUS PLANNING, DESIGN AND CONSTRUCTION
Sixth Avenue and Grant Street • P.O. Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

PERIODIC ESTIMATE FOR PARTIAL PAYMENT

PPA or SC No: _____ Date: _____
Period From _____ Period To: _____
Pay Estimate # _____ ☐ Final Pay Request
Close Out Documents Attached ☐ Yes ☐ No

Project Title: _____
Location: Montana State University

Contractor: _____
Address: _____
Phone: _____

RETAINAGE ADJUSTMENT

1. Total Retainage to Date:	NEXT PAGE
2. Less Securities Deposited:	-
3. Retainage Withheld (1 - 2)	NEXT PAGE

CONTRACT AMOUNT STATUS

1. Original Contract Amount:		
2. Net +/- by Change Order:	[Pulls from Change Order Summary]	-
3. Contract Amount to Date:		-

CHANGE ORDER SUMMARY

No.	Date Approved	Additions	Deductions
			-
TOTALS:		-	-
		NET TOTAL:	-

CONTRACT STATUS

1. Work in Place (from next page):	[Column D + E Total - Page 2]	NEXT PAGE
2. Total Work & Stored Material:	[Column G Total - Page 2]	NEXT PAGE
3. Retainage Withheld:	5.0%	NEXT PAGE
4. Total Earned Less Retainage:		**NEXT PAGE**
5. Less Previous Payments (+ 1 % Tax):		-
6. **Amount Due This Payment:**		**NEXT PAGE**
7. Less 1% State Contractor's Tax:	[Contracts > 4999.99]	-
8. **Payment Due Contractor:**		**NEXT PAGE**

I hereby certify that this submitted request for payment is correct, true and just in all respects and that payment or credit has not previously been received. I further warrant and certify by submission of this request that all previous work for which payment has been received is free and clear of all liens, disputes, claims, security interests, encumbrances, or causes of action of any type or kind in favor of the contractor, subcontractors, material suppliers, or other persons or entities and do hereby release the Owner from such.

Submitted by: _____ (Name) _____ Date

Reviewed by: _____ (Consultant) _____ (Name) _____ Date

Approved by: **State of Montana, Montana State University**
Campus Planning, Design and Constructions
_____ (Name) _____ Date

WORK IN PLACE/STORED MATERIALS

Project Name:
Location: MONTANA STATE UNIVERSITY

Contractor:
Address:

PPA No.:
Date:
Pay Estimate No.: 2

A	B	C	D	E	F	G		H	I
		(Contract Amt)	WORK COMPLETED						
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	FROM PREVIOUS APPLICATION (D + E)	THIS PERIOD	MATERIALS PRESENTLY STORED (NOT IN D OR E)	TOTAL COMPLETED AND STORED TO DATE (D + E + F)	% (G / C)	BALANCE TO FINISH (C – G)	RETAINAGE
			-			-			-
PAGE TOTALS		-	-	-	-	-		-	-
GRAND TOTALS									

STANDARD FORM INSTRUCTIONS

To simplify the form and request for payment process, formulas have been inserted in the form. Fields shaded in light blue are formula fields and cannot be manipulated. Please start by completing the top of Page 1 along with the RED outlined fields, then move to Page 2 inserting the necessary detail. Formulas will pull the detail from Page 2 into Page 1 to correctly calculate payment due. Don't forget to check your retainage calculation for each request submitted. Retainage is calculated at 5%, which is the default contractual retainage. [Please see the instructions below if you are working under an MSU Bozeman General Services Contract.]

SUBMISSION

Periodic Estimates for Partial Payment (Form 101) should be submitted with a valid signature at the bottom of Page 1.
With the exception of Final Requests for payment, which requires closeout documents.
Scanned/Emailed requests for payment are acceptable with a valid signature and date.
Emailed requests should be sent to ptc@montana.edu and CC the Project Manager.
Please send pay applications in separate emails and put in subject line: PPA/SC#, Project name, and Pay Request#.

CONSULTANT APPROVAL

If there is an Architectual Firm (Consultant) assigned to your project their approval is required prior to submitting the request for payment to MSU. Please submit the Perodic Estimate for Partial Payment (Form 101) to the consultant on the project directly, they will route the request for payment to MSU once they have approved it.

COMPLETE BOTH PAGES

Please complete BOTH pages of the Periodic Estimate for Partial Payment (Form 101). Because both pages are contract documents, your request can be declined if both pages are not completed. Also, your amount due is calculated from the detail on Page 2, it will not calculate appropriately without Page 2 completed. ***(Use the tabs at the bottom of Excel to move between the instructions and both pages)***

FINAL REQUESTS

Final Requests for payment need to be submitted with an original Notorized and Signed Affidavit of Completion (Form 108)
Retainage will be held on Final Requests received without an Affidavit of Completion attached or on file.

RETAINAGE CALCULATION

The retainage field auto calculates the default contract retainage amount of 5%. This field can be overwritten in order for the contractor to request no retainage holding or a reduced retainage holding amount. Please keep in mind that MSU Bozeman reserves the right to make changes to the submitted Periodic Estimate For Partial Payment (Form 101) in keeping with the signed contractual agreement between MSU Bozeman and the contractor.

GENERAL SERVICE CONTRACT INSTRUCTIONS

If you are a contractor working under an MSU Bozeman issued General Services contract. Please request the electronic version of the GENERAL SERVICES pay request form.

If you have questions on the **Pay Request Form** or need additional information regarding the usage of this form:
Please Contact:

Rebecca Barney | MSU Bozeman
rebecca.barney@montana.edu
406-994-5287

Vaitiary Porras Merino | MSU Bozeman
vaitiary.porrasmerino@montana.edu

If you have questions on **Change Orders, Addendums, Contracts, or other Contract Documents** related to your work on campus:
Please Contact:

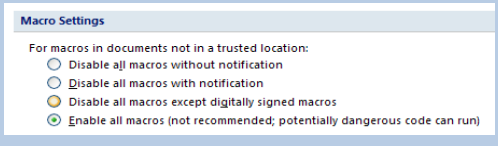
Your Project Manager OR

Rebecca Barney | MSU Bozeman
Rebecca.Barney@montana.edu
406-994-5287

HINTS:

Please note: the Macro Settings for the user computer need to be set at "Enable" in order to run the **PRINT** and **RESET FORM** macros.

That can be done by entering the Trust Center for Microsoft Excel and selecting Enable Macros.



**(Trust Center is on Windows XP and newer versions)*
**(Older versions have the "Enable Macros" setting, however, it is under Security settings)*

If you need additional help adjusting these settings do a search under Microsoft Excel Help for "Enable Macros", there you can get step by step instructions for adjusting your macro settings.

MONTANA STATE UNIVERSITY

CAMPUS PLANNING, DESIGN & CONSTRUCTION
Sixth Avenue and Grant Street • PO Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

ACKNOWLEDGEMENT OF SUBCONTRACTORS

Project Title: _____ PPA NO. _____
Location: _____ Date: _____
Contractor: _____
Address: _____

TO: MONTANA STATE UNIVERSITY
CAMPUS PLANNING, DESIGN & CONSTRUCTION
6TH AND GRANT STREET, PO BOX 172760
BOZEMAN, MONTANA 59717-2760

Listed below are the principal subcontractors proposed on this project. *All subcontracts exceeding $5,000 are to be listed.*
The Contractor certifies that these subcontractors:

1. Have been advised of the labor standards and provisions applicable to this project.
2. That all provisions incorporated in the Contract between the Owner and the undersigned contractor will be incorporated in the contracts between the Contractor and any Subcontractors.
3. Are competent to accomplish the work subcontracted to them.

NAME AND ADDRESS OF SUBCONTRACTORS	REGISTRATION NO.	TYPE OF WORK

Submitted by: _____ _____ _____
(Company/Contractor) (Name) (Date)

Reviewed by: _____ _____ _____
(Architect/Engineer) (Name) (Date)

Acknowledged by: Montana State University
Campus Planning, Design & Construction _____ _____
(Name) (Date)

CAMPUS PLANNING, DESIGN & CONSTRUCTION
Sixth Avenue and Grant Street • PO Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

CONSENT OF SURETY

Project: _____
Location: Montana State University
PPA No. _____

TO: Montana State University
Campus Planning, Design & Construction
6TH & Grant, PO Box 172760
Bozeman, Montana 59717-2760

Contractor: _____ Contract Date: _____

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(here insert name and address of Surety Company)

,Surety Company,

on bond of (here insert name and address of Contractor)

,Contractor,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety Company of any of its obligations to State of Montana, Owner, as set forth in the said Surety Company's bond. The Surety agrees to be bound to the warranty period under the same conditions as the Contractor. The warranty is defined as commencing with Substantial Completion (or with each Substantial Completion if there is more than one) of the Project, or any portion thereof, and continuing for one (1) calendar year from the date of Final Acceptance of the entire project unless otherwise modified in writing as part of the Substantial Completion or Final Acceptance.

IN WITNESS WHEREOF,

the Surety Company has hereunto set its hand this _____ Day of_____, _____

_____
Surety Company

_____
Signature of Authorized Representative

_____
Title

Attest:
(Seal)

MONTANA STATE UNIVERSITY

CAMPUS PLANNING, DESIGN & CONSTRUCTION
PO BOX 172760, BOZEMAN, MONTANA 59717-2760
406/994-5413 FAX 406/994-5665

CONTRACT CHANGE ORDER

Project Name: _____ **PPA No.:** _____
Location: Montana State University, Bozeman, Montana **Chg. Order No.:** _____
Contractor: _____ **Date:** _____
Address: _____ **Phone:** _____

The Contractor is hereby directed to make the following changes in the Contract:

Item No.	DESCRIPTION /UNIT/BREAKDOWN/UNIT COSTS (Indicate Critical Path Schedule impact for each Item)	(Indicate Add or Deduct)	COST
	SUBTOTAL (Labor & Materials) =		$0.00
	(All contractor proposals will show break out of O&P) Overhead & Profit @ _____ =		
	TOTAL COST (This Change Order Only) =		**$0.00**

Change In Contract Duration/Time By This Change Order: (No Change) (Increase) (Decrease) BY _____ CALENDAR DAYS

NEW CONTRACT COMPLETION DATE: _____

CONTRACT STATUS

1. Original Contract Amount	
2. Net Change by Previous Change Order(s)	
3. Current Contract Amount (1+2)	$0.00
4. This Change Order Total Amount	$0.00
5. New Contract Amount (3+4)	$0.00
6. Total Cost of All Change Orders to Date (2+4)	$0.00

PPA No. _____

Change Order No.: _____

JUSTIFICATION FOR CHANGE(S) (To be completed by Architect/Engineer):

Describe the details which mandate the change(s).

JUSTIFICATION FOR COST ADJUSTMENT (To be completed by Architect/Engineer):

Describe the basis used to calculate the cost adjustment.

JUSTIFICATION FOR SCHEDULE ADJUSTMENT (To be completed by Architect/Engineer):

Describe the impact of adjustment(s) to the critical path.

APPROVALS

By signature on this change order, the Contractor certifies that this change order is complete and includes all direct costs, indirect costs and consequential items (including additional time, if any) and is free and clear of any and all claims or disputes (including, but not limited to, additional costs, additional time, disruptions, and impacts) in favor of the Contractor, subcontractors, material suppliers, or other persons or entities concerning this change order and on all previously contracted Work and does hereby release the Owner from such.

Approved by Contractor: _____

(Company) (Signature)

Recommended by Architect/Engineer: _____

(Company) (Signature)

Surety Consent: SURETY CONSENT IS REQUIRED IF THE TOTAL AMOUNT OF ALL CHANGE ORDERS (LINE 6) EXECEEDS 10% OF THE ORIGINAL CONTRACT AMOUNT.

The Surety consents to this Contract Change Order and agrees that its bond or bonds shall apply and extend to the Contract as modified or amended per this Change Order. The principal and the Surety further agree that on or after execution of this consent, the penalty of the applicable Performance Bond and Labor & Material Bond is increased by:

(___)

By One Hundred Percent (100%) of ALL Change Orders

Countersigned by Resident Agent:

Surety:

Recommended by: CPDC Project Manager:

(Signature) Date:

Accepted by: _____

(Signature) MSU Campus Planning, Design, & Construction Date:

MONTANA
STATE UNIVERSITY

CAMPUS PLANNING, DESIGN & CONSTRUCTION
Sixth Avenue and Grant Street • PO Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

CONTRACTOR'S AFFIDAVIT OF COMPLETION PAYMENT OF DEBTS AND CLAIMS, AND RELEASE OF LIENS

Project Name: _____
Location: Montana State University
PPA No.: _____

I CERTIFY to the best of my knowledge and belief that all work has been performed and materials supplied in strict accordance with the terms and conditions of the corresponding contract documents between the STATE OF MONTANA, acting by and through its DIRECTOR, MONTANA STATE UNIVERSITY, CAMPUS PLANNING, DESIGN & CONSTRUCTION, hereinafter called the Owner, and _____, hereinafter called the CONTRACTOR, for the above referenced project.

I further certify and declare that all bills for materials, supplies, utilities and for all other things furnished or caused to be furnished by the CONTRACTOR and used in the execution of the contract will be fully paid upon receipt of Final Payment and that there are no unpaid obligations, liens, claims, security interests, encumbrances, liabilities and/or demands of State Agencies, subcontractors, material men, mechanics, laborers or any others resulting from or arising out of any work done, caused to be done or ordered to be done by the CONTRACTOR under the contract.

In consideration of the prior and final payments made and all payments made for authorized changes, the CONTRACTOR releases and forever discharges the OWNER from any and all obligations, liens, claims, security interests, encumbrances and/or liabilities arising by virtue of the contract and authorized changes between the parties, either verbal or in writing, and any and all claims and demands of every kind and character whatsoever against the OWNER, arising out of or in any way relating to the contract and authorized changes.

I further certify and agree that the warranty period is defined as commencing with Substantial Completion (or with each Substantial Completion if there is more than one) of the Project, or any portion thereof, and continuing for one (1) calendar year from the date of Final Acceptance of the entire project unless otherwise modified in writing as part of the Substantial Completion or Final Acceptance.

This statement is made for the purpose of inducing the OWNER to make FINAL PAYMENT under the terms of the contract, relying on the truth and statements contained herein.

(Seal)

CONTRACTOR

_____
_____
_____
_____

_____ _____
(Signature) (Title)

State of Montana
County of _____

Subscribed and sworn to me this _____ Day of_____, _____

(Seal)

NOTARY

_____
Notary Public for the State of Montana
My Commission Expires:

MONTANA STATE UNIVERSITY

MONTANASTATE UNIVERSITY
CAMPUS PLANNING, DESIGN & CONSTRUCTION
1PO BOX 172760, BOZEMAN, MONTANA 59717-2760
Phone: 406 994-5413 • Fax: 406 994-5665

CERTIFICATE OF SUBSTANTIAL COMPLETION

Project Name: _____ PPA NO.: _____
Project Address: _____ Date: _____
Project Location: _____

To: **MONTANA STATE UNIVERSITY**

Campus Planning, Design & Construction
6TH & Grant, PO Box 172760
Bozeman, Montana 59717-2760

Architect/Engineer: _____
_____
_____

Contractor: _____ Contract Date: _____
_____ Contract Award Amount: _____
_____

PROJECT OR DESIGNATED PORTION SHALL INCLUDE:

The work performed under this Contract has been reviewed and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above, which is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below is hereby established as: _____

BASIC PROJECT INFORMATION (required by Risk & Tort Defense Division)	NEW	REMODEL/RENOVATION
Total Square Footage	Sq. Ft.	Sq. Ft.
General Construction Material (e.g. masonry, metal panel, wood, etc.)		
Total Construction Cost		
Fire Sprinklers Installed (yes/no)	Yes No	Yes No
Estimated Date of Occupancy (if different from date of Substantial)		
Building Usage:		
Safety Consultation with DLI:	Yes No	Yes No
Additional Comments:		

Definition of Date of Substantial Completion
The Date of Substantial Completion of the Work or designated portion thereof is the Date certified by the Architect/Engineer when construction is sufficiently complete, in accordance with the Contract Documents, so the Owner can occupy or utilize the Work or designated portion thereof for the use for which it is intended, as expressed in the Contract Documents.

A list of items to be completed or corrected, prepared by the Contractor and verified and amended by the Architect/Engineer, is attached hereto. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all the Work in accordance with the Contract Documents. The warranty period is defined as commencing with Substantial Completion (or with each Substantial Completion if there is more than one) of the Project, or any portion thereof, and continuing for one (1) calendar year from the date of Final Acceptance of the entire project unless otherwise modified in writing as part of the Substantial Completion or Final Acceptance.

Architect/Engineer	Signature	Date

The Contractor will complete or correct the Work on the list of items attached hereto within _____ days from the above Date of Substantial Completion.

Contractor	Signature	Date

The Owner accepts the Work or designated portion thereof as substantially complete and will assume full possession thereof at _____ (Time) on _____ (Date)

Montana State University, Campus Planning, Design & Construction

Owner	Signature	Date

The responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, damage to the Work and insurance will be as follows (use attachments as necessary):

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Sixth Avenue and Grant Street • PO Box 172760 • Bozeman, Montana 59717-2760
Phone: (406) 994-5413 • Fax: (406) 994-5665

CONSTRUCTION CHANGE DIRECTIVE

Project Name: _____ PPA No.: _____

Location: Montana State University Date: _____

Contractor: _____ Change Directive No.: CCD-_____

_____

_____

Owner: Montana State University
Campus Planning, Design & Construction
6TH & Grant, PO Box 172760
Bozeman, Montana 59717-2760

Architect/Engineer: _____

_____

_____

The Contractor is directed to proceed as described below. Proceed with this Work promptly. Costs for the Work (if any) involved and change in Contract Time (if any) will be included in a subsequent Change Order.

Description:

Attachments: (insert listing of documents that support description)

The following is based on information provided by the Contractor:

☐ Lump Sum
☐ Unit Price
☐ Estimated Not To Exceed

} Change in Contract Sum of _____

☐ Fixed
☐ Estimated
☐ Maximum

} Change in Contract Time of _____ Calendar Days.

Issued by Arch/Eng.: _____ By: _____ Date: _____

Accepted by Owner: Montana State University
Campus Planning, Design & Construction By: _____ Date: _____

Accepted by Contractor: _____ By: _____ Date: _____

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REQUEST FOR INFORMATION

Project Title: _____ PPA No.: _____
Location: Montana State University RFI No.: _____
Date: _____

To: _____ Attention: _____

From: _____ Attention: _____

Trades Affected: _____

In order to expedite the Work and avoid or minimize delays in the Work the following information is requested. Please return a response by: _____ Date Sent: _____ Date Received: _____

Information Requested:

Response:

Response Date: _____ Respondent: _____

☐ Cost Impact
☐ Schedule Impact

This RFI is for clarification only. The contractor shall document the Owner's Representative within 48 hours if he/she feels the response to this RFI constitutes additional work.

Distribution: ☐ Owner ☐ Architect ☐ Engineer
☐ Agency ☐ Contractor ☐ Other

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PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we:

_____

(Contractor), hereinafter called the Principal, and

_____

(Surety), a corporation licensed to do business as a surety under the laws of the State of Montana, hereinafter called Surety, are held and firmly bound unto the State of Montana in the full and just sum of:

_____**DOLLARS ($_____)**
Alpha Notation Numeric Notation

to be paid to the State of Montana or its assigns, to which payment we bind ourselves, heirs, executors, administrators, successors and assigns, jointly, severally, firmly by this bond.

WHEREAS, the Principal has entered into a contract with State of Montana, acting by and through its Director, Montana State University, Campus Planning, Design & Construction dated _____ and whereas it is one of the conditions of the award of the contract pursuant to statutes that this bond be executed for the Project entitled:

Project Title:_____
Montana State University
PPA No.: __-____

NOW, THEREFORE, the conditions of this obligation are such that if the above Principal as Contractor shall promptly and faithfully perform all of the provisions of the contract, and all obligations thereunder including the specifications, and any alterations provided for, and shall in a manner satisfactory to the State of Montana, complete the work contracted for including any alterations, and shall save harmless the State of Montana from any expense incurred through the failure of the Contractor to complete the work as specified, then this obligation shall be void; otherwise it shall remain in full force and effect.

The surety hereby waives notice of any extension of time and any alterations made in the terms of the contract, unless the cumulative cost of such alterations cause the total project cost to exceed the original contract sum by more than 10%.

FOR STATE USE ONLY:

Surety is licensed in MT: ☐ Yes ☐ No

Date verified: _____

Verified by: _____
Montana State University
State of Montana

Contractor: _____
(signature)

_____
(print name)

_____
(date)

Surety: _____
(print name)

_____
(date)

By: _____
(Attorney-in-Fact, seal & signature)

_____
(Agency)

_____
(Street Address)

_____
(Address)

_____
(Phone/Fax)

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Phone: (406) 994-5413 • Fax: (406) 994-5665

LABOR & MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that we:

_____

(Contractor), hereinafter called the Principal, and

_____

(Surety), a corporation licensed to do business as a surety under the laws of the State of Montana, hereinafter called Surety, are held and firmly bound unto the State of Montana in the full and just sum of:

_____ **DOLLARS ($)**
Alpha Notation Numeric Notation

to be paid to the State of Montana or its assigns, to which payment we bind ourselves, heirs, executors, administrators, successors and assigns, jointly, severally, firmly by this bond.

WHEREAS, the Principal has entered into a contract with State of Montana, acting by and through its Director, Montana State University, Campus Planning, Design & Construction dated _____ and whereas it is one of the conditions of the award of the contract pursuant to statutes that this bond be executed for the Project entitled:

Project Title: _____
Montana State University
PPA No.: __-____

NOW, THEREFORE, the conditions of this obligation are such that if the above Principal as Contractor shall duly and promptly pay all laborers, mechanics, subcontractors and material men who perform work or furnish material under the contract and all persons who shall supply him or the subcontractor with materials, services, bonds and insurance for the carrying on of the work, then this obligation shall be void; otherwise it shall remain in full force and effect and shall save harmless the State of Montana from any expense incurred through the failure of the Contractor to comply.

The surety hereby waives notice of any extension of time and any alterations made in the terms of the contract, unless the cumulative cost of such alterations cause the total project cost to exceed the original contract sum by more than 10%.

FOR STATE USE ONLY:

Surety is licensed in MT: ☐ Yes ☐ No

Date verified: _____

Verified by: _____
Montana State University
State of Montana

Contractor: _____
(signature)

_____
(print name)

_____
(date)

Surety: _____
(print name)

_____
(date)

By: _____
(Attorney-in-Fact, seal & signature)

_____
(Agency)

_____
(Street Address)

_____
(Address)

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Phone: (406) 994-5413 • Fax: (406) 994-5665

CERTIFICATE OF FINAL ACCEPTANCE

Project Title: _____ PPA NO.: __-____
Location: Montana State University Date: _____

To: Montana State University
Campus Planning, Design & Construction
PO Box 172760
Bozeman, Montana 59717-2760

Architect/Engineer: _____
_____
_____

Contractor: _____ Contract Date: _____
_____ Contract Amount: _____
_____

The Work performed under this Contract has been reviewed and found to be complete and has reached Final Acceptance. The Date of Final Acceptance of the Work is defined as the Date Certified by the Architect/Engineer upon which the Work is fully complete in all aspects, **and** which the Owner accepts the Contractor's work as complete. The Date of Final Acceptance of the Project, or portion thereof designated above, is also the basis for commencement of the DURATION of applicable warranties required by the Contract Documents. The Warranty Period is defined in the Contract Documents as commencing with Substantial Completion(s) and continuing for one (1) calendar year from the Date of Final Acceptance. This date shall correspond to the date of the Architect/Engineer's approval on the final pay application unless otherwise agreed upon in writing. In the event of a disparity between the date of the Architect/Engineer's approval and this form, if no other written agreement exists as to the date of final acceptance, this form shall constitute such agreement and it shall govern as the date of Final Acceptance.

Date of Substantial Completion:	Date of Final Acceptance:	Date of Warranty Expiration:

Notes:

_____ _____ _____
Architect/Engineer By Date

_____ _____ _____
Contractor By Date

State of Montana
Montana State University
Campus Planning, Design & Construction
_____ _____ _____
Owner By Date

Clear Form

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Buy-Safe Montana

_____ submits the following Buy-Safe Montana values for A&E review. For assistance, clarification, or the latest industry average rates, visit: https://www.bls.gov/iif/osheval.htm

Incident Rate: _____

Industry Average Incident Rate: _____

Experience Modification Ratio (EMR): _____

Loss Ratio: _____

Less than Industry Average Incident Rate -	☐ Yes	☐ No
EMR less than 1.0 -	☐ Yes	☐ No
Loss ratio less than 100% -	☐ Yes	☐ No
Is a Comprehensive Safety Consultation Required?	☐ Yes	☐ No

*If all 3 options are responded to as "No," a consultation is required

Explanation of above average incident rate, EMR greater than 1.0, or loss ratio greater than 100%...

Per 3.1.7 – Buy-Safe Montana. The Owner shall review the Buy-Safe Montana form provided by the Bidder under Articles 16 of the Instructions to Bidders. To promote a safe work environment, the Owner encourages an incidence rate less than the latest average for non-residential building construction for Montana as established by the federal Bureau of Labor Statistics for the prior year; an experience modification rating (EMR) less than 1.0; and a loss ratio of less than 100%. The Contractor with a greater-than-average incidence rate, an EMR greater than 1.0, and a loss ratio of more than 100% shall schedule and obtain a Comprehensive Safety Consultation from the Montana Department of Labor & Industry, Employment Relations Division, Safety Bureau before the Owner grants Substantial Completion of the Work. For assistance in obtaining the Comprehensive Safety Consultation, visit http://erd.dli.mt.gov/safety-health/onsite-consultation.

_____ Name

_____ Signature

_____ Date

SECTION 011000
SUMMARY

1.1 PART 1 - GENERAL

A. Related Documents
1. Drawings and general provisions of Contract, including General Conditions, Supplemental Conditions and other Division 1 Specification Sections, apply to this Section.

B. Project Description
1. This project will provide for the installation of a new 100 KW natural gas fueled standby generator to serve select loads in the Johnson Family Livestock Facility.

C. Site Information

1. Scope of work includes, but is not necessarily limited to, installation of owner furnished panelboards, transfer switches, and standby generator. All connections to generator including electrical and gas connections as well as excavation, patch and repair to site, and installation of concrete generator pad shall be included.

D. Contracts
1. Contracts shall be under one General Contract and shall include, but not be limited to, all labor, materials, and supervision necessary to furnish and install the Work.

E. Work Sequence

1. The work will be conducted in one (1) phase to provide the least possible interference to the activities of the Owner's personnel and activities.
2. The Contractor will have access to the Johnson Family Livestock Facility from the date of receipt of the contract.

F. Contractor Use of Premises

1. Work on this contract is expected to be done during regular working hours Monday through Friday. Any variation from this will require prior approval of the Consultant and Owner.
2. All work must be coordinated with MSU at all times and MSU must be informed about any work impacting campus operations 72 hours or 3 working days in advance of work being conducted and shall require MSU approval.
3. General: Limit use of the premises to construction activities in areas indicated; allow for Owner/MSU occupancy and use by the public. Confine operations to areas within contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
4. Contractor shall conduct all his work in such a manner as to minimize the inconvenience and disruption of MSU’s daily schedule.
5. Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the work while engaged in project construction.

6. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials to the areas designated on the drawings. If additional storage is necessary, obtain and pay for such storage off-site.
7. Contractor shall establish a staging area for storage of materials and equipment.
8. The Contractor is to coordinate with MSU for the location of the job site trailer office.
9. Keep driveways and entrances serving the premises clear and available to MSU and MSU's employees, staff and visitors at all times, unless otherwise agreed by MSU. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.

G. Parking and Site Access
(See also Supplemental Conditions of the Contract for Construction.)

1. MSU Bozeman Vehicle Regulations state: "All students, faculty, staff, and visitors must register any motor vehicle they park on the University campus, for any reason. A visitor is anyone not defined as student, staff or faculty."
2. All Contractor and Contractor employees shall comply with Montana State University parking regulations. MSU parking permits can be purchased at the University Police Office located in the Huffman Building at Seventh Avenue and Kagy Boulevard. Violators of MSU Bozeman Vehicle Regulations may be ticketed and towed.
3. A maximum of three (3) Contractor Permits (or as agreed with MSU) will be made available to the Contractor for parking of essential vehicles within the designated parking lot (as designated on the Cover Sheet of the Contract Documents). Essential vehicles are vehicles used for delivery of equipment and tools required to be parked in close proximity to the construction area. All allowed vehicles only to be parked on hard surfaced areas within the Staging Area. All other Contractor and Contractor employee vehicles on campus shall be parked in designated parking lots to be agreed with MSU. No personal vehicles shall be parked at the project site in any event. If a driver of a vehicle not allowed to be parked at the project site must unload equipment, tools, or materials, the vehicle must be immediately thereafter move to a designated lot or leave campus.
4. Access and egress to and from the project site shall be from Lincoln Street only. In cases where a different route must be used for a specific purpose, permission must be obtained from MSU. Access routes are for delivery of equipment, tools, and materials and not for parking.
5. The site Staging Areas for materials and equipment are designated on the Cover Sheet of the Contract Documents. Staged materials and equipment must be secured on the ground surface or in trailers. Site staging areas shall be fenced in accordance with the Contract Documents. Vehicles in addition to those allowed to be parked may not be used for staging of equipment, tools, or materials.

H. Owner Occupancy

1. Full Owner/MSU Occupancy: The Owner/MSU will occupy the site during the entire construction period. Cooperate with MSU during construction operations to minimize conflicts and facilitate MSU usage. Perform the work so as not to interfere with MSU’s operations.

I. Safety Requirements

1. General: The safety measures required by the Contract Documents are not meant to be inclusive. The Contractor shall be solely responsible for safety on a 24-hours-per-day, 7 days-per-week basis and shall take whatever additional measures are necessary to insure the health and safety of the buildings' occupants, or pedestrians at or near the construction site and access routes and of all other persons in all areas affected by the Contractor's activities. Prior to the start of construction, the Contractor is to submit to the Consultant, a detailed written plan specifying the safety procedures that will be followed. Include (but not by way of limitation) the following: Verbiage, size and locations of warning signs; construction sequence as related to safety; use of barricades (type and location); employee policies as related to safety; and delivery of materials as related to safety. Revise the safety plan as required during construction and resubmit to the Owner.
2. All application, material handling, and associated equipment shall conform to and be operated in conformance with OSHA safety requirements.
3. Comply with Federal, State, local, and the Owner’s fire, health and safety requirements.
4. Advise MSU whenever work is expected to be hazardous or inconvenient (including objectionable odors) to MSU's employees, students, visitors or the building occupants.
5. Construction materials or equipment shall be placed so as not to endanger the work or prevent free access to all emergency devices or utility disconnects.
6. Maintain the proper rated fire extinguishers within easy access where power tools, sanding or other equipment is being used.
7. The Contractor shall erect and maintain, as required by law, conditions and progress of the work, warning signs, barricades and other reasonable safeguards for safety and protection.
8. **Emergency and Public Safety Alert System:**
   Montana State University has an Emergency and Public Safety Alert System that warns the campus community in the event of an emergency or public safety event. Because contractors, consultants, and vendors are considered members of the campus community when working on campus, they must be familiar with the alert system and understand when the system is used. Montana State University requires all contractors, consultants, vendors, and their employees working on or entering the MSU-Bozeman campus to register for the Emergency and Public Safety Alert System. The link to register is: http://www.montana.edu/msualert/

J. Existing Premises Condition

1. The Contractor is responsible for adequately documenting in photos the existing condition of the premises, to include external road surfaces, curbing and landscaped areas, specifically the cleanliness of areas. Any damage to the premises which is found after construction and is not so documented will be the responsibility of the Contractor to repair or replace.

K. Discrepancies in the Documents

1. The Contractor shall bring any discrepancies between any portions of the drawings and specifications to the attention of the Owner and the Consultant in writing. The Owner and Consultant shall review the discrepancy and clarify the intent desired in the Contract Documents. Unless specifically directed otherwise, the Contractor shall be obligated to

provide the greater quantity or quality without any change in contract sum or time.

END OF SECTION 011000

SECTION 012000
PRICE AND PAYMENT PROCEDURES

1.1 GENERAL

A. Related Documents
1. Drawings and general provisions of Contract, including General Conditions, Supplemental Conditions and other Division 1 Specification Sections, apply to this Section.

B. Summary

1. This Section specified administrative and procedural requirements governing the Contractor's Applications for Payment.
2. The Contractor's Construction Schedule and Submittal Schedule are included in Section "Submittals".

C. Schedule of Values

1. Coordinate preparation of the Schedule of Values, Form 100, with preparation of the Contractor's Construction Schedule.
2. Each prime Contractor shall coordinate preparation of its Schedule of Values for its part of the work with preparation of the Contractor's Construction Schedule.
3. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:

a. Contractor's construction schedule
b. Application for Payment form
c. List of subcontractors
d. Schedule of allowances
e. Schedule of alternates
f. List of products
g. List of principal suppliers and fabricators
h. Schedule of submittals
i. Submit the Schedule of Values to the Architect at the earliest feasible date, but in no case later than seven (7) days before the date scheduled for submittal of the initial Application for Payment.
j. Sub-Schedules: Where the work is separated into phases that require separately phased payments, provide sub-schedules showing values correlated with each phase of payment.

4. Format and Content: Use the Project Manual Table of Contents as a guide to establish the format for the Schedule of Values.

a. Identification: Include the following project identification on the Schedule of Values:

1) Project name
2) Name of the Architect
3) Project number (PPA No.)
4) Contractor's name and address
5) Date of submittal

b. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:

1) Generic name
2) Related specification section
3) Name of subcontractor
4) Name of manufacturer or fabricator
5) Name of supplier
6) Change Orders (numbers) that have affected value
7) Dollar value

a) Percentage of Contract Sum in the nearest one-hundredth percent, adjusted to total 100%

c. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items.

d. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.

e. For each part of the work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that art of the work.

5. Margins of Cost: Show line items for indirect costs, and margins on actual costs, only to the extent that such items will be listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete including its total cost and proportionate share of general overhead and profit margin.

a. At the Contractor's option, temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the Schedule of Values or distributed as general overhead expense.

6. Schedule Updating: Update and resubmit the Schedule of Values when Change Orders or Construction Change Directives result in a change in the Contract Sum.

D. Applications for Payment

1. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
2. Payment Application Times: Each progress payment date is as indicated in the Agreement. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
3. Payment Application Forms: Use Montana Form 101 as the form for Application for Payment.
4. Application Preparation: Complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the Owner. Incomplete applications will be returned without action.

a. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.
b. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.

5. Transmittal: Submit one (1) executed copy of each Application for Payment to the Architect by means ensuring receipt within 24 hours, including waivers of lien and similar attachments, when required.

    a. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Architect.

6. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following:

    a. List of subcontractors
    b. Schedule of Values

        1) Contractor's Construction Schedule (preliminary if not final)

    c. Copies of building permits

        1) Copies of authorizations and licenses from governing authorities for performance of the work

    d. Certificates of insurance and insurance policies (submitted with Contract)
    e. Performance and payment bonds (submitted with Contract if required)

7. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the work.
8. Administrative actions and submittals that shall proceed or coincide with this application include:

    a. Occupancy permits and similar approvals
    b. Warranties (guarantees) and maintenance agreements
    c. Test/adjust/balance records
    d. Maintenance instructions
    e. Meter readings
    f. Start-up performance reports

        1) Change-over information related to Owner's occupancy, use, operation and maintenance.

    g. Final cleaning

        1) Application for reduction of retainage, and consent of surety

9. Final Payment Application: Administrative actions and submittals which must precede or coincide with submittal of the final Application for Payment include the following:

   a. Completion of project closeout requirements

      1) Completion of items specified for completion after Substantial Completion

   b. Assurance that unsettled claims will be settled

      1) Assurance that work not complete and accepted will be completed without undue delay
      2) Transmittal of required project construction records to Owner

END OF SECTION 01200

SECTION 012500
SUBSTITUTION PROCEDURES

PART 1 - GENERAL

A. Related Documents
   1. Drawings and general provisions of Contract, including General Conditions, Supplemental Conditions and *Instructions to Bidders*.

B. Substitution Procedures
   1. Substitutions include changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by the Contractor.
   2. Substitution Requests: Submit three copies of each request on MSU Substitution Request Form 099 for each consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

      a. Submit requests in accordance with *Instructions to Bidders*.
      b. Identify product to be replaced and show compliance with requirements for substitutions. Include a detailed comparison of significant qualities of proposed substitution with those of the Work specified, a list of changes needed to other parts of the Work required to accommodate proposed substitution, and any proposed changes in the Contract Sum or the Contract Time should the substitution be accepted.

C. Architect will review proposed substitutions and notify Contractor of their acceptance or rejection. If necessary, Architect will request additional information or documentation of evaluation.

   1. Architect will notify Contractor of acceptance or rejection of proposed substitution within 10 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

D. Do not submit unapproved substitutions on Shop Drawings or other submittals.

END OF SECTION 012500

SECTION 013000

SUBMITTALS

1.1 GENERAL

A. Related Documents

1. Drawings and general provisions of Contract, including General Conditions, Supplemental Conditions and other Division 1 Specification Sections, apply to this Section.

B. Summary

1. This Section specifies administrative and procedural requirements for submittals required for performance of the work, including:

    a. Contractor's construction schedule
    b. Submittal schedule
    c. Daily construction reports
    d. Shop Drawings
    e. Product data
    f. Samples

    Note: All Submittals are to be both print and electronic.

2. Administrative Submittals: Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:

    a. Permits
    b. Applications for Payment
    c. Performance and payment bonds
    d. Insurance certificates
    e. List of Subcontractors

3. The Schedule of Values submitted is included in Section "Applications for Payment".
4. Inspection and test reports are included in Section "Quality Requirements".
5. Unless otherwise instructed by the Owner all submittals shall be directed to Architect/Engineer Consultant of Record. The Contractor’s construction schedule, submittal schedule and daily construction reports shall be directed to the Consultant’s representative, the State of Montana’s representative and MSU’s representative. Shop drawings, product data and samples shall be directed to the Consultant’s representative.

C. Submittal Procedures

1. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

    a. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.

b. Coordinate transmittal of different types of submittals for related elements of the work so processing will not be delayed by the need to review submittals concurrently for coordination.

1) The Consultant reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

c. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.

1) Allow two (2) weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Consultant will promptly advise the Contractor when a submittal being processed must be delayed for coordination.
2) If an intermediate submittal is necessary, process the same as the initial submittal.
3) Allow two (2) weeks for reprocessing each submittal.
4) No extension of contract time will be authorized because of failure to transmit submittals to the Consultant sufficiently in advance of the work to permit processing.

2. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

a. Provide a space approximately 4" x 5" on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
b. Include the following information on the label for processing and recording action taken.

1) Project name and PPA Number
2) Date
3) Name and address of Consultant
4) Name and address of Contractor
5) Name and address of Subcontractor
6) Name and address of supplier
7) Name of manufacturer

a) Number and title of appropriate Specification Section
b) Drawing number and detail references, as appropriate

3. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Consultant using a transmittal form. Submittals received from sources other than the Contractor will be returned without action.

a. On the transmittal record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include

Contractor's certification that information complies with Contract Documents requirements.

b. Transmittal Form: Contractor's standard form.

D. Contractor's Construction Schedule

1. Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart type Contractor's construction schedule. Submit both in print and electronically within thirty (30) days of the date established for "Commencement of the Work".

   a. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the work as indicated in the "Schedule of Values".
   b. Within each time bar indicate estimated completion percentage in 10 percent increments. As work progresses, place a contrasting mark in each bar to indicate actual completion.
   c. Prepare the schedule on a sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data for the entire construction period.
   d. Secure time commitments for performing critical elements of the work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the work. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the work.
   e. Coordinate the Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other schedules.
   f. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Consultant's procedures necessary for certification of Substantial Completion.

2. Work Stages: Indicate important stages of construction for each major portion of the Work, including testing and installation.
3. Area Separations: Provide a separate time bar to identify each major construction area for each major portion of the work. Indicate where each element in an area must be sequenced or integrated with other activities.
4. Cost Correlation: At the head of the schedule, provide a two (2) item cost correlation line, indicating "pre-calculated" and "actual" costs. On the line show dollar-volume of work performed as of the dates used for preparation of payment requests.

   a. Refer to Section "Price and Payment Procedures" for cost reporting and payment procedures.

5. Distribution: Following response to the initial submittal, print and distribute copies to the Consultant, Owner, subcontractors, and other parties required to comply with scheduled dates. Transmit electronically and post copies in the project meeting room and temporary field office.

   a. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have

completed their assigned portion of the work and are no longer involved in construction activities.

6. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule electronically and in print concurrently with report of each meeting.

E. Submittal Schedule

1. After development and acceptance of the Contractor's construction schedule, prepare a complete schedule of submittals. Submit the schedule within ten (10) days of the date required for establishment of the Contractor's construction schedule.

   a. Coordinate submittal schedule with the list of subcontracts, schedule of values and the list of products, as well as the Contractor's construction schedule.
   b. Prepare the schedule in chronological order; include submittals required during the first thirty (30) or sixty (60) days of construction. Provide the following information:

      1) Scheduled date for the first submittal
      2) Related section number
      3) Submittal category
      4) Name of subcontractor
      5) Description of the part of the work covered
      6) Scheduled date for resubmittal
         a) Scheduled date the Consultant's final release or approval

2. Distribution: Following response to initial submittal, print and distribute copies to the Consultant, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the project meeting room and field office.

   a. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in construction activities.

3. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

F. Daily Construction Reports

1. Prepare a daily construction report, recording the following information concerning events at the site; and submit duplicate copies to the Consultant at weekly intervals:

   a. List of subcontractors at the site
   b. Approximate count of personnel at the site
   c. High and low temperatures, general weather conditions
   d. Accidents and unusual events
   e. Meetings and significant decisions

f. Stoppages, delays, shortages, losses
g. Meter readings and similar recordings
h. Emergency procedures
i. Orders and requests of governing authorities
j. Change Orders received, implemented
k. Services connected, disconnected
l. Equipment or system tests and start-ups
m. Partial completions, occupancies
n. Substantial Completions authorized

G. Shop Drawings

1. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the project is not considered Shop Drawings.
2. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings. Include the following information:

a. Dimensions
b. Identification of products and materials included
c. Compliance with specified standards
d. Notation of coordination requirements
e. Notation of dimensions established by field measurement
f. Sheet Size: Except for templates, patterns and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2" x 11", but no larger than 36" x 48".
g. Submittal: Submit electronically and in print for the Consultant's review; Consultant’s comments will be returned electronically.

1) One (1) of the prints returned shall be marked-up and maintained as a "Record Document".

k. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

3. Coordination drawings are a special type of Shop Drawing that show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or function as intended.

a. Preparation of coordination drawings is specified in section "Project Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
b. Submit coordination drawings for integration of different construction elements. Show sequences and relationships of separate components to avoid conflicts in use of space.

H. Product Data

1. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's

installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings".

a. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:

1) Manufacturer's printed recommendations
   a) Compliance with recognized trade association standards
   b) Compliance with recognized testing agency standards

2) Application of testing agency labels and seals
   a) Notation of dimensions verified by field measurement
3) Notation of coordination requirements

b. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

c. Preliminary Submittal: Submit a preliminary single-copy of Product Data where selection of options is required.

d. Submittals: Submit two (2) copies of each required submittal; submit four (4) copies where required for maintenance manuals. The Consultant will retain one (1), and will return the other marked with action taken and corrections or modifications required.

1) Unless non-compliance with Contract Document provisions is observed, the submittal may serve as the final submittal.

e. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.

1) Do not proceed with installation until an applicable copy of Product Data applicable is in the installer's possession.
2) Do not permit use of unmarked copies of Product Data in connection with construction.

I. Samples

1. Submit full-size, fully fabricated samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.

a. Mount, display, or package samples in the manner specified to facilitate review of qualities indicated. Prepare samples to match the Consultant's sample. Include the following:

1) Generic description of the sample
2) Sample source
3) Product name or name of manufacturer

4) Compliance with recognized standards
5) Availability and delivery time

2. Submit samples for review of kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed.

   a. Where variation in color, pattern, texture, or other characteristics are inherent in the material or product represented, submit multiple units (not less than three (3), that show approximate limits of the variations.
   b. Refer to other specification sections for requirements for samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
   c. Refer to other sections for samples to be returned to the Contractor for incorporation in the work. Such samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of sample submittals.

3. Preliminary Submittals: Where samples are for selection of color, pattern, texture, or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.

   a. Preliminary submittals will be reviewed and returned with the Consultant's mark indicating selection and other action.

4. Submittals: Except for samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit three (3) sets; one (1) will be returned marked with the action taken.

   a. Maintain sets of samples, as returned, at the project site, for quality comparisons throughout the course of construction.

      1) Unless non-compliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
      2) Sample sets may be used to obtain final acceptance of the construction associated with each set.

5. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the work. Show distribution on transmittal forms.

   a. Field samples specified in individual sections are special types of samples. Field samples are full-size examples erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the work will be judged.

      1) Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

J. Consultant's Action

1. Except for submittals for record, information, or similar purposes, where action and return is required or requested, the Consultant will review each submittal, mark to indicate action taken, and return promptly. Compliance with specified characteristics is the Contractor's responsibility.
2. Action Stamp: The Consultant will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

    a. Final-But-Restricted Release: When submittals are marked "Make Corrections Noted", that part of the work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
    b. Returned for Resubmittal: When submittal is marked "Revise and Resubmit", do not proceed with that part of the work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.

        1) Do not permit submittals marked "Revise and Resubmit" to be used at the project site, or elsewhere where work is in progress.

    c. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Action not Required".

END OF SECTION 013000

SECTION 013100
PROJECT COORDINATION

1.1 GENERAL

A. Related Documents
1. Drawings and general provisions of Contract, including General Conditions and Supplemental Conditions and other Division1 Specification Sections, apply to this Section.

B. Summary
1. This section specifies administrative and supervisor requirements necessary for project coordination including, but not necessarily limited to:
   a. Coordination
   b. Administrative and supervisory personnel
   c. General installation provisions
   d. Cleaning and protection
2. Field Engineering is included in Section "Field Engineering".
3. Progress meetings, coordination meetings and pre-installation conferences are included in Section "Project Meetings".
4. Requirements for Contractor's Construction Schedule are included in Section "Submittals".

C. Coordination
1. Coordination: Coordinate construction activities included under various sections of these specifications to assure efficient and orderly installation of each part of the work. Coordinate construction operations included under different sections of the specifications that are dependent upon each other for proper installation, connection, and operation.
   a. Provide access to work at all times for inspections by Owner and authorized representatives.
   b. Provide safe working conditions and protection of completed work.
   c. Provide barricades and signs.
   d. Where installation of one part of the work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
   e. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
   f. Make adequate provisions to accommodate items scheduled for later installation.
   g. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
      1) Prepare similar memoranda for the Owner and separate Contractors where coordination of their work is required.
2. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the work. Such administrative activities include, but are not limited to, the following:

a. Notify Facilities Services or Campus Planning, Design and Construction of any expected disruptions in service or changes in construction schedule at least 72 hours (3 working days) in advance.
b. Preparation of schedules.
c. Installation and removal of temporary facilities.
d. Delivery and processing of submittals.
e. Progress meetings.
f. Project close-out activities.

3. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
a. Salvage materials and equipment involved in performance of, but not actually incorporated in, the work. Refer to other sections for disposition of salvaged materials that are designated as Owner's property.

D. Submittals
1. Coordinated Drawings: Prepare and submit coordination drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.
a. Show the interrelationship of components shown on separate shop drawings.
b. Indicate required installation sequences.
c. Comply with requirements contained in Section "Submittals".
d. Section "Basic Electrical Requirements" for specific coordination drawing requirements for mechanical and electrical installations.

2. Staff Names: Within 15 days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers. Post copies of the list in the project meeting room, the temporary field office, and each temporary telephone.

1.2 PROJECT MEETINGS

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

B. Summary
1. This section specifies administrative and procedural requirements for project meetings including but not limited to:
a. Pre-construction conference
b. Pre-installment conferences
c. Coordination meetings
d. Progress meetings

C. Pre-construction Conference
1. Schedule a pre-construction conference and organizational meeting.
a. Hold meeting at the project site or other convenient location and prior to commencement of construction activities, including the moving of

equipment on to the site. Conduct the meeting to review responsibilities and personnel assignments.

2. Attendees: The Owner, Consultant and their consultants, the Contractor and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the work. Both the Contractor and the Contractor's job foremen shall attend the meeting, along with all subcontractors.
3. Agenda: Discuss items of significance that could affect progress including such topics as:
    a. Tentative construction schedule
    b. Critical work sequencing
    c. Designation of responsible personnel
    d. Procedures for processing field decisions and Change Orders
    e. Procedures for processing Applications for Payment
    f. Distribution of Contract Documents
    g. Submittal of Shop Drawings, Product Data and Samples
    h. Preparation of record documents
    i. Use of the premises
    j. Office, work and storage areas
    k. Equipment deliveries and priorities
    l. Safety procedures
    m. First aid
    n. Security
    o. Housekeeping
    p. Working hours

D. Pre-Installation Conferences
1. Conduct a pre-installation conference at the site before each construction activity that requires coordination with other construction. The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Consultant of scheduled meeting dates.
2. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:
    a. Contract Documents
    b. Options
    c. Related Change Orders
    d. Purchases
    e. Deliveries
    f. Shop Drawings, Product Data and quality control samples
    g. Possible conflicts
    h. Compatibility problems
    i. Time schedules
    j. Weather limitations
    k. Manufacturer's recommendations
    l. Compatibility of materials
    m. Acceptability of substrates
    n. Temporary facilities
    o. Space and access limitations
    p. Governing regulations

q. Safety
r. Inspection and testing requirements
s. Required performance results
t. Recording requirements
u. Protection

3. The Consultant will record significant discussions and agreements and disagreements of each conference, along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner and Consultant.
4. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of work and reconvene the conference at the earliest feasible date.

E. Coordination Meeting

1. Conduct project coordination meetings at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.
2. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.
3. The Consultant will record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

F. Progress Meetings

1. Conduct progress meetings at the project site at regularly scheduled intervals. Coordinate with the Owner and Consultant of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.
2. Attendees: In addition to representatives of the Owner and Consultant, each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the project and authorized to conclude matters relating to progress.
3. Agenda: Visit job site to raise specific pending issues prior to meeting. Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the project.
   a. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the contract time.
   b. Review the present and future needs of each entity present, including such items as:
      1) Interface requirements
      2) Time
      3) Sequences
      4) Deliveries
      5) Off-site fabrication problems
      6) Access
      7) Site utilization

8) Temporary facilities and services
9) Hours of work
10) Hazards and risks
11) Housekeeping
12) Quality and work standards
13) Change Orders
14) Documentation of information for payment requests

4. Reporting: The Consultant shall distribute printed and electronic copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
   a. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

1.3 PRODUCTS (NOT APPLICABLE)

1.4 EXECUTION

A. General Installation Provisions
1. Inspection of Conditions: Require the installer of each major component to inspect both the substrate and conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
2. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
3. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
4. Provide attachment and connection devices and methods necessary for securing work. Secure work true to line and level. Allow for expansion and building movement.
5. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable choices to the Consultant for final decision.
6. Recheck measurements, quantities and dimensions, before starting each installation.
7. Install each component during weather conditions and project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
8. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
9. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated and in compliance with accessibility requirements. Refer questionable mounting height decisions to the Consultant for final decision.

B. Cleaning and Protection
1. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

2. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
3. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
    a. Excessive static or dynamic loading
    b. Excessive internal or external pressures
    c. Excessively high or low temperatures
    d. Thermal shock
    e. Excessively high or low humidity
    f. Air contamination or pollution
    g. Water or ice
    h. Solvents
    i. Chemicals
    j. Light
    k. Radiation
    l. Puncture
    m. Abrasion
    n. Heavy traffic
    o. Soiling, staining and corrosion
    p. Bacteria
    q. Rodent and insect infestation
    r. Combustion
    s. Electrical current
    t. High speed operation
    u. Improper lubrication
    v. Unusual wear or other misuse
    w. Contact between incompatible materials
    x. Destructive testing
    y. Misalignment
    z. Excessive weathering
        aa. Unprotected storage
        ab. Improper shipping or handling
        ac. Theft
        ad. Vandalism

END OF SECTION 013100

SECTION 014000
QUALITY REQUIREMENTS

1.1 GENERAL

A. RELATED DOCUMENTS

1. Drawings and general provisions of Contract, including General Conditions, Supplemental Conditions and other Division-1 Specification Sections, apply to this Section.

B. SUMMARY

1. This Section specifies administrative and procedural requirements for quality control services.
2. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Architect.
3. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements.
4. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.

    a. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
    b. Inspections, test and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.
    c. Requirements for the Contractor to provide quality control services required by the Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. RESPONSIBILITIES

1. Contractor Responsibilities: The Contractor shall provide inspections, tests and similar quality control services, specified in individual Specification Sections and required by governing authorities, except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified entity; these services include those

    a. Services specified to be performed by an independent agency and not by the Contractor. Costs for these services shall be included in the Contract Sum.
    b. The Contractor shall employ and pay an independent agency, to perform specified quality control services.
    c. The Owner will engage and pay for the services of an independent agency

to perform inspections and tests specified as the Owner's responsibility. Payment for these services will be made by the Owner.

d. Where the Owner has engaged a testing agency or other entity for testing and inspection of a part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.

2. Retesting: The Contractor is responsible for retesting where results of required inspections, tests or similar services provide unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.

a. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.

3. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Associated services required include but are not limited to:

a. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
b. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
d. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
e. Security and protection of samples and test equipment at the Project site.

4. Owner Responsibilities: The Owner will provide inspections, tests and similar quality control services specified to be performed by independent agencies and not by the Contractor, except where they are specifically indicated as the Contractor's responsibility or are provided by another identified entity. Costs for these services are not included in the Contract Sum.

a. The Owner will employ and pay for the services of an independent agency, testing laboratory or other qualified firm to perform services which are the Owner's responsibility.

5. Duties of the Testing Agency: The independent testing agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Architect and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.

a. The agency shall notify the Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.

b. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
c. The agency shall not perform any duties of the Contractor.

6. Coordination: The Contractor and each agency engaged to perform inspections, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests. The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

D. SUBMITTALS

1. The independent testing agency shall submit a certified written report and electronic copy of each inspection, test or similar service, to the Architect, in duplicate, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate.

a. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
b. Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to:

1) Date of issue
2) Project title and number
3) Name, address and telephone number of testing agency
4) Dates and locations of samples and tests or inspections
5) Names of individuals making the inspection or test
6) Designation of the Work and test method
7) Identification of product and Specification Section
8) Complete inspection or test data
9) Test results and in interpretations of test results
10) Ambient conditions at the time of sample-taking and testing
11) Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements
12) Name and signature of laboratory inspector
13) Recommendations on retesting

E. QUALITY ASSURANCE

1. Qualification for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.
2. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State of Montana.

1.2 PRODUCTS (NOT APPLICABLE)

1.3 EXECUTION

A. GENERAL

1. Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
2. Protect construction exposed by or for quality control service activities, and protect repaired construction.
3. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION 014000

SECTION 015000
TEMPORARY FACILITIES AND UTILITIES

1.1 GENERAL

A. RELATED DOCUMENTS

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

B. SUMMARY

1. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection.
2. Temporary utilities required may include but are not limited to:

    a. Telephone service
    b. Electric Service
    c. Water
    d. Natural gas
    e. Sewer

3. Temporary construction and support facilities required may include but are not limited to:

    a. Field offices and storage sheds.
    b. Sanitary facilities, including drinking water
    c. Temporary Project identification signs and bulletin boards
    d. Waste Disposal services
    e. Construction aids and miscellaneous services and facilities

4. Security and protection facilities required include but are not limited to:

    a. Temporary Security Fencing
    b. Temporary fire protection
    b. Barricades, warning signs, lights
    c. Environmental protection

C. QUALITY ASSURANCE

1. Regulations: Comply with industry standards and applicable laws and regulations if authorities having jurisdiction, including but not limited to:

    a. Building Code requirements
    b. Health and safety regulations
    c. Utility company regulations
    d. Police, Fire Department and Rescue Squad rules
    e. Environmental protection regulations

2. Standards: Comply with NFPA Code 241, "Building Construction and

Demolition Operations" and ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition".

D. PROJECT CONDITIONS

1. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

1.2 PRODUCTS

A. MATERIALS

1. General: Provide new materials; if acceptable to the Architect, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.
2. Water: Provide potable water approved by local health authorities.
3. Open-Mesh Fencing: Provide 11-gage, galvanized 2-inch, chain link fabric fencing 6-feet high with galvanized barbed wire top strand and galvanized steel pipe posts, 1 1/2" I.D. for line posts and 2-1/2" I.D. for corner posts.

B. EQUIPMENT

1. General: Provide new equipment; if acceptable to the Architect, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.
2. Water Hoses: Provide 3/4" heavy-duty, abrasion-resistant, flexible rubber hoses 100 ft. long, with pressure rating greater than the maximum pressure of the water distribution system; provide adjustable shut-off nozzles at hose discharge.
3. Electrical Outlets: Provide properly configured NEA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.
4. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.
5. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.
6. Temporary Offices: Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.
7. Temporary Toilet Units: Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent

material.

9. First Aid Supplies: Comply with governing regulations.
10. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.

    a. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

1.3 EXECUTION

A. INSTALLATION

1. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work and Owner's operations. Relocate and modify facilities as required.
2. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.

B. TEMPORARY UTILITIES

1. Temporary Telephones: Provide temporary telephone service for all personnel engaged in construction activities, throughout the construction period. Provide cellular telephone, operational and on site at all times.

C. TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

1. Locate field offices, storage sheds, sanitary facilities and other temporary construction and support facilities for easy access and minimal interruption to Owner's operations.

    a. Maintain temporary construction and support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.

2. Field Offices: The Contractor, at his option, shall provide insulated, weather tight temporary offices of sufficient size to accommodate required office personnel at the Project site. Keep the office clean and orderly for use for small progress meetings. Furnish and equip offices as follows:

    a. Furnish with a desk and chairs, a 4-drawer file cabinet, plan table and plan rack and a 6-shelf bookcase.
    b. Equip with a water cooler and private toilet complete with water closet, lavatory and mirror-medicine cabinet unit.

3. Storage and Fabrication Sheds: Install storage and fabrication sheds, sized, furnished and equipped to accommodate materials and equipment involved,

including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on the site.

4. Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with regulations and health codes for the type, number, location, operation and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.

    a. Provide toilet tissue, paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used material.

5. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.

6. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.

    a. Provide safety showers, eye-wash fountains and similar facilities for convenience, safety and sanitation of personnel.

7. Drinking Water Facilities: Provide containerized tap-dispenser bottled-water type drinking water units, including paper supply.

    a. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F (7 to 13 deg C).

8. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg. F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner. Do not use University trash containers for any reason.

D. SECURITY AND PROTECTION FACILITIES INSTALLATION

1. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

    (a) Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.

2. 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.

3. Open-Mesh Fencing: Provide 11-gage, galvanized 2-inch, chain link fabric fencing 6-feet high with galvanized barbed wire top strand and galvanized steel

pipe posts, 1 1/2" I.D. for line posts and 2-1/2" I.D. for corner posts.

4. Barricades, Warning Signs and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

5. Do not remove temporary security and protection facilities until Substantial Completion, or longer as requested by the Architect.

6. Temporary Fire Protection: Install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations."

    a. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than on extinguisher on each floor at or near each usable stairwell.
    b. Store combustible materials in containers in fire-safe locations.
    c. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
    d. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.

7. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

E. OPERATION, TERMINATION AND REMOVAL

1. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
2. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
3. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, or when 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 the temporary facility. Repair damaged Work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.

    a. Materials and facilities that constitute temporary facilities are property of the Contractor. The Owner reserves the right to take possession of Project identification signs.

END OF SECTION 015000

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplemental Conditions and Division 1 Specification Sections, apply to this section.

1.2 SECTION REQUIREMENTS

A. Provide products of same kind from a single source. The term "product" includes the terms "material," "equipment," "system," and similar terms.

B. Deliver, store, and handle products according to manufacturer's written instructions, using means and methods that will prevent damage, deterioration, and loss, including theft.

1. Inspect products at time of delivery for compliance with the Contract Documents and to ensure items are undamaged and properly protected.

C. Product Substitutions: Reasonable and timely requests for substitutions will be considered. Substitutions include products and methods of construction differing from that required by the Contract Documents and proposed by Contractor after award of Contract. Substitutions only allowed for products when more than one manufacturer is indicated.

1. Submit two (2) copies of each request for product substitution. Identify product to be replaced and provide complete documentation showing compliance of proposed substitution with applicable requirements. Include a full comparison with the specified product, a list of changes to other Work required to accommodate the substitution, and any proposed changes in Contract Sum or Contract Time should the substitution be accepted.
2. Submit requests for product substitution in time to permit processing of request and subsequent Submittals, if any, sufficiently in advance of when materials are required in the Work. Do not submit unapproved substitutions on Shop Drawings or other submittals.
3. Owner will review the proposed substitution and notify Contractor of its acceptance or rejection.

PART 2 - PRODUCTS

2.1 PRODUCT OPTIONS

A. Provide products that comply with the Contract Documents, are undamaged, and are new at the time of installation.

1. Provide products complete with accessories, trim, finish, and other devices and components needed for a complete installation and the intended use and effect.

B. Select products as follows:

1. Where only a single product or manufacturer is named, provide the item indicated. No substitutions will be permitted.
2. Where two or more products or manufacturers are named, provide one of the items indicated. No substitutions will be permitted.
3. Where products or manufacturers are specified by name, accompanied by the term "or equal," provide the named item or comply with provisions concerning "product substitutions" to obtain approval for use of an unnamed product or manufacturer.
4. Where a product is described with required characteristics, with or without naming a brand or trademark, provide a product that complies with those characteristics and other Contract requirements.
5. Where compliance with performance requirements is specified, provide products that comply and are recommended in writing by the manufacturer for the application.
6. Where compliance with codes, regulations, or standards, is specified, select a product that complies with the codes, regulations, or standards referenced.

C. Unless otherwise indicated, Owner will select color, pattern, and texture of each product from manufacturer's full range of options.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 60 00

SECTION 173000
EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1. Drawings and general provisions of Contract, including General Conditions, Supplemental Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Installation of the Work.
3. Cutting and patching.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

B. Related Requirements:

1. Section 011000 "Summary" for limits on use of Project site.

1.3 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Consultant of locations and details of cutting and await directions from Consultant before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or those results in increased maintenance or decreased operational life or safety.
3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Consultant's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

1. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Consultant for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a written and email request for information to Consultant.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings. If discrepancies are discovered, promptly notify Consultant by email and in writing.

1. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
2. Inform installers of lines and levels to which they must comply.
3. Check the location, level and plumb, of every major element as the Work progresses.
4. Notify Consultant when deviations from required lines and levels exceed allowable tolerances.

B. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Consultant.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Consultant, and in compliance with accessibility requirements.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond- core drill.
4. Proceed with patching after construction operations requiring cutting are complete.

F. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.

2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
4. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

G. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste.
4. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

1. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

H. Clean and provide maintenance on completed construction as frequently as necessary through

the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

I. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTIO N 017300

SECTION 017400
WARRANTIES AND BONDS

1.1 GENERAL

A. RELATED DOCUMENTS

1. Drawings and general provisions of Contract, including General and Supplemental Conditions and other Division-1 Specification Sections, apply to this Section.

B. SUMMARY

1. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers standard warranties on products and special warranties.

    a. Refer to the General Conditions for terms of the Contractor's special warranty of workmanship and materials.
    b. General closeout requirements are included in Section "Project Closeout."
    c. Specific requirements for warranties for the Work and products and installations that are specified to be warranted, are included in the individual Sections of Divisions-2 through -16.
    d. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

2. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

C. DEFINITIONS

1. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
2. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

D. WARRANTY REQUIREMENTS

1. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
2. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
3. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with

requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefitted from use of the Work through a portion of its anticipated useful service life.

4. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.

    a. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

5. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

E. SUBMITTALS

1. Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.

    a. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within fifteen days of completion of that designated portion of the Work.

2. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate items and identification, ready for execution by the required parties. Submit a draft to the Owner through the Architect for approval prior to final execution.

    a. Refer to individual Sections of Divisions-2 through -16 for specific content requirements, and particular requirements for submittal of special warranties.

3. Forms of Submittal: At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.

    a. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a

typed description of the product or installation, including the name or the product, and the name, address and telephone number of the installer.

b. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS, the Project title or name, and the name of the Contractor.

2. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

1.2 PRODUCTS (NOT APPLICABLE)

1.3 EXECUTION

A. SCHEDULE OF WARRANTIES

1. Schedule: Provide warranties and bonds on products and installations as specified in the appropriate Sections.

END OF SECTION 017400

SECTION 017419
WASTE MANAGEMENT

PART 1 - GENERAL

1.1 WASTE MANAGEMENT REQUIREMENTS

Owner requires that this project generate the least amount of trash and waste possible.
Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration and shall be recycled:

Aluminum and plastic beverage containers.
Corrugated cardboard.
Wood pallets.
Clean dimensional wood: May be used as blocking or furring.
Land clearing debris, including brush, branches, logs, and stumps.
Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.

Methods of trash/waste disposal that are **not** acceptable are:
Burning on the project site.
Burying on the project site.
Dumping or burying on other property, public or private.
Other illegal dumping or burying.

Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, State and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.2 DEFINITIONS

Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
Non-hazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
Return: To give back reusable items or unused products to vendors for credit.

Reuse: To reuse a construction waste material in some manner on the project site.
Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
Toxic: Poisonous to humans either immediately or after a long period of exposure.
Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

1.3 WASTE MANAGEMENT PLAN IMPLEMENTATION

Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and the Architect.
Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
Meetings: Discuss trash/waste management goals and issues at project meetings, including the Pre-bid meeting, Pre-construction meeting and regular job-site meetings.
Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.

As a minimum, provide:
Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
Separate dumpsters for each category of recyclable.
Recycling bins at worker lunch area.
Provide containers as required.
Provide adequate space for pick-up and delivery and convenience to subcontractors.
Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION 017419

SECTION 017700
PROJECT CLOSEOUT

1.1 GENERAL

A. RELATED DOCUMENTS
1. Drawings and general provisions of Contract, including General and Supplemental Conditions and other Division-1 Specification Sections, apply to this Section.

B. SUMMARY
1. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:
   a. Inspection procedures
   b. Project record document submittal
   c. Operating and maintenance manual submittal
   d. Submittal of warranties
   e. Final cleaning
   f. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions - 2 through - 33.

C. SUBSTANTIAL COMPLETION
1. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
   a. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
      1) If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
   b. Advise Owner of pending insurance change-over requirements.
   c. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
   d. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates and similar releases.
   e. See the *Supplemental Conditions of the Contract for Construction* 3.11 for Documentation and As-Built Conditions, and the *Project Closeout Checklist*: Contractor Requirements. Submit maintenance manuals, final project photographs, damage or settlement survey, property survey, and similar final record information.
   f. Deliver tools, spare parts, extra stock, and similar items.
   h. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.
   i. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.

2. Inspection Procedures: On receipt of a request for inspection, the Consultant will either proceed with inspection or advise the Contractor of unfilled requirements. The Consultant will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
    a. The Consultant will repeat inspection when requested and assured that the Work has been substantially completed.
    b. Results of the completed inspection will form the basis of requirements for final inspection.

D. FINAL ACCEPTANCE
1. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
    a. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
    b. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
    c. Submit a certified copy of the Consultant's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Consultant.
    e. Submit consent of surety to final payment.
    f. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
2. Re-inspection Procedure: The Consultant will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Consultant.
    a. Upon completion of re-inspection, the Consultant will prepare a certificate of final acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
    b. If necessary, re-inspection will be repeated.

E. RECORD DOCUMENT SUBMITTALS
1. See also the *Supplemental Conditions of the Contract for Construction* 3.11 for Documentation and As-Built Conditions, and the *Project Closeout Checklist*: Contractor Requirements.
2. General: Do not use record documents (red-line markups) for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Consultant's reference during normal working hours.
3. Record Drawings (Red-lined): Maintain two clean, undamaged sets of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the sets to show the red-line changes during the course of construction with actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the

corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

a. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
b. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.
c. Note related Change Order numbers where applicable.
d. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.

4. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Product Data.
   a. Upon completion of the Work, submit record Specifications to the Consultant for the Owner's records.
5. Record Product Data: Maintain one copy of each Product Data submittal. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned later by direct observation. Note related Change Orders and mark up of record drawings and Specifications.
   a. Upon completion of mark-up, submit (3) complete sets of record Product Data to the Consultant for the Owner's records.
6. Record Sample Submitted: Immediately prior to the date or dates of Substantial Completion, the Contractor will meet at the site with the Consultant and the Owner's personnel to determine which of the submitted Samples that have been maintained during progress of the Work are to be transmitted to the Owner for record purposes. Comply with delivery to the Owner's Sample storage area
7. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Consultant for the Owner's records.
8. Maintenance Manuals: Provide one (1) draft copy for review. Provide **one (1)** final paper copy and one electronic pdf file prior to final completion. Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual heavy-duty 3-inch, 3 ring vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include the following types of information; and others as specified in other Divisions:
   a. Emergency instructions
   b. Spare parts list
   c. Copies of warranties
   d. Wiring diagrams

e. Recommended "turn around" cycles
f. Inspection procedures
g. Shop Drawings and Product Data
h. Fixture lamping schedule
i. List of final color and material selections

F. WARRANTIES AND BONDS

1. SUMMARY

a. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.

1) Refer to the General Conditions and Supplemental Conditions for terms of the Contractor's special warranty of workmanship and materials.
2) General closeout requirements are included in Section "Project Closeout."
3) Specific requirements for warranties for the Work and products and installations that are specified to be warranted, are included in the individual Sections of Divisions-2 through -16.
4) Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

C. Separate Prime Contracts: Each prime Contractor is responsible for warranties related to its own Contract.

2. DEFINITIONS

a. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
b. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

3. WARRANTY REQUIREMENTS

a. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
b. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
c. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is

responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefitted from use of the Work through a portion of its anticipated useful service life.

d. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
   1) Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

e. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

4. SUBMITTALS

a. Submit written warranties to the Consultant prior to the date certified for Substantial Completion. If the Consultant's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Consultant.
   1) When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Consultant within fifteen days of completion of that designated portion of the Work.

b. Forms of Submittal: At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

c. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.
   1) Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name or the product, and the name, address and telephone number of the installer.
   2) Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS, the Project title or name, and the name of the Contractor.

e. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

1.2 EXECUTION

A. CLOSEOUT PROCEDURES

1. Functional Demonstration: Demonstrate proper operation of all systems to Consultants and Owners representative prior to request for substantial completion. Coordinate schedule with Consultant.
2. Operating and Maintenance Instructions: Provide two (2) duplicate training sessions for each MSU trade group responsible for systems installed under this project. Coordinate schedule with Owner. Arrange for each installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:
    a. Maintenance manuals
    b. Record documents
    c. Spare parts and materials
    d. Tools
    e. Lubricants
    f. Fuels
    g. Identification systems
    h. Control sequences
    i. Hazards
    j. Cleaning
    k. Warranties and bonds
        1) Maintenance agreements and similar continuing commitments

END OF SECTION 017700

SECTION 017823
OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 A.RELATED DOCUMENTS

A. General provisions of Contract, including General and Supplemental Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Operation manuals for systems, subsystems, and equipment.
3. Product maintenance manuals.
4. Systems and equipment maintenance manuals.

1.3 CLOSEOUT SUBMITTALS

A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.

a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
b. Enable inserted reviewer comments on draft submittals.

2. One paper copy and one electronic pdf. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect will deliver copies to the Owner.

C. Manual Submittal: Submit each manual in DRAFT in PDF format form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect and Commissioning Authority will return copy with comments. PROVIDE PAPER AND PDF OF FINAL APPROVED MANUALS

1. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's and Commissioning Authority's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 REQUIREMENTS FOR OPERATION, AND MAINTENANCE MANUALS

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information.

B. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

C. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Construction Manager.
7. Name and contact information for Architect.
8. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
9. Cross-reference to related systems in other operation and maintenance manuals.

D. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

E. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

F. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily

navigated file tree. Configure electronic manual to display bookmark panel on opening file.

G. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.

1. Binders: These binders are sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and oversize sheets will need to be folded to 8x11.5.

a. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.2 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Precautions against improper use.
9. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.

7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.3 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

2.4 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

C. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

D. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.

E. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

PART 4 - MATERIAL AND FINISHES MAINTENANCE MANUAL

A. General: Incorporate as part of the O & M Manuals. Material and finishes to the Architect/Engineer for approval and distribution. Provide one section for architectural products, including applied materials and finishes, and a second section for products designed for moisture protection and products exposed to the water.

1. Refer to individual specification sections for additional requirements on the care and maintenance of materials and finishes

B. Architectural Products, Applied Materials and Finishes: Provide complete manufacturers data and instructions on the care and maintenance of architectural products, including applied materials and finishes.

C. Manufacturers Data: Provide complete information on architectural products, including but not limited to the following items, as applicable:
1. Manufacturer’s catalog number
2. Size
3. Material composition
4. Color texture reordering information for specially manufactured products
5. Manufacturer and supplier/installers contact information
6. Warranty terms

D. Care and Maintenance Instruction: Provide complete information on the care and maintenance of architectural products, including the manufacturer’s recommendations for the types of cleaning agents to be used and the methods of cleaning. In addition, provide information regarding cleaning agents and methods which could prove detrimental to the product. Include the manufacturer’s recommended schedule for cleaning and maintenance.

E. Manufacturer's Data: Provide complete manufacturer's data giving detailed information including, but not limited to the following, as applicable:
   1. Applicable standards
   2. Chemical composition
   3. Installation details
   4. Inspection procedures
   5. Maintenance information
   6. Repair procedures

F. Schedule: Provide complete information in the materials and finishes manual on products specified in the following sections: (To be determined with Owner)

G. Color Schedule: Provide complete information on MSU CPDC provided electronic spreadsheet form, to include manufacturer's name and number, location, item and surface of all painted, stained or treated material, surface or piece of equipment.

END OF SECTION 017823

SECTION 017839
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. See also General Conditions and Supplemental Conditions of the Contract for Construction.

B. **See the *Supplemental Conditions of the Contract for Construction* 3.11 for Documentation and As-Built Conditions, and the *Project Closeout Checklist*: Contractor Requirements**

C. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.

D. Related Requirements:

1. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
2. Divisions 02 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings (Redline Markups): Comply with the following:

1. Number of Copies: Submit copies of record Drawings as follows:

a. Draft Submittal:

1) Submit PDF electronic files of scanned record prints.
2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal:

1) Submit one paper-copy set(s) of marked-up record prints.
2) Submit PDF electronic files of scanned record prints and one set(s) of prints.
3) Print each drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit one annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one annotated PDF electronic files and directories of each submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised Drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Record data as soon as possible after obtaining it.
c. Record and check the markup before enclosing concealed installations.

2. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:

a. Project name and PPA Number.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect.
e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.

4. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

B. Format: Submit record Product Data as annotated PDF electronic file.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 017839

SECTION 017900
DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

1. System Demonstration:
    a. General:
        i. The system demonstration is a functional test of systems to determine whether they are substantially complete and operating as specified. Systems are to be tested and confirmed to be operating properly by the contractor prior to the Demonstration.
        ii. Where initial Demonstration Session uncovers substantial deficiencies that require more than one Demonstration Session, Contractor shall reimburse Owner for personnel costs associated with performing subsequent Sessions.
    b. Systems to be Tested:
        i. All systems installed and/or provided under the project to have functional testing.
    c. Attendance:
        i. The system demonstration is to be provided by trained representatives that are familiar with the systems, and can operate systems as required to test and verify proper function. The Engineer and Owner's representatives will be present to document performance and/or deficiencies. The General Contractor or others may attend if desired.
        ii. Individual testing sessions (modules) shall be provided for each type or group of systems, separated roughly by trade group that will be performing maintenance on the system. MSU trades groups and systems typically involved in testing are:
            (1) Electricians
            (2) Heating Plant (Hydronic and steam heating systems, controls)
            (3) Plumbers (Plumbing, gas-fired heating, process piping systems)
            (4) Refrigeration (Refrigeration, chilled water, packaged cooling systems)
    d. Schedule:
        i. Contractor to coordinate time requirements and dates with Owner and Engineer. Begin scheduling with sufficient time prior to desired Substantial Completion date to allow all parties to work into schedule, and for deficiencies to be completed prior to desired Substantial Completion date. Demonstration is to be provided prior to, and separate from, training.

2. Training:
    a. General:
        i. The system training is intended to familiarize the Owner's operating and maintenance staff with all systems requiring maintenance. Training is to be provided after the systems are in place and operational, after issues noted during the Demonstration have been resolved, and before final acceptance.
    b. Systems Requiring Training:
        i. All systems installed and/or provided under the project are to have training.
    c. Attendance:
        i. Training is to be provided by trained representatives that are familiar with the system's operation and maintenance requirements. Individual training sessions (modules) shall be provided for each type or group of systems, separated roughly by trade group that will be performing maintenance on the system. MSU trades groups and systems typically requiring training are:
            (1) Electricians

(2) Heating Plant (Hydronic and steam heating systems, controls)
(3) Plumbers (Plumbing, gas-fired heating, process piping systems)
(4) Refrigeration (Refrigeration, chilled water, packaged cooling systems)

d. Schedule:
i. Duplicate training sessions are to be provided for each training module, so that Owner's operating personnel can be split into two groups during training. Duplicate training sessions to be scheduled during different weeks. Length of training sessions will be determined by scope of training, and as coordinated with Owner after draft copy of training documents have been reviewed.

2.1 PRODUCTS
1. Not applicable

3.1 EXECUTION
1. Demonstration:
a. Demonstration Program:
i. Engineer to develop a demonstration program to verify the proper operation of all required systems. Submit program to Owner and Contractor at least two weeks prior to Demonstration.
ii. Engineer to work with Contractor to generate methods to be used to verify sequences and modes of operation that cannot be verified directly.
iii. Engineer to provide at least one copy of all submittals, contract drawings, specifications, and changes related to systems to be demonstrated. Documents to be made available during Demonstration.
iv. Contractor to provide at least one copy of Operating and Maintenance Manuals to be used during demonstration, including specified sequences of operation for field-constructed systems, and operating sequences for all manufactured equipment.

b. Demonstration Session:
i. Verify that all systems are functional and ready to operate in all modes prior to demonstration.
ii. Assemble all program materials required for demonstration.
iii. Contractor to provide all equipment necessary for access to, and operation of, systems including tools, ladder, lighting, and diagnostic equipment.
iv. Verify operation of individual components within systems.
v. Verify controls of related components are coordinated.
vi. Verify all operating sequences, operating modes, and safety controls.
vii. Record all pressures, temperatures, and other relevant data available from installed devices.
viii. Where digital control systems are available, set-up trend reports of relevant parameters which will confirm proper operation of systems installed, modified, or affected by changes made during this project. Provide copies of reports to Engineer and Owner for review. Review, analyze, and discuss results, and provide follow-up reports as required to confirm proper operation.

2. Training:
a. Training Documentation:
i. Contractor to submit draft copy of agenda and training documents to Owner for review at least two weeks prior to training date.
ii. Provide a copy of the following items for each person that will be attending the

training sessions. Coordinate required number with the Owner.

(1) Training agenda.
(2) Summary of new systems and existing systems affected by this project.
(3) Summary of work performed under this project.
(4) Control system drawings and sequences of operation.
(5) List of important maintenance and trouble-shooting operations for all systems.

iii. Provide minimum of 2 copies of following items:

(1) Contract documents including all drawings, specifications, addendums, and change orders.

b. Training Sessions:

i. Assemble at location to be determined by the Owner.
ii. Distribute training documentation as indicated above.
iii. Provide classroom style training if required for orientation, discussion of new systems and existing systems affected by this project, and other issues appropriate for a classroom format.
iv. Visit site and review locations, and perform detailed review of operation and maintenance requirements for current systems.

END OF SECTION 179000

SECTION 024119
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Demolition and removal of selected portions of building or structure.
   2. Salvage of existing items to be reused or recycled.

1.3 DEFINITIONS

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

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
B. Standards: Comply with ANSI A10.6 and NFPA 241.

1.5 PRE-INSTALLATION MEETINGS

A. Pre-demolition Conference: Conduct conference at Project site.

1.6 CLOSEOUT SUBMITTALS

A. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.7 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
   1. Before selective demolition, Owner will remove the following items:

      a. Text books and other loose classroom resources.
      b. Loose shelving units and storage cabinets.
      c. Loose furniture (tables and chairs).
      d. Loose equipment.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: Hazardous materials are present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is included in the Contract Documents. Examine report to become aware of locations where hazardous materials are present. Do not proceed with selective demolition until all hazardous materials have been removed. Do not proceed with selective demo until all hazardous materials have been removed.

1. Hazardous material remediation is specified elsewhere in the Contract Documents.
2. Do not disturb hazardous materials or items suspected of containing hazardous materials
    i. except under procedures specified elsewhere in the Contract Documents.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities and the protection facilities indicated to remain in service and protect them against damage during selective demolition operations.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit and email a written report to Architect and MSU Project Manager.

3.2 UTILITY SERVICES AND MECHANICAL/ ELECTRICAL SYSTEMS

A. Existing Services/ Systems to Remain: Maintain services/ systems indicated to remain and protect them against damage.

B. Comply with requirements for existing services/ systems interruptions specified in Section 011000 "Summary."

C. Existing Services/ Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/ electrical systems serving areas to be selectively demolished.

1. If services/ systems are required to be removed, relocated, or abandoned, provide temporary

services/ systems that bypass area of selective demolition and that maintain continuity of services/ systems to other parts of building.

2. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
3. Piping to be removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
4. Piping to be abandoned in place: Drain piping and cap or plug piping with same or compatible piping material.
5. Equipment to be removed: Disconnect and cap services and remove equipment.
6. Equipment to be removed and reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
7. Equipment to be removed and salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
8. Ducts to be removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
9. Ducts to be abandoned in place: Cap or plug ducts with same or compatible ductwork material.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls".

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

B. . Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.

C. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

D. Do not use cutting torches for selective demolition operations.

E. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

F. Dispose of demolished items and materials promptly.

G. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area on campus as directed by Owner.
5. Protect items from damage during transport and storage.

H. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

I. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal".

B. Burning: Do not burn demolished materials.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 023000

EARTHWORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Preparing subgrades for slabs-on-grade.
   2. Base course for asphalt paving repair.
   3. Excavating and backfilling trenches.

B. Related Sections include the following:
   1. Division 23 and 26 Sections for excavating and backfilling required for buried mechanical and electrical utilities.

1.3 DEFINITIONS

A. Backfill: Soil materials used to fill an excavation.
   1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
   2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Layer placed between the subbase course and asphalt paving.

C. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.

E. Excavation: Removal of material encountered above subgrade elevations.
   1. Additional Excavation: Excavation below subgrade elevations as directed by Architect. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
   2. Bulk Excavation: Excavations more than 10 feet (3 m) in width and pits more than 30 feet (9 m) in either length or width.
   3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material 3/4 cu. yd. (0.57 cu. m) or more in volume that when tested by an independent geotechnical testing agency, according to ASTM D 1586, exceeds a standard penetration resistance of 100 blows/2 inches (97 blows/50 mm).

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Layer placed between the subgrade and base course for asphalt paving, or layer placed between the subgrade and a concrete pavement or walk.

J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

K. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Architect and Owner not less than seven (7) days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Architect's and Owner's written permission.
   3. Contact utility-locator service for area where Project is located before excavating.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.
   1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Backfill and Fill: Satisfactory soil materials.

E. Subbase: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2- inch (38-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.

F. Base: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch (38-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

G. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (38-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.

H. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch (25-mm) sieve and 0 to 5 percent passing a No. 4 (4.75-mm) sieve.

J. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:
   1. Red: Electric.
   2. Yellow: Gas, oil, steam, and dangerous materials.
   3. Orange: Telephone and other communications.
   4. Blue: Water systems.
   5. Green: Sewer systems.

PART 3 EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
   1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
   2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
   1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
   1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.
   1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit, unless otherwise indicated.
   1. Clearance: 12 inches (300 mm) on each side of pipe or conduit.

C. Trench Bottoms: Excavate trenches 4 inches (100 mm) deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.
   1. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.8 APPROVAL OF SUBGRADE

A. Notify Architect when excavations have reached required subgrade.

B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
   1. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

C. Proof roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect.

3.9 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Architect.
   1. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

3.10 STORAGE OF SOIL MATERIALS

A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
   1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:
   1. Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
   2. Surveying locations of underground utilities for record documents.
   3. Inspecting and testing underground utilities.
   4. Removing concrete formwork.
   5. Removing trash and debris.
   6. Removing temporary shoring and bracing, and sheeting.
   7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.12 UTILITY TRENCH BACKFILL

A. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

B. Backfill trenches excavated under footings and within 18 inches (450 mm) of bottom of footings; fill with concrete to elevation of bottom of footings.

C. Provide 4-inch- (100-mm-) thick, concrete-base slab support for piping or conduit less than 30 inches (750 mm) below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches (100 mm) of concrete before backfilling or placing roadway subbase.

D. Place and compact initial backfill of subbase material, free of particles larger than 1 inch (25 mm), to a height of 12 inches (300 mm) over the utility pipe or conduit.
   1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.

E. Coordinate backfilling with utilities testing.

F. Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.

G. Place and compact final backfill of satisfactory soil material to final subgrade.

H. Install warning tape directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

3.13 FILL

A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.

B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

C. Place and compact fill material in layers to required elevations as follows:
   1. Under walks and pavements, use satisfactory soil material.
   2. Under steps and ramps, use engineered fill.
   3. Under building slabs, use engineered fill.
   4. Under footings and foundations, use engineered fill.

3.14 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.15 COMPACTION OF BACKFILLS AND FILLS

A. Place backfill and fill materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. There shall be 95% compaction ASTM D1557 modified proctor density of all back fill soil under slabs on grade.

3.16 GRADING

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
1. Walks: Plus or minus ¼ inches (7mm)
2. Pavements: Plus or minus 1/2 inch (13 mm).

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10-foot (3-m) straightedge.

3.17 SUBBASE AND BASE COURSES

A. Install separation fabric on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.

B. Under pavements and walks, place subbase course on prepared subgrade and as follows:
1. Place base course material over subbase.
2. Compact subbase and base courses at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.
3. Shape subbase and base to required crown elevations and cross-slope grades.
4. When thickness of compacted subbase or base course is 6 inches (150 mm) or less, place materials in a single layer.

5. When thickness of compacted subbase or base course exceeds 6 inches (150 mm), place materials in equal layers, with no layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick when compacted.

3.18 FIELD QUALITY CONTROL

A. Testing Agency: Contractor shall engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. (186 sq. m) or less of paved area or building slab, but in no case fewer than three tests.
2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for each 100 feet (30 m) or less of wall length, but no fewer than two tests.
3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 150 feet (46 m) or less of trench length, but no fewer than two tests.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.
1. Additional testing until compliance is achieved shall be at the contractors expense.

3.19 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.20 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION

SECTION 027410

HOT-MIX ASPHALT PAVING REPAIR

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Hot-mix asphalt pavement patching.

B. Related Sections include the following:
   1. Division 2 Section "Earthwork" for aggregate subbase and base courses.

1.3 DEFINITIONS

A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

1.4 SYSTEM DESCRIPTION

A. Provide hot-mix asphalt paving according to materials, workmanship, and other applicable requirements of standard specifications of ISPWC Section 800- Aggregates and Asphalt.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

B. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

C. Material Certificates: For each paving material, signed by manufacturers.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer.

B. Installer qualifications: Engage an experienced installer with a record of successful in service performance.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:

1. Prime and Tack Coats: Minimum surface temperature of 60 deg F (15.5 deg C).
2. Asphalt Base Course: Minimum surface temperature of 40 deg F (4 deg C) and rising at time of placement.
3. Asphalt Surface Course: Minimum surface temperature of 60 deg F (15.5 deg C) at time of placement.

PART 2 PRODUCTS

2.1 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Coarse Aggregate: ASTM D 692, sound; angular crushed stone, crushed gravel, or properly cured, crushed blast-furnace slag.

C. Fine Aggregate: ASTM D 1073, sharp-edged natural sand or sand prepared from stone, gravel, properly cured blast-furnace slag, or combinations thereof.
1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

2.2 ASPHALT MATERIALS

A. Asphalt Cement: ASTM D 3381 for viscosity-graded material ASTM D 946 for penetration-graded material.

B. Prime Coat: Asphalt emulsion prime complying with ITD requirements.

C. Tack Coat: ASTM D 977, emulsified asphalt or ASTM D 2397, cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

D. Fog Seal: ASTM D 977, emulsified asphalt or ASTM D 2397, cationic emulsified asphalt, slow setting, factory diluted in water, of suitable grade and consistency for application.

E. Water: Potable.

2.3 MIXES

A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and designed according to procedures in AI MS-2, "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types."
1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
2. Provide mixes complying with composition, grading, and tolerance requirements in ASTM D 3515 for the following nominal, maximum aggregate sizes:
   a. Base Course: 1 inch (25 mm).
   b. Surface Course: 1/2 inch (13 mm).

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.

B. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.

C. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 PATCHING

A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches (300 mm) into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).
   1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
   2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

C. Patching: Fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact flush with adjacent surface.

D. Patching: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

3.3 REPAIRS

A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch (25 mm) in existing pavements.
   1. Install leveling wedges in compacted lifts not exceeding 3 inches (75 mm) thick.

3.4 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
   1. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.

B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.
   1. Mix herbicide with prime coat if formulated by manufacturer for that purpose.

C. Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd. (0.7 to 2.3 L/sq. m). Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure for 72 hours minimum.
   1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
   2. Protect primed substrate from damage until ready to receive paving.

3.5 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
   1. Place hot-mix asphalt in a single lift. Total thickness not less than 3”.
   2. Spread mix at minimum temperature of 250 deg F (121 deg C).
   3. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes, unless otherwise indicated.
   4. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet (3 m) wide unless infill edge strips of a lesser width are required.
   1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.6 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.
   1. Clean contact surfaces and apply tack coat to joints.
   2. Offset longitudinal joints, in successive courses, a minimum of 6 inches (150 mm).
   3. Offset transverse joints, in successive courses, a minimum of 24 inches (600 mm).
   4. Construct transverse joints as described in AI MS-22, "Construction of Hot Mix Asphalt Pavements."
   5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
   6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.7 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.
   1. Complete compaction before mix temperature cools to 185 deg F (85 deg C).

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
   1. Average Density: 96 percent of reference laboratory density according to AASHTO T 245, but not less than 94 percent nor greater than 100 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.8 INSTALLATION TOLERANCES

A. Thickness: Compact each course to produce the thickness indicated within the following tolerances:
   1. Surface Course: Plus 1/4 inch (6 mm), no minus.

B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot (3-m) straightedge applied transversely or longitudinally to paved areas:
   1. Surface Course: 1/8 inch (3 mm).

C. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.9 DISPOSAL

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.
   1. Do not allow excavated materials to accumulate on-site.

END OF SECTION

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, mix design, placement procedures, and finishes.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

1.4 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. Indicate amounts of mix water to be withheld for later addition at Project site.

C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

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.

1.5 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.

C. 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.

D. 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."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 PRODUCTS

2.1 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed for welded conditions.

C. Plain-Steel Wire: ASTM A 82, as drawn.

D. Deformed-Steel Wire: ASTM A 496.

E. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

2.2 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/A 615M, Grade 60 (Grade 420). Cut bars true to length with ends square and free of burrs.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I.
   1. Fly Ash: ASTM C 618, Class C or F.
   2. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Blended Hydraulic Cement: ASTM C 595M, Type IS, portland blast-furnace slag cement.

C. Silica Fume: ASTM C 1240, amorphous silica.

D. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:
   1. Class: Severe weathering region, but not less than 3S.
   2. Nominal Maximum Aggregate Size: 1-1/2 inches (38 mm).
   3. Combined Aggregate Gradation: Well graded from coarsest to finest with not more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on No. 50 (0.3-mm) sieve, and less than 8 percent may be retained on sieves finer than No. 50 (0.3 mm).

E. Water: Potable and complying with ASTM C 94.

2.4 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.

C. Water-Reducing Admixture: ASTM C 494, Type A.

D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

G. Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   2. Products: Subject to compliance with requirements, provide one of the following:
      a. Catexol 1000CL; Axim Concrete Technologies.
      b. MCI 2000 or MCI 2005; Cortec Corporation.
      c. DCI or DCI-S; W. R. Grace & Co., Construction Products Div.
      d. Rheocrete 222+; Master Builders, Inc.
      e. FerroGard-901; Sika Corporation.

2.5 CONCRETE MIXES

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.

B. Footings and Foundation Walls: Proportion normal-weight concrete mix as follows:
   1. Compressive Strength (28 Days): 3000 psi (20.7 MPa).
   2. Maximum Slump: 3 inches (100 mm).

C. Slab-on-Grade: Proportion normal-weight concrete mix as follows:

1. Compressive Strength (28 Days): 3000 psi (20.7 MPa).
2. Minimum Cementitious Materials Content: 470 lb/cu. yd. (279 kg/cu. m).
3. Maximum Slump: 3 inches (100 mm).

D. Cementitious Materials: For concrete exposed to deicers, limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements.

E. Maximum Water-Cementitious Materials Ratio: 0.50 for concrete required to have low water permeability.

F. Maximum Water-Cementitious Materials Ratio: 0.45 for concrete exposed to deicers or subject to freezing and thawing while moist.

G. 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: 5.5 percent for 1-1/2-inch- (38-mm-) nominal maximum aggregate size.

H. Do not air entrain concrete to trowel-finished interior floors and suspended slabs. Do not allow entrapped air content to exceed 3 percent.

I. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

J. 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.

2.6 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.

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 B, 1/4 inch (6 mm).

D. Construct forms tight enough to prevent loss of concrete mortar.

E. 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.

F. 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.

G. 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.

H. Do not chamfer corners or edges of concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. 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.

3.3 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.

1. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover.

C. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

D. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.4 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. 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 (38 mm) 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. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch (12 mm) or more than 1 inch (25 mm) 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.

3.5 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. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by Architect.

C. Before placing concrete, water may be added at Project site, subject to limitations of ACI 301.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mix.

D. 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.

E. Deposit concrete in forms in horizontal layers no deeper than 24 inches (600 mm) and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
   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 (150 mm) 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.

F. 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.

G. 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 (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) 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.

H. 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 (32 deg C) 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.

3.6 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. 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.

3.7 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. 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.

C. 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 and measure surface so gap at any point between concrete surface and an unleveled freestanding 10-foot- (3.05-m-) long straightedge, resting on two high spots and placed anywhere on the surface, does not exceed the following:
   a. 1/8 inch (3.2 mm).

D. 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 fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application. Match adjacent finish.

3.8 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 (1 kg/sq. m 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:

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 Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
      a. Water.
      b. Continuous water-fog spray.
      c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
   2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
      a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
      b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.

c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer recommends for use with floor coverings.

3. 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.
4. 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.

3.9 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one-part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.2-mm) 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 (13 mm) in any dimension in solid concrete but not less than 1 inch (25 mm) 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 (0.25 mm) 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 (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) 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 (19 mm) 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 and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Contractor shall engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article. See the general structural notes for additional information.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements: See the general structural notes for addition information.
1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mix placed each day.
   a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mix, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C 143; See the general structural notes for additional requirements.

3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, 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 (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
    a. Cast and field cure one set of four standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39; test two laboratory-cured specimens at 7 days and two at 28 days.
    a. Test two field-cured specimens at 7 days and two at 28 days.
    b. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.

C. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

D. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

E. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.

F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

END OF SECTION

SECTION 230000

GENERAL PROVISIONS FOR MECHANICAL WORK

PART 1 GENERAL

1.1 ALTERNATES

A. Take cognizance of any change required in this work which may be a direct result of any alternate bid item listed and include the price deemed necessary to meet the requirements of the respective alternate.

1.2 BIDDING

A. The Contractor shall provide labor, materials, equipment, items, articles, operations and methods listed, shown, scheduled, or mentioned on the drawings, and/or specified, including all incidentals required for their completion.

B. The Contractor shall refer to the General part of these specifications, such as Instructions to Bidders, Special Conditions and DIVISION 01 for restrictions covering time that work can be performed in certain areas, noisy and dusty operations, sequence of work, access to restricted areas and similar types of work and operations.

1.3 SUBSTITUTIONS AND PRODUCTS DEEMED AS EQUAL TO BASIS OF DESIGN PRODUCTS

A. **"Substitution'** is defined in Division 1 and represents a **change or deviation in the Contract Documents** either in the type of product that forms the basis of design or in its application. Substitutions require approval either prior to bid or following project bid as allowed in Division 1 specifications. Substitution requests must follow the requirements of Division 1.

B. **Products submitted as equals** to those listed on the plans or in the specifications as the basis of design **are not required to be submitted as substitutions**. **Rather, their acceptability as an equal to the basis of design product must be shown during the submittal process following contract award. The onus to prove that the product is equal to the basis of design product is on the Contractor.** The acceptability of an item to that which is the basis of design rests with the Owner and the Engineer. In general, items accepted as equals must have the same salient features, performance and be similar in physical makeup as the basis of design product in all aspects, whether or not these salient attributes are listed on the plans or in the specifications. Those proposing the acceptance of a product as an equal to the basis of design must be prepared to submit a complete side-by-side comparison of the two materials or products as proof of equality. Any and all additional costs resulting from differences in a product granted acceptance as an equal shall be borne by the Contractor or his supplier.

C. Most items in this Division are eligible for substitution in accordance with the General Conditions and Supplements thereto. Most items are also eligible to be replaced with products deemed as being equal to the basis of design product when proven to be equal

through the submittal process. Where a proprietary specification is written for a particular item, then only that item may be used.

D. When the Engineer deems it necessary, to assure satisfactory installation and compatibility with other equipment, piping, ductwork, electrical provisions and other appurtenances, the Contractor shall prepare scale drawings of the substitute or 'equal' item showing proposed location, connections, relation to other equipment and other pertinent data such as maintenance space requirements, electrical requirements, height and weight. Drawings must receive Engineer's approval before the substitution is made or the equivalent product can be approved.

E. It is the Contractor's responsibility that the substitute or equal/equivalent item shall fit into the space allocated and that the item can be installed and function as intended. Should changes in the work of any Contractor become necessary as a result of any substitute item under this Division, such changes shall be arranged and paid for by this Contractor.

F. Capacities of substitute or equal/equivalent items shall not be less than that of the specified item.

G. The performance of the factory representative and supplier on past work will be a consideration in the approval process of substitute items and equal/equivalent items.

H. The final decision as to acceptability rests with the Engineer.

1.4 CODES, REGULATIONS AND PERMITS

A. All materials and equipment shall be new, approved by the governing authority, and be in new, undamaged condition when installed.

B. Comply with the International Mechanical Code, National Fire Protection Association Fire Codes, State of Montana Plumbing Code, International Building Code, and all other applicable Federal, State, County and City codes, regulations and ordinances. Comply with DIVISION 26 and all codes referenced therein for any and all electrical work accomplished under this Division or by this Contractor.

C. Arrange for and obtain all permits and approvals required for the execution of the work.

1.5 INTENT OF DRAWINGS

A. Pipe or duct risers and other diagrams are schematic only and not to scale. They are intended only to indicate sizes or relative arrangement of pipe and equipment shown elsewhere in plan view.

1.6 WORKMANSHIP

A. Work shall be accomplished by workmen skilled in the particular trade, in conformance with best practices and to meet all applicable codes.

B. This Contractor shall replace materials or equipment not properly installed or finished, without increase in payment received.

1.7 RESPONSIBILITY

A. The Contractor is responsible for installation of a satisfactory and complete piece of work in accordance with true intent of the drawings and specifications.

B. Consult all drawings for the project to predetermine that the work and equipment will fit as planned.

C. The location of piping, ducts, equipment, etc., shall be checked to ensure clearance from openings, structural members, cabinets, lights, outlets, and equipment having fixed locations. This shall be accomplished prior to fabrication of pipe or ducts.

D. If, at any time, and in any case, changes in location of piping, ducts, equipment, etc., becomes necessary due to existing obstacles or installation of other trades shown on any of the project drawings and such conflict could have been avoided by proper coordination between trades or proper pre-planning of work, such required changes shall be made by the Contractor at no extra cost. These changes are to be recorded on the record drawings.

E. This Contractor is responsible to provide all incidental electrical interconnections, control wiring, etc., which are necessary for system completion and which are not specifically shown or otherwise indicated on the electrical drawings or specified in DIVISION 16.

F. All electrical work incidental to or accomplished under this Division shall comply with all requirements of DIVISION 26.

1.8 DELIVERY AND STORAGE OF MATERIALS

A. Make provisions which are acceptable to the Owner and Engineer for delivery and storage of materials.

B. Make provisions for introduction into the building of equipment furnished under this Division. Refer to DIVISION 01 for additional provisions to allow equipment passage into the building.

C. All materials shall be protected from damage and from weather. Cover, enclose and protect all stored materials and preserve in new, clean condition. Keep all openings in pipe, ductwork and equipment closed with caps and covers. All materials shall be elevated above the ground or floor during storage.

D. All materials and products installed shall be new and shall be in new and undamaged condition. Materials which are rusted, weathered or otherwise depleted in condition shall not be installed.

1.9 MANUFACTURER'S DIRECTIONS

A. Manufactured materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer unless noted otherwise herein or on the drawings.

B. Certain items of equipment, as noted herein, shall be checked out, started and put into service by factory representatives.

1.10 CUTTING, PATCHING, REPAIRING

A. Cutting, patching and repairing required by the work of this Division shall be the responsibility of this Contractor.

B. Work shall be performed in accordance with DIVISION 01 of these specifications.

C. The performance of this work shall not weaken the structural integrity of the building.

D. Any abrasion or disfigurement of the finished work or any portion of the building where any such abrasion or disfigurement is caused by the activities of the Contractor shall be repaired and neatly refinished to match the adjacent work.

1.11 OPENINGS IN PIPES AND DUCTS

A. Openings in pipes and ducts shall be kept closed during progress of work.

B. The Contractor is required to clean new systems found dirty to the satisfaction of the Engineer at no additional cost.

1.12 CLEANUP

A. Upon completion of work, remove materials, scraps, etc., relative to this work and leave the premises in a clean and orderly condition. This applies equally to finished, unfinished and concealed spaces.

B. Clean equipment of dirt and debris.

1.13 COMPLETION AND TESTS

A. Complete and test each system as specified. Submit all reports and complete the Project Completion Checklist in PART 3 of this Section. Leave all systems in proper operation.

B. At the time of finalizing the project, a demonstration of all systems shall be performed in the presence of the Owner's designated representative. The Contractor shall demonstrate that the systems perform in the manner described in the specifications and indicated on the drawings.

1.14 RECORD DRAWINGS

A. A separate set of mechanical drawings shall be maintained at the job site at all times and shall be used as record drawings. This set shall be kept up to date with all changes and/or additions in the construction and/or mechanical systems, and shall be delivered to the Engineer at the completion of this job. This set of drawings shall be kept clean and protected at all times.

PART 2 SUBMITTALS AND BROCHURES OF EQUIPMENT

2.1 GENERAL

A. The literature required to be submitted and approved in order to fulfill the requirements of this Division falls into two general categories. These are the "Brochures of Equipment" and "Submittals."

B. "Submittals" is a general term for informational literature which must be supplied to and approved by the Contractor and the Engineer prior to installing, receiving, or in some instances, even ordering equipment. “Submittals”, as used in this section and Division 23, generally refer to “Shop Drawings” and “Product Data” as defined and required in Section 013000. The normal required types of submittals include shop drawings, manufacturer's literature, installation and operation instructions (from the manufacturer) and wiring diagrams. System reports, such as start-up reports or balancing reports, and the project completion checklist are two forms of submittals which are required after the equipment has been installed and is operational

C. “Brochures of Equipment” are booklets assembled by the contractor which contain operation, maintenance and repair literature for all equipment installed under the requirements of the project. They will be used by the Owner's personnel as the primary source of information for operating and maintaining the installed systems. As such, they shall exhibit a professional quality, high degree of clarity and durability which will allow their use throughout the useful life of the installed system. These are also known as ‘Operations and Maintenance Manuals” or “Maintenance Manuals’. These manuals shall be configured as prescribed in Section 017700 –Project Closeout and Section 017823 –Operation and Maintenance Data.

2.2 SUBMITTALS

A. The contractor shall procure all manufacturer's literature and produce or have produced, all drawings, calculations or other data as called out in the individual Sections of this Division. Follow Division 1 for submittal format and procedures.

B. Submittal materials shall be complete in every respect and shall clearly indicate equipment features, dimensions, weights, performance characteristics and capacities. Capacity and performance calculations shall be adjusted to indicate actual equipment performance at the project elevation. Literature or drawings which describe more than one model or size of equipment shall be marked with arrows or otherwise clearly inscribed to identify the actual equipment which will be furnished. All options and special parts of features shall also be

clearly identified. All submitted materials must be clear, complete and legible. Copies or duplications of poor quality will not be reviewed or accepted.

C. Where specified or otherwise required, proof of equipment compliance with standards or listings by specific agencies (e.g. UL, AGA, ASME, etc.) shall be included in submittal material.

D. Submittals for all equipment shall be routed through and reviewed by the Contractor. The Contractor shall check all submittals for adequate identification, number of copies, correctness and compliance with contract drawings and specifications and apply his stamp of approval. For printed form (as opposed to electronic) submittals which are required to be reviewed by the Engineer, the minimum number of copies prescribed in Section 013000 shall be forwarded for approval after review and approval by the Contractor. These shall be returned and shall be revised and resubmitted until acceptable and approved by the Engineer. A minimum of one copy of each submittal will be retained by the Architect and Engineer. Copies of ALL submittals, including those which are not required to be forwarded for the Engineer's approval, shall be included in the Brochures of Equipment.

E. Submittals in printed form shall be bound by staples, comb binders or flexible post binders. Three-ring binders shall not be used. Submittals not bound as specified herein shall be rejected and returned without review.

F. Approval of submittals by the Engineer shall not relieve the Contractor from responsibility for deviations from drawings or specifications, nor shall it relieve him from responsibility for errors in shop drawings or other submittal literature.

2.3 BROCHURES OF EQUIPMENT (AKA 'OPERATIONS AND MAINTENANCE MANUALS')

A. In addition to any requirements for these manuals stated in Division 1 (which may be either electronic or printed or both), if not otherwise stated in the pertinent Division 1 specification sections, each manual shall contain all required submittal data for the construction materials and each piece of equipment installed under this project. The literature required for submittal purposes shall be expanded to include operation and maintenance literature for each piece of equipment. Maintenance information shall be complete in every respect and shall include parts lists and assembly drawings wherever applicable. Manuals, catalogs, etc., shall be new, as supplied by the factory, and not photocopied.

B. All literature shall clearly indicate the equipment it represents and shall be labeled with the equipment identification abbreviation found on the drawings, e.g. EF-1, etc. All information which is not applicable to the particular model and size supplied shall be clearly and neatly crossed out with heavy black marker or other suitable means. This includes dimensional drawings, maintenance information, parts lists, wiring diagrams, etc. Only the information applicable to the particular equipment supplied shall remain and it shall be easy to follow. Booklets not meeting these requirements shall be returned for correction.

END OF SECTION

SECTION 231123

NATURAL GAS PIPING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Pipes, tubes, and fittings.
2. Piping risers for underground pipe.
3. Piping and tubing joining materials.
4. Valves.
5. Piping specialties.
6. Pipe Markers/Labels

B. The scope of the project includes modifying the facility gas piping just downstream of the existing meter and installing a new underground gas line to the new gas fired emergency generator. This contractor shall install the underground line with locator tape and tracer wire from the generator pad to the building, with anodeless risers at each end of the underground run, a generator isolation valve at each end of the underground run. The scope includes painting of all the existing and new outdoor, above-ground gas piping located downstream of the meter.

C. **The scope of work also includes any modifications required to the existing meter/ regulator set at the building to be performed by the Utility Company. This Contractor shall arrange and pay for the Utility to modify their meter/regulator set in order to provide not less than 2800 scfh of gas at 12" water column within plus 1inch water column or minus 2 inches water column. Both the meter and regulator appear to be very near their stated capacities to achieve this and that it is likely both will need to be replaced.**

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include outdoor exposed gas piping and equipment.

1.4 PERFORMANCE REQUIREMENTS

A. Minimum Operating-Pressure Ratings:
   1. Piping, tubing, fittings and valves: 100 psig minimum unless otherwise indicated.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of the following:
   1. Piping, pipe specialties, tracer wire, buried warning tape, anodeless risers, pipe markers.
   2. Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
   3. Flexible natural gas hoses for connection to generator. Indicate features, pressure ratings, fitting types and capacities.

1.6 CLOSEOUT SUBMITTALS

A. Record drawings with hyper-accurate location coordinates for the underground tubing to be installed.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Piping and materials shall be new, free of rust and dirt and shall be protected indoors during construction. Rusted and dirty materials shall be removed from the site.

B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

1.10 COORDINATION

A. Coordinate sizes and locations of concrete bases with the contractor responsible for placing the generator pad.

PART 2 PRODUCTS

2.1 PIPES AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
   1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
   2. Wrought-Steel Welding Fittings: ASTM A 234/A 234M for butt welding and socket welding.
   3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.

B. PE Pipe: ASTM D 2513, SDR 11 for underground service.
   1. PE Fittings: ASTM D 2683, socket-fusion type or ASTM D 3261, butt-fusion type with dimensions matching PE pipe.

2. PE Transition Fittings: Factory-fabricated fittings with PE pipe complying with ASTM D 2513, SDR 11; and steel pipe complying with ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
3. Anodeless Service-Line Risers: Factory fabricated and leak tested.
   a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet.
   b. Casing: Steel pipe complying with ASTM A 53/A 53M, Schedule 40, black steel, Type E or S, Grade B with corrosion-protective coating covering.
   c. Aboveground Portion: PE transition fitting.
   d. Outlet shall be threaded or flanged or suitable for welded connection.
   e. Tracer wire connection.
   f. Ultraviolet shield.
   g. Stake supports with factory finish to match steel pipe casing or carrier pipe.

2.2 PIPING SPECIALTIES

A. Generator Set Flexible Connectors:
   1. As noted on plan schedules. Comply with ANSI Z21.24.
   2. Corrugated stainless-steel tubing with polymer coating.
   3. Operating-Pressure Rating: 1 psig.
   4. End Fittings: Zinc-coated steel.
   5. Threaded Ends: Comply with ASME B1.20.1.
   6. Length: 24” or as recommended by Manufacturer for application.

2.3 JOINING MATERIALS

A. Joint Compound and Tape: Suitable for natural or LP gas.

2.4 MANUAL GAS SHUTOFF VALVES

A. See "Aboveground Manual Gas Shutoff Valve Schedule" Articles for where each valve type is applied in various services.

B. General Requirements for Metallic Valves, NPS 2 and Smaller: Comply with ASME B16.33.
   1. CWP Rating: 125 psig.
   2. Threaded Ends: Comply with ASME B1.20.1.
   3. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch (25 mm) and smaller.
   4. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.

C. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.
   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. BrassCraft Manufacturing Company; a Masco company.
      b. Conbraco Industries, Inc.; Apollo Div.
      c. Perfection Corporation; a subsidiary of American Meter Company.
      d. As approved
   2. Body: Bronze, complying with ASTM B 584.

3. Ball: Chrome-plated bronze.
4. Stem: Bronze; blowout proof.
5. Seats: Reinforced TFE; blowout proof.
6. Packing: Threaded-body packnut design with adjustable-stem packing.
7. Ends: Threaded
8. CWP Rating: 600 psig.
9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for gas service with "WOG" indicated on valve body.

2.5 LABELING AND IDENTIFYING OF UNDERGROUND SERVICE PIPING

A. Detectable Warning Tape: Acid- and alkali-resistant PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

B. Tracer Wire: Install a 14 gauge solid copper tracer wire immediately adjacent to the underground piping and terminate above ground adjacent to each riser with an 18” coil.

2.6 LABELING AND IDENTIFYING OF ABOVE GRADE PIPING

A. Label above grade natural gas piping at the generator using a UV resistant snap-on wrap-around marker such as Seton ‘Setmark’ marker.

PART 3 INSTALLATION

3.1 EXAMINATION

A. Conduct utility locates and examine the site for other conflicts for underground piping system routing. Verify the location of piping risers at the meter and generator pad before pipe installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EARTHWORK

A. Comply with requirements in Division 2 Section "Earthwork" for excavating, trenching, and backfilling.

3.3 OUTDOOR PIPING INSTALLATION

A. Comply with NFPA 54 and the 2018 International Fuel Gas Code requirements for installation, testing, and purging of gas piping.

B. Install underground gas piping buried at least 18 inches below finished grade. Comply with requirements in Division 2 Section "Earthwork" for excavating, trenching, and backfilling.

C. Underground piping shall be HDPE as specified hereinbefore. Install underground piping according to ASTM D 2774.

D. Joints for connection to inlets and outlets to regulators, and valves may be flanged or threaded to match the equipment.

E. Install pressure gage tap fitting downstream from the service regulator and downstream of the generator riser isolation valve. Tap fittings shall be a tee fitting with ¼" threaded cap or plug.

3.4 VALVE INSTALLATION

A. Install manual gas shutoff valve at the meter set in the branch line serving the generator and another in the riser at the generator ahead of the flexible hose connection to the generator set.

3.5 PIPING JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints:
1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
2. Cut threads full and clean using sharp dies.
3. Ream threaded pipe ends to remove burrs and restore full ID of pipe.
4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
1. Plain-End Pipe and Fittings: Use butt fusion.
2. Plain-End Pipe and Socket Fittings: Use socket fusion.

E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.6 HANGER AND SUPPORT INSTALLATION

A. Comply implicitly with any specific support details indicated on plans.

B. Rigidly support metallic gas piping and riser at the generator from the generator pad using hot dip galvanized strut and clamps with stainless steel hardware.

3.7 LABELING AND IDENTIFYING

A. Label above grade natural gas piping at the generator using a UV resistant snap-on wrap-around marker such as Seton 'Setmark' marker.

B. Install detectable warning tape directly above gas piping, 8-12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.8 PAINTING

A. Paint all exterior piping upstream and downstream of the meter/regulator set at the building and all exposed metallic piping at the generator riser/pad.

B. Paint exposed, exterior metal piping and fittings and piping specialties, except components with factory-applied paint or protective coating using the following:
   1. Alkyd System: MPI EXT 5.1D.
      a. Prime Coat: Alkyd anticorrosive metal primer.
      b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
      c. Topcoat: Exterior alkyd enamel in gloss finish.
      d. Color: Yellow unless otherwise directed by the Owner.

3.9 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:
   1. Test, inspect, and purge piping according to NFPA 54, the 2018 International Fuel Gas Code and requirements of authorities having jurisdiction.

C. Gas piping will be considered defective if it does not pass tests and inspections.

D. Prepare and submit test and inspection reports.

3.10 OUTDOOR PIPING SCHEDULE

A. Aboveground natural gas piping shall be constructed of the following:
   1. Schedule 40 steel pipe, malleable-iron threaded fittings and threaded joints. Paint pipe and fittings as specified hereinbefore.

B. Underground natural gas piping shall be constructed of the following:
   1. PE pipe and fittings joined by heat-fusion; service-line risers with tracer wire terminated at each riser in an accessible location.

3.11 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

A. Valves for pipe at service regulator, branch takeoffs and appliance isolation shall be the following:
   1. Two-piece, full port, bronze ball valves with bronze trim.

END OF SECTION

DIVISION 26 - ELECTRICAL

SECTION 260000

GENERAL PROVISIONS FOR ELECTRICAL WORK

PART 1 GENERAL

1.1 ALTERNATES

A. Take cognizance of any change required in the work and include the price deemed necessary to meet the requirements of the respective alternate.

1.2 BIDDING

A. The Contractor shall provide labor, materials, equipment, items, articles, operations, and methods listed, shown, scheduled, or mentioned on the drawings, and/or specified, including all incidentals required for their completion.

B. The Contractor shall refer to the General part of these specifications, such as Instructions to Bidders, Special Conditions and DIVISION 01 for restrictions covering time that work can be performed in certain areas, noisy and dusty operations, sequence of work, access to restricted areas and similar types of work and operations.

1.3 SUBSTITUTIONS

A. Most items in this DIVISION are eligible for substitution in accordance with the General Conditions and Supplements hereto. Where a proprietary specification is written for a particular item, then only that item may be used. The final decision as to acceptability rests with the Engineer.

B. When the Engineer deems it necessary to assure satisfactory installation and compatibility with other equipment, piping, ductwork, electrical provisions and other appurtenances, the Contractor shall prepare scale drawings of the substitute item showing proposed location, connections, relation to other equipment and other pertinent data such as maintenance space requirements, electrical requirements, height and weight. Drawings must receive Engineer’s approval before the substitution is made.

C. It is the Contractor's responsibility that the substitute item shall fit into the space allocated and that the item can be installed and function as intended. Should changes in the work of any Contractor become necessary as a result of any substitute item under this DIVISION, such changes shall be arranged and paid for by this Contractor.

D. Capacities of substitute items shall not be less than that of the specified item.

E. The performance of the factory representative and supplier on past work will be a consideration in the approval process of substitute items.

1.4 CODES, REGULATIONS AND PERMITS

A. All materials and equipment shall be new, approved by Underwriters' Laboratories, Inc., Factory Mutual Research Corporation or other nationally recognized testing organization or by the local inspection authority, and be in new, undamaged condition when installed.

B. All materials and equipment shall comply with the National Electrical Code, National Electrical Safety Code, Uniform Building Code, and all other applicable Federal, State, City and County codes, regulations and ordinances.

C. The Contractor must obtain and arrange for all permits and approvals required for the execution of the work.

1.5 INTENT OF DRAWINGS

A. Riser diagrams and other diagrams are schematic only and not to scale. They are intended only to indicate sizes or relative arrangement of conduit and equipment shown elsewhere in plan view.

B. The drawings and specifications are intended to supplement each other and any details contained in one and not the other shall be included as if contained in both. Items not specifically mentioned in the specifications or noted on the drawings, but which are necessary to make a complete working installation shall be included.

1.6 WORKMANSHIP

A. Work to be accomplished by workmen skilled in the particular trade, in conformance with best practices and to meet all applicable codes.

B. Owner's representative decides when work is satisfactory. Contractor shall replace materials or equipment not properly installed or finished, without an increase in cost.

1.7 RESPONSIBILITY

A. The Contractor is responsible for installation of satisfactory and complete piece of work in accordance with true intent of drawings and specifications.

B. Consult all drawings for project to predetermine that work and equipment will fit as planned.

C. Location of conduit, panels, outlets, equipment, switches, etc., checked to determine it clears openings, structural members, cabinets, heating units, ducts, piping, telephone equipment and equipment having fixed locations. This check-out done prior to rough-in.

D. If, at any time, and in case, change in location of conduit, outlets fixtures, switches, panels, equipment, etc., become necessary due to obstacles or installation of other trades shown on any of the project drawings, such required changes made by Contractor at no extra cost.

E. By the act of submitting a bid, this Contractor shall be deemed to have:

1. Examined all drawings and specifications which are a part of this project.
2. Made proper allowances for coordination with other trades and the Government.
3. Provided for the requirement to work with other contractors.
4. Considered the complexity, scheduling and all other special and unusual circumstances involved which this Contractor has determined to be connected with this project.
5. Make an affirmative statement that this Contractor has read the documents, he understands their meaning and intent, he is able to install the work in the manner shown and satisfactory to the Engineer and that he is willing and able to execute the work of this Division 16 in accordance with the requirements, restrictions and limitations stated or implied in these construction documents.

1.8 DELIVERY AND STORAGE OF MATERIALS

A. Make provisions acceptable to the Owner's representative for delivery and storage of materials. Materials shall not be stored within the building unless specifically authorized by Owner's representative.

B. Make provisions for introduction into the building of equipment furnished under this DIVISION.

1.9 MANUFACTURER'S DIRECTIONS

A. Manufactured materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by manufacturer unless noted otherwise herein or on the drawings.

1.10 CUTTING, PATCHING, REPAIRING

A. Cutting, patching and repairing required by the work of this DIVISION shall be the responsibility of this Contractor.

B. Work shall be performed in accordance with DIVISION 1, GENERAL REQUIREMENTS, of these specifications.

C. The performance of this work shall not weaken the structural integrity of the building.

D. Any abrasion or disfigurement of the finished work or any portion of the building where any such abrasion or disfigurement is caused by the activities of the contractor shall be repaired, and neatly refinished to match the adjacent work.

1.11 OPENINGS IN RACEWAYS AND BOXES

A. Openings in conduit, boxes, etc., kept closed during progress of work.

B. The Contractor required to clean new systems found dirty to satisfaction of the Owner's representative at no additional cost.

1.12 CLEANUP

A. Upon completion of daily work (or more often if necessary), remove materials, scraps, etc., relative to this work and leave premises in clean and orderly condition. Any work which creates dust or dirt shall be performed with a shop type vacuum cleaner so as to prevent any dust or dirt contamination of the space and switch or equipment. This includes drilling of holes for equipment installation.

B. Clean equipment of dirt and debris, including panelboards, disconnects, outlet boxes, lighting fixtures, and fixture lenses.

1.13 SAMPLES

A. The Contractor shall submit actual production samples on any material or equipment requested if, in the Engineer's opinion, it is necessary in order to determine the quality, workmanship, operation, etc., of the item.

B. Samples will be returned to the Contractor. Approved samples may be used on the job.

C. Costs incurred in providing and returning samples will be the responsibility of the Contractor.

1.14 TEMPORARY SERVICES

A. See DIVISION 1 - GENERAL REQUIREMENTS for Temporary Facilities.

1.15 FIRE PROTECTION

A. Raceway penetrations of all fire partitions, walls and floors shall be effectively fire-stopped to equal the fire rating of the floor or partition using materials and methods UL approved and tested to meet all conditions of ASTME E119, UL 1479 and ASTME 814 tests. One such material is Carborundum bulk "Fiberfrax" fiber packing for filling the annual space between pipe and sleeve or hole and Fiberfrax LDS moldable caulking for sealing in the fiber packing. Other acceptable materials are Dow Corning 3-6548 Silicon RTV foam firestop system, General Electric 'Pensil' 851 system or U.S.G. fire code compound and Thermafire.

B. Construction of permanent bracing, framing, roof curbs and platforms or other structures which utilize wood construction shall be fabricated from fire resistant treated materials or shall be otherwise protected by approved fire-resistant materials.

1.16 EQUIPMENT MOUNTING

A. Floor Mounting
   1. Concrete bases 4" high with chamfered edges shall be provided under floor-mounted equipment such as switchboards, transformers, and motor control centers where bases are called out or indicated on the drawings.
   2. Floor-mounted equipment shall be secured to the concrete bases with steel anchor bolts preset in the concrete base. Anchor bolts and anchoring shall be capable of resisting horizontal and vertical earthquake forces as required in the Uniform Building

Code, Section 2312. Where spring-type vibration mounts are required, they shall be secured to the concrete bases and, in addition, the equipment restrained whereby the equipment is free to vibrate but cannot move from the base.

B. Wall Mounting
   1. Wall-mounted equipment, such as panelboards, shall be securely fastened to the wall using appropriate fasteners such as toggle bolts, expansion bolts, etc.

1.17 COMPLETION AND TESTS

A. Complete and test each system and leave in proper operation.

B. At the time of finalizing the Project, a completion system test shall be performed in the presence of the owner's designated representative. During the test, the contractor shall demonstrate that the systems perform in the manner described in the specifications and indicated on the drawings. Test procedure and the results shall be recorded and delivered to the Owner's representative. Tests shall be repeated after any corrections are made as a result of initial testing or correctional work under guarantee provisions.

1.18 OPERATING INSTRUCTIONS

A. The Contractor shall provide qualified personnel to instruct the Owner's maintenance people in the operation and maintenance of the system.

B. Written operation and maintenance instructions, as produced by the manufacturer, shall be provided for all equipment. These instructions shall be bound and submitted as described in Part 2, below.

1.19 REMODELING WORK

A. Wherever existing electrical wire, conduit, controls, circuits, etc., are cut into, removed, interrupted, as a result of the remodeling, all such items that serve areas or equipment that remain shall be rerouted, extended, relocated, etc., as necessary to maintain operation of equipment and services.

B. Downtime shall be held to a minimum. Outages shall be scheduled at a time acceptable to and approved by the Owner. Consult with Owner in sufficient time for him to make necessary preparations for the outage.

C. Demolition
   1. Refer to the drawings for execution of demolition.
   2. All existing equipment and material removed and not scheduled for reinstallation shall remain the property of the Owner and shall be delivered to a designated stockpile area on the site by the Contractor. Materials not wanted by the Owner shall be removed from the site by the Contractor.

D. Asbestos Awareness
   1. If suspect asbestos materials are encountered, the contractor shall cease work in that area and inform the owner of his suspicions and will not proceed with work until such time that a determination can be made on how to proceed.

1.20 SITE INVESTIGATION

A. The Contractor shall be cognizant that this is a remodeling project and as such, certain items cannot be fully illustrated nor explained without field observation. Therefore, before submitting his proposal, the Contractor should examine the site and building as it pertains to this Project and make allowances in this proposal for all conditions that will affect the work indicated in the Project manual and contract documents.

1.21 RECORD DRAWINGS

A. Maintain a separate set of electrical drawings at the job site at all times to be used as record drawings. This set shall be kept up to date with all changes and/or additions in the construction and/or electrical systems, and shall be delivered to the Owner's representative at the completion of this job. This set of drawings shall be kept clean and protected at all times.

PART 2 SUBMITTALS AND BROCHURES OF EQUIPMENT

2.1 GENERAL

A. The literature required to be submitted and approved in order to fulfill the requirements of this Division falls into two general categories. These are the "Brochures of Equipment" and "Submittals."

B. The Brochures of Equipment, as the name implies, shall contain all pertinent information for all equipment installed. These books are required to be turned over to the Owner and approved before final payment is authorized. Special training for certain equipment may require the use of this book at an earlier stage of project completion. In this instance, the Contractor will be required to prepare and submit the applicable portions of the Brochures of Equipment significantly before project completion.

C. "Submittals" is a general term for informational literature which must be supplied to and approved by the Contractor prior to installing, receiving, or in some instances, even ordering equipment. The normal required types of submittals include shop drawings, manufacturer's literature, installation and operation instructions (from the manufacturer) and wiring diagrams. System reports, such as start-up reports or balancing reports, and the project completion checklist are two forms of submittals which are required after the equipment has been installed and is operational. Each Section of this Division may contain special or more specific requirements for expanded or additional types of submittal literature. These shall be provided as required by each Section.

D. In general, copies of all returned, approved submittals shall be included in the Brochures of Equipment. These books shall also include complete operation and maintenance literature

for each piece of equipment such as may be packaged with the equipment for OEM components. They will be used by the Owner's personnel as the primary source of information for operating and maintaining the installed systems and as such, they shall exhibit a high degree of clarity, thoroughness and be suitably bound and arranged to be useful and durable throughout the life of the installed systems.

2.2 SUBMITTALS

A. **The contractor** shall procure manufacturer's literature and/or certified prints for **all** items of equipment, materials or systems on the job. Shop drawings and literature shall be complete and marked showing name of job, item used, size, dimensions, capacity, rough-in, etc., as required for complete check and installation. **Any exceptions** of the equipment being furnished from that specified shall be clearly defined. Specific requirements of submittals may be expanded in individual specification sections. Minimum requirements shall include the following:

1. Submit actual installation layout drawings on floor plans showing conduit runs, conduit and conductor sizes, color coding, number of conductors and location of devices and equipment. Provide such drawings for system such as fire alarm, clock and program and P.A. systems.
2. Manufacturer's literature shall include any and all restrictions on the application and installed service limitations of the product.

B. All shop drawings shall be **reviewed**, **approved** and stamped by the Contractor before ordering.

1. **All** items of equipment and systems which are to be installed **as** specified or are not otherwise designated as requiring Owner's or Engineer's approval, will require a **letter of compliance** by the Contractor stating that these items or system will be provided as specified and will be reviewed and stamped by the contractor.
2. Submittals for **any** piece of equipment or system which is a **substitute** from that specified or of any equipment or system specifically **directing** Engineer's review shall be **forwarded** to the owner **or Engineer** (as designated) for review. The Contractor shall check submittals for number of copies, adequate identification, correctness and compliance with drawings and specifications and apply his stamp of approval **before** forwarding the submittal. Submittals shall be revised, changed and/or resubmitted until acceptable and approved by the Owner's representative.
    a. Approval of submittals and literature by the owner or Engineer shall not relieve the Contractor from responsibility for deviations from drawings or specifications, nor shall it relieve him from responsibility for errors in shop drawings or other submittal literature.
    b. Submit a minimum of six copies of submittals for review. A minimum of two copies will be retained by the Owner and/or Engineer.
    c. Copies on copy machines which are not of a permanent or legible nature will not be accepted for shop drawing submittals. Copies must be legible with all dimensions and other pertinent data clear.

2.3 BROCHURES OF EQUIPMENT

A. The Contractor shall prepare two complete Brochures of Equipment containing all required submittal data for construction materials and for each piece of equipment and/or electrical system. Operation and maintenance literature shall also be included for each piece of equipment. Maintenance information shall be complete in every respect and shall include parts lists and assembly drawings wherever applicable. Manuals, catalogs, etc., shall be new, as supplied by the factory, and not photocopied. The Brochures shall also include a copy of the submittal requirement list and a final copy of the project completion checklist.

B. All literature shall clearly indicate the equipment it represents or supplies protection for and shall be labeled with the equipment identification abbreviation found on the drawings, e.g. EF-1, etc. All information which is not applicable to the particular model and size supplied shall be clearly crossed out with heavy black marker or other suitable means. This includes dimensional drawings, maintenance information, parts lists, wiring diagrams, etc. Only the information applicable to the particular equipment supplied shall remain and it shall be easy to follow. Booklets not meeting these requirements shall be returned for correction.

C. Binders shall be high quality telescoping post type with slide or lever release, metal hinges, and covered hardboard or rigid plastic covers.

D. Dividers shall be used to separate the literature for equipment supplied under each of the various Sections of this Division. Divider headings shall read the same as the Section title e.g. "265100 INTERIOR LIGHTING."

E. The format of the Brochure shall begin with the submittal requirement list at the front as an index sheet. The dividers for each section shall then progress sequentially and the project completion checklist shall be included at the back as the appendix.

F. Large size drawings or diagrams shall be folded and placed in heavyweight sheets with pockets.

G. Authorization for final payment shall not be made prior to final acceptance of the Brochures of Equipment.

END OF SECTION

SECTION 260519

POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Building wires and cables rated 600 V and less.
   2. Connectors, splices, and terminations rated 600 V and less.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
   1. Testing Agency's Field Supervisor: Person currently certified by the International Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

PART 2 PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Copper Conductors: Comply with NEMA WC 70.

B. Conductor Insulation: Comply with NEMA WC 70 for Types THW, THHN/THWN, XHHW, UF, USE and SO.

2.2 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

B. Cable size #6 or larger shall use lugs or approved connectors.

C. Conductors #8 and smaller, use solderless connector similar to Ideal Industries 'Wing Nut' twist on connector.

PART 3 EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Type THHN-THWN, single conductors in raceway.

B. Type MC prewired flexible metallic cable shall not be permitted, except for light fixture whips, not to exceed 6 feet in length.

3.3 IDENTIFICATION OF CONDUCTORS

A. Color Code conductors with the following table.

SYSTEM VOLTAGE	ØA	ØB	ØC	Neutral	Ground
120/208 Wye	Black	Red	Blue	White	Green

B. Circuits run and numbered to agree with drawings. Combining of circuits other than what is shown on the drawings is not acceptable with approval.

3.4 INSTALLATION OF CONDUCTORS AND CABLES

A. Splices in Feeders not permitted.

B. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

F. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."

G. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

3.5 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
   1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Division 26 Section "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

3.8 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:
   1. After installing conductors and cables and before electrical circuitry has been energized, Perform an insulation resistance test on all feeder conductors installed under this contract, including neutrals, using a megohmeter. Apply 1,000 volts DC to each conductor and maintain for one minute. Minimum value for each conductor shall be 100 megohms at 60 degrees F. Insulation test is to be made between conductors and between conductors and ground.

C. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

D. Remove and replace failed conductors and retest as specified above.

END OF SECTION

SECTION 260526

GROUNDING AND BONDING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes: Grounding systems and equipment.

B. Section includes grounding systems and equipment, plus the following special applications:
1. Overhead-line grounding.
2. Underground distribution grounding.
3. Ground bonding common with lightning protection system.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

A. Retain first paragraph below to require Contractor to provide Drawings that locate significant grounding features. Division 01 Sections "Project Record Documents" and "Operation and Maintenance Data" require submittals to be included in those documents for use by maintenance forces throughout the life of the Project.

B. Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in "Field Quality Control" Article, including the following:
1. Test wells.
2. Ground rods.
3. Ground rings.
4. Grounding arrangements and connections for separately derived systems.
5. Grounding for sensitive electronic equipment.

C. Qualification Data: For qualified testing agency and testing agency's field supervisor.

D. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
1. Instructions for periodic testing and inspection of grounding features.

a. Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
b. Include recommended testing intervals.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.
1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on site testing.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

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

PART 2 PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:
1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
8. Retain first paragraph below if Project includes overhead-line work.

C. Bare Grounding Conductor and Conductor Protector for Wood Poles:
1. No. 4 AWG minimum, soft-drawn copper.
2. Conductor Protector: Half-round PVC or wood molding; if wood, use pressure-treated fir, cypress, or cedar.

D. Grounding Bus: Predrilled rectangular bars of annealed copper, with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V. Lexan or PVC, impulse tested at 5000 V.

2.2 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.
   1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

D. Bus-bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel, 3/4-inch diameter by 10 feet long.

PART 3 EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.
   1. Bury at least 24 inches (600 mm) below grade.
   2. Duct-Bank Grounding Conductor: Bury 12 inches (300 mm) above duct bank when indicated as part of duct-bank installation.

C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
   1. Install bus on insulated spacers 2 inches (50 mm) minimum from wall, 6 inches (150 mm) above finished floor unless otherwise indicated.
   2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down to specified height above floor; connect to horizontal bus.

E. Conductor Terminations and Connections:
   1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
   2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.

3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch Circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
   1. Feeders and branch circuits.
   2. Lighting circuits.
   3. Receptacle circuits.
   4. Single-phase motor and appliance branch circuits.
   5. Three-phase motor and appliance branch circuits.
   6. Flexible raceway runs.
   7. Armored and metal-clad cable runs.
   8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
   9. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. bond conductor to each unit and to air duct and connected metallic piping.

D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-racing cable. Bond conductor to heater units, piping, connected equipment, and components.

E. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

F. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

G. Signal and Communication Equipment: In addition to grounding and bonding required by NFPA 70, provide a separate grounding system complying with requirements in TIA/ATIS J-STD-607-A.

1. For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
2. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-4-by-12-inch (6.3-by-100-by-300-mm) grounding bus.
3. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

H. Metal Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

C. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade unless otherwise indicated.
1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 26 Section "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches (300 mm) deep, with cover.
1. Test Wells: Install at least one test well for each service unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect- type connection is required, use a bolted clamp.

F. Grounding and Bonding for Piping:
   1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
   2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
   3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

G. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

H. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart.

I. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70; use a minimum of 20 feet of bare copper conductor not smaller than No. 4 AWG.
   1. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.
   2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.

3.4 LABELING

A. Comply with requirements in Division 26 Section "Identification for Electrical Systems" Article for instruction signs. The label or its text shall be green.

B. Install labels at the telecommunications bonding conductor and grounding equalizer and at the grounding electrode conductor where exposed.
   1. Label Text: "If this connector or cable is loose or if it must be removed for any reason, notify the facility manager."

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections.
   1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:
   1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.

2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal. Make tests at ground rods before any conductors are connected.
    a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    b. Perform tests by fall-of-potential method according to IEEE 81.
4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

C. Grounding system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

E. Report measured ground resistances that exceed the following values:
1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
4. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm.
5. Substations and Pad-Mounted Equipment: 5 ohms.

F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION

SECTION 260529

HANGERS AND SUPPORTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Hangers and supports for electrical equipment and systems.
   2. Construction requirements for concrete bases.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:
   1. Steel slotted support systems.
   2. Nonmetallic slotted support systems.

B. Shop Drawings. Show fabrication and installation details and include calculations for the following:
   1. Trapeze hangers. Include Product Data for components.
   2. Steel slotted channel systems. Include Product Data for components.
   3. Nonmetallic slotted channel systems. Include Product Data for components.
   4. Equipment supports.

1.5 QUALITY ASSURANCE

A. Comply with NFPA 70.

1.6 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

PART 2 PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Allied Tube & Conduit.
      b. Cooper B-Line, Inc.; a division of Cooper Industries.
      c. ERICO International Corporation.
      d. GS Metals Corp.
      e. Thomas & Betts Corporation.
      f. Unistrut; Tyco International, Ltd.
   2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
   3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
   4. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
   1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
      a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
         1) Hilti Inc.

2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
3) MKT Fastening, LLC.
4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
   a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      1) Cooper B-Line, Inc.; a division of Cooper Industries.
      2) Empire Tool and Manufacturing Co., Inc.
      3) Hilti Inc.
      4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      5) MKT Fastening, LLC.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

PART 3 EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch) in diameter.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, raceways may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
6. To Light Steel: Sheet metal screws.
7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 03

C. Anchor equipment to concrete base.
1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 260533

RACEWAYS AND BOXES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Metal conduits, tubing, and fittings.
2. Nonmetal conduits, tubing, and fittings.
3. Metal wireways and auxiliary gutters.
4. Nonmetal wireways and auxiliary gutters.
5. Surface raceways.
6. Boxes, enclosures, and cabinets.
7. Handholes and boxes for exterior underground cabling.

B. Related Requirements:
1. Division 26 Section "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.
2. Division 27 Section "Pathways for Communications Systems" for conduits, wireways, surface pathways, innerduct, boxes, faceplate adapters, enclosures, cabinets, and handholes serving communications systems.
3. Division 28 Section "Pathways for Electronic Safety and Security" for conduits, surface pathways, innerduct, boxes, and faceplate adapters serving electronic safety and security.

1.3 DEFINITIONS

A. ARC: Aluminum rigid conduit.

B. GRC: Galvanized rigid steel conduit.

C. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

PART 2 PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

A. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. GRC: Comply with ANSI C80.1 and UL 6.

C. ARC: Comply with ANSI C80.5 and UL 6A.

D. IMC: Comply with ANSI C80.6 and UL 1242.

E. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040 inch minimum.

F. EMT: Comply with ANSI C80.3 and UL 797.

G. FMC: Comply with UL 1; zinc-coated steel

H. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

I. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
2. Fittings for EMT:
   a. Material: Steel
   b. Type: Setscrew or compression.
   c. Connectors shall be watertight in wet location and concrete tight in concrete and masonry.
3. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.

J. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

A. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Provide insulated bushings type B, SB or SBT as required.

C. ENT: Comply with NEMA TC 13 and UL 1653.

D. RNC: Type EPC-40-PVC complying with NEMA TC 2 and UL 651 unless otherwise indicated.

E. LFNC: Comply with UL 1660.

F. Rigid HDPE: Comply with UL 651A.

G. Continuous HDPE: Comply with UL 651B.

H. Coilable HDPE: Preassembled with conductors or cables, and complying with ASTM D 3485.

I. RTRC: Comply with UL 1684A and NEMA TC 14.

J. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.

K. Fittings for LFNC: Comply with UL 514B.

L. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

M. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

A. Description: Sheet metal, complying with UL 870 and NEMA 250, NEMA type per drawings or as required by area being installed. Size according to NFPA 70.
   1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

C. Wireway Covers: Screw-cover type unless otherwise indicated.

D. Finish: Manufacturer's standard enamel finish.

2.4 SURFACE RACEWAYS

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

B. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5. Prime coated, ready for field painting.

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. Hubbell.
    b. Wiremold / Legrand.
    c. Tele-Power Poles:
1. Provide poles as specified on drawings.
2. Fittings and Accessories: Dividers, end caps, covers, cutouts, wiring harnesses, devices, mounting materials, and other fittings shall match and mate with tele-power pole as required for complete system.

2.5 BOXES, ENCLOSURES, AND CABINETS

A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.

D. Metal Floor Boxes:
1. Material: Cast metal or sheet metal.
2. Type: Fully adjustable.
3. Shape: Rectangular.
4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

F. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, galvanized, cast iron with gasketed cover.

G. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

H. Device Box Dimensions: 4 inches square by 2-1/8 inches deep

I. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250.
1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Nonmetallic Enclosures: Fiberglass
3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

J. Cabinets:
1. NEMA 250, Type as specified or required by area, with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.

5. Accessory feet where required for freestanding equipment.
6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.6 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. General Requirements for Handholes and Boxes:
1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 3 EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed Conduit: GRC.
2. Concealed Conduit, Aboveground: EMT
3. Underground Conduit: Schedule 80 RNC or as noted on drawings
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R or Type 4.

B. Indoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT
3. Exposed and Subject to Severe Physical Damage: GRC.
4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: GRC.
7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 in damp or wet locations.

C. Minimum Raceway Size: 1/2-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
3. EMT: Use setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

3.2 INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Comply with requirements in Division 26 Section "Hangers and Supports for Electrical Systems" for hangers and supports.

E. Arrange stub-ups so curved portions of bends are not visible above finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.

G. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

H. Raceways Embedded in Slabs:
   1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
   2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
   3. Arrange raceways to keep a minimum of 1 inch of concrete cover in all directions.
   4. Do not embed thread less fittings in concrete unless specifically approved by Architect for each specific location.

I. Stub-ups to Above Recessed Ceilings:
   1. Use EMT.
   2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

J. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

L. Surface Raceways:
   1. Install surface raceway with a minimum 2-inch radius control at bend points.
   2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section.

M. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
   1. Use LFMC in damp or wet locations.

N. Mount boxes at 48” for switches, 15” for receptacles or as indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

O. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.

P. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

Q. Locate boxes so that cover or plate will not span different building finishes.

R. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.

S. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

T. Set metal floor boxes level and flush with finished floor surface.

U. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:
   1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches in nominal diameter.
   2. Install backfill as specified in Division 31 Section "Earth Moving."
   3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."

4. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
    b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
5. Underground Warning Tape: Comply with requirements in Division 26 Section "Identification for Electrical Systems."

3.4 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies.

3.5 FIRESTOPPING

A. Install firestopping

B. at penetrations of fire-rated floor and wall assemblies.

3.6 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.
    1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
    2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 26-05-53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Underground-line warning tape.
5. Equipment identification labels.
6. Miscellaneous identification products.

1.3 ACTION SUBMITTALS

A. Product Data: For each electrical identification product indicated.

1.4 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 PRODUCTS

2.1 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Write-On Tags: Polyester tag, 0.015-inch-thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
   1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
   2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

D. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

2.2 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils) thick by 1 to 2 inches wide.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

D. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

E. Write-On Tags: Polyester tag, 0.015-inch-thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
   1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.3 UNDERGROUND-LINE WARNING TAPE

A. Tape:
   1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical utility lines.
   2. Printing on tape shall be permanent and shall not be damaged by burial operations.
   3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:
   1. Comply with ANSI Z535.1 through ANSI Z535.5.
   2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE,

3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE

2.4 EQUIPMENT IDENTIFICATION LABELS

A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch

B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch Overlay shall provide a weatherproof and UV-resistant seal for label.

C. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch

D. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch

2.5 CABLE TIES

A. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, Type 6/6 nylon.
1. Minimum Width: 3/16 inch
2. Tensile Strength at 73 deg F According to ASTM D 638: 12,000 psi (
3. Temperature Range: Minus 40 to plus 185 deg F (olor: Black.

B. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one-piece, self-locking.
1. Minimum Width: 3/16 inch
2. Tensile Strength at 73 deg F According to ASTM D 638: 7000 psi
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F
5. Color: Black.

2.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in Division 09 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 EXECUTION

3.1 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

F. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.

G. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
   1. Outdoors: UV-stabilized nylon.
   2. In Spaces Handling Environmental Air: Plenum rated.

H. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches overall.

3.2 IDENTIFICATION SCHEDULE

A. Concealed Raceways, Duct Banks, More Than 600 V, within Buildings: Tape and stencil 4-inch- wide black stripes on 10-inch centers over orange background that extends full length of raceway or duct and is 12 inches wide. Stencil legend "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch high black letters on 20-inch centers. Stop stripes at legends. Apply to the following finished surfaces:
   1. Floor surface directly above conduits running beneath and within 12 inches of a floor that is in contact with earth or is framed above unexcavated space.
   2. Wall surfaces directly external to raceways concealed within wall.
   3. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.

B. Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
   1. Color-Coding for Phase Identification, 600 V or Less: Use color coding for ungrounded service and feeder conductors.
      a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG,.
      b. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

C. Power-Circuit Conductor Identification, More than 600 V: For conductors in vaults, pull and junction boxes, manholes, and handholes, use write-on tags nonmetallic plastic tag holder with adhesive-backed phase tags,

D. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.

E. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
   1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
   2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
   3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

F. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
   1. Limit use of underground-line warning tape to direct-buried cables.
   2. Install underground-line warning tape for both direct-buried cables and cables in raceway.

G. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
   1. Labeling Instructions:
      a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label Unless otherwise indicated, provide a single line of text with 1/2-inch- -) high letters on minimum 2 -inch- high label. Provide higher labels for more than 2 lines of text.
      b. Outdoor Equipment: Engraved, laminated acrylic or melamine label
      c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
      d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
   2. Equipment to Be Labeled:
      a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be engraved, laminated label.
      b. Enclosures and electrical cabinets.
      c. Access doors and panels for concealed electrical items.
      d. Switchgear.
      e. Switchboards.
      f. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.

g. Substations.
h. Emergency system boxes and enclosures.
i. Motor-control centers.
j. Enclosed switches.
k. Enclosed circuit breakers.
l. Enclosed controllers.
m. Variable-speed controllers.
n. Push-button stations.
o. Power transfer equipment.
p. Contactors and associated controls (light switches, timeclocks, photocells).
q. Remote-controlled switches, dimmer modules, and control devices.
r. Battery-inverter units.
s. Battery racks.
t. Power-generating units.
u. Monitoring and control equipment.
v. UPS equipment.

END OF SECTION

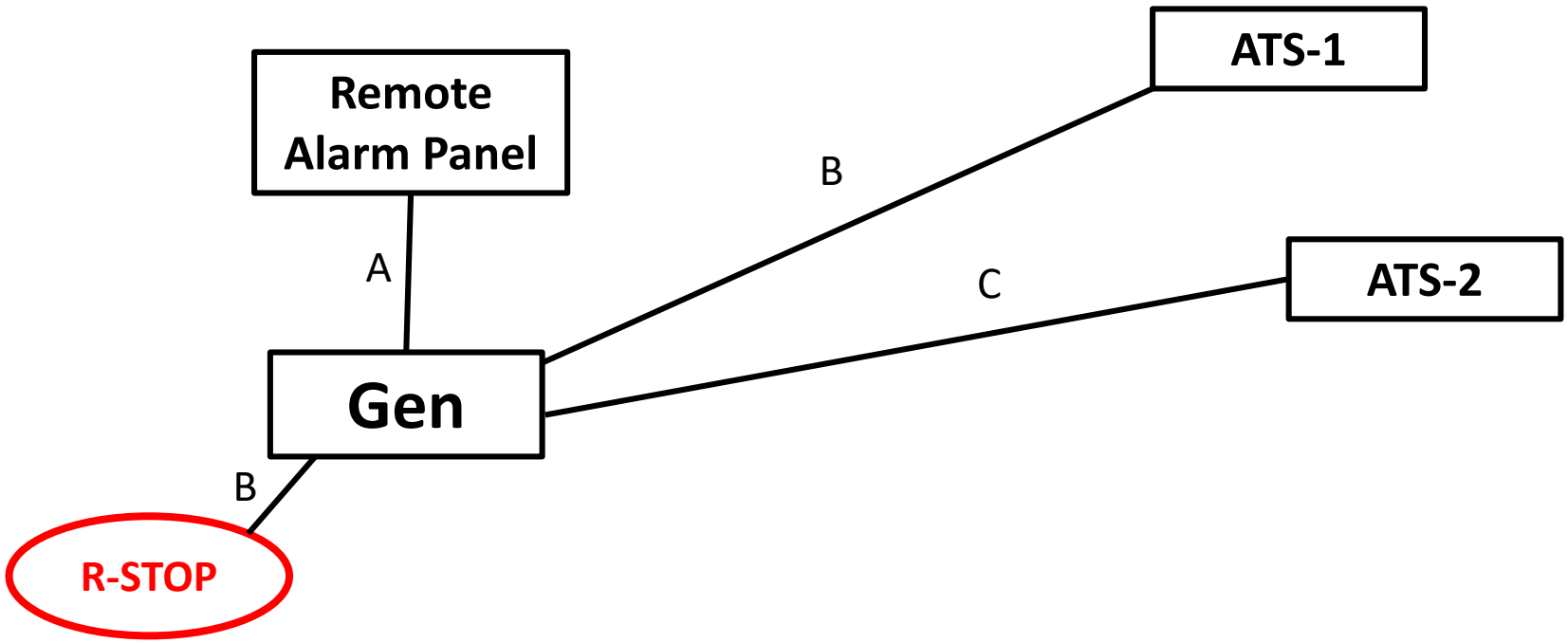
Reference: Johnson Family Lab (MSU Bzn)

Quantity 1 - Generac Industrial gaseous 9.0L V-8 engine-driven generator, consisting of the following features and accessories:

- Stationary Emergency-Standby rated
- 100 kW Rating, wired for 120/208 VAC three phase, 60 Hz
- Permanent Magnet Excitation
- Level 2 Acoustic Enclosure, Steel
    - Industrial Grey Baked-On Powder Coat Finish
- IBC Seismic Certified
- UL2200
- EPA Certified
- SCAQMD
- H-100 Control Panel
    - Meets NFPA 99 and 110 requirements
    - Temp Range -40 to 70 degrees C
    - Digital Microprocessor:
        - Two 4-line x 20 displays, full system status
        - 3 Phase sensing, +/-0.25% digital voltage regulation
        - RS232, RS485 and Canbus remote ports
        - Waterproof connections
        - All engine sensors are 4-20ma for minimal interference
        - Programmable I/O
        - Built-in PLC for special applications
    - Engine function monitoring and control:
        - Full range standby operation; programmable auto crank, Emergency Stop, Auto-Off-Manual switch
        - Isochronous Governor, +/-0.25% frequency regulation
        - Full system status on all AC output and engine function parameters
        - Service reminders, trending, fault history (alarm log)
        - I2T function for full generator protection
    - 2-wire start controls for any 2-wire transfer switch
- 21 Light Annunciator - Surface
- Remote Emergency Stop Switch, surface-mount, shipped loose
- Natural Gas fuel system (7-11")
- 90 AH, 700 CCA Group 27F Battery, with rack, installed
- IBC Seismic Certified
- Standard MLCB, 80% rated thermal-magnetic
    - 400 Amp
- Battery Heating Pad
- Battery Charger, 10 Amp, NFPA 110 compliant, installed
- Coolant Heater, 1500W, 120VAC
- Std set of 3 Manuals
- 120V GFCI and 240V Outlet
- Flex Fuel Line
- 1 Hour factory load test at reactive (0.8) power factor
- 5-Year Comprehensive Warranty
- SG0100GG269.0S18HPLYE

Quantity 2 - TRANSFER SWITCH - TX SERIES

- 200 Amp, 3 pole, 120/208 VAC three phase, 60 Hz, with 2-Wire Start Circuit
    - Utility Voltage Sensing Controls:
        - Adjustable Drop-out and Pick-up
        - Adjustable Utility Interrupt Delay
    - Adjustable Logic Controls:
        - Minimum Standby Voltage
        - Minimum Standby Frequency
        - Engine Warmup
        - Return to Utility
        - Engine Cooldown
        - Transfer on Exercise
- Enclosure Heater
- Double Set of Form C Auxiliary Contacts
- UL Listed 1008 by ETL
- Controller Cover, Padlockable, Black
- NEMA 3R Enclosure
- 3 Owner's Manuals
- 42KA Contactor Withstand and Closing Rating
- Non Service Entrance Rated
- In Phase Only Transfer
- Five Year Extended Warranty
- TX301NN0200G3CH



Johnson Family Lab – MSUB Control Wires *ONLY*

(No Spares Included & Recommend Adding)

A. Pair Twisted Shield w/Drain Wire & Two 18-14awg stranded
B. Two 18-14awg stranded (Also see Submittal Detail)
C. Two 18-14awg stranded

TWEnterprises, Inc.

GENERAC

SG100 | 9.0L | 100 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

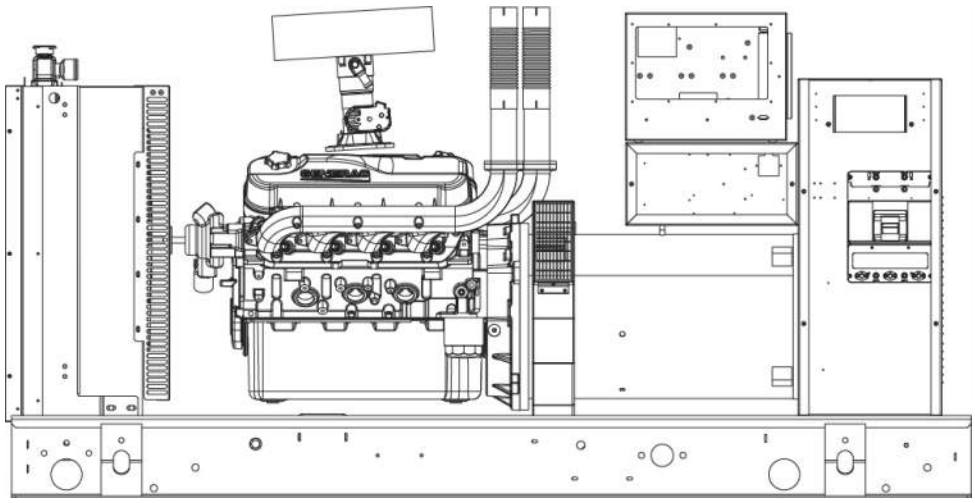
DEMAND RESPONSE READY

Standby Power Rating
100 kW, 125 kVA, 60 Hz

Prime Power Rating*
90 kW, 113 kVA, 60 Hz

100kW 120/208V
3Phs 60Hz

*Assembled in the USA using domestic and foreign parts



*EPA Certified Prime ratings are not available in the US or its Territories

Image used for illustration purposes only

Codes and Standards

Not all codes and standards apply to all configurations. Contact factory for details.

- UL2200, UL6200, UL1236, UL489
- CSA C22.2
- BS5514 and DIN 6271
- SAE J1349
- NFPA 37, 70, 99, 110
- NEC700, 701, 702, 708
- ISO 3046, 7637, 8528, 9001
- NEMA ICS10, MG1, 250, ICS6, AB1
- ANSI C62.41
- IBC 2009, CBC 2010, IBC 2012, ASCE 7-05, ASCE 7-10, ICC-ES AC-156 (2012)

Powering Ahead

Generac ensures superior quality by designing and manufacturing most of its generator components, such as alternators, enclosures, control systems and communications software. Generac also makes its own spark-ignited engines, and you'll find them on every Generac gaseous-fueled generator. We engineer and manufacture them from the block up — all at our facilities throughout Wisconsin. Applying natural gas and LP-fueled engines to generators requires advanced engineering expertise to ensure reliability, durability and necessary performance. By designing specifically for these dry, hotter-burning fuels, the engines last longer and require less maintenance. Building our own engines also means we control every step of the supply chain and delivery process, so you benefit from single-source responsibility.

Plus, Generac Industrial Power's distribution network provides all parts and service so you don't have to deal with third-party suppliers. It all leads to a positive owner experience and higher confidence level. Generac spark-ignited engines give you more options in commercial and industrial generator applications as well as extended run time from utility-supplied natural gas.

SG100 | 9.0L | 100 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

STANDARD FEATURES

DEMAND RESPONSE READY

ENGINE SYSTEM

- Oil Drain Extension
- Air Cleaner
- Fan Guard
- Stainless Steel Flexible Exhaust Connection
- Factory Filled Oil and Coolant
- Radiator Duct Adapter (Open Set Only)
- Critical Silencer (Open Set Only)

Fuel System

- NPT Fuel Connection on Frame
- Primary and Secondary Fuel Shutoff

Cooling System

- Closed Coolant Recovery System
- UV/Ozone Resistant Hoses
- Factory-Installed Radiator
- 50/50 Ethylene Glycol Antifreeze
- Radiator Drain Extension

Electrical System

- Battery Charging Alternator
- Battery Cables
- Battery Tray
- Rubber-Booted Engine Electrical Connections
- Solenoid Activated Starter Motor

ALTERNATOR SYSTEM

- UL2200 GENprotect™
- Class H Insulation Material
- 2/3 Pitch
- Skewed Stator
- Brushless Excitation
- Sealed Bearing
- Amortisseur Winding
- Full Load Capacity Alternator

GENERATOR SET

- Internal Genset Vibration Isolation
- Separation of Circuits - High/Low Voltage
- Separation of Circuits - Multiple Breakers
- Wrapped Exhaust Piping
- Standard Factory Testing
- 2 Year Limited Warranty (Standby and Demand Response Rated Units)
- 1 Year Warranty (Prime Rated Units)
- Silencer Mounted in the Discharge Hood (Enclosed Units Only)

ENCLOSURE (If Selected)

- Rust-Proof Fasteners with Nylon Washers to Protect Finish
- High Performance Sound-Absorbing Material (Sound Attenuated Enclosures)
- Gasketed Doors
- Upward Facing Discharge Hoods (Radiator and Exhaust)
- Stainless Steel Lift Off Door Hinges
- Stainless Steel Lockable Handles
- RhinoCoat™ - Textured Polyester Powder Coat Paint

CONTROL SYSTEM

Digital H Control Panel- Dual 4x20 Display

Program Functions

- Programmable Crank Limiter
- 7-Day Programmable Exerciser
- Special Applications Programmable Logic Controller
- RS-232/485 Communications
- All Phase Sensing Digital Voltage Regulator
- 2-Wire Start Capability
- Date/Time Fault History (Event Log)
- Isochronous Governor Control
- Waterproof/Sealed Connectors
- Audible Alarms and Shutdowns
- Not in Auto (Flashing Light)
- Auto/Off/Manual Switch
- E-Stop (Red Mushroom-Type)
- NFPA110 Level I and II (Programmable)
- Customizable Alarms, Warnings, and Events
- Modbus® Protocol
- Predictive Maintenance Algorithm
- Sealed Boards
- Password Parameter Adjustment Protection
- Single Point Ground
- 16 Channel Remote Trending
- 0.2 msec High Speed Remote Trending
- Alarm Information Automatically Annunciated on the Display

Full System Status Display

- Power Output (kW)
- Power Factor
- kW Hours, Total, and Last Run
- Real/Reactive/Apparent Power
- All Phase AC Voltage
- All Phase Currents
- Oil Pressure
- Coolant Temperature
- Coolant Level
- Engine Speed
- Battery Voltage
- Frequency

Alarms and Warnings

- Oil Pressure
- Coolant Temperature
- Coolant Level
- Low Fuel Pressure
- Engine Overspeed
- Battery Voltage
- Alarms and Warnings Time and Date Stamped
- Snap Shots of Key Operation Parameters During Alarms and Warnings
- Alarms and Warnings Spelled Out (No Alarm Codes)

SG100 | 9.0L | 100 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

CONFIGURABLE OPTIONS

DEMAND RESPONSE READY

ENGINE SYSTEM

- ○ Engine Block Heater
- ○ Baseframe Cover/Rodent Guard
- ○ Oil Heater
- ○ Air Filter Restriction Indicator
- ○ Radiator Stone Guard (Open Set Only)
- ○ Level 1 Fan and Belt Guards (Enclosed Units Only)

FUEL SYSTEM

- ○ NPT Flexible Fuel Line

ELECTRICAL SYSTEM

- ○ 10A UL Listed Battery Charger
- ○ Battery Warmer

ALTERNATOR SYSTEM

- ○ Alternator Upsizing
- ○ Anti-Condensation Heater
- ○ Tropical Coating
- ○ Permanent Magnet Excitation

CIRCUIT BREAKER OPTIONS

- ○ Main Line Circuit Breaker
- ○ 2nd Main Line Circuit Breaker
- ○ Shunt Trip and Auxiliary Contact
- ○ Electronic Trip Breakers

GENERATOR SET

- ○ Extended Factory Testing (3-Phase Only)
- ○ 8 Position Load Center
- ○ IBC Seismic Certification
- ○ Pad Vibration Isolators

ENCLOSURE

- ○ Weather Protected Enclosure
- ○ Level 1 Sound Attenuated
- ○ Level 2 Sound Attenuated
- ○ Level 2 Sound Attenuated with Motorized Dampers
- ○ Steel Enclosure
- ○ Aluminum Enclosure
- ○ Up to 200 MPH Wind Load Rating (Contact Factory for Availability)
- ○ AC/DC Enclosure Lighting Kit
- ○ Enclosure Heater (with Motorized Dampers Only)
- ○ Door Open Alarm Switch

CONTROL SYSTEM

- ○ NFPA 110 Compliant 21-Light Remote Annunciator
- ○ Remote Relay Assembly (8 or 16)
- ○ Oil Temperature Indication with Alarm
- ○ Remote E-Stop (Break Glass-Type, Surface Mount)
- ○ Remote E-Stop (Red Mushroom-Type, Surface Mount)
- ○ Remote E-Stop (Red Mushroom-Type, Flush Mount)
- ○ Remote Communication - Modem
- ○ 10A Engine Run Relay
- ○ Ground Fault Annunciator
- ○ Damper Kit Auxiliary Contacts (with Motorized Dampers Only)
- ○ 100 dB Alarm Horn
- ○ 120V GFCI and 240V Outlets

WARRANTY (Standby Gensets Only)

- ○ 2 Year Extended Limited Warranty
- ○ 5 Year Limited Warranty
- ○ 5 Year Extended Limited Warranty
- ○ 7 Year Extended Limited Warranty
- ○ 10 Year Extended Limited Warranty

ENGINEERED OPTIONS

ENGINE SYSTEM

- ○ Coolant Heater Ball Valves
- ○ Fluid Containment Pan

ALTERNATOR SYSTEM

- ○ 3rd Breaker System

CONTROL SYSTEM

- ○ Spare Inputs (x4) / Outputs (x4)
- ○ Battery Disconnect Switch

GENERATOR SET

- ○ Special Testing
- ○ Battery Box

SG100 | 9.0L | 100 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency

APPLICATION AND ENGINEERING DATA

DEMAND RESPONSE READY

ENGINE SPECIFICATIONS

General

Make	Generac
Cylinder #	8
Type	V
Displacement - In^3 (L)	543 (8.9)
Bore - in (mm)	4.49 (114.23)
Stroke - in (mm)	4.25 (107.95)
Compression Ratio	9.9:1
Intake Air Method	Naturally Aspirated
Number of Main Bearings	5
Connecting Rods	Forged Steel
Cylinder Head	Cast Iron
Ignition	High Energy
Piston Type	Aluminum Alloy
Crankshaft Type	Forged Steel
Lifter Type	Hydraulic Roller
Intake Valve Material	Steel Alloy
Exhaust Valve Material	Stainless Steel
Hardened Valve Seats	Yes

Engine Governing

Governor	Electronic
Frequency Regulation (Steady State)	±0.25%

Lubrication System

Oil Pump Type	Gear Driven
Oil Filter Type	Full-Flow Spin-On Cartridge
Crankcase Capacity - qt (L)	10.0 (9.5)

Cooling System

Cooling System Type	Pressurized Closed
Fan Type	Pusher
Fan Speed - RPM	2,386
Fan Diameter - in (mm)	22 (559)

Fuel System

Fuel Type	Natural Gas, Propane Vapor
Carburetor	Down Draft
Secondary Fuel Regulator	Standard
Fuel Shut Off Solenoid	Standard
Operating Fuel Pressure - in H_2O (kPa)	11 - 14 (2.7 - 3.5)
Optional Operating Fuel Pressure - in H_2O (kPa)	7 - 11 (1.7 - 2.7)

Engine Electrical System

System Voltage	12 VDC
Battery Charger Alternator	40 Amps
Battery Size	See Battery Index 0161970SBY
Battery Voltage	12 VDC
Ground Polarity	Negative

ALTERNATOR SPECIFICATIONS

Standard Model	K0130124Y21
Poles	4
Field Type	Revolving
Insulation Class - Rotor	H
Insulation Class - Stator	H
Total Harmonic Distortion	<5% (3-Phase)
Telephone Interference Factor (TIF)	<50

Standard Excitation	Synchronous Brushless
Bearings	Sealed Ball
Coupling	Direct Drive
Prototype Short Circuit Test	Yes
Voltage Regulator Type	Full Digital
Number of Sensed Phases	All
Regulation Accuracy (Steady State)	±0.25%

SG100 | 9.0L | 100 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

OPERATING DATA

DEMAND RESPONSE READY

POWER RATINGS - NATURAL GAS/PROPANE VAPOR

	Standby		Prime	
Single-Phase 120/240 VAC @1.0pf	100 kW/100 kVA	Amps: 417	90 kW/90 kVA	Amps: 375
Three-Phase 120/208 VAC @0.8pf	100 kW/125 kVA	Amps: 347	90 kW/113 kVA	Amps: 313
Three-Phase 120/240 VAC @0.8pf	100 kW/125 kVA	Amps: 301	90 kW/113 kVA	Amps: 271
Three-Phase 277/480 VAC @0.8pf	100 kW/125 kVA	Amps: 151	90 kW/113 kVA	Amps: 135
Three-Phase 346/600 VAC @0.8pf	100 kW/125 kVA	Amps: 120	90 kW/113 kVA	Amps: 108

MOTOR STARTING CAPABILITIES (skVA)

skVA vs. Voltage Dip			
277/480 VAC	30%	208/240 VAC	30%
K0130124Y21	327	K0130124Y21	327

FUEL CONSUMPTION RATES*

60 Hz Natural Gas – scfh (m³/hr)

Percent Load	Standby	Prime
25%	497 (14.1)	475 (13.5)
50%	768 (21.7)	714 (20.2)
75%	1,017 (28.8)	942 (26.7)
100%	1,280 (36.2)	1,175 (33.3)

Supply 4-14"wc
Supply not drop over 2"
from 0-100% Load

100%	487 (13.8)	450 (12.7)

60 Hz LP Liquid – gph (Lph)

Percent Load	Standby	Prime
25%	5.1 (19.3)	4.8 (18.2)
50%	7.9 (29.9)	7.3 (27.6)
75%	10.5 (39.7)	9.7 (36.7)
100%	12.9 (48.8)	11.9 (45.0)

* Fuel supply installation must accommodate fuel consumption rates at 100% load.

COOLING

		Standby	Prime
Air Flow (Fan Air Flow Across Radiator) - Open Set	scfm (m^3/min)	6,589 (186)	6,864 (194)
Coolant Flow	gpm (Lpm)	27.5 (104.1)	27.5 (104.1)
Coolant System Capacity	gal (L)	5.5 (20.8)	5.5 (20.8)
Maximum Operating Ambient Temperature	°F (°C)	122 (50)	122 (50)
Maximum Operating Ambient Temperature (Before Derate)		See Bulletin No. 0199270SSD	
Maximum Additional Radiator Backpressure	in H_2O (kPa)	0.5 (0.12)	0.5 (0.12)

COMBUSTION AIR REQUIREMENTS

	Standby	Prime
Flow at Rated Power - scfm (m^3/min)	230 (6.5)	208 (5.9)

ENGINE

		Standby	Prime
Rated Engine Speed	RPM	1,800	1,800
Horsepower at Rated kW**	hp	154	139
Piston Speed	ft/min (m/min)	1,275 (389)	1,275 (389)
BMEP	psi (kPa)	123 (846)	112 (775)

EXHAUST

		Standby	Prime
Exhaust Flow (Rated Output)	scfm (m^3/min)	771 (21.8)	682 (19.3)
Maximum Exhaust Backpressure	inHg (kPa)	0.75 (2.54)	0.75 (2.54)
Exhaust Temp (Rated Output - Post Catalyst)	°F (°C)	1,350 (732)	1,315 (713)

** Refer to "Emissions Data Sheet" for maximum bHP for EPA and SCAQMD permitting purposes.

Deration – Operational characteristics consider maximum ambient conditions. Derate factors may apply under atypical site conditions.
Please contact a Generac Power Systems Industrial Dealer for additional details. All performance ratings in accordance with ISO3046, BS5514, ISO8528, and DIN6271 standards.
Standby - See Bulletin 0187500SSB
Demand Response - See Bulletin 10000018250.

H-100 CONTROL PANEL

The Quiet-Test™ H-100 Control Panel is a digital microprocessor electronic controller that integrates all engine and transfer switch functions into a single control system.

- Digital Controls for All Saftey Shutdowns
- Isochronous Governor Control
- Digital 3 Phase Sensing Voltage Regulator
- Sealed Digital Circuit Board
- Mates with HTS Transfer Switch and Any 2-wire Start ATS
- Alarm and Event Logging
- Built-in Diagnostics
- Internal PLC

Features

- Two 4-line x 20 Displays
- Full System Status
- 3 Phase Sensing Digital Voltage Regulator
- Remote Ports
  - RS232
  - RS485
  - CANbus
- Waterproof Connections
- Built -in PLC
- Full Range Standby Operation
- Full System Status
  - 3 Phase AC Volts
  - 3 Phase Amps
  - kW
  - Power Factor
  - Reactive Power
  - Oil Pressure
  - Water Temperature
  - Water Level
  - Oil Temperature (Optional)
  - Fuel Pressure
  - Engine Speed
  - Battery Voltage
  - Alternator Frequency
  - Time
  - Date
  - Transfer Switch Status
  - Run Hours
  - Service Reminders
  - Trending
  - Fault History (Alarm Log)
  - I^2T Function for Full Generator Protection
- Shutdowns
  - Overvoltage
  - Overspeed
  - Low Oil Pressure
  - High Coolant Temperature
  - Low Coolant Level
- Remote Communications
- Configurable to NFPA 110, Level 1 or 2
- Programmable Auto Crank
- Emergency Stop
- On/Off/Manual Switch
- Not in Auto Flashing Light
- Audible Alarm for Fault Condition
- Transfer Switch Logic Communicates with HTS Transfer Switch
- Selectable Low Speed Exercise
- Temperature Range: -40° to +70°C

The generator set parameters can be manipulated and monitored without standing in front of the control panel with GenLink® software. The Generac H-100 control panel also monitors and controls transfer switch functions when used with the HTS transfer switch.

- Monitors Utility Voltage
- Monitors Generator Voltage
- Timer for Line Interrupt Delay
- Timer for Engine Warmup
- Timer for Minimum Engine Run Time
- Timer for Return to Utility Position
- Timer for Engine Cooldown
- Built-in Exerciser Timer (7 Day)
- Additional 2-wire Start Controls for Any 2-wire Transfer Switch

Part No. 0172110SBY
Rev. D 10/18/19

21 LIGHT REMOTE ANNUNCIATOR AND REMOTE RELAY PANEL

Model 0054650 Gray Remote Annunciator Panel without Relays
Model 0054660 Gray Remote Relay Panel without LEDs and Keypad (Relays Only)
Model 0054640 Gray Remote Annunciator Panel with 8 Relays
Model 0056370 Tan Flush Mount Enclosure without Annunciator
Model 0066950 Gray Flush Mount Enclosure without Annunciator

Description:

The Remote Annunciator Panel provides remote monitoring and annunciation of up to 18 generator parameters using LEDs located on the annunciator keypad. It also provides two system level warnings which are System Ready and Communications OK.

The Relay Panel has up to 8 selectable functions on form A relays; multiple relay panels can be connected for all 18 generator parameters.

The specific faults can be selected using either the DIP switches located on the annunciator circuit board or through a computer via the RS232 connection on the circuit board. All relays are energized on power up and open during a fault condition.

Communication is via a RS485 serial data link and power is supplied by the generator battery (+12 VDC or +24 VDC).

The Remote Annunciator Panel complies with NFPA 99 and NFPA 110.

Environmental Specifications:

Operating Temperature	-25 ºC to 60 ºC
Humidity	0 to 95% Non-Condensing
Power Supply	Generator Battery, +12 or +24 Volts DC
Power Usage	6 WattsTypical
Communication Line	RS485 Fully Isolated Twisted Pair Cable with Shield
Maximum Cable Length	4,000 ft
Relay Output	One NO Contact (Energized when Annunciator is Powered and No Faults are Present)
Relay Contact Rating	30 VDC, 1 A
Enclosure Rating	NEMA 1
Alarm Horn (Remote Annunciator Panels Only)	90 dB @ 10 cm

Part No. 0604160SSD
Rev. E 06/13/19

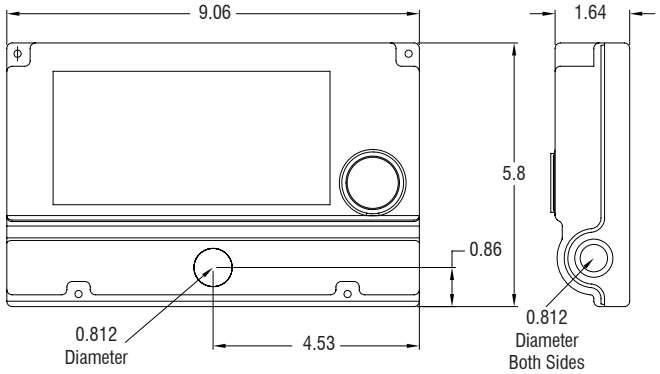
21 LIGHT REMOTE ANNUNCIATOR AND REMOTE RELAY PANEL

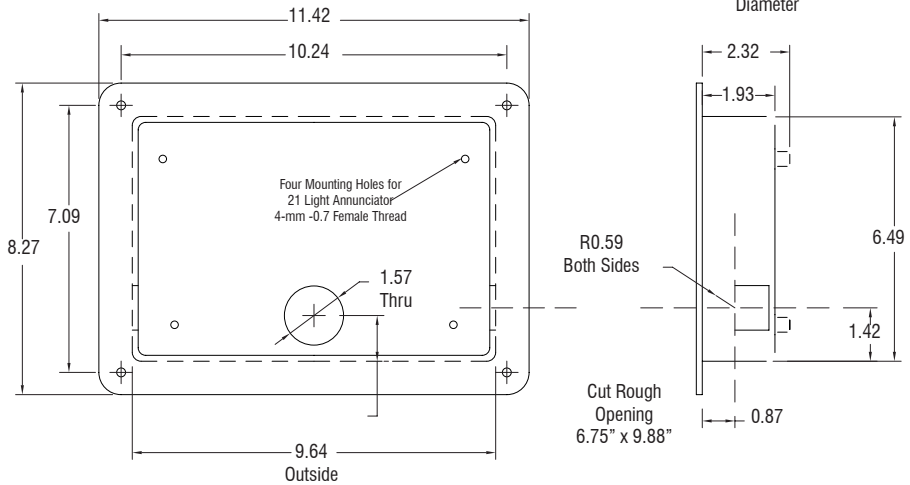
Function	Color	Alarm	Latched
Pre-Low Oil Pressure	Yellow	Yes	Yes
Pre-High Water Temperature	Yellow	Yes	Yes
Pre-Low Water Temperature	Yellow	Yes	Yes
Pre-Low Fuel	Yellow	Yes	Yes
Battery Charge AC Fail	Yellow	Yes	No
Low Battery Voltage	Yellow	Yes	No
High Battery Voltage	Yellow	No	No
Not in Auto	Red	Yes	No
RPM Sensor Loss	Red	Yes	Yes
Overcrank	Red	Yes	Yes
Overspeed	Red	Yes	Yes
Low Oil Pressure	Red	Yes	Yes
High Water Temperature	Red	Yes	Yes
Low Water Level	Red	Yes	Yes
Emergency Stop	Red	Yes	No
Gen Running	Yellow	No	No
Gen Power (ATS)	Yellow	No	No
Line Power (ATS)	Green	No	No
Systems Ready	Green	Yes	No
Communications OK	Green	Yes	No
Spare	Green	No	No

Spare Keypad Switch can be used to implement a remote start function (Model 0054640 only).

Surface Mount Annunciator

The 21 Light Annunciator can mount to a flat surface with connections through the 0.812 inch diameter knockout on the back surface or through 0.812 inch diameter knockouts on sides as shown.





Flush Mount Annunciator

This Flush Mount Box is recessed into the wall opening and the surface mount annunciator mounts to the (4) 4 mm screw holes on the back surface. After wire connections are made the front annunciator cover is attached.

Dimensions are in inches.

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P: (262) 544-4811

Part No. 0604160SSD
Rev. E 06/13/19

ALTERNATOR DATA SHEET
K0130124Y21

General Characteristics

Voltages (V)	208/240 and 480	Number of Leads	12
Frequency (Hz)	60	Winding Type	Reconnectable
Phases (Ø)	3	Air Flow (CFM)	483
Speed (RPM)	1,800	Total Harmonic Distortion (%)	<5
Excitation System	PMG/Brushless	Largest Single Harmonic Value (%)	<3.5
Insulation Class	H	Telephone Interference Factor (TIF)	<50
Winding Pitch	2/3	Reference Part Number	0J1385F01R, 0L4175V01R, 0J1385E01R, 0L4175E01R

Ratings at 0.8PF Based on 40 °C Ambient

Voltage (V)	80 °C Rise		105 °C Rise		120 °C Rise		150 °C Rise	
	kW	kVA	kW	kVA	kW	kVA	kW	kVA
208/240	99	124	119	149	130	162	140	175
480	99	124	119	149	130	162	140	175

Base Data at 480V, 162 kVA, 1,800 RPM, 60 Hz, 3Ø

Description	Value
Stator Resistance, Line to Line, High Wye Connection (Ω)	0.0250
Rotor Resistance (Ω)	2.2000
Exciter Stator Resistance - PMG/Brushless (Ω)	5.5000/6.0000
Exciter Rotor Resistance - PMG/Brushless (Ω)	0.5155/0.4565
Excitation Winding Resistance - PMG/Brushless (Ω)	1.3334/0.5042
Xd, Direct Axis Synchronous Reactance (p.u.)	2.630
X2, Negative Sequence Reactance (p.u.)	0.230
X0, Zero Sequence Reactance (p.u.)	0.030
X'd, Direct Axis Transient Reactance (p.u.)	0.180
X"d, Direct Axis Subtransient Reactance (p.u.)	0.140
Xq, Quadrature Axis Synchronous Reactance (p.u.)	1.150
T'd, Direct Axis Transient Short Circuit Time Constant (s)	0.054

Description	Value
T"d, Direct Axis Subtransient Short Circuit Time Constant (s)	0.008
T'do, Direct Axis Transient Open Circuit Time Constant (s)	1.235
Ta, Short Circuit Time Constant of Armature Winding (s)	0.018
Phase Sequence CCW-NDE	T1, T2, T3
Voltage Balance, L-L or L-N (%)	2.5
Deviation Factor (%)	7
High Wye Connection, Sustained 3Ø Short Circuit Current (%) - PMG Only	300
X/R	7
Short Circuit Ratio	0.46
Heat Rejection (BTU/hr) - 100% Rated Load, 480V, 0.8PF, 120°C Temperature Rise	59,916

Reference: Mil-STD-705B
All Ratings are Nominal

ALTERNATOR DATA SHEET
K0130124Y21

skVA

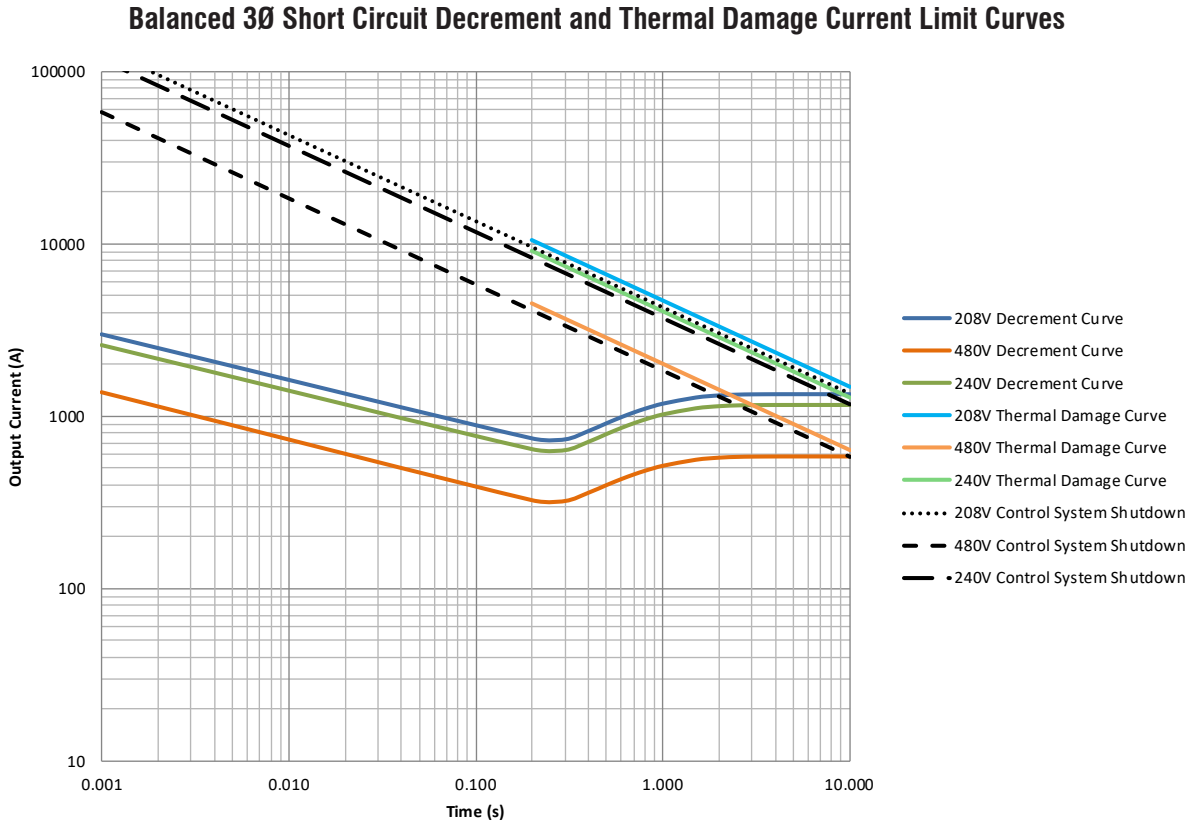
	10%	15%	20%	25%	30%	35%
480 V @ 0.3PF	77	120	169	223	292	361
480 V @ 0.6PF	94	139	192	251	327	403
208/240 V @ 0.3PF	78	120	169	223	294	365
208/240 V @ 0.6PF	89	137	192	250	327	404

Efficiencies

Rated Power*	480 @ 0.8PF	480 @ 1.0PF	208/240 @ 0.8PF	208/240 @ 1.0PF
20%	86.8	88.0	86.9	88.1
40%	89.9	92.0	90.1	92.0
60%	90.0	92.8	90.1	92.8
80%	89.3	92.6	89.1	92.5
100%	88.1	92.1	88.0	92.0

*Rated Power value is rating kW at 120 °C Winding Temperature Rise and 0.8PF

LOG LOG Decrement Curve



Part No. 0182610SSD
Rev. G 03/16/20

GENprotect ™
Seamless Protection for Industrial Power Generators

GENprotect Operation

The design choice of an onsite power system using a Generac Industrial Power Generator assures your emergency power source is protected from unexpected power distribution faults. Typically, a generator will include some type of over-current device, such as a circuit breaker, or be protected by inherent design with the controller protecting the alternator through a protection algorithm. Generac's GENprotect generator protection system monitors the system current output and protects the alternator with extended security against fault scenarios that could occur within the site's downstream distribution system.

It is a common misconception that the alternator's main circuit breaker protects the alternator from a short circuit event. The main output breaker protects the cabling and provides a convenient disconnect. The characteristic trip curve for the industry standard thermal magnetic breaker (MCCB, molded case thermal magnetic or solid state) does not coordinate with the thermal damage limitation for an on-site generator. If circuit breakers are used for generator protection, a solid-state circuit breaker with full adjustments (Long Time, Short Time and Instantaneous, LSI) is required to coordinate the breaker protection curve within the generator thermal damage curve. Historically, this limitation was often accepted in system design since failures of the main generator feeder are extremely rare. Most short circuit events happen at a branch circuit, equipment level, where the fault is easily cleared by the smaller down stream breakers.

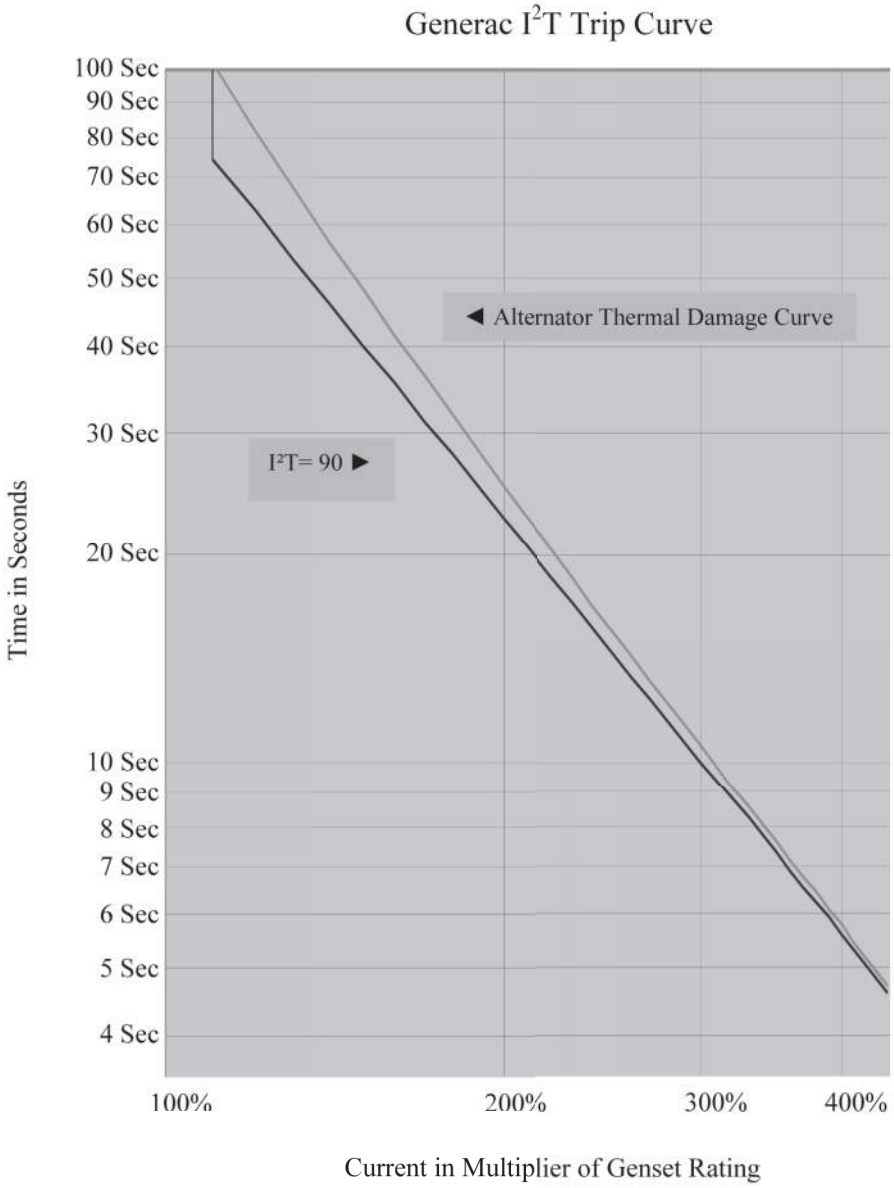
Given the mission critical nature of today's back-up power applications, it is more desirable to protect the system against even relatively rare failure modes. As generator controllers have become more powerful it is feasible for manufactures to supply coordinated short circuit protection integral to the generator control system, negating the need for a main-line circuit breaker.

Generac's GENprotect alternator protection algorithm monitors the generator output. If this monitoring senses short circuit current in excess of rated amps, GENprotect steps in to provide a controlled and safe approach to breaker coordination and alternator protection. GENprotect first limits the alternator short circuit current level to 300%. By limiting the available fault current, GENprotect extends the time the alternator can maintain fault current resulting in consistent breaker coordination. Without this functionality a line to neutral fault may be at 800% of rated current and need to be cleared within 1.4 seconds. The second function GENprotect performs is I2T thermal protection for the alternator. Since a short circuit event can heat the alternator so rapidly, it is not possible to protect the alternator by monitoring temperature. Instead GENprotect calculates the heat energy of the fault current. When this energy reaches the limits of NEMA MG1, GENprotect trips the generator off-line. This configuration ensures the alternator is protected and the power system is ensured 10 seconds of 300% fault current for breaker coordination.

DESCRIPTION

- GENprotect is an alternator protection algorithm approved by UL.
- Protects alternator from damage due to shorts and electrical faults.
- Provides breaker coordination and alternator protection.
- Allows for use of multiple circuit breaker choices, including "no" breaker.

GENprotect ™
Seamless Protection for Industrial Power Generators



The above Figure shows the Generac GENprotect thermal protection curve for use in protection and coordination studies. The alternator Thermal Damage Curve is shown just to the right of the GENprotect protection curve. If the alternator load is greater than the thermal damage protection curve for the alternator, the generator set will trip off-line. For example, an overload current of 110% for 75 seconds causes an overload alarm and will trip the generator off-line, shutting down the engine. GENprotect will provide generator protection over a full range of time and current, from instantaneous faults to overloads lasting several minutes. An advantage of GENprotect over a MCCB is that GENprotect allows for downstream breakers to clear faults without tripping the generator off-line, providing selective coordination with the first level of downstream breakers.

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Doc. No 0187980SBY
Rev. D 06/13/19

INDUSTRIAL GENSET - BATTERY INDEX

• Warranty by Exide Corp. • Exide e-mail: tbgna@exide.com • 800-782-7848 National Hot line

INDUSTRIAL SPARK-IGNITED GENSETS - AVAILABLE BATTERIES

			GENERAC PART #					
Engine	System Voltage	Battery Quantity	058208 (Group 24F)	077483 (Group 26)	058665 (Group 27F)	061119 (Group 31)	061104 (Group 8D)	BT0015A02 (Group 8D)
G2.4	12	1		X				
G4.5	12	1			X	X		
G9.0	12	1			X	X		
G14.2	24	2					X	
G21.9	24	2					X	
G25.8	24	2					X	
G33.9	24	4					X	
G49.0	24	4					X	X

INDUSTRIAL DIESEL GENSETS - AVAILABLE BATTERIES

			GENERAC PART #			
Engine	System Voltage	Battery Quantity	058665 (Group 27F)	061119 (Group 31)	061104/BT0015A00 (Group 8D)	BT0015A02 (Group 8D)
D2.2 Perkins	12	1	X	X		
D2.4 Generac	12	1	X	X		
D3.4 Generac	12	1	X	X		
D4.5 FPT	12	1		X		
D6.7 FPT 100, 130kW	12	1 or 2†		X		
D6.7 FPT 150, 175kW	12	2†		X		
D8.7 FPT	24	2		X		
D10.3 FPT	24	2		X	X	
D12.9 FPT	24	2		X	X	
D12.5 Perkins	24	2			X	
D15.2 Perkins	24	2			X	
D16.0 Volvo	24	2		X	X	
D18.1 Perkins	24	2			X	
D33.9 MHI	24	2			X	X
D37.1 MHI	24	4			X	X
D49.0 MHI	24	4			X	X
D65.4 MHI	24	4			X	X

			DIMENSIONS (in) NOMINAL		
Part Number	Group Number*	Nominal CCA @ 0° F	L	W	H
058208	24F	525	6.75	10.63	9.00
077483	26	525	6.75	8.25	7.75
058665	27F	700	6.75	12.50	9.00
061119	31	925	6.75	13.00	9.40
061104/ BT0015A00	8D	1,155	11.00	20.80	10.00
BT0015A02	8D	1,300	11.00	20.80	10.00

All batteries are 12V, 6 cell construction, lead calcium type.
For 24V systems, batteries are wired in series.

X Battery available with electrolyte and installed in genset.
† Single or dual-paralleled battery options are available on 100 and 130kW. Single-battery option not available on 150 and 175kW.
* BCI Group Size reference.

Part No. 0161970SBY
Rev. L 8/24/20

GENERATOR ENCLOSURES

DESCRIPTION

GENERAC POWER SYSTEMS' generator enclosures provide year-round weather protection for your power equipment. Engineered with functionality and value in mind, the enclosure design benefits are unique in that the enclosures utilize dimensionally matched components for either a weather protective configuration or a sound attenuated/acoustic configuration. With common components used between design, modification and on-site upgrades can be accomplished with ease.

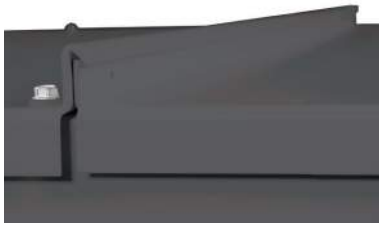
The enclosure design offers several benefits over the "standard enclosures" of other manufacturers. Generac's enclosures have been created with the goal of maximizing the customer's product performance satisfaction while maintaining the functionality of reducing exterior noise levels and discouraging product tampering.

Although others may require a "premium" for a self-enclosed exhaust system, rugged steel panel construction or protective polyethylene washers under all exterior panel fasteners, Generac includes these and several other features on every enclosure configuration. Be sure to compare. Generac Enclosures offer additional design enhancement extras that other "standard enclosures" do not.

Doc No. 0163180SBY
Rev. E 06/10/19

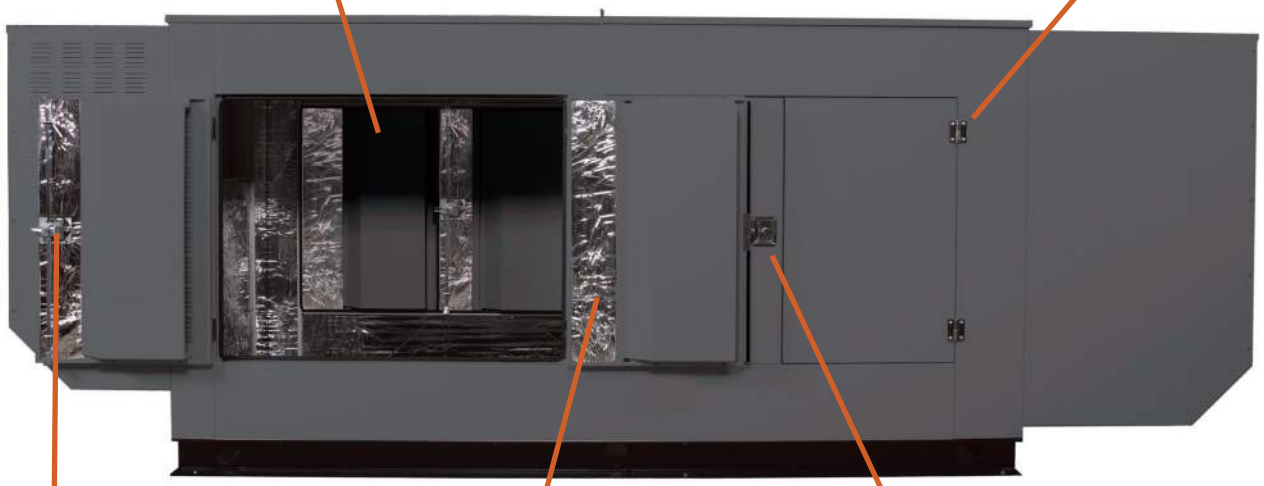
GENERATOR ENCLOSURES

Post-Free Twin Doors
Provide Large, Unobstructed Service Access

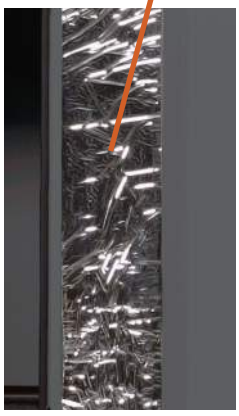


Gasket-Free, Interconnected Roof Panel Joint
Drip-Free, Maintenance-Free

Heavy Gauge, Stainless Steel, Partial Pin Hinges with Nylon Spacers
Durable, Corrosion-Free, Removable Doors



Two-Point Door Latch System
Ensures Proper Seal Preventing Water Ingress and Sound Egress



Dense, Closed-Cell Foam Insulation with Reflective Silver Mylar Layer
Improved Sound Attenuation Without Damaging Effects From Radiant Heat Exposure

Lockable Turn and Tuck Stainless Steel Latch Handle
Corrosion-Free, Non-Protruding and Secure

Doc No. 0163180SBY
Rev. E 06/10/19

GENERATOR ENCLOSURES

FEATURES:	BENEFITS:
Dimensional matching of acoustic and non-acoustic enclosure designs	Reduces variation in fuel tank pricing, inventory; removes need to change out fuel tank or retrofit
Standardized enclosure components *	Ease of retrofit or upgrade to acoustic system; reduced parts inventory, costs
Enclosure mounted directly to unit baseframe	Simplified delivery and installation with enclosure and unit in single component design
Electrostatically painted panels	Maximum protection from weather elements
12 or 14 gauge steel based on kW rating	Maximum sound attenuation, protection and product life
Aluminum Enclosure optional	Prevents corrosion in coastal regions
Stainless steel door latch and hinge hardware	Provides extended component life; maximum protection against rusting
Stainless steel door latch strike plate	Maximum protection against enclosure paint damage from door latch pin
Door hinges utilize slip-pin design	Provides quick door removal for full-unit access
Polyethylene gasketing under door hinges	Additional protection for enclosure paint finish
Keyed door latches	Protection for equipment and personnel
Large removable access doors	Ease of maintenance
Relocation of access doors	Provides improved access to MLCB on all units
Redesigned door gasketing	Improved sealing quality from sound and weather elements
Weather resistant aluminum roof design with drip ledge	Provides optimum moisture/rain runoff from unit
Cabled and gasketed radiator access cover	Provides improved radiator access and additional protection from weather elements
Acoustic roof panels manufactured with mechanical retention pins	Increased acoustic foam retention within unit
Polyethylene washers under all panel fasteners	Additional paint finish protection from stainless steel fastener
Internally fastened enclosure panels (where possible)	Provides streamlined unit appearance
Additional roof panel stiffener	Added overall compartment rigidity and acoustic foam panel retention
Self-enclosed exhaust system	Provides safe unit operation; no enclosure hot spots; streamlined unit appearance
Discharge air duct has been designed with minimal fasteners	Ease of removal and access to exhaust system
Stainless steel exhaust band clamps	Provides extended component life; ensures proper exhaust seal
Drain holes within air ducts	Enables maximum water run-off
Rodent-proof, tamper proof enclosure design	Safety and security for personnel and equipment
Redesigned baseframe lifting lugs	Ease of unit relocation; prevents compartment damage from lifting straps
Up to 200 MPH wind kit options (Contact Factory for Availability)	Meets locally enforced wind requirements

* Consult Generac Power Systems, Inc. for installation drawings for specific configurations and dimensions.

CIRCUIT BREAKER 40-600 AMP

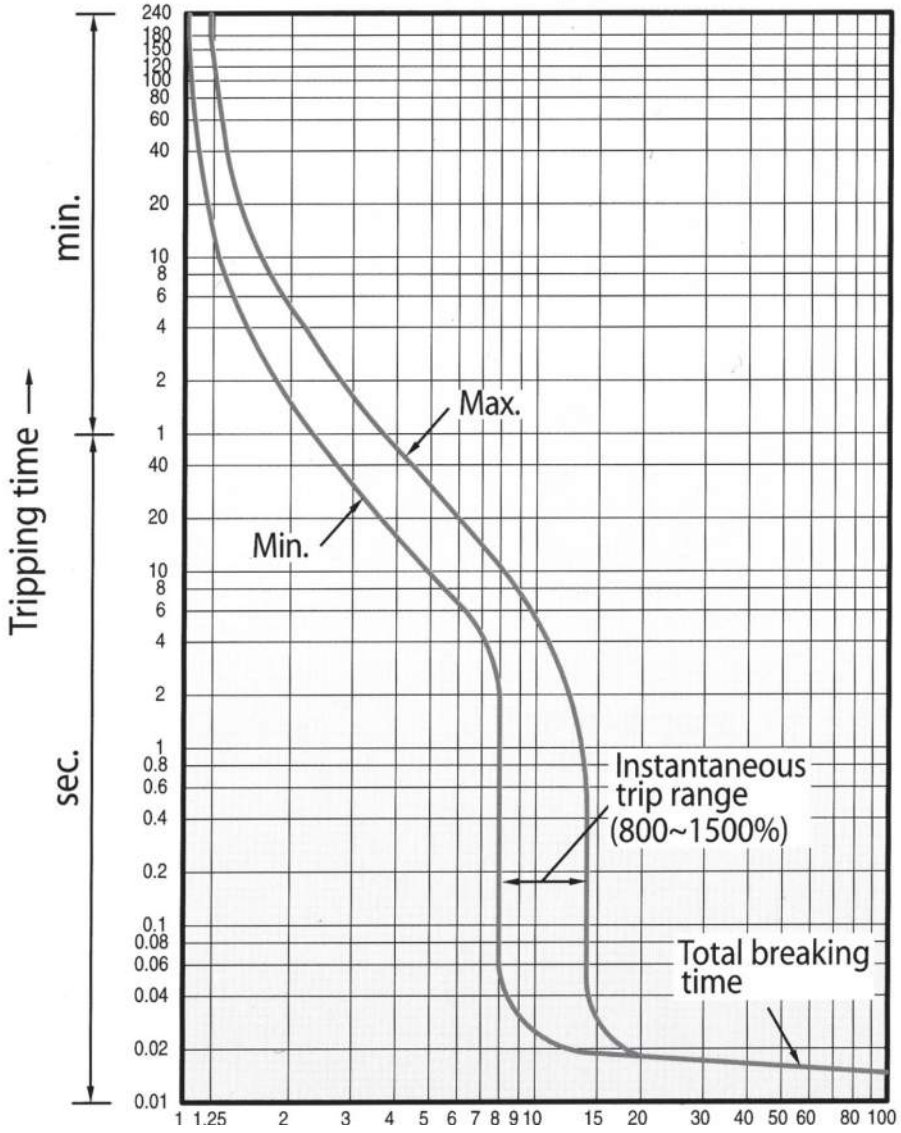
GENERAC CIRCUIT BREAKER INFORMATION							
Circuit Breaker Amps	Generac C.B. Lug Part Number	Lug Description	Wire Size Per 310-16*	Frame	Interrupt Rating	Rating Temp.	Type
40	0F8451	Single Hole 0.656 Diameter # 6 to 300 MCM Cu/Al Single Conductor Only Mounting Bolt 70 in lbs. Wire Lug is 375 in lbs.	#8	200 Amp Frame	18,000	40 °C	Thermal Magnetic
50			#8				
60			#6				
70			#4				
80			#4				
90			#3				
100			#3				
125			#1				
150			1/0				
175			2/0				
200			3/0				
225	0A7822	(1) - 600 MCM to # 4 Cu/Al or (2) - 250 MCM to (2) - 1/0	4/0	400 Amp Frame	25,000		
250			250MCM				
300			350MCM				
350		Mounting 70 in lb. Wire Lug is 375 in lb	500MCM				
400			600MCM				
450	0F9721 Standard Lug	(3) - 2/0 - 400 MCM Cu/Al 480 in lb.	700MCM or 2 - 4/0	600 Amp UL Rated Frame	35,000		
500	0F8452 Optional Lug - 450-600A		2 - 250 MCM				
600		(2) - 500-750 mcm Cu/Al Optional Lug	2 - 350MCM or 3-3/0				

All circuit breakers are CUL 489 listed for 120, 208, 240, 480 Volts. Wire size is based on Amp Ratings at 75 °C from Table 310.16, 2008 NEC. All Lugs Are Rated 75 °C.

Derate by Temperature	
Temperature °C	Rated Trip Current %
20	110
30	105
40	100
50	95

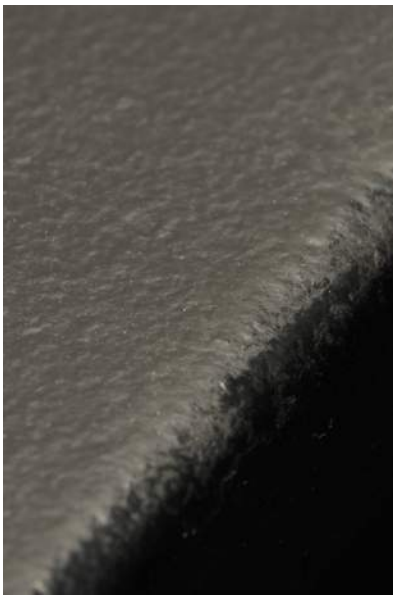
Part No. 0172520SBY
Rev. F 11/20/19

CIRCUIT BREAKER
40-600 AMP



Part No. 0172520SBY
Rev. F 11/20/19

RhinoCoat™



Generac's RhinoCoat™ finish system provides superior durability as a standard for all Generac Industrial enclosures, tanks and frames.*

Testing Standards

Generac's RhinoCoat™ finished surfaces are subjected to numerous tests. These include:

- ASTM D - 1186 - 87.....2.5+ MIL Paint Thickness
- ASTM D - 3363 - 92a.....Adequate Material Hardness
- ASTM D 522 - B.....Resistant to Cracking
- ASTM D 3359 - B.....Exceptional Adhesion
- ASTM B117 D 1654.....Resistant to Salt Water Corrosion
- ASTM D1735 D 1654.....Resistant to Humidity
- ASTM 2794 93 (2004).....Exceptional Impact Resistance
- SAEJ1690 - UV Specifications.....UV Protection

In addition to the testing standards above, Generac adds the following test requirements more specific to generator applications:

- Resistant to Typical Oils
- Resistant to Typical Fuels
- Resistant to Typical Antifreeze
- Resistant to Distilled Water

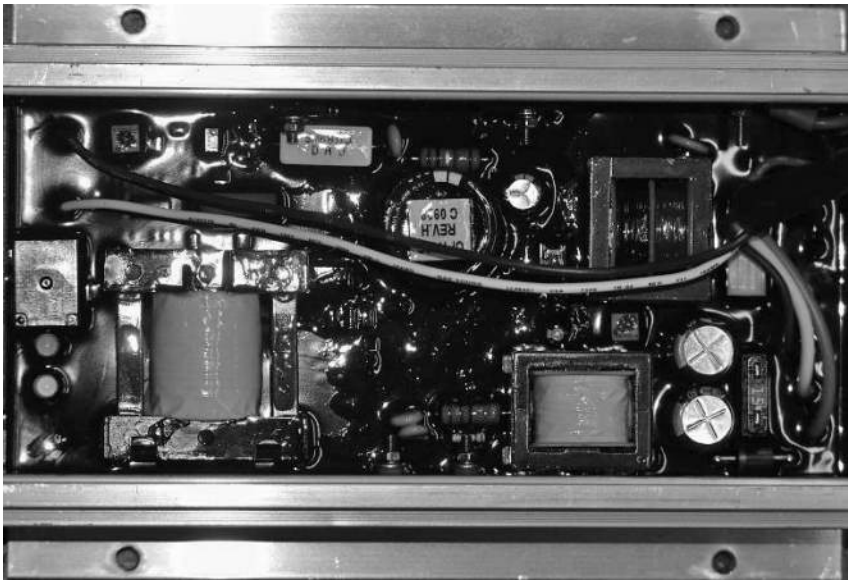
Primary Codes and Standards

*RhinoCoat™ powder coat paint is durable and corrosion resistant however it is not a rust preventative. Generac pretreats all powder coated parts to assist with resistance to corrosion.

Generac Power Systems, Inc. | P.O. Box 8 | Waukesha, WI 53187
P: (262) 544-4811

Part No. 0180230SBY
Rev. F 11/16/19

BATTERY CHARGER
2.5 amp and 10 amp



Battery charger shown from inside of control panel enclosure. Connections are made via an attached harness.

The Generac 2.5 amp 12 volt and 10 amp 12/24 volt battery chargers are designed to work with Generac Industrial Controls to provide the ultimate in automatic battery voltage maintenance.

The 2.5 amp charger is self-regulating and produces instantaneous output current adjustments to keep the battery charged to an optimum level. Battery voltage is read on the control panel digital display.

The 10 amp charger has automatic float and equalize control. It precisely monitors the battery's voltage and automatically activates the correct charging mode. The charge rate is limited and controlled to efficiently and safely maintain ideal battery levels under varying conditions.

The equalize system uses a control circuit to limit charging current to 10 amps. When battery voltage drops below a preset level, charging current increases to 5 amps and then to the 10 amp charge rate if needed. When the battery reaches maximum charge, the charger switches to float mode to supply just enough current to maintain the battery at or above 13/26 volts. Battery voltage and charging current are read at the control panel digital display.

Specifications	2.5A	10A
Nominal Input	120 VAC	120 VAC
Operating AC Line Voltage Range	108 to 132 VAC	108 to 132 VAC
Input AC Line Frequency	50/60 Hz	50/60 Hz
Battery Fuse	N/A	15 A
Nominal Charge Rate	2.5 A	10 A
Equalize Voltage	N/A	13.8/27.6 V
Float Voltage	13.4 V	13.0/26.0 V
Current @ Equalize to Float Transition	N/A	5 A
Battery Under-voltage shutdown	N/A	11/22 V
LED Indicators	No	Yes
AC Line Voltage	N/A	Green LED
Battery Connected and Charging	N/A	Yellow LED
Battery Current Drain	30 mA	30 mA
AC Line Connection	Connector Plug	Connector Plug
Battery Connection	Connector Plug	Connector Plug
Control Connection		AC Power Fail Form Relay Form C 2 A Rating
CUL Recognized	Yes	Yes
NFPA 110 Compliant	No	Yes
AGM Compatible	No	Yes
UL1236	No	Yes
CSA 22.2 No. 107	No	Yes

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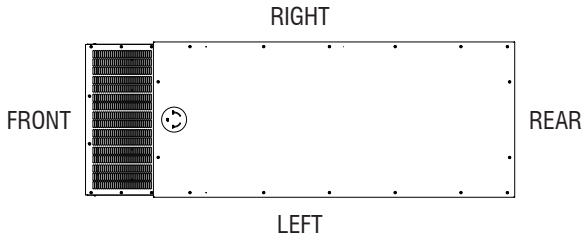
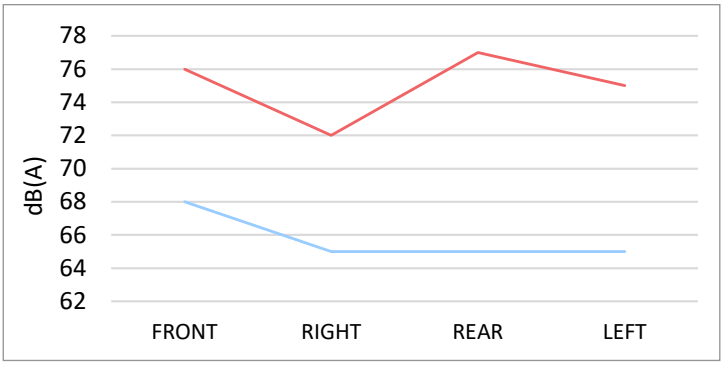
Part No.0191900SBY
Rev. E 08/12/19

LEVEL 2 SOUND ATTENUATED ENCLOSURE
G9.0L SG100

60Hz NO-LOAD, dB(A)										DISTANCE: 7 METERS
MICROPHONE LOCATION	OCTAVE BAND CENTER FREQUENCY (Hz)									
	31.5	63	125	250	500	1,000	2,000	4,000	8,000	dB(A)
FRONT	34	53	55	60	64	62	57	57	48	**68**
RIGHT	39	55	55	56	59	59	57	54	45	**65**
REAR	39	60	59	55	61	57	50	47	39	**65**
LEFT	39	53	55	55	59	59	55	54	45	**65**
AVERAGE	**38**	**55**	**56**	**56**	**61**	**60**	**54**	**53**	**44**	**66**

60Hz FULL-LOAD, dB(A)										DISTANCE: 7 METERS
MICROPHONE LOCATION	OCTAVE BAND CENTER FREQUENCY (Hz)									
	31.5	63	125	250	500	1,000	2,000	4,000	8,000	dB(A)
FRONT	39	64	74	63	66	65	58	57	47	**76**
RIGHT	41	61	70	59	62	60	58	55	45	**72**
REAR	40	64	76	61	62	58	52	49	40	**77**
LEFT	42	60	74	58	62	59	56	54	45	**75**
AVERAGE	**40**	**62**	**74**	**60**	**63**	**61**	**56**	**53**	**45**	**75**





- All positions at 23 feet (7 meters) from side faces of generator set.
- Test conducted on a 100 foot diameter asphalt surface.
- Sound pressure levels are subject to instrumentation, installation and testing conditions.
- Sound levels are ±2 dB(A).

Part No. 0196740SSD
Rev. D 11/17/20

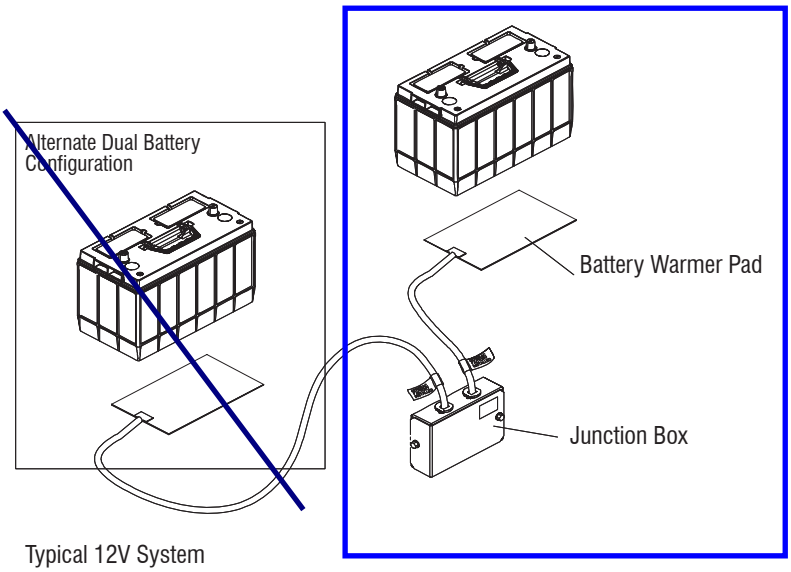
BATTERY PAD WARMER

DESCRIPTION

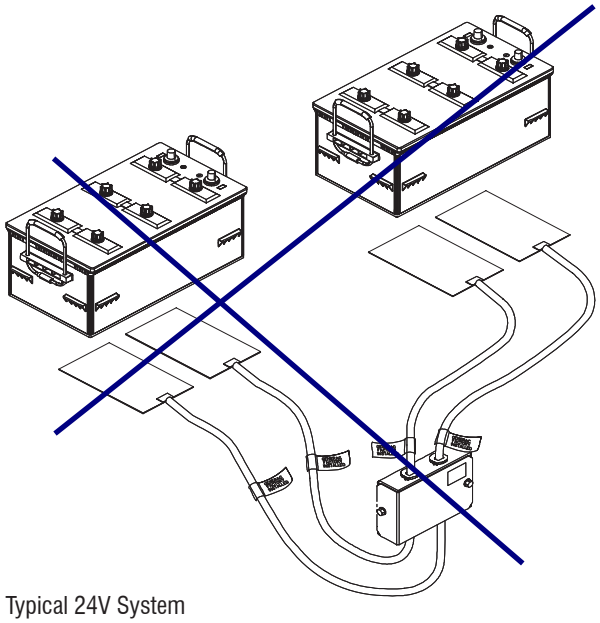
Battery warmers are designed to keep batteries warm and ensure maximum engine cranking speed in cold climate installations. Warming pads are thermostatically controlled, UL listed and factory-wired. 120 VAC is supplied to the warming pad junction box via power cord plugged into a GFCI receptacle or hard-wired to a circuit breaker in a genset-mounted load panel (if equipped).

SPECIFICATIONS

- Power: 75W @ 120 VAC
- Current: 0.625A @ 120 VAC
- Heating Element Type: Wire-Wound
- Pad Material: Silicone Rubber/Fiberglass
- Thermostatic Control
- Open: 40°F, Close: 20°F
- Factory Installed and Wired
- UL Listed
- All Dimensions and Specification are Nominal
- Battery Warmer
- Dimensions: 254 X 152 MM (10 X 6 IN)



Typical 12V System



Typical 24V System

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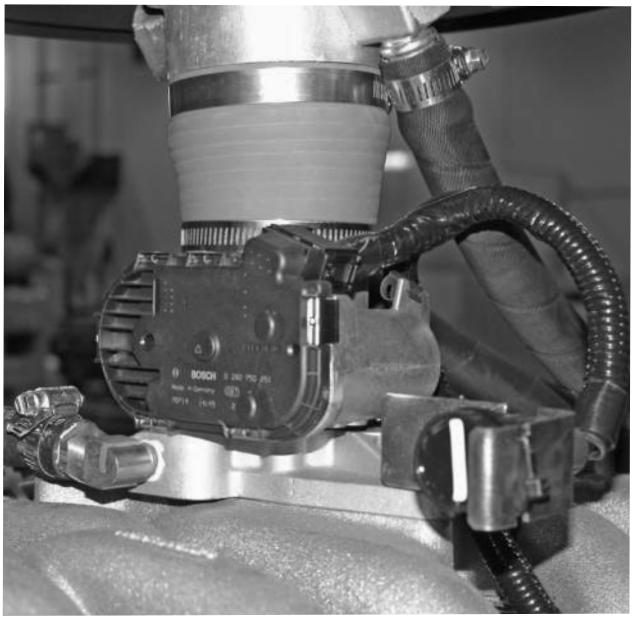
Part No. 0197620SSD
Rev. E 5/11/2020

ELECTRONIC GOVERNOR
Spark-Ignited Engines



Generac's electronic isochronous governor systems are standard on all Spark-Ignited gensets utilizing Generac's Digital Control Platforms.

- Isochronous Speed Regulation
- ±0.25% Steady State Regulation
- Factory Installed and Adjusted
- Fully Adjustable
- Quiet-Test™ Low-Speed Exercise Capability
- Fast Response
- High Reliability
- Environmentally Sealed

ACTUATOR

Die cast enclosure housing the throttle plate and the gear-driven rotary actuator with the interior components sealed against dust, dirt and moisture. The gear drive is directly connected to the throttle plate for fast and precise control. Safety spring-return to a closed position upon loss of power.

Design	Bosch
Type	Electronically Actuated Throttle Valve
Operating Voltage	12/24VDC
Response Time	<100 ms
Operating Temperature Range	-40˚F to 284˚F
Output	Rotary (internal - no linkage)

CONTROLLER

The governor driver module is located in the generator control panel. A sealed unit with waterproof connections and a feedback circuit from the actuator for throttle plate position. Generac software controls speed governing, and is fully adjustable.

The Generac electronic governor system applies to all spark-ignited gensets with Generac's Digital Control Platforms.

COOLANT HEATER OPTION
1500 WATT, 120VAC

SPECIFICATIONS:

VOLTAGE: 120VAC

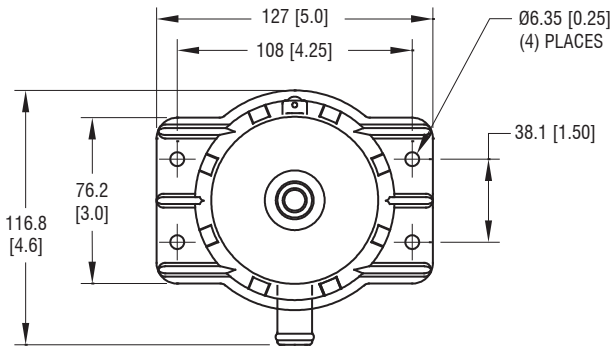
HEAT POWER: 1500W

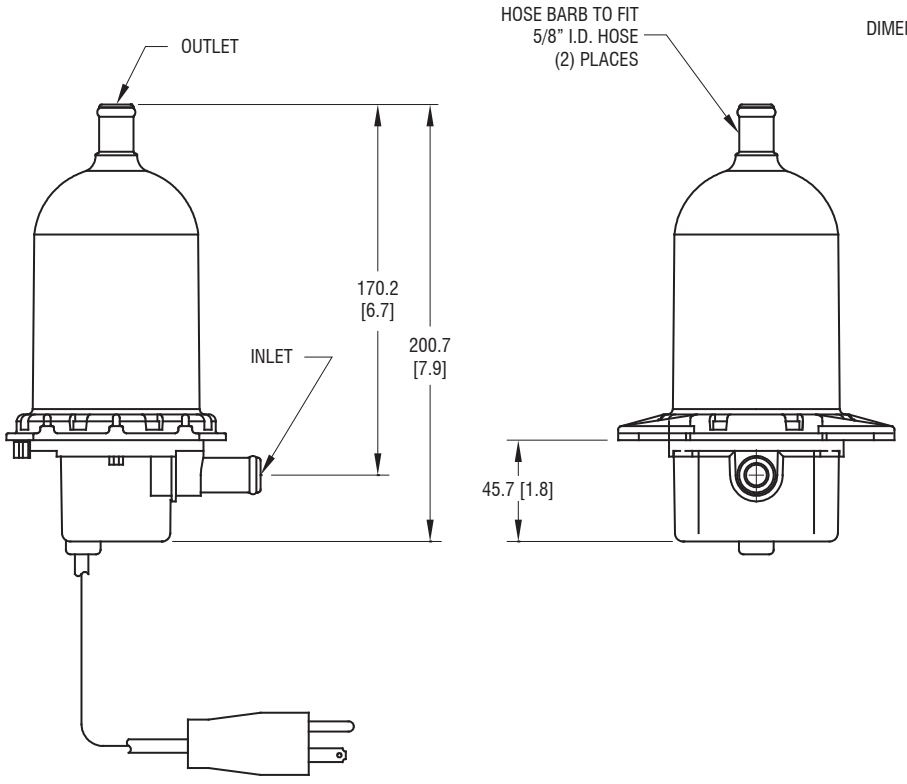
FIXED THERMOSTAT: 60°-80°F

HEATING ELEMENT: INCOLOY 800

MAXIMUM PRESSURE: 90 PSI (620 kPa)

PLUG NEMA STD: 5-15P





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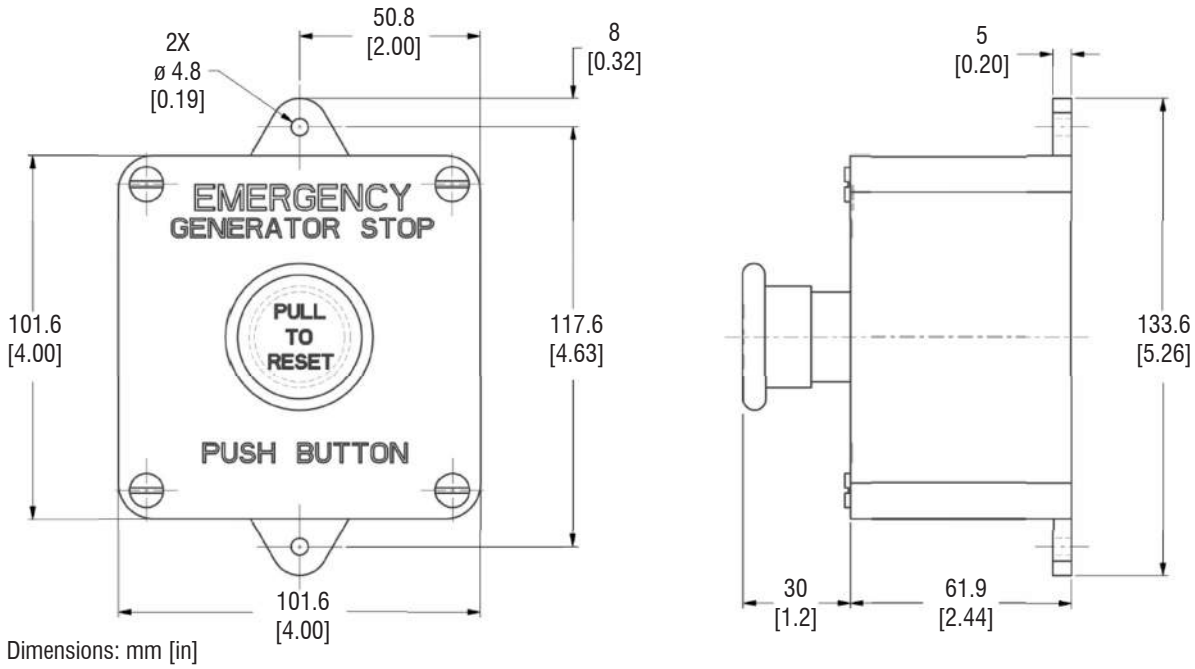
P: (262) 544-4811

Part No. 084918Q
05/13/15

REMOTE EMERGENCY STOP SWITCH
Surface Mount, H-Panel



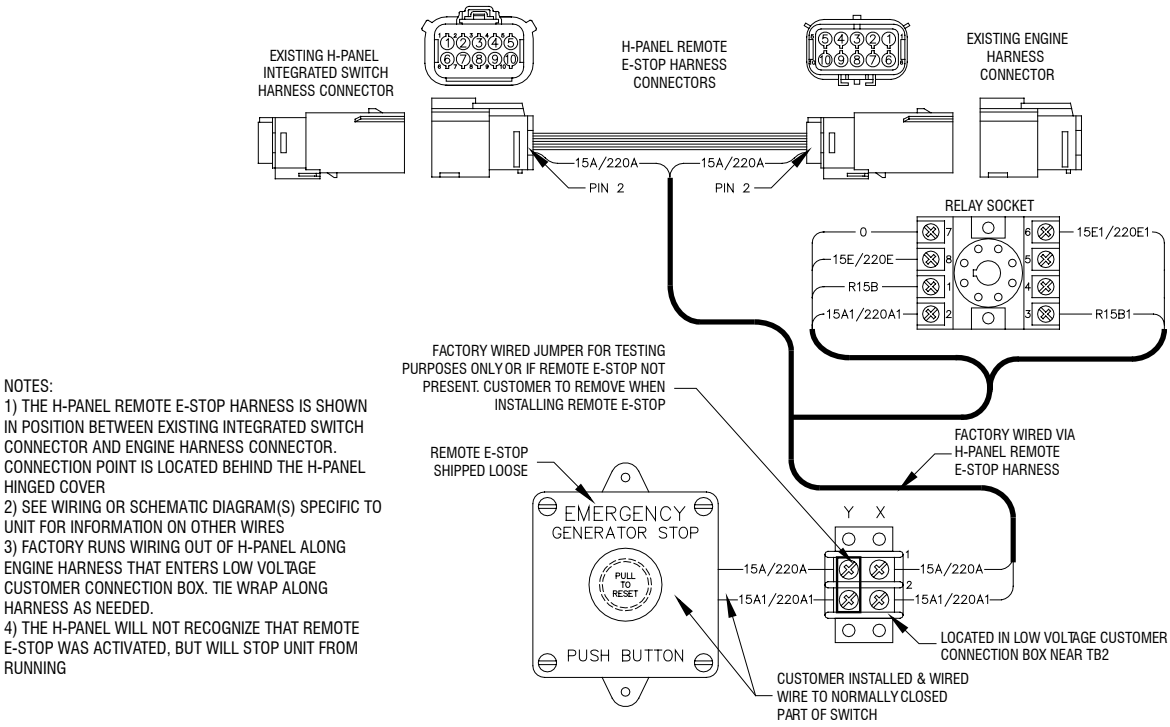
Dimensions: mm [in]

Specifications

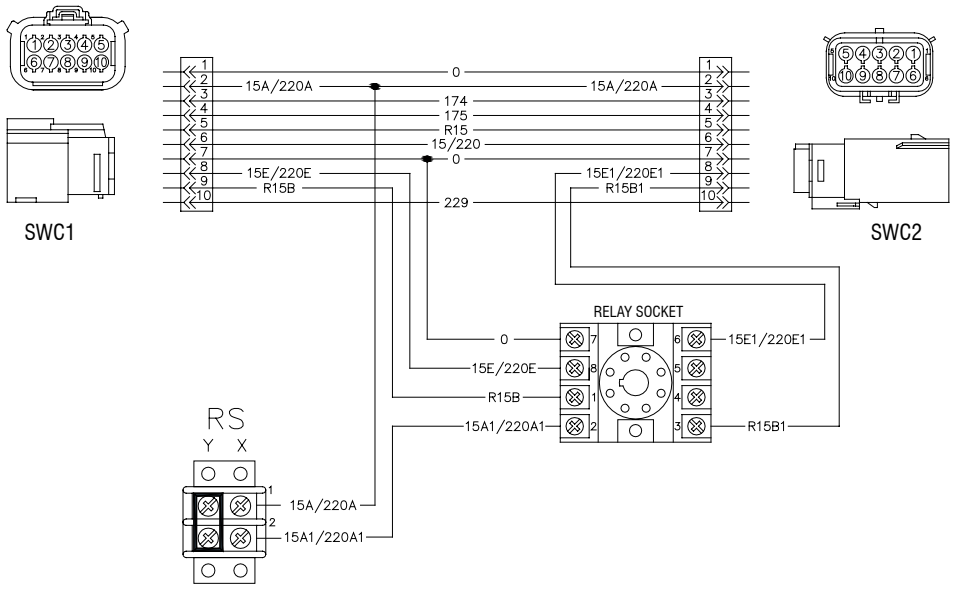
Generac Part Number: 061129E
Surface Mount, NEMA 4X
Nonmetalic Back Box
Contact Rating: 10A at 120V

REMOTE EMERGENCY STOP SWITCH
Surface Mount, H-Panel

Wiring - H-Panel



NOTES:
1) THE H-PANEL REMOTE E-STOP HARNESS IS SHOWN IN POSITION BETWEEN EXISTING INTEGRATED SWITCH CONNECTOR AND ENGINE HARNESS CONNECTOR. CONNECTION POINT IS LOCATED BEHIND THE H-PANEL HINGED COVER
2) SEE WIRING OR SCHEMATIC DIAGRAM(S) SPECIFIC TO UNIT FOR INFORMATION ON OTHER WIRES
3) FACTORY RUNS WIRING OUT OF H-PANEL ALONG ENGINE HARNESS THAT ENTERS LOW VOLTAGE CUSTOMER CONNECTION BOX. TIE WRAP ALONG HARNESS AS NEEDED.
4) THE H-PANEL WILL NOT RECOGNIZE THAT REMOTE E-STOP WAS ACTIVATED, BUT WILL STOP UNIT FROM RUNNING



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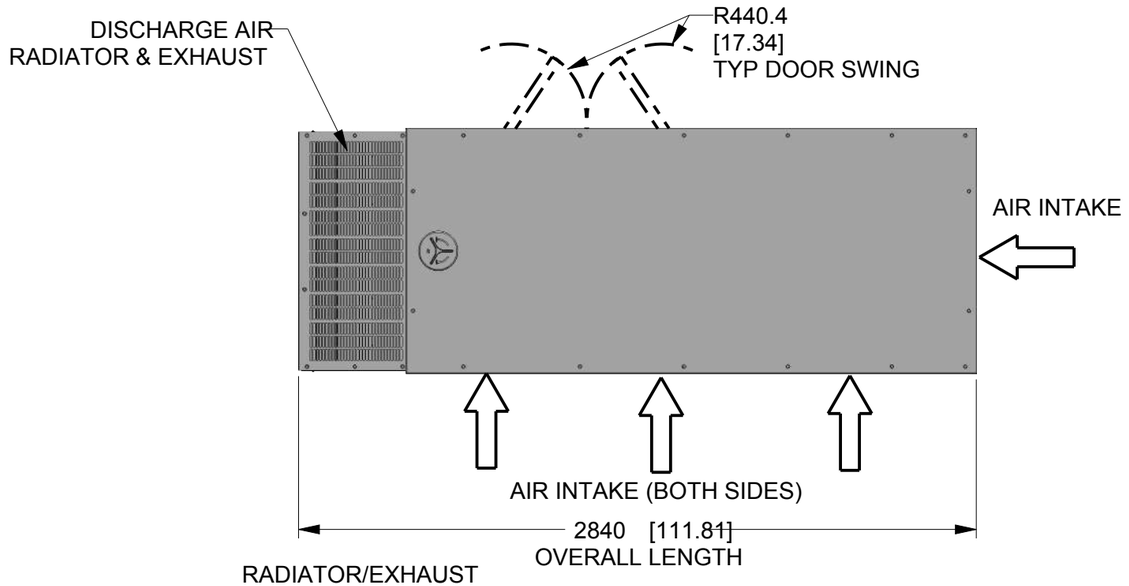
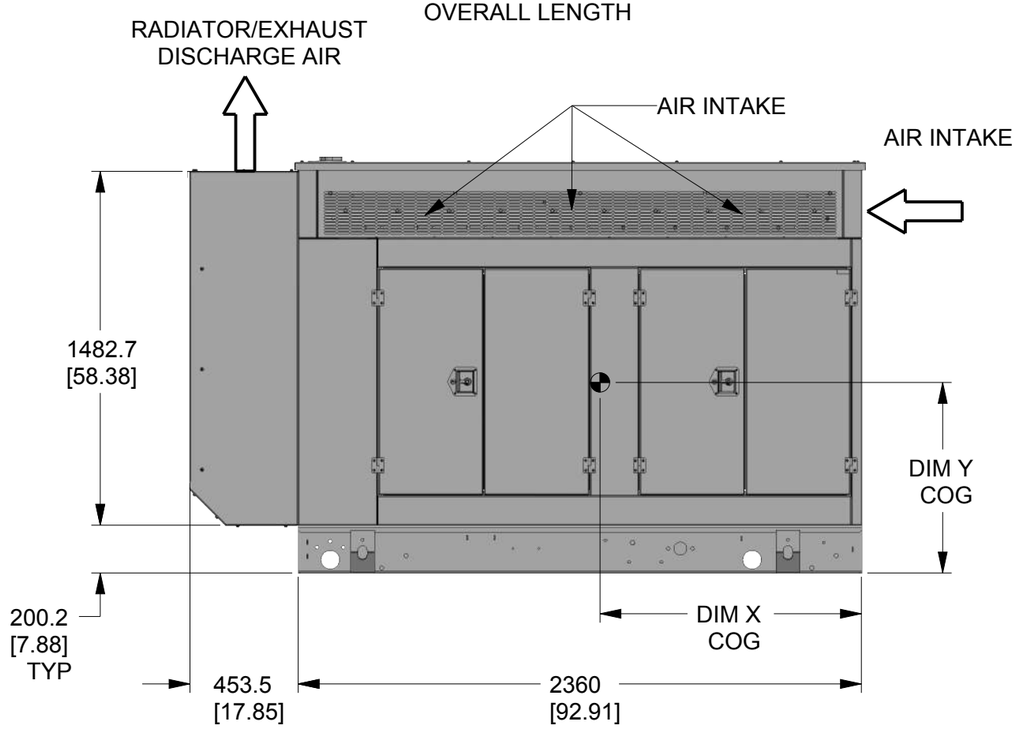
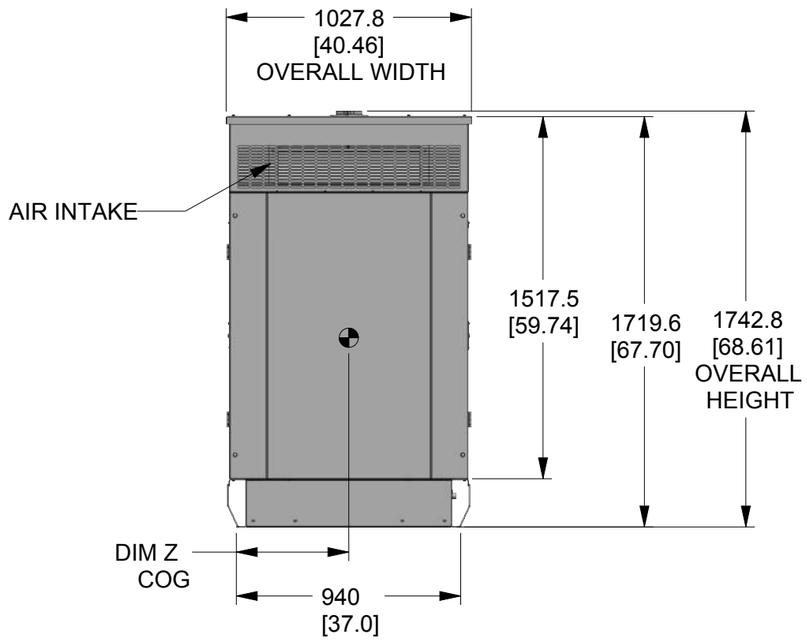
Part No. 0L6260
Rev. B 07/10/19



FOR ALL STUB-UP, WEIGHT, AND COG DETAILS, SEE
CORRESPONDING OPEN SET DRAWING PER UNIT CONFIGURATION





DRAWING CREATED FROM PRO/ENGINEER 3D FILE. ECO MODIFICATION TO BE APPLIED TO SOLID MODEL ONLY.

DIMENSIONS ARE IN MILLIMETERS [INCHES]

INSTALLATION DRAWING

ELECTRONICALLY APPROVED
INSIDE WINDCHILL

GENERAC

TITLE
L2A ENCLOSURE
G8.0L, 60HZ: SG080, PG072 50HZ: SG064, PG058
G9.0L, 60HZ: SG100, PG090 50HZ: SG080, PG072

ISSUE DATE:	07/25/14		
SIZE B	CAGE NO	DWG NO 0K0383C	REV C-1
SCALE 0.050	WT-KG	SHEET 1 of 1	

GAS SUPPLY CHECK LIST

- **Gas Service Meter and Serving Utility**
  - Available on site and reliable
  - Rated for the combined loading of the facility and the generator (total BTU)
  - Maintains generator minimum pressure requirements while under maximum loading
- **Step Down Pressure Regulators**
  - Selected for the pressure and flow needs of the generator
  - Direct acting type with good dynamic response (no significant time lags in regulation)
  - Selected for minimum no-load to full load pressure droop (< 1-2" w.c desired)
  - Located near the generator (allows the long piping runs to be at higher pressure)
  - Located at least 10' away from generator connection (avoids regulator oscillations)
  - Dedicated to a single generator (increases system reliability)
- **Piping**
  - Sized large enough to minimize pressure drops to acceptable levels under full gas flow
  - Minimize the number of elbows to avoid unwanted pressure drops
  - Ensure entire gas supply system maintains acceptable generator pressure under full gas flow conditions
  - Should be connected to generator with a flexible connection
  - Should include a drip leg (sediment trap)
- **LP**
  - LP tank's boil off rate (BTU capacity) needs to support rated BTU at minimum ambient
  - LP liquid withdrawal systems should be considered: cold ambients, small tanks, large generators
  - LP liquid systems require pressure rated piping and vaporization outside a building
- **Generac Design Resources**
  - "Installation Guidelines for Stationary Industrial Generators" manual 046622 (detailed information)
  - "Power Design Pro" software -- mechanical design tab (gas piping pressure drop calculator)
- **National Codes and Standards**
  - NFPA 37 "Installation and use of Stationary Combustion Engines"
  - NFPA 54 "National Fuel Gas Code"
  - NFPA 58 "LP Gas Code"

Part No. 10000002132
Rev. C 11/15/19

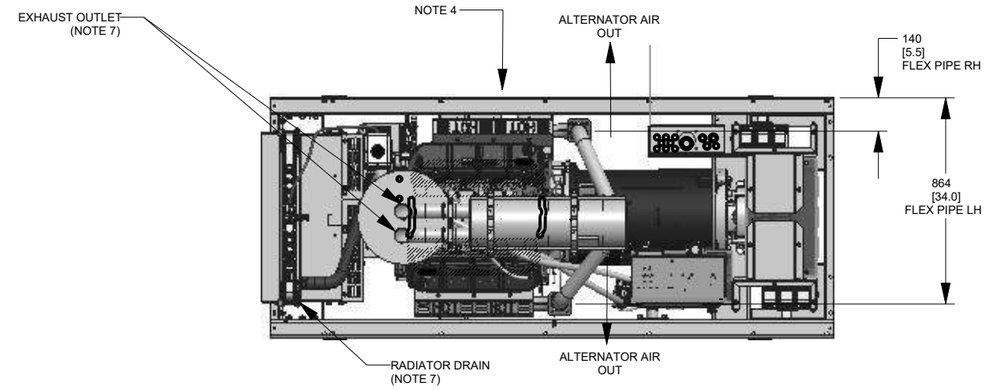
SH	REV	WINDCHILL VERSION
1/3	B	B.1

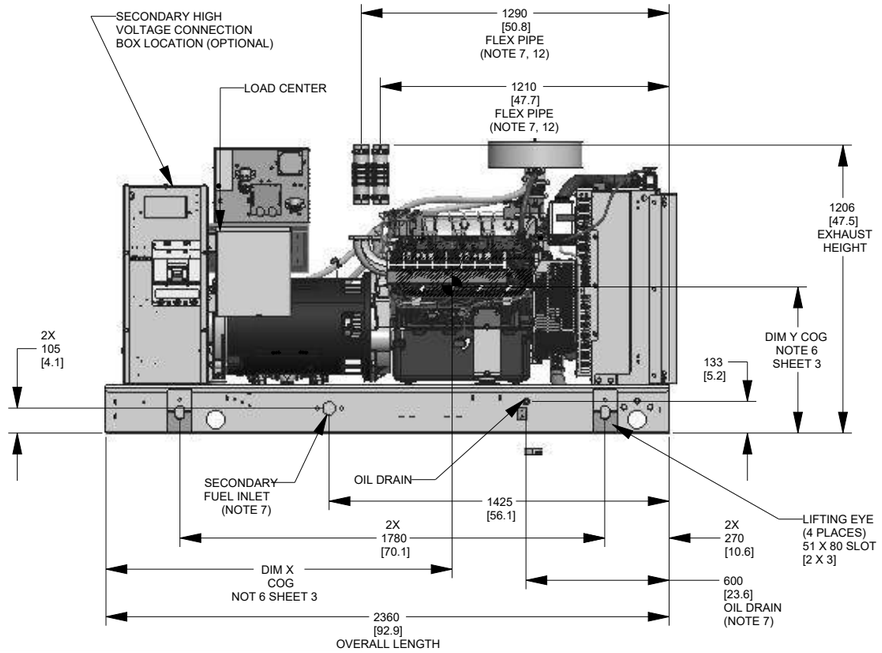
NOTES:
1. CONTROL PANEL, (OPTIONAL BATTERY CHARGER INSIDE).
2. 120V, 20A GFCI & 250V, 15A OUTLET (OPTIONAL).
3. CONNECTION POINTS FOR CONTROL WIRES PROVIDED IN THE LOW VOLTAGE CONNECTION BOX (USE LOW VOLTAGE STUB-UP AREA).
4. BATTERY (12 VOLT NEGATIVE GROUND SYSTEM).
5. MAIN LINE CIRCUIT BREAKER (MLCB), AC LOAD LEADS. (DIMENSIONS MAY VARY DUE TO UNIT CONFIGURATION)
6. CENTER OF GRAVITY AND WEIGHT MAY CHANGE DUE TO UNIT OPTIONS.

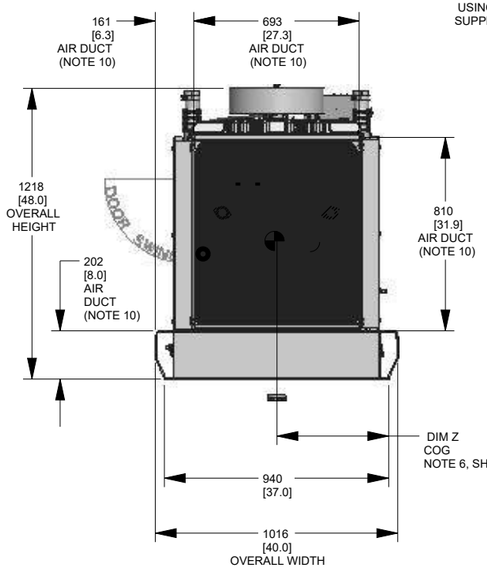
7. ENGINE SERVICE CONNECTIONS:
   INLET NATURAL GAS = 1-1/4" FEMALE NPT COUPLING
   INLET LP LIQUID = 1/4"-18 NPT FEMALE
   INLET DIESEL = N/A
   RETURN DIESEL = N/A
   OIL DRAIN = 1/2" NPT FEMALE COUPLING
   RADIATOR DRAIN = 3/8" BARB FITTING
   FLEX PIPE OUTLET = 2.5" I.D.
   EXHAUST OUTLET = 2.5" O.D.

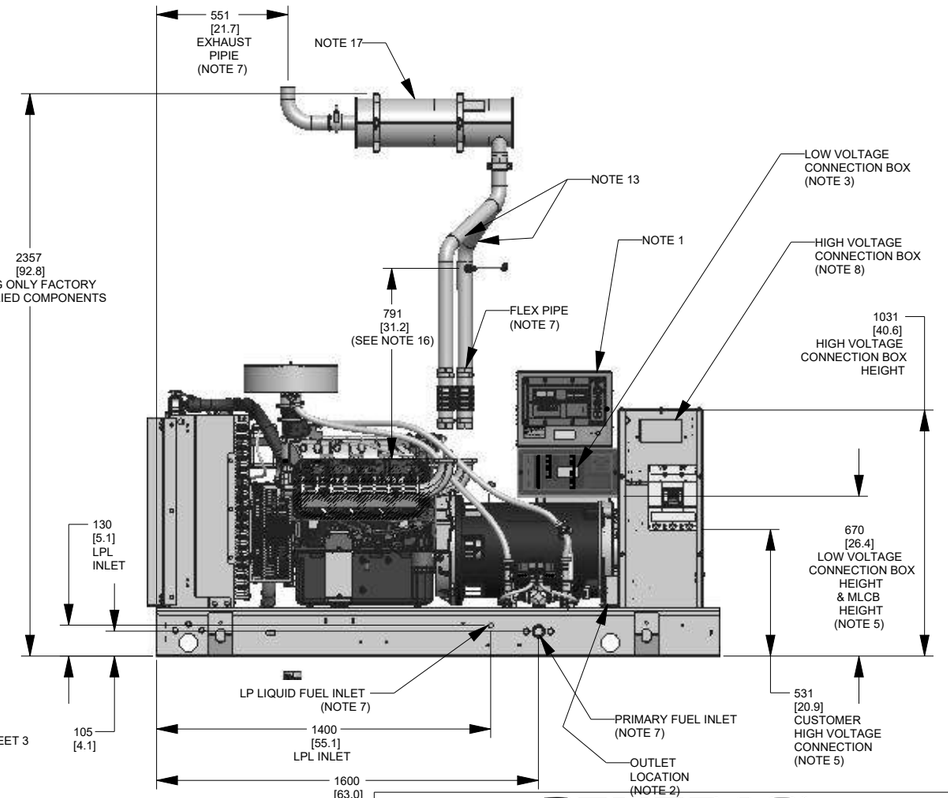
***** SEE GENERATOR SIZING GUIDE FOR FUEL PIPE SIZING TO SUIT APPLICATION *****

8. AUXILARY AC CONNECTION FOR UNIT OPTIONS ARE LOCATED IN HIGH VOLTAGE CONNECTION BOX, UNLESS AN OPTIONAL LOAD CENTER IS INSTALLED.
9. EXHAUST PIPES MAY BE ROTATED TO ALLOW MUFFLER TO POINT OUT TO THE RIGHT OR LEFT SIDE OF GENERATOR. (MAY NOT APPLY TO ALL UNITS)
10. GENERATOR SET MUST BE INSTALLED SUCH THAT FRESH COOLING AIR IS AVAILABLE AND DISCHARGE AIR FROM THE RADIATOR IS NOT RECIRCULATED.
11. BOTTOM OF GENERATOR SET MUST BE ENCLOSED TO PREVENT PEST INTRUSION AND RECIRCULATION OF DISCHARGE AIR AND/OR IMPROPER COOLING AIR FLOW.
12. EXHAUST SYSTEM MAXIMUM BACK PRESSUE = 37 INCHES H20.
13. INSTALL EXHAUST BLANKETS ALONG THIS LINE.
14. CONNECT THE OPEN SET EXHAUST PER NFPA 37
15. BLANKETS SHOULD NOT COVER OXYGEN SENSOR.
16. OXYGEN SENSOR MUST BE MOUNTED BETWEEN ENGINE OUTLET AND SILENCER INLET AS SHOWN. IF ELBOW IS REQUIRED, ONLY SINGLE ELBOW MAY BE USED.
17. CATALIZED SILENCER (FOR EPA UNITS) MUST BE MOUNTED IN DESCRIBED POSITION. FAILING TO FOLLOW THESE INSTRUCTIONS WHEN INSTALLING A CERTIFIED ENGINE IN A PIECE OF STATIONARY EQUIPMENT VIOLATES FEDERAL LAW 40 CFR 1068.105(b),
18. BOLTS OR STUDS USED TO MOUNT UNIT TO PAD SHALL BE 5/8 - 11 GRADE 5.
    ADDITIONAL NOTES: FOR WEIGHT AND CENTER OF GRAVITY DATA SEE NOTE 6, AND SHEET 3.









DIMENSIONS ARE IN MILLIMETERS [INCHES]

DRAWING CREATED FROM PRO/ENGINEER 3D FILE. ECO MODIFICATION TO BE APPLIED TO SOLID MODEL ONLY.

INSTALLATION DRAWING

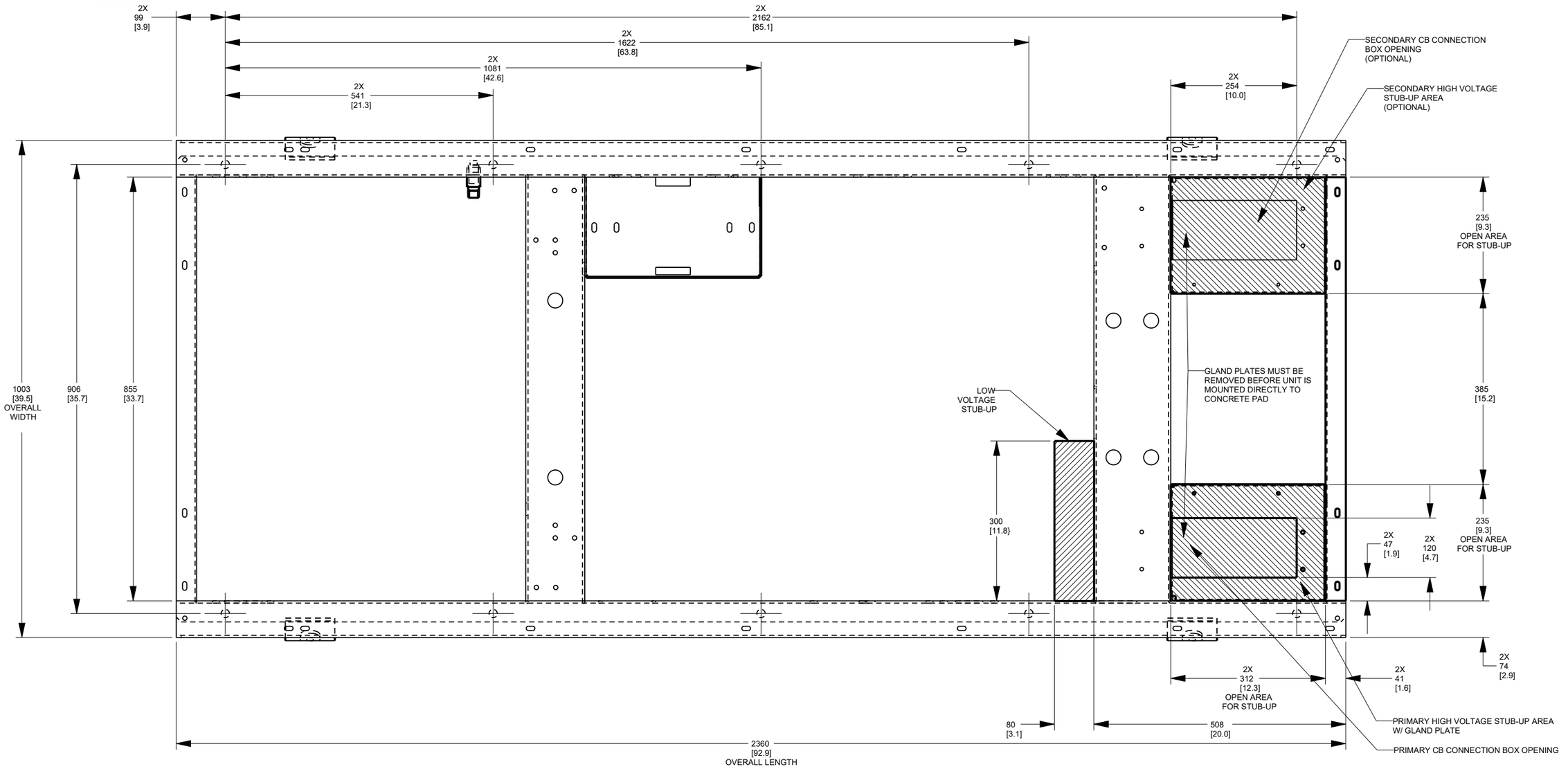
ELECTRONICALLY APPROVED
INSIDE WINDCHILL

GENERAC

TITLE
OPEN SET
G9.0L 60 HZ: SG080, PG072
SG100. PG090

ISSUE DATE:	4/3/17				
SIZE	CAGE NO	DWG NO			REV
B	N/A	10000013539			B
SCALE	0.040	WT-KG	N/A	SHEET	1 of 3

RECOMMENDED ELECTRICAL STUB-UP	
(HIGH VOLTAGE STUB-UP) AC LOAD LEAD CONDUIT FOR PERMANENT MAGNET EXCITATION CONNECTION BOX	
LOW VOLTAGE STUB-UP	



DRAWING CREATED FROM PRO/ENGINEER 3D FILE. ECO MODIFICATION TO BE APPLIED TO SOLID MODEL ONLY.

INSTALLATION DRAWING

ELECTRONICALLY APPROVED INSIDE WINDCHILL

GENERAC

TITLE

STUB-UP VIEW
G9.0L, 60HZ: SG080, PG072
SG100, PG090

ISSUE DATE:	04/03/16		
SIZE B	CAGE NO N/A	DWG NO 10000013539	REV B
SCALE 0.120	WT-KG N/A	SHEET 2 of 3	

OPEN SET

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG 080, PG 072	240V, Ø	1,018 kg [2,245 lbs]	1308 [51.5]	509 [20.1]	466 [18.3]
SG 080/100, PG 072/090	240V, Ø (100kw)	1,068 kg [2,355 lbs]	1275 [50.2]	506 [19.9]	
SG 100, PG 090	240v, Ø (130kw UPSIZED)	1,132 kg [2,496 lbs]	1229 [48.4]	502 [19.8]	
SG 080, PG 072	208V, 240V, 480V, & 600V	1,023 kg [2,256 lbs]	1305 [51.4]	509 [20.0]	
SG 080/100. PG 072/090	208V, 240V, 480V, & 600V (100kw)	1,075 kg [2,371 lbs]	1271 [50.1]	506 [19.9]	
SG 100, PG 090	208V, 240V, 480V, & 600V (130kw UPSIZED)	1,153 kg [2,543 lbs]	1218 [47.9]	501 [19.7]	

NOTE:
CENTER OF GRAVITY AND WEIGHT MAY CHANGE DUE TO UNIT OPTIONS.

STD ENCLOSURE, STEEL

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG 080, PG 072	240V, Ø	1,258 kg [2,774 lbs]	1343 [52.9]	577 [22.7]	444 [17.5]
SG 080/100, PG 072/090	240V, Ø (100kw)	1,308 kg [2,884 lbs]	1315 [51.8]	572 [22.5]	
SG 100, PG 090	240v, Ø (130kw UPSIZED)	1,372 kg [3,025 lbs]	1275 [50.2]	566 [22.3]	
SG 080, PG 072	208V, 240V, 480V, & 600V	1,263 kg [2,785 lbs]	1341 [52.8]	577 [22.7]	
SG 080/100. PG 072/090	208V, 240V, 480V, & 600V (100kw)	1,315 kg [2,900 lbs]	1312 [51.6]	571 [22.5]	
SG 100, PG 090	208V, 240V, 480V, & 600V (130kw UPSIZED)	1,393 kg [3,072 lbs]	1266 [49.8]	564 [22.2]	

STD ENCLOSURE, ALUMINUM

WEIGHT	CENTER OF GRAVITY DIM "X"	CENTER OF GRAVITY DIM "Y"	CENTER OF GRAVITY DIM "Z"
1,136 kg [2,504 lbs]	1338 [52.7]	547 [21.5]	500 [19.7]
1,186 kg [2,615 lbs]	1307 [51.5]	543 [21.4]	
1,250 kg [2,756 lbs]	1264 [49.8]	538 [21.2]	
1,141 kg [2,515 lbs]	1335 [52.6]	547 [21.5]	
1,193 kg [2,630 lbs]	1304 [51.3]	542 [21.3]	
1,271 kg [2,802 lbs]	1253 [49.3]	536 [21.1]	

L1A ENCLOSURE, STEEL

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG 080, PG 072	240V, Ø	1,331 kg [2,935 lbs]	1283 [50.5]	591 [23.3]	445 [17.5]
SG 080/100, PG 072/090	240V, Ø (100kw)	1,381 kg [3,045 lbs]	1259 [49.6]	585 [23.0]	
SG 100, PG 090	240v, Ø (130kw UPSIZED)	1,445 kg [3,186 lbs]	1224 [48.2]	579 [22.8]	
SG 080, PG 072	208V, 240V, 480V, & 600V	1,336 kg [2,946 lbs]	1281 [50.4]	590 [23.2]	
SG 080/100. PG 072/090	208V, 240V, 480V, & 600V (100kw)	1,388 kg [3,061 lbs]	1256 [49.4]	585 [23.0]	
SG 100, PG 090	208V, 240V, 480V, & 600V (130kw UPSIZED)	1,466 kg [3,233 lbs]	1215 [47.9]	577 [22.7]	

L1A ENCLOSURE, ALUMINUM

WEIGHT	CENTER OF GRAVITY DIM "X"	CENTER OF GRAVITY DIM "Y"	CENTER OF GRAVITY DIM "Z"
1,168 kg [2,630 lbs]	1308 [51.5]	555 [21.9]	440 [17.3]
1,218 kg [2,685 lbs]	1280 [50.4]	550 [21.7]	
1,282 kg [2,826 lbs]	1239 [48.8]	545 [21.5]	
1,173 kg [2,586 lbs]	1306 [51.4]	555 [21.9]	
1,225 kg [2,701 lbs]	1276 [50.2]	550 [21.7]	
1,303 kg [2,873 lbs]	1229 [48.4]	543 [21.4]	

L2A ENCLOSURE, STEEL

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG 080, PG 072	240V, Ø	1,389 kg [3,062 lbs]	1366 [53.8]	665 [26.2]	443 [17.4]
SG 080/100, PG 072/090	240V, Ø (100kw)	1,439 kg [3,172 lbs]	1340 [52.8]	657 [24.7]	
SG 100, PG 090	240v, Ø (130kw UPSIZED)	1,503 kg [3,314 lbs]	1303 [51.3]	648 [25.5]	
SG 080, PG 072	208V, 240V, 480V, & 600V	1,394 kg [3,073 lbs]	1364 [53.7]	664 [26.1]	
SG 080/100. PG 072/090	208V, 240V, 480V, & 600V (100kw)	1,446 kg [3,188 lbs]	1337 [52.6]	656 [25.8]	
SG 100, PG 090	208V, 240V, 480V, & 600V (130kw UPSIZED)	1,524 kg [3,360 lbs]	1294 [50.9]	645 [25.4]	

L2A ENCLOSURE, ALUMINUM

WEIGHT	CENTER OF GRAVITY DIM "X"	CENTER OF GRAVITY DIM "Y"	CENTER OF GRAVITY DIM "Z"
1,193 kg [2,630 lbs]	1308 [51.5]	594 [23.4]	439 [17.3]
1,243 kg [2,740 lbs]	1280 [50.4]	587 [23.1]	
1,307 kg [2,881 lbs]	1239 [48.8]	580 [22.8]	
1,198 kg [2,641 lbs]	1306 [51.4]	593 [23.3]	
1,250 kg [2,756 lbs]	1276 [50.2]	586 [23.1]	
1,328 kg [2,928 lbs]	1229 [48.4]	577 [22.7]	

DRAWING CREATED FROM PRO/ENGINEER 3D FILE. ECO MODIFICATION TO BE APPLIED TO SOLID MODEL ONLY.

INSTALLATION DRAWING

ELECTRONICALLY APPROVED
INSIDE WINDCHILL

GENERAC

TITLE
WEIGHT & CENTER OF GRAVITY
G9.0L 60HZ: SG080, PG072
SG100, PG090

ISSUE DATE: 04/3/17

SIZE	CAGE NO	DWG NO	REV
B	N/A	10000013539	B

SCALE 0.040 | WT-KG N/A | SHEET 3 of 3

FUEL SPECIFICATION
Natural Gas

Generac products are designed to run on natural gas and are tested for performance and reliability with clean, dry, pipeline quality natural gas. The properties presented in this standard represent the natural gas used in product testing. The performance and reliability of Generac products using non-conforming fuels are unknown and cannot be guaranteed.

Natural gas is, by definition, any gas that occurs organically, but this standard focuses on natural gas that is intended for use as fuel in reciprocating internal combustion engines. This natural gas is generally assumed to have specific properties, but compositional differences and contaminates greatly influence the fuel's quality and combustion stability. This variation can lead to lower power output, pre-ignition, detonation, and corrosion if the fuel does not meet this standard. This standard identifies an acceptable fuel composition for use in Generac products.

Fuel Specifications

The fuel used by Generac is clean, dry, pipeline quality natural gas adhering to the following:

Component / Property	Unit	Range
Methane	% Volume	80 Minimum
Ethane	% Volume	0-10
Propane	% Volume	0-5
Butanes	% Volume	0-2
Pentanes and Heavier	% Volume	0-0.5
Nitrogen and Other Inerts	% Volume	0-3
Carbon Dioxide	% Volume	0-3
Total Diluents Gases	% Volume	0-5
Hydrogen Sulfide	g/100scf (mg/m3)	0.25-0.3 (6-7)
Total Sulfur	g/100scf (mg/m3)	5-20 (115-460)
Water Vapor	lb/MMscf (mg/m3)	4-7 (60-110)
High Heating Value	Btu/scf (kJ/m3)	950-1,150 (35,400-42,800)
Methane Number	MN	80 Minimum

Notes:
- The fuel must be free of liquid water and hydrocarbons at delivery temperature and pressure.
- The fuel must be free of particulate matter.

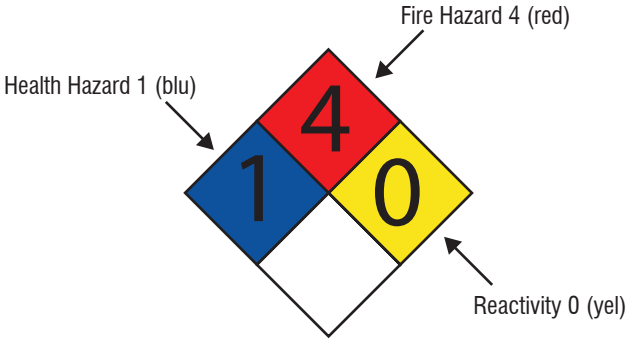
Hazards Information

Emergency Overview

DANGER!
EXTREMELY FLAMMABLE GAS - MAY CAUSE FLASH FIRE OR EXPLOSION!

High concentrations may exclude oxygen and cause dizziness and suffocation. Contact with pressurized vapor may cause frostbite or freeze burn.

NFPA 704 Hazard Identification System



4 - Severe	3 - Serious	2 - Moderate	1 - Slight	0 - Minimal

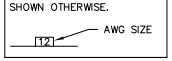
Part No. A0000641394
Rev. B 4/13/2020

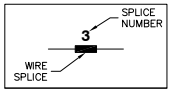
LEGEND

AFS	– AIR/FUEL SOLENOID*	IFT	– INTERFACE TRANSFORMER
AH1	– ALARM HORN	INS	– IGNITION NOISE SUPPRESSION
ALT	– DC CHARGE ALTERNATOR	J_	– ENGINE CONTROL MODULE CONN.
AVR	– AUTOMATIC VOLTAGE REGULATOR	LFP	– LOW FUEL PRESSURE SWITCH
BCC	– BATTERY CHARGER CONNECTOR	MLCB	– MAIN LINE CIRCUIT BREAKER
BCH	– BATTERY CHARGER	MOD	– MODEM CONNECTOR
CB	– CIRCUIT BREAKER DPE	MPU1	– MAGNETIC PICKUP
CO	– CROSSOVER CONNECTOR	NB	– NEUTRAL BLOCK
COM	– COMMUNICATIONS PORT	OPS1	– OIL PRESSURE SENDER
CT_	– CURRENT TRANSFORMER	OS	– OXYGEN SENSOR*
DB	– DIODE BRIDGE	OTC	– OIL TEMPERATURE CONNECTOR
DIST	– DISTRIBUTOR	OTS_	– OIL TEMPERATURE SENDER
ES1	– EMERGENCY STOP SWITCH	R1	– RESISTOR
EXC	– EXCITER	RB_	– RELAY BOARD
F_	– FUSE	RB_A	– RELAY BOARD CONNECTOR
FS_	– FUEL SOLENOID	SC	– START CONTACTOR
FSP	– FUEL SOLENOID PLUG	SM	– STARTER MOTOR
FSR	– FUEL SOLENOID RECEPTACLE	SW1	– OFF/AUTO/MANUAL SWITCH
GA_	– GOVERNOR ACTUATOR	SWC	– OPERATOR SWITCH CONNECTOR
GD	– GOVERNOR DRIVER	TB_	– TERMINAL BLOCKS
GFCI	– GROUND FAULT CURRENT INTERRUPT*	WLS_	– COOLANT LEVEL SENDER
GND	– GROUND BAR CONNECTION	WTS_	– COOLANT TEMPERATURE SENDER

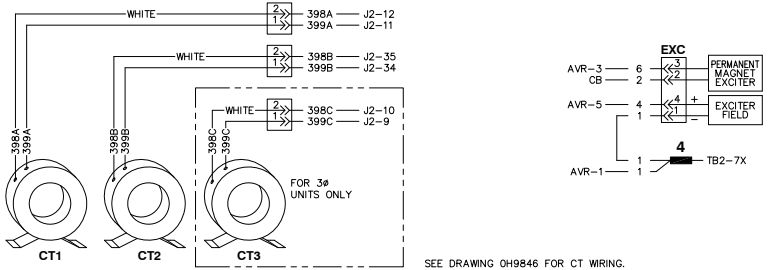
* – AVAILABLE US & CANADA ONLY

NOTE: ALL WIRES 18 AWG 300V UL LISTED UNLESS SHOWN OTHERWISE.





COMPONENTS LOCATED IN ALTERNATOR CONNECTION BOX



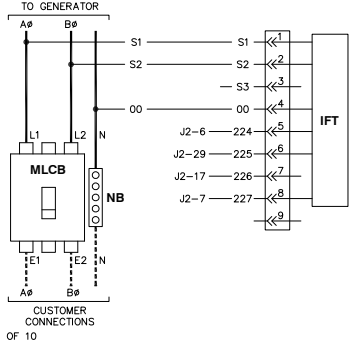
SEE DRAWING 0H9846 FOR CT WIRING.

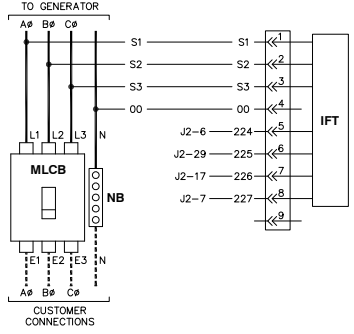
COMPONENTS LOCATED IN HIGH VOLTAGE CUSTOMER CONNECTION MODULE

CONNECTIONS FOR 1Ø UNIT

NOTE: ALL WIRES IN THIS SECTION ARE 600V RATED

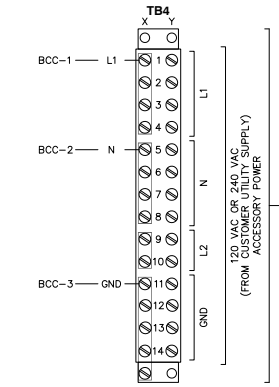
CONNECTIONS FOR 3Ø UNIT





COMPONENTS LOCATED IN HIGH VOLTAGE CUSTOMER CONNECTION MODULE

NOTE: ALL WIRES ON THIS PAGE ARE 600V RATED



NOTE:
FOR FIELD WIRING TO CUSTOMER CONNECTIONS (TERMINAL STRIP)
MAXIMUM WIRE SIZE: #10 AWG
RECOMMENDED TIGHTENING TORQUE: 14 LB–IN

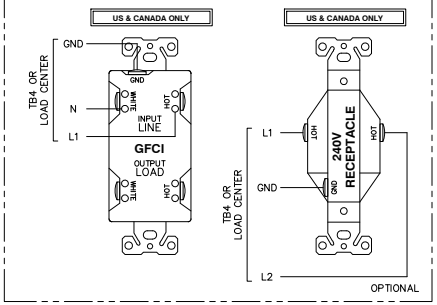
OR

US & CANADA ONLY

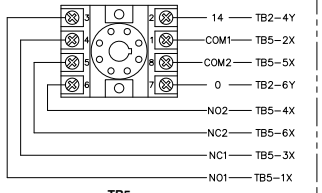
GND
N
L1
120/240 VAC UTILITY SUPPLY (BY CUSTOMER)

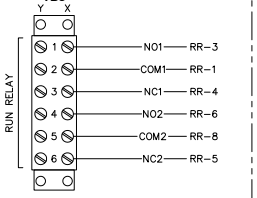
125A LOAD CENTER

L1
GND
L2
VERIFY COMPONENT RATINGS FOR PROPER SUPPLY VOLTAGE TO BE PROVIDED.



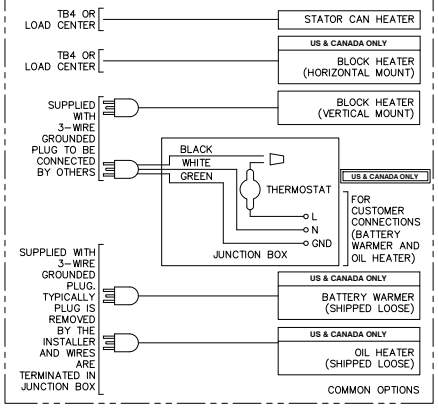
RUN RELAY



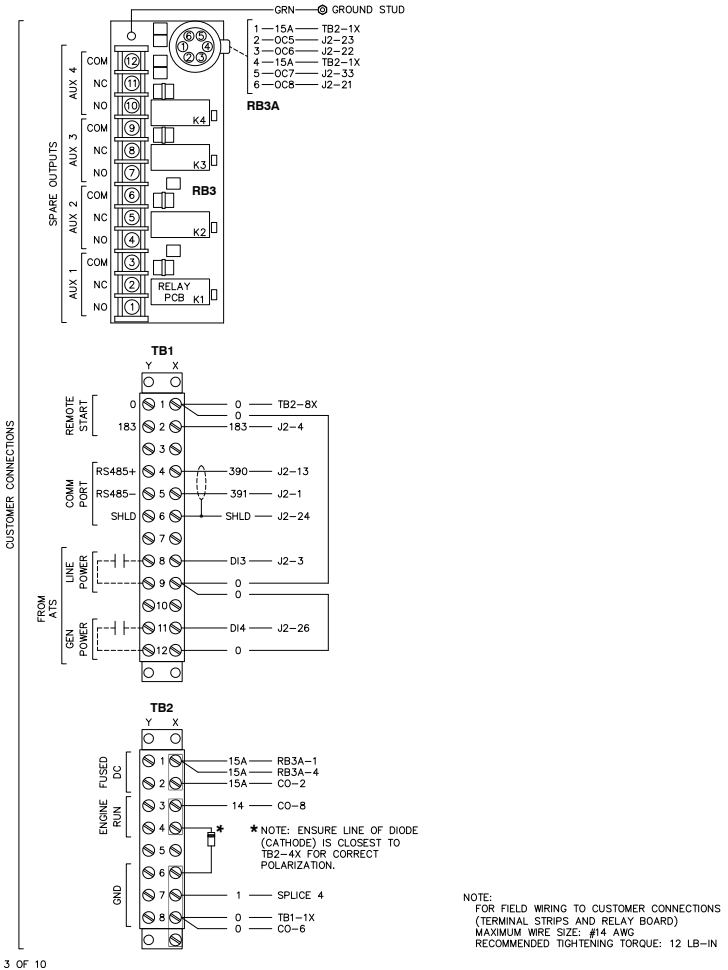


NOTE:
FOR FIELD WIRING TO CUSTOMER CONNECTIONS (TERMINAL STRIPS AND RELAY BOARD)
MAXIMUM WIRE SIZE: #14 AWG
RECOMMENDED TIGHTENING TORQUE: 12 LB–IN

OPTIONAL

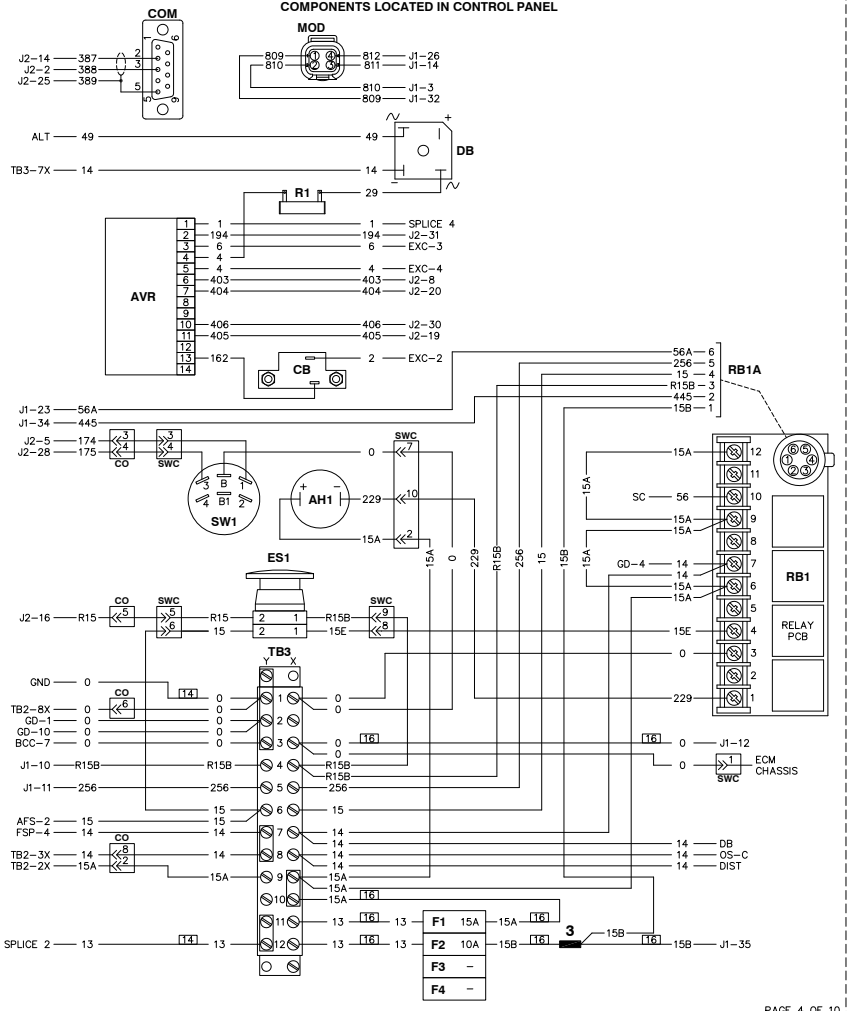


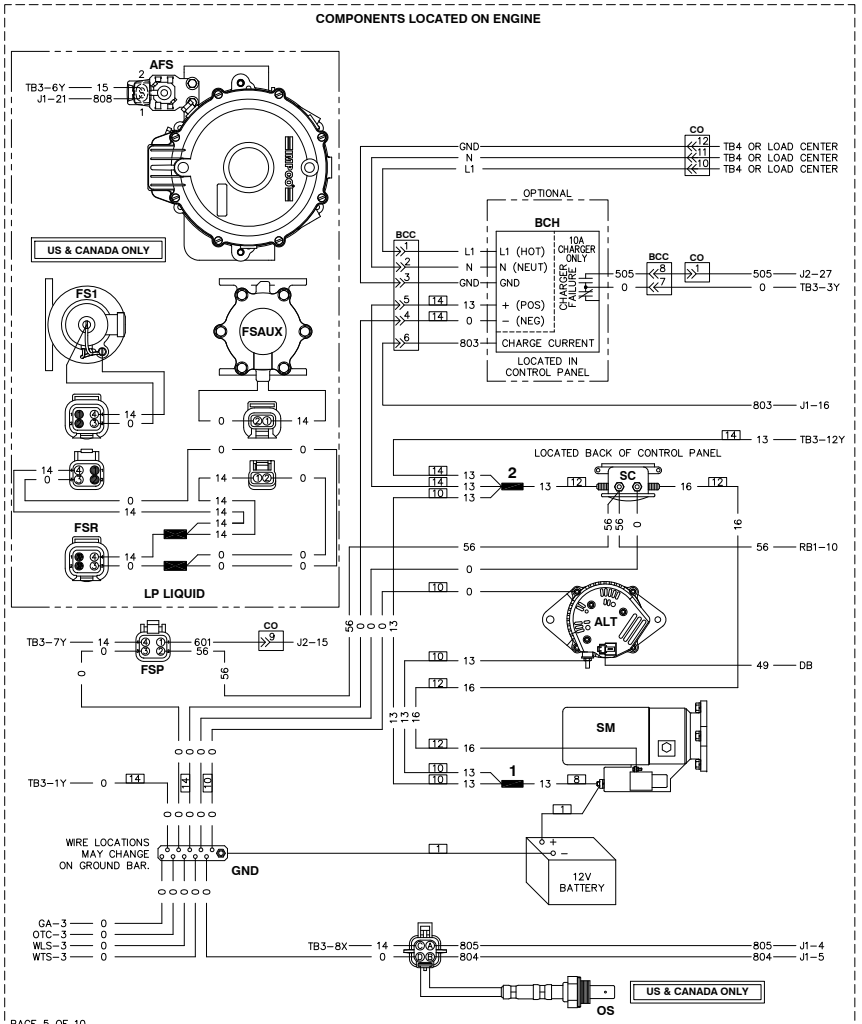
COMPONENTS LOCATED ON LOW VOLTAGE CUSTOMER CONNECTION PANEL

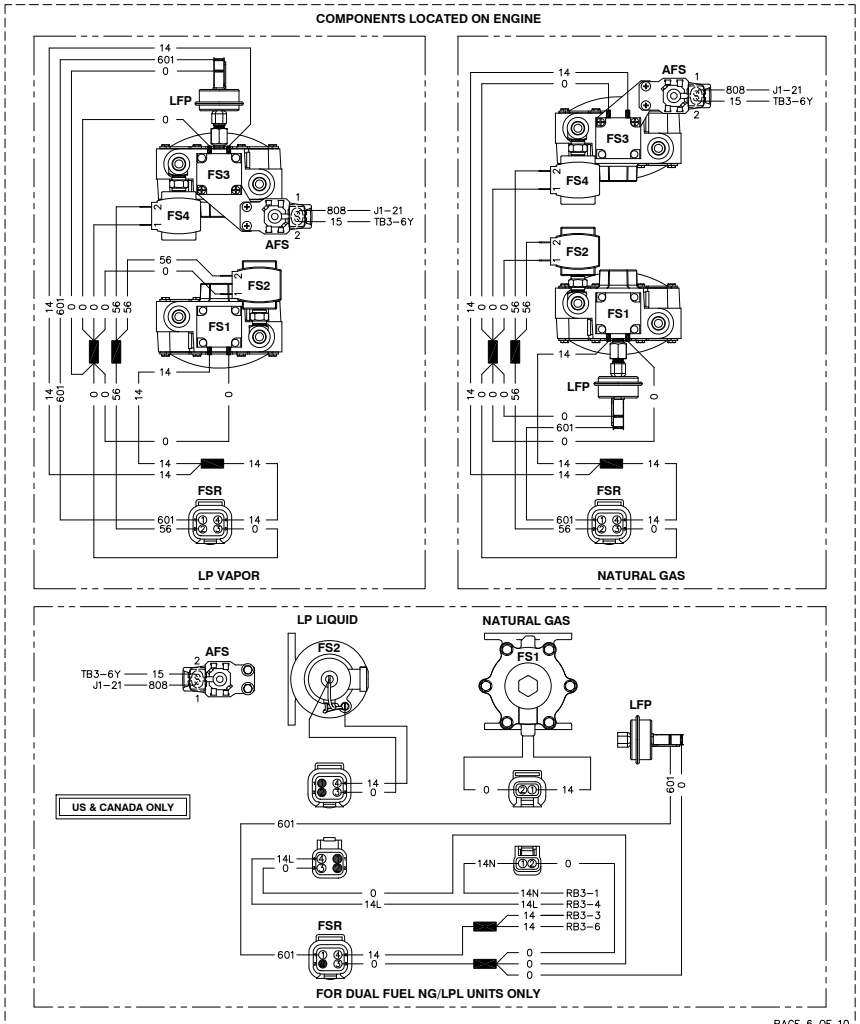


NOTE:
FOR FIELD WIRING TO CUSTOMER CONNECTIONS (TERMINAL STRIPS AND RELAY BOARD)
MAXIMUM WIRE SIZE: #14 AWG
RECOMMENDED TIGHTENING TORQUE: 12 LB-IN

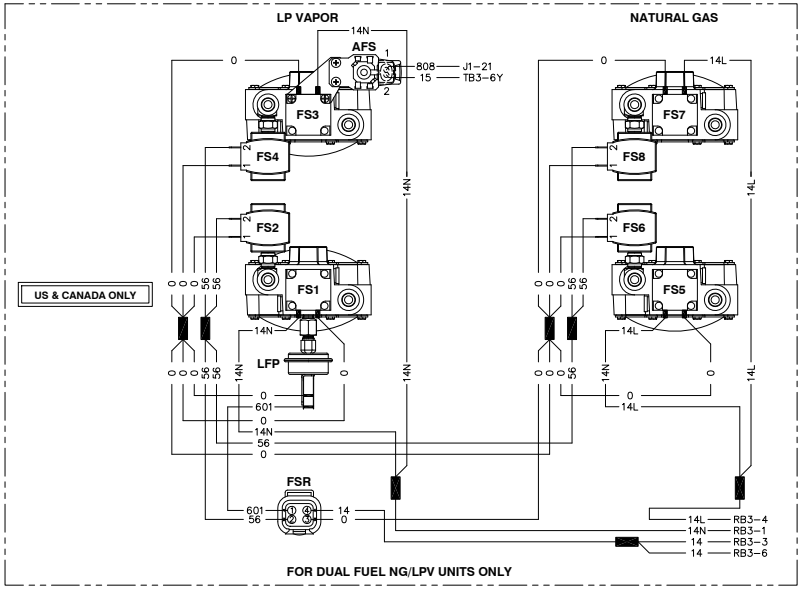
COMPONENTS LOCATED IN CONTROL PANEL




COMPONENTS LOCATED ON ENGINE
AFS
TB3-6Y 15
J1-21 808
US & CANADA ONLY
FS1
FSAUX
FSR
LP LIQUID
GND
N
L1
CO
TB4 OR LOAD CENTER
TB4 OR LOAD CENTER
TB4 OR LOAD CENTER
OPTIONAL
BCH
BCC
L1 (HOT)
N (NEUT)
GND
+ (POS)
- (NEG)
CHARGE CURRENT
10A CHARGER ONLY
CHARGER FAILURE
LOCATED IN CONTROL PANEL
505
J2-27
TB3-3Y
803
J1-16
TB3-12Y
LOCATED BACK OF CONTROL PANEL
SC
RB1-10
ALT
49
DB
SM
TB3-7Y
FSP
J2-15
TB3-1Y
WIRE LOCATIONS MAY CHANGE ON GROUND BAR.
GND
12V BATTERY
GA-3
OTC-3
WLS-3
WTS-3
TB3-8X
805
804
J1-4
J1-5
OS
US & CANADA ONLY
PAGE 5 OF 10

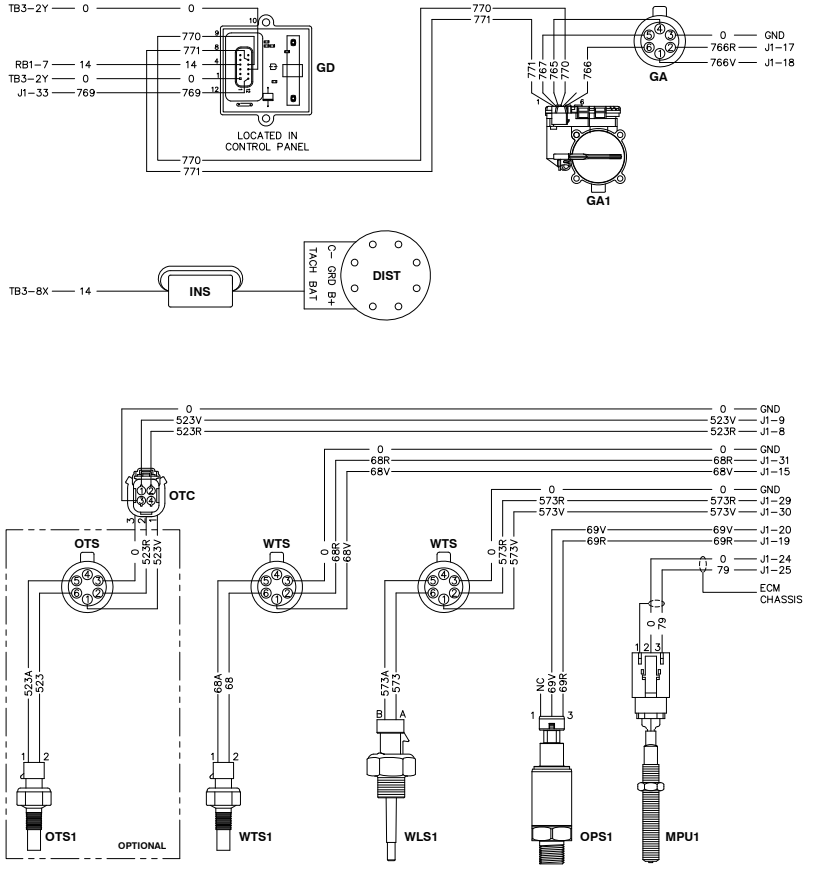

COMPONENTS LOCATED ON ENGINE
LFP
FS3
FS4
AFS
808 J1-21
15 TB3-6Y
FS2
FS1
FSR
LP VAPOR
NATURAL GAS
LP LIQUID
US & CANADA ONLY
14L
14N
RB3-1
RB3-4
RB3-3
RB3-6
FOR DUAL FUEL NG/LPL UNITS ONLY
PAGE 6 OF 10

COMPONENTS LOCATED ON ENGINE



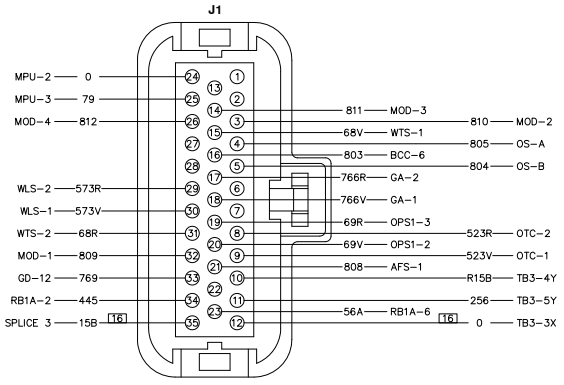
FOR DUAL FUEL NG/LPV UNITS ONLY

COMPONENTS LOCATED ON ENGINE

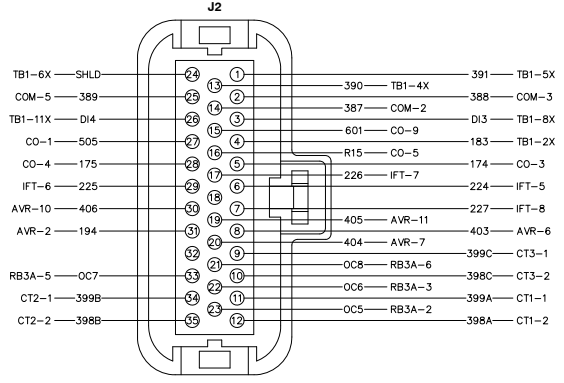


ENGINE CONTROL MODULE CONNECTORS

J1



J2



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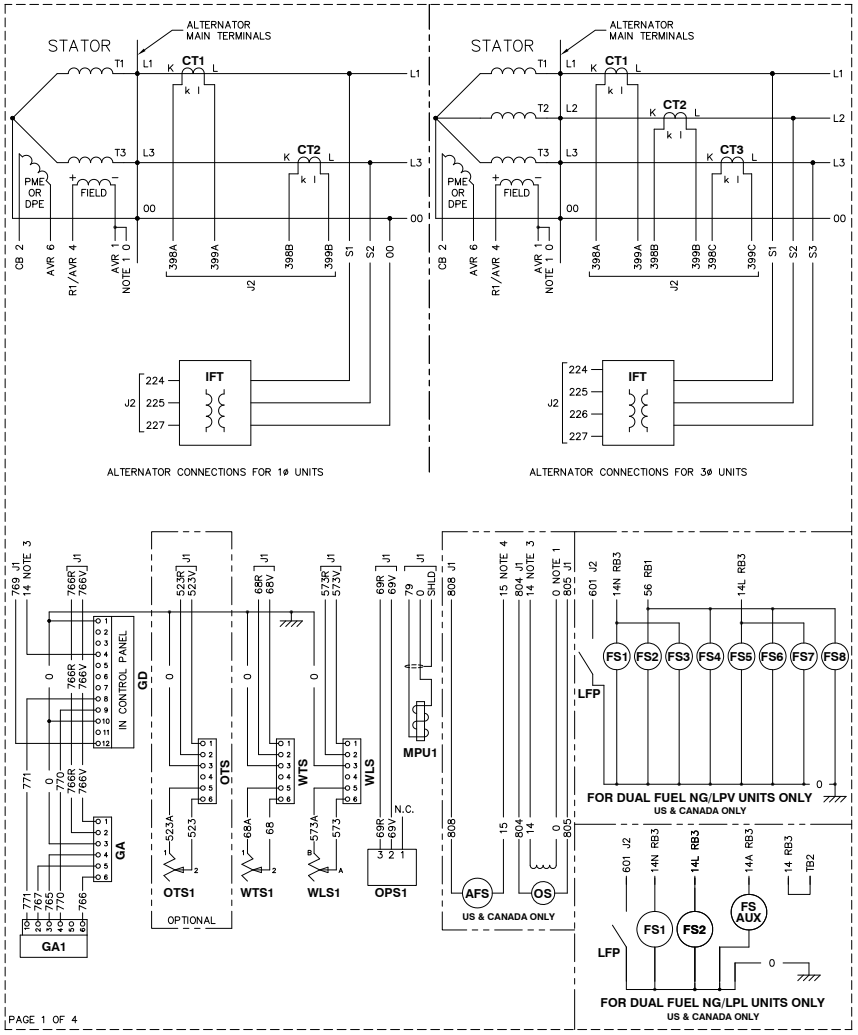
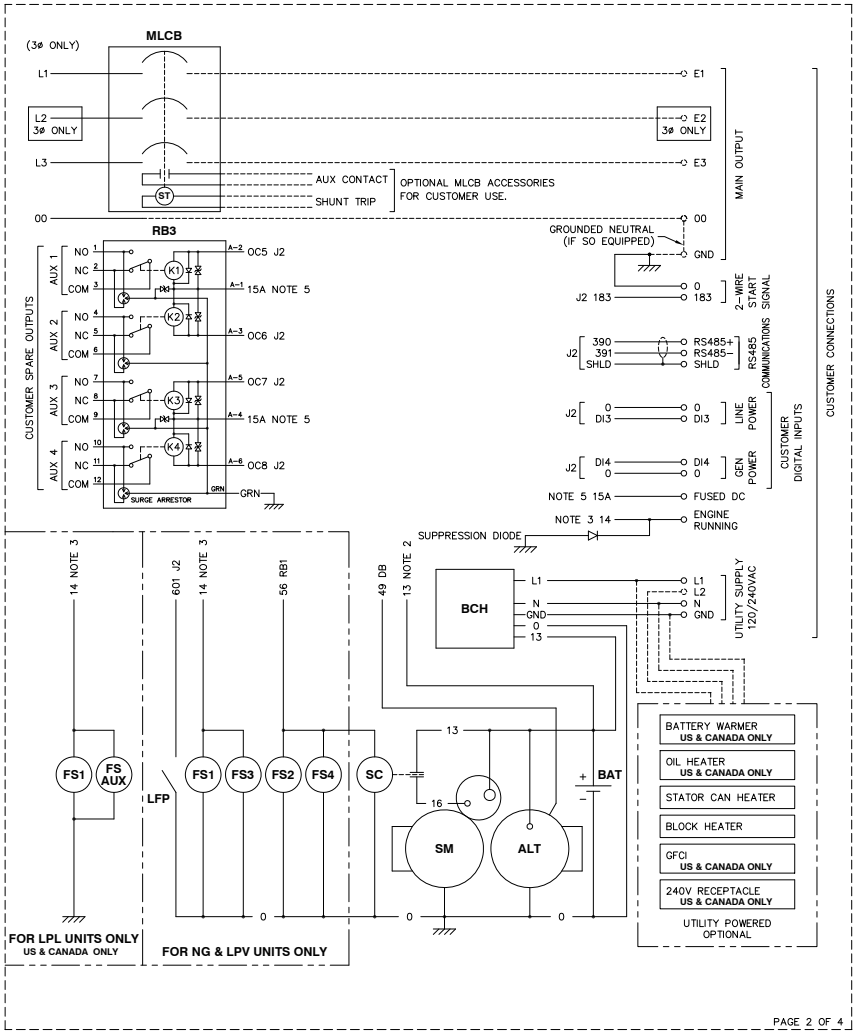


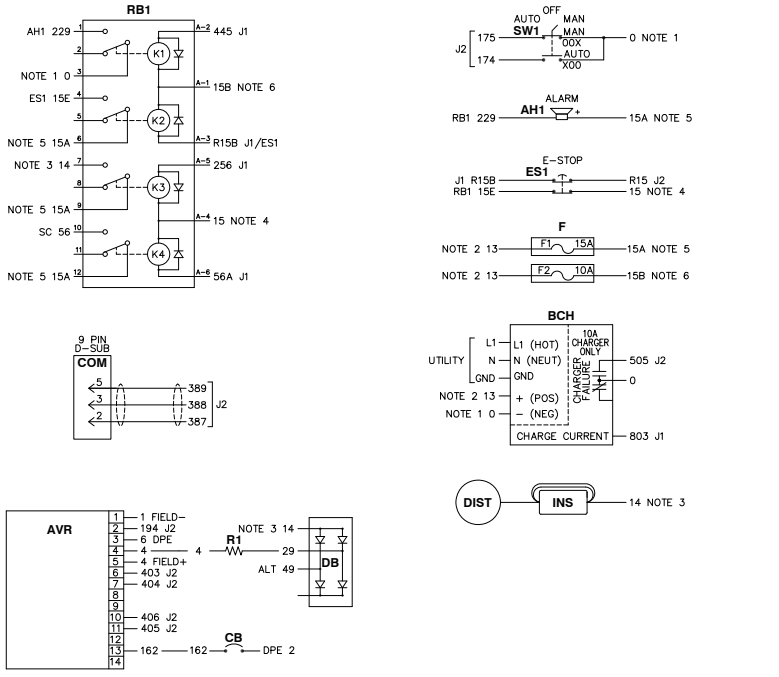
SCHEMATIC - DIAGRAM
G9.0L G18 12V H-PANEL
DRAWING #: 0H9857

REVISION: J-7672-E
DATE: 1/31/14



SCHEMATIC - DIAGRAM
G9.0L G18 12V H-PANEL
DRAWING #: 0H9857

REVISION: J-7672-E
DATE: 1/31/14



LEGEND

00 – NEUTRAL	DPE – EXCITER	OPS1 – OIL PRESSURE SENDER
AFS – AIR/FUEL SOLENOID*	ES1 – EMERGENCY STOP SWITCH	OS – OXYGEN SENSOR*
AH1 – ALARM HORN	F_ – FUSE	OTS_ – OIL TEMPERATURE SENDER
ALT – DC CHARGE ALTERNATOR	FS_ – FUEL SOLENOID	PME – PERMANENT MAGNET EXCITER
AVR – AUTOMATIC VOLTAGE REGULATOR	GA_ – GOVERNOR ACTUATOR	R1 – RESISTOR
BAT – BATTERY	GD – GOVERNOR DRIVER	RB_ – RELAY BOARD
BCH – BATTERY CHARGER	GFCI – GROUND FAULT CIRCUIT INTERRUPT	SC – STARTER CONTACTOR
CB – CIRCUIT BREAKER	IFT – INTERFACE TRANSFORMER	SM – STARTER MOTOR
COM – COMMUNICATION CONNECTOR	INS – IGNITION NOISE SUPPRESSION	SW1 – OFF/AUTO/MANUAL SWITCH
CT_ – CURRENT TRANSFORMER	J_ – ENGINE CONTROL MODULE CONN.	WLS_ – COOLANT LEVEL SENSOR
CUST CON – CUSTOMER CONNECTION	LFP – LOW FUEL PRESSURE	WTS_ – COOLANT TEMPERATURE SENDER
DB – DIODE BRIDGE	MLCB – MAIN LINE CIRCUIT BREAKER	
DIST – DISTRIBUTOR	MPU1 – MAGNETIC PICKUP	

* – AVAILABLE US & CANADA ONLY

SCHEMATIC - DIAGRAM
G9.0L G18 12V H-PANEL
DRAWING #: 0H9857

GD CONNECTOR

PIN	WIRE	TO	FUNCTION
1	0	GND	NOTE 1
4	14	RB1-7	NOTE 3
8	771	GA1-1	THROTTLE DRIVE LO
9	770	GA1-4	THROTTLE DRIVE HI
10	0	GND	NOTE 1
12	769	J1-33	THROTTLE PWM

AVR CONNECTOR

PIN	WIRE	TO	FUNCTION
1	1	FIELD	– FIELD
2	194	J2-31	+12VDC
3	6	DPE	PME OUTPUT
4	4	R1/FIELD	+ FIELD
5	4	R1/FIELD	+ FIELD
6	403	J2-8	GATE TRIGGER B
7	404	J2-20	GATE TRIGGER A
10	406	J2-30	ZERO CROSSING I/P
11	405	J2-19	GROUND (ISO)
13	162	CB	PME OUTPUT (AFTER CB)

ENGINE CONTROL MODULE CONNECTIONS

J1

	PIN	WIRE	TO	FUNCTION
	3	810	MOD-2	MODEM SIGNAL RETURN
**	4	805	OS	OXYGEN SENSOR RTN
**	5	804	OS	OXYGEN SENSOR +
	8	523R	OTS-2	OIL TEMPERATURE RTN
	9	523V	OTS-1	OIL TEMPERATURE +
	10	R15B	RB1A-3/ES1	OVERSPEED/WATCHDOG
	11	256	RB1A-5	FUEL RELAY
	12	0	GND	NOTE 1
	14	811	MOD-3	MODEM DATA CARRIER DETECT
	15	68V	WTS-1	COOLANT TEMP +
	16	803	BCH	BAT CHARGER CURRENT
	17	766R	GA-2	THROTTLE POS RTN
	18	766V	GA-1	THROTTLE POS +
	19	69R	OPS1-3	OIL PRESS RTN
	20	69V	OPS1-1	OIL PRESS +
**	21	808	AFS	AIR/FUEL SOLENOID
	23	56A	RB1A-6	STARTER RELAY
	24	0	MPU1-2	MPU1 SIGNAL (–)
	25	79	MPU1-3	MPU1 SIGNAL (+)
	26	812	MOD-4	MODEM ENABLE
	29	573R	WLS-2	COOLANT LVL RTN
	30	573V	WLS-1	COOLANT LVL +
	31	68R	WTS-2	COOLANT TEMP RTN
	32	809	MOD-1	MODEM 12V POWER
	33	769	GD-12	THROTTLE PWM
	34	445	RB1A-2	ALARM RELAY
	35	15B	F2	NOTE 6

** – AVAILABLE US & CANADA ONLY

J2

	PIN	WIRE	TO	FUNCTION
	1	391	CUST CON	RS485- (XFER SW)
	2	388	COM-3	RS232 TX (GENLINK)
	3	DI3	CUST CON	LINE POWER SIGNAL
	4	183	CUST CON	REMOTE START
	5	174	SW1	"AUTO" START
	6	224	IFT	V SENSE GEN A PH
	7	227	IFT	V SENSE RTN
	8	403	AVR-6	AVR GATE TRIGGER B
*	9	399C	CT3	GEN C PH CURRENT –
*	10	398C	CT3	GEN C PH CURRENT +
	11	399A	CT1	GEN A PH CURRENT –
	12	398A	CT1	GEN A PH CURRENT +
	13	390	CUST CON	RS485+ (XFER SW)
	14	387	COM-2	RS232 RX (GENLINK)
	15	601	LFP	LOW FUEL PRESSURE
	16	R15	ES1	EMERGENCY STOP
*	17	226	IFT	V SENSE GEN C PH
	19	405	AVR-11	AVR GROUND
	20	404	AVR-7	AVR GATE TRIGGER A
	21	OC8	RB3A-6	SPARE OUTPUT 4
	22	OC6	RB3A-3	SPARE OUTPUT 2
	23	OC5	RB3A-2	SPARE OUTPUT 1
	24	SHLD	CUST CON	RS485 DRAIN (XFER SW)
	25	389	COM-5	RS232 COM (GENLINK)
	26	DI4	CUST CON	GEN POWER SIGNAL
	27	505	BCH	BAT CHARGER FAIL
	28	175	SW1	"MANUAL" START
	29	225	IFT	V SENSE GEN B PH
	30	406	AVR-10	AVR ZERO CROSSING I/P
	31	194	AVR-2	AVR +12VDC
	33	OC7	RB3A-5	SPARE OUTPUT 3
	34	399B	CT2	GEN B PH CURRENT–
	35	398B	CT2	GEN B PH CURRENT+

* – CONNECTIONS NOT USED IN 1Ø UNITS.

NOTES:

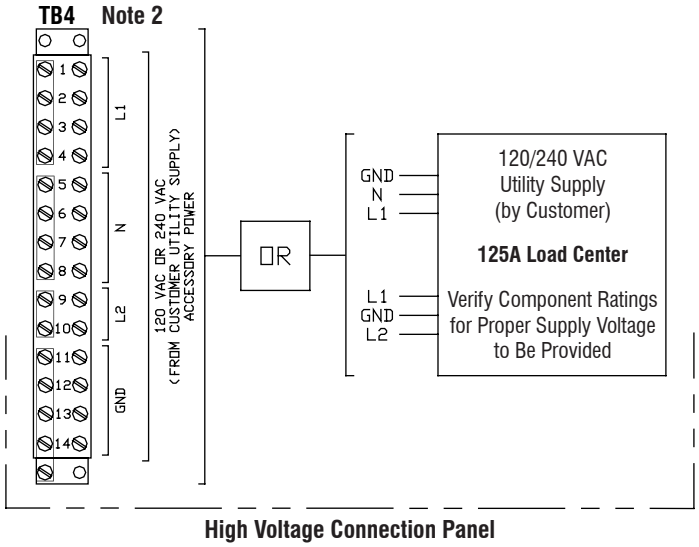
1) WIRE# 0 IS CHASSIS GROUND (BATTERY–) UNLESS NOTED OTHERWISE.
2) WIRE# 13 IS UNFUSED +12VDC (BATTERY+).
3) WIRE# 14 IS FUSED +12VDC WHEN GENERATOR IS CRANKING OR RUNNING.
4) WIRE# 15 IS FUSED +12VDC WHEN E-STOP IS NOT ACTIVATED.
5) WIRE# 15A IS FUSED +12VDC FOR GENERAL USE.
6) WIRE# 15B IS FUSED +12VDC FOR THE ENGINE CONTROL MODULE.

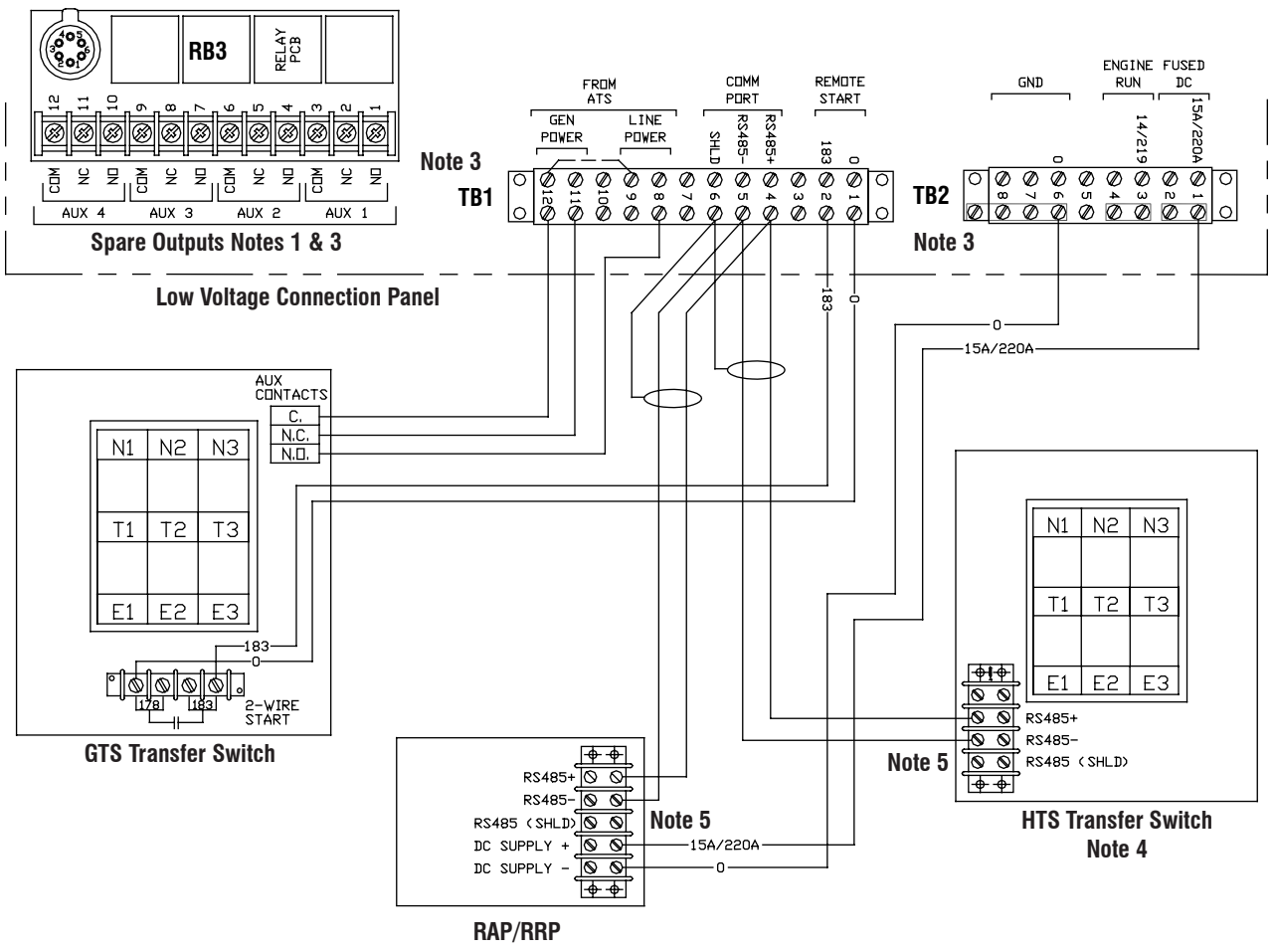
SCHEMATIC - DIAGRAM
G9.0L G18 12V H-PANEL
DRAWING #: 0H9857

H-PANEL CONTROL INTERCONNECTIONS

Notes:

1. Spare Outputs are Standard on Industrial Product Only. GenLink® Required for Programming. Contacts Rated at 5A at 30VAC/30VDC
2. TB4 Max Wire Size: #10 AWG, Recommended Tightening Torque: 14 LB-IN
3. TB1, TB2, TB9 & RB3 Max Wire Size: #14 AWG, Recommended Tightening Torque: 12 LB-IN
4. Refer to H-Panel Manual for Instructions on Enabling HTS Transfer Switch. Refer to HTS Transfer Switch Manual for Dip Switch Settings for Multiple HTS Application
5. Connect the RS-485 Overall Shield at Genset Connection Terminal Only





Part No. 0191120SSD
Rev. E 11/19/19

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2021 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Generac Power Systems, Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: MGNXB08.92O1-030

Effective Date: 10/16/2020

Expiration Date: 12/31/2021

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 10/16/2020

Revision Date: N/A

Manufacturer: Generac Power Systems, Inc.
Engine Family: MGNXB08.92O1
Mobile/Stationary Certification Type: Stationary
Fuel : Natural Gas (CNG/LNG)
Emission Standards :
Part 60 Subpart JJJJ Table 1
NOx (g/Hp-hr) : 2.0
CO (g/Hp-hr) : 4.0
VOC (g/Hp-hr) : 1.0
Emergency Use Only : Y

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 1065, 1068, and 60 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

Certification of Quality

Generac Power Systems certifies that the products we manufacture have been built and tested in accordance with strict internal and external standards for quality. Our quality management system has been registered with the internationally recognized ISO 9001:2008 standard and our products comply with external standards that include, but are not limited to, CSA, NEMA, EGSA, ISO, and UL.

The Generac Quality Management System (GQMS) ensures the highest standards of quality at every level of production, from raw materials to the finished product. This includes receiving inspection, in-process checks, product and process audits, testing, final inspections, and shipping standards.

Tests of our products are performed in accordance with our internal procedures and controlled through the GQMS to ensure accuracy and effectiveness. The testing process and product designs comply with external standards which may include, but are not limited to: ISO 8528-5, ISO 3046, NFPA 99, NFPA 110, BS 5514, SAE J1349, and DIN 6271.

Generac Power Systems has over one million square feet of manufacturing space and over 2000 employees dedicated to designing and manufacturing power generation equipment in our multiple State of Wisconsin, USA factories. All of our installed and mobile generators are built with pride by our skilled American workforce to ensure our customers receive the quality that they expect from Generac.

We are committed to producing quality products for both our internal and external customers. We will continuously improve our processes and diligently measure all aspects of our business.

Daniel Waschow

Vice President of Quality
Generac Power Systems, Inc.
Waukesha, Wisconsin USA

Part No. 0184520SSD
Rev. B 03/01/12

Generac Power Systems 5 Year (5C) Extended Limited Warranty for Industrial Standby Generators

For the period of warranty noted below, which begins upon the successful start-up and/or on-line activation of the unit, Generac Power Systems, Inc. "Generac" warrants that its Generator will be free from defects in material and workmanship for the items and period set forth below. Generac will, at its discretion, repair or replace any part(s) which, upon evaluation, inspection and testing by Generac or an Independent Authorized Service Dealer, is found to be defective. Any equipment that the purchaser/owner claims to be defective must be evaluated by the nearest Independent Authorized Service Dealer. Emissions components are excluded from coverage under this extended warranty. Emissions warranty coverage is detailed in a separate emissions warranty.

Warranty Coverage: Warranty coverage period is for Five (5) years or two-thousand (2,000) hours, whichever occurs first.

Warranty Coverage in Year(s) 1-5
Parts, Labor and Limited Travel

Limited Gearbox Coverage:

Year(s): 1-5 Coverage	Year(s): 6-10 Coverage
Limited Parts and Labor	Limited Parts Only

Guidelines:

1. Unit must be registered and proof of purchase available.
2. Any and all warranty repairs and/or concerns must be performed and/or addressed by an Independent Authorized Service Dealer, or branch thereof. Repairs or diagnostics performed by individuals other than Independent Authorized Service Dealers not authorized in writing by Generac will not be covered.
3. This Warranty is transferable between ownership of original install site.
4. Generac supplied engine coolant heaters (block-heaters), heater controls and circulating pumps are only covered during the first year of the warranty provision.
5. Generac may choose to repair, replace or refund a piece of equipment in its sole discretion.
6. Enclosures are warranted against rust for the first year of ownership only. Damage caused after receipt of generator is the responsibility of the owner and is not covered by this warranty. Nicks, scrapes, dents or scratches to the painted enclosure should be repaired promptly by the owner.
7. Warranty only applies to permanently wired and mounted units.
8. Damage to any covered components or consequential damages caused by the use of a non-OEM part will not be covered by the warranty.
9. Proof of performance of all required maintenance must be available.
10. Travel allowance is limited to 300 miles maximum and seven and one half (7.5) hours maximum (per occurrence, whichever is less) round trip from the nearest Independent Authorized Service Dealer. Any additional travel required will not be covered.
11. Engines, driven components and fuel tanks used in Generac's standby power products system can carry a separate manufacturer's (OEM) warranty (the "OEM Warranties"), unless otherwise expressly stated. OEM Warranties are in addition to this Warranty. All warranty claims for defects in material and/or workmanship on Generac product OEM components, may be directed through the OEM distributor/dealer network. OEM Warranties may vary and are subject to change. Generac shall have no liability under OEM warranties.

The following will NOT be covered by this warranty:

1. Costs of normal maintenance (i.e. tune-ups, associated part(s), adjustments, loose/leaking clamps, installation and start-up).
2. Damage/failures to the generator caused by accidents, shipping, handling, or improper storage.
3. Damage/failures caused by operation with improper fuels, speeds, loads or installations other than what's recommended or specified by Generac Power Systems.
4. Damage to the generator due to the use of non-Generac parts and/or equipment, contaminated fuels, oils, coolants/antifreeze or lack of proper fuels, oil or coolants/antifreeze.
5. Failures due to normal wear and tear, accident, misuse, abuse, neglect, improper installation, improper sizing, or rodent, reptile, and/or insect infestation.
6. Rental equipment used while warranty repairs are being performed and/or any extraordinary equipment used for removal and/or reinstallation of generator (i.e. cranes, hoists, lifts, et. al.).
7. Planes, ferries, railroad, buses, helicopters, snowmobiles, snow-cats, off-road vehicles or any other mode of transport deemed not standard by Generac.
8. Products that are modified or altered in a manner not authorized by Generac in writing.
9. Starting batteries, fuses, light bulbs, engine fluids and any related labor.
10. Steel enclosures that rust as a result of improper installation, location in a harsh or salt water environment, or are scratched where the integrity of applied paint is compromised.
11. Units sold, rated or used for "Prime Power", "Trailer Mounted" or "Rental Unit" applications as defined by Generac. Contact an Independent Authorized Service Dealer for definitions.
12. Shipping costs associated with expedited shipping.
13. Additional costs for overtime, holiday or emergency labor costs for repairs outside of normal business hours.
14. Any incidental, consequential or indirect damages caused by defects in materials or workmanship, or any delay in repair or replacement of the defective part(s).
15. Failures caused by any act of God or external cause including without limitation, fire, theft, freezing, war, lightning, earthquake, windstorm, hail, water, tornado, hurricane, or any other matters which are reasonably beyond the manufacturer's control.

THIS WARRANTY SUPERSEDES ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. SPECIFICALLY, GENERAC MAKES NO OTHER WARRANTIES AS TO THE MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY IMPLIED WARRANTIES WHICH ARE ALLOWED BY LAW, SHALL BE LIMITED IN DURATION TO THE TERMS OF THE EXPRESS WARRANTY PROVIDED HEREIN. SOME JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. GENERAC'S ONLY LIABILITY SHALL BE THE REPAIR OR REPLACEMENT OF PART(S) AS STATED ABOVE. IN NO EVENT SHALL GENERAC BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, EVEN IF SUCH DAMAGES ARE A DIRECT RESULT OF GENERAC'S NEGLIGENCE. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU ALSO HAVE OTHER RIGHTS UNDER APPLICABLE LAW.

FOR AUSTRALIA ONLY: Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.
FOR NEW ZEALAND ONLY: Nothing in this warranty statement excludes, restricts or modifies any condition, warranty right or remedy which pursuant to the New Zealand Legislation (Commonwealth or State) including the Fair Trading Practices Act of 1986 or the Consumer Guarantees Act 1993 ("CGA") applies to this limited warranty and may not be so excluded, restricted or modified. Nothing in this statement is intended to have the effect of contracting out of the provisions of the CGA, except to the extent permitted by that Act, and these terms are to be modified to the extent necessary to give effect to that intention. If you acquire goods from Generac Power Systems or any of its authorized resellers and distributors for the purposes of a business, then pursuant to section 43(2) of the CGA, it is agreed that the provisions of the CGA do not apply.

GENERAC POWER SYSTEMS, INC. • P.O. BOX 8 • Waukesha, WI, USA 53187
Ph: (888) GENERAC (436-3722) • Fax: (262) 544-4851

To locate the nearest Independent Authorized Service Dealer and to download schematics, exploded views and parts lists
visit our website: www.generac.com

Part No. 0J4301 Revision M (2/16)

CERTIFICATE

This is to certify that

Generac Power Systems, Inc.

S45 W29290 Hwy. 59
Waukesha, WI 53189
United States of America

with the organizational units/sites as listed in the annex

has implemented and maintains a **Quality Management System**.

Scope:
Design, Manufacturing, and Distribution of Generators and Power Products.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 9001 : 2015

Certificate registration no.	10012920 QM15
Date of original certification	2013-12-09
Date of certification	2018-07-16
Valid until	2021-07-15

DQS Inc.

Brad McGuire
Managing Director

Annex to certificate
Registration No. 10012920 QM15

Generac Power Systems, Inc.

S45 W29290 Hwy. 59
Waukesha, WI 53189
United States of America

Location	Scope
10012920 **Generac Power Systems, Inc.** **S45 W29290 Hwy. 59** **Waukesha, WI 53189** **United States of America**	Design, Manufacturing of Generator Components and Distribution of Service Parts.
10012922 **Generac Power Systems, Inc.** **211 Murphy Dr.** **Eagle, WI 53119** **United States of America**	Manufacturing and Distribution of Generators.
10012923 **Generac Power Systems, Inc.** **757 N. Newcomb St.** **Whitewater, WI 53190** **United States of America**	Manufacturing and Distribution of Generators and Manufacture of Generator components.
10012924 **Generac Power Systems, Inc.** **900 N. Parkway** **Jefferson, WI 53549** **United States of America**	Manufacturing of Generators and Power Products.
10013528 **Generac Power Systems** **3815 Oregon St.** **Oshkosh, WI 54902** **United States of America**	Manufacturing of Generators.

Remote Location	Scope
10014175 **Generac Power Systems, Inc.** **351 Collins Road** **Jefferson, WI 53549** **United States of America**	The remote location at Jefferson, WI performs the following primary functions: Parts and Components Receiving, Inventory, and Distribution to Generac Locations.

This annex (edition: 2018-07-16) is only valid in connection with the above-mentioned certificate.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2020 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Generac Power Systems, Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: LGNXB08.92O1-018

Effective Date: 06/27/2019

Expiration Date: 12/31/2020

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 06/27/2019

Revision Date: N/A

Manufacturer: Generac Power Systems, Inc.
Engine Family: LGNXB08.92O1
Mobile/Stationary Certification Type: Stationary
Fuel : Natural Gas (CNG/LNG)
Emission Standards :
Part 60 Subpart JJJJ Table 1
NOx (g/Hp-hr) : 2.0
CO (g/Hp-hr) : 4.0
VOC (g/Hp-hr) : 1.0
Emergency Use Only : Y

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 1065, 1068, and 60 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

GENERAC DIESEL & BI-FUEL GENERATORS
GENERAC / OLYMPIAN GAS GENERATORS
SPECIAL SEISMIC CERTIFICATION

Buehler Project No. 2017-0460.00
April 20, 2020

Generac and Olympian Gas Generators and Generac Diesel and Bi-Fuel Generators (listed in Table 1) are seismically certified in accordance with the 2018 International Building Code (IBC), 2019 California Building Code (CBC), and American Society of Civil Engineers (ASCE) Minimum Design Loads for Buildings and Other Structures, ASCE 7-16. This product line is also preapproved in accordance with PIN 55: Office of Statewide Health Planning and Development (OSHPD) Special Seismic Certification Preapproval (OSP-0282-10), dated 04/08/2020.

The basis of this seismic certification is through successful tri-axial shake table testing at the US Army Construction Engineering Research Laboratory (Report 2012-0211.00), Curtiss-Wright QualTech NP testing lab (Report Q1218.0 – Rev 2 and amendment dated 09/12/2019), and University of Buffalo testing lab, SEESL (Report No: UB CSEE/SEESL-2019-05 Rev2), and the analytic evaluation by Buehler Engineering, Inc. The shake table testing and operability tests were conducted in accordance with ICC-ES AC 156 (2018).

Units are qualified for seismic applications when properly installed utilizing a **rigid base mounted** configuration, used as intended and located in the United States where the "design 5 percent damped spectral response acceleration at short periods adjusted for site class effects", S_{DS}, is less than or equal to values in **Table 1**. Below grade, at grade, or above grade installations are permitted and included in this certification. This certification may be valid for additional S_{DS} levels where the height factor, z/h, is less than listed in **Table 1**. This certification is valid for a component importance factor, I_P, of 1.0 or 1.5.

For anchorage requirements, refer to the manufacturer supplied installation instructions for seismic applications. Anchorage requirement details such as brand, type, embedment, edge spacing, anchor spacing, support structure strength, special inspection, and attachment to building and non-building structures must be outlined and approved by the Structural Engineer of Record (SEOR) for the project or building. Structural floors and housekeeping pads must also be designed to resist seismic forces and approved by SEOR. The installing contractor is responsible for the proper installation of units, observing and complying with the mounting requirements, and any additional requirements outlined by the SEOR.

This certification applies only to the manufacture model numbers noted herein, and further limited to the internal components certified by qualified shake table testing. For additional information, refer to the supplemental analysis report.

Submitted:

Scott R. Hooker
President
For Buehler Engineering, Inc.

S_{DS} = 0.80g @ z/h = 1.0 F_P / W_p = 1.80

S_{DS} = 2.44g @ z/h = 0.0 F_P / W_p = 1.83

Table 1B. Gas Generator Certified Product Matrix Cont.

Model Number	Kw Rating	Level 2A Enclosure					Level 3 Enclosure				
		Unit Dimensions (mm)			Operating Weight (lbs)		Unit Dimensions (mm)			Operating Weight (lbs)	
		H	W	L	Steel	Alum	H	W	L	Steel	Alum
SG0035*G54[1]	35	1574	965	2409	2,328	1,974	n/a	n/a	n/a	n/a	n/a
SG0035*G54[1]	35	1574	965	2409	2,328	1,974	n/a	n/a	n/a	n/a	n/a
SG0035*G45[1]	35	1461	965	2409	2,353	2,083	n/a	n/a	n/a	n/a	n/a
SG0040*G54[1]	40	1574	965	2409	2,328	1,974	n/a	n/a	n/a	n/a	n/a
SG0040*G45[1]	40	1461	965	2409	2,353	2,083	n/a	n/a	n/a	n/a	n/a
SG0045*G54[1]	45	1574	965	2409	2,328	1,974	n/a	n/a	n/a	n/a	n/a
SG0045*G45[1]	45	1461	965	2409	2,353	2,083	n/a	n/a	n/a	n/a	n/a
SG0050*G54[1]	50	1574	965	2409	2,328	2,070	n/a	n/a	n/a	n/a	n/a
SG0050*G45[1]	50	1461	965	2409	2,353	2,083	n/a	n/a	n/a	n/a	n/a
SG0050*G68[1]	50	1722	1016	2840	2,811	2,499	n/a	n/a	n/a	n/a	n/a
SG0060*G45[1]	60	1779	1028	2839	2,756	2,475	n/a	n/a	n/a	n/a	n/a
SG0060*G68[1]	60	1722	1016	2840	2,811	2,530	n/a	n/a	n/a	n/a	n/a
SG0070*G45[1]	70	1779	1028	2839	2,756	2,475	n/a	n/a	n/a	n/a	n/a
SG0070*G68[1]	70	1722	1016	2840	2,811	2,530	n/a	n/a	n/a	n/a	n/a
SG0080*G45[1]	80	1779	1028	2839	2,756	2,475	n/a	n/a	n/a	n/a	n/a
SG0080*G68[2]	80	2054	1028	3671	3,600	3,240	n/a	n/a	n/a	n/a	n/a
SG0080*G90[2]	80	1743	1028	2840	3,100	2,802	n/a	n/a	n/a	n/a	n/a
SG0100*G68[2]	100	2054	1028	3671	3,600	3,240	n/a	n/a	n/a	n/a	n/a
SG0100*G90[2]	100	1743	1028	2840	3,100	2,756	n/a	n/a	n/a	n/a	n/a
SG0130*G68[2]	130	2054	1028	3671	3,600	3,240	n/a	n/a	n/a	n/a	n/a
SG0130*G90[2]	130	2054	1028	3671	3,400	2,928	n/a	n/a	n/a	n/a	n/a
SG0150*G68[2]	150	2330	1280	3633	4,190	3,771	n/a	n/a	n/a	n/a	n/a
SG0150*G90[2]	150	2330	1280	3633	4,050	2,928	n/a	n/a	n/a	n/a	n/a
SG0150*G129[2]	150	2372	1371	3923	7,236	n/a	n/a	n/a	n/a	n/a	n/a
SG0150*G133[2]	150	2726	1463	4588	8,000	n/a	n/a	n/a	n/a	n/a	n/a
SG0150*G142[2]	150	2370	1371	3923	6,980	6,122	3274	1617	5269	10,602	8,386
SG0175*G129[2]	175	2372	1371	3923	7,236	n/a	n/a	n/a	n/a	n/a	n/a
SG0175*G133[2]	175	2726	1463	4588	8,000	n/a	n/a	n/a	n/a	n/a	n/a
SG0175*G142[2]	175	2370	1371	3923	6,980	6,122	3274	1617	5269	10,602	8,386
SG0200*G129[2]	200	2372	1371	3923	7,236	n/a	n/a	n/a	n/a	n/a	n/a
SG0200*G133[2]	200	2726	1463	4588	8,000	n/a	n/a	n/a	n/a	n/a	n/a
SG0200*G142[2]	200	2370	1371	3923	6,980	6,206	3274	1617	5269	10,602	8,386
SG0200*G142[2]	200	2726	1463	4588	8,395	6,731	3274	1617	5269	10,905	9,096
SG0230*G129[2]	230	2726	1463	4588	9,169	n/a	n/a	n/a	n/a	n/a	n/a
SG0230*G133[2]	230	2726	1463	4588	9,200	n/a	n/a	n/a	n/a	n/a	n/a
SG0230*G142[2]	230	2726	1463	4588	8,251	7,117	3274	1617	5269	10,602	9,618
SG0250*G129[2]	250	2726	1463	4588	9,169	n/a	n/a	n/a	n/a	n/a	n/a
SG0250*G133[2]	250	2726	1463	4588	9,200	n/a	n/a	n/a	n/a	n/a	n/a
SG0250*G142[2]	250	2726	1463	4588	8,251	7,247	3274	1617	5269	10,905	9,793
SG0250*G142[2]	250	2726	1450	4588	8,502	7,652	3274	1617	5269	11,080	10,340
SG0275*G129[2]	275	2726	1463	4588	9,421	n/a	n/a	n/a	n/a	n/a	n/a
SG0275*G133[2]	275	2726	1463	4588	9,200	n/a	n/a	n/a	n/a	n/a	n/a
SG0275*G142[2]	275	2726	1463	4588	8,502	7,201	3274	1617	5269	11,080	10,340
SG0300*G129[2]	300	2726	1463	4588	9,421	n/a	n/a	n/a	n/a	n/a	n/a
SG0300*G133[2]	300	2726	1463	4588	9,200	1,974	n/a	n/a	n/a	n/a	n/a
SG0300*G142[2]	300	2726	1463	4588	8,502	7,487	3274	1617	5269	11,080	10,340
SG0350*G219[2]	350	2899	1803	5268	11,100	9,510	3281	1954	5890	13,577	11,888
SG0350*G219[2]	350	2899	1803	5268	11,808	10,210	3281	1954	5890	14,285	12,763
SG0400*G219[2]	400	2899	1803	5268	11,100	9,510	3281	1954	5890	13,577	11,888
SG0400*G219[2]	400	2899	1803	5268	11,808	10,210	3281	1954	5890	14,285	12,763
SG0450*G219[2]	450	2899	1803	5268	11,808	10,210	3281	1954	5890	14,285	12,763
SG0500*G258[2]	500	2899	1803	5268	13,274	11,419	3281	1954	5890	15,635	14,274

1. Available in Prime Modular (MPS) configuration (MG vs SG). See Nomenclature.
2. Available in MPS configuration (MG vs SG) AND in Olympian Brand (LG). See Nomenclature.

United States Environmental Protection Agency Warranty Statement (Stationary Emergency Spark-Ignited Generators)

Warranty Rights, Obligations and Coverage

The United States Environmental Protection Agency (EPA) and Generac Power Systems, Inc. (Generac) are pleased to explain the Emission Control System Warranty on your new stationary emergency engine. If during the warranty period, any emission control system or component on your engine is found defective in materials or workmanship, Generac will repair your engine at no cost to you for diagnosis, replacement parts and labor provided it be done by a Generac Authorized Warranty Service Facility. Your emission control system may include parts such as the fuel metering, ignition, and exhaust systems and other related emission related components listed below. Generac will warrant the emissions control systems on your 2009 and later model year engines provided there has been no abuse, neglect, unapproved modification, or improper maintenance of your engine. For engines less than 130 HP the warranty period is two years from the date of sale to the ultimate purchaser. For engines greater than or equal to 130 HP the warranty period is three years or 2500 hours of operation, whichever comes first, from the date of the engine being placed into service. For high-cost warranted components, the Emission Control System warranty is valid for 5 years or 3500 hours of operation, whichever comes first.

Purchaser's/Owner's Warranty Responsibilities

As the engine purchaser/owner you are responsible for the following: 1) The engine must be installed and configured in accordance to Generac's installation specifications. 2) The completion of all maintenance requirements listed in your Owner's Manual. 3) Any engine setting adjustment must be done in accordance and consistent with the instructions in the Owner's Manual. 4) Any emission control system or component must be maintained and operated appropriately in order to ensure proper operation of the engine and control system to minimize emissions at all times.

Generac may deny any/or all Emission Control System Warranty coverage or responsibility of the engine, or an emission control system or component on your engine thereof, if it has failed due to abuse, neglect, unapproved modification or improper maintenance, or the use of counterfeit and/or “gray market” parts not made, supplied or approved by Generac. Warranty service can be arranged by contacting either your selling dealer or a Generac Authorized Warranty Service dealer, 1-800-333-1322 for the dealer nearest you. The purchaser/owner shall be responsible for any expenses or other charges incurred for service calls and/or transportation of the product to/from the inspection or repair facilities. The purchaser/owner shall be responsible for any and/or all damages or losses incurred while the engine is being transported/shipped for inspection or warranty repairs. Contact Generac Power Systems Inc. for additional Emission Control System Warranty related information, Generac Power Systems, Inc., PO. Box 8, Waukesha, WI 53187, or call 1-800-333-1322 or www.generac.com.

Important Note

This warranty statement explains your rights and obligations under the Emission Control System Warranty, which is provided to you by Generac pursuant to federal law. Note that this warranty shall not apply to any incidental, consequential, or indirect damages caused by defects in materials or workmanship or any delay in repair or replacement of the defective part(s). This warranty is in place of all other warranties, expressed or implied. Specifically, Generac makes no other warranties as to the merchantability or fitness for a particular purpose. Any implied warranties which are allowed by law, shall be limited in duration to the terms of the express warranty provided herein. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

Emission Related Parts Include the Following (if so equipped)

1) Fuel Metering System

1.1) Gasoline Carburetor Assembly and Internal Components
A) Fuel Filter, B) Carburetor, C) Fuel Pump

1.2) Carburetion Assembly and Its Components
A) Fuel Controller, B) Carburetor and Its Gaskets, C) Mixer and Its Gaskets, D) Primary Gas Regulator, E) Liquid Vaporizer

1.3) Fuel Regulator

2) Air Induction System Including A) Intake Pipe/Manifold, B) Air Cleaner

3) Ignition System Including A) Spark Plug, B) Ignition Module, C) Ignition Coil, D) Spark Plug Wires

4) Exhaust System
A) Catalyst Assembly*, B) Exhaust Manifold, C) Muffler, D) Exhaust Pipe, E) Muffler Gasket

5) Crankcase Breather Assembly Including
A) Breather Connection Tube, B) PCV Valve

6) Oxygen Sensor

7) Diagnostic Emission-Control System

*High-Cost Warranted Component

United States Environmental Protection Agency Compliance Requirements (Stationary Emergency Spark-Ignited Generators)

Purchaser's/Owner's Record Keeping Responsibilities

The United States Environmental Protection Agency (EPA) and Generac Power Systems, Inc. (Generac) are pleased to explain your record keeping requirements for compliance with Subpart JJJJ- Standards of Performance for Stationary Spark Ignition Internal Combustion Engines as listed in the Electronic Code of Federal Regulations Title 40 Part 60. As the engine purchaser/owner who operates and maintains their certified emergency stationary engine and emission control system according to applicable emission related guidelines as specified in this Owner's Manual, you are required to meet the following notification and record keeping requirements to demonstrate compliance: 1) Maintain documentation that the engine is certified to meet emission standards. 2) Record keeping of maintenance conducted. 3) Record keeping of the provision allowing natural gas engines to operate using propane for a maximum of 100 hours per year as an alternate fuel solely during emergency operations provided the engine is not certified to operate on propane. 4) Meet all compliance notifications submitted to the purchaser/owner and maintain all supporting documentation. 5) Record keeping of hours of operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation. For emergency engines greater than or equal to 130 HP, record keeping of hours of operation begins January 1, 2011. For emergency engines less than 130 HP, record keeping of hours of operation begins January 1, 2009; engines are equipped with non-resettable hour meters to facilitate record keeping.

Specific Air Quality Management or Air Pollution Control Districts may have different and additional record keeping/reporting requirements. Your permit to construct and/or operate the engine may be contingent upon compliance with those requirements. Check with your local Air Quality Management or Air Pollution Control District for specific requirements.

Emergency stationary internal combustion engines (ICE) may be operated for the purpose of maintenance checks and readiness testing, provided that the tests are recommended by Federal, State or local government, Generac, or the insurance company associated with the engine. Maintenance checks and readiness testing of such units is limited to 100 hours per year. There is no time limit on the use of emergency stationary ICE in emergency situations. The purchaser/owner may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner maintains records indicating that Federal, State, or local standards require maintenance and testing of emergency ICE beyond 100 hours per year. Emergency stationary ICE may operate up to 50 hours per year in non emergency situations, but those 50 hours are counted towards the 100 hours per year provided for maintenance and testing.

The 50 hours per year for non-emergency situations cannot be used for peak shaving or to generate income for a facility to supply power to an electric grid or otherwise supply power as part of a financial arrangement with another entity. For purchaser/owner of emergency engines, any operation other than emergency operation, maintenance and testing, and operation in non-emergency situations for 50 hours per year, as permitted in this section is prohibited.

If you operate and maintain your certified emergency stationary SI internal combustion engine and emissions control systems in accordance to the specifications and guidelines in this Owner’s Manual, EPA will not require engine performance testing. If not, your engine will be considered non-certified and you must demonstrate compliance according to Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines as listed in the Electronic Code of Federal Regulations Title 40 Part 60.

Emission-Related Installation Instructions

Your certified emergency stationary engine has pre-set emission control systems or components that require no adjustment. Inspection and replacement of an emissions related component is required to be done so in accordance with the requirements cited in the United States Environmental Protection Agency Warranty Statement or can be arranged by contacting either your selling dealer or a Generac Authorized Warranty Service dealer, 1-800-333-1322 for the dealer nearest you. Failing to follow these instructions when installing a certified engine in a piece of non-road equipment violates federal law 40 CFR 1068.105 (b), subject to fines or penalties as described in the Clean Air Act.

TX301 Series Transfer Switch

100 – 400 Amps

Contactor Type · Open and Delayed Transition

- Automatic Transfer Switch
- 100 – 400 A, up to 480 VAC, 50/60 Hz, 100% Current Rated
- Single or Three Phase
- 2, 3, or 4 Poles
- NEMA 1 or 3R
- Open and Inphase ~~or Open with Delayed Transition~~
- ETL Listed to UL 1008
- High Withstand and Closing Ratings

120/208V 60Hz
200 Amp
OTS InPhase
3R Enclosure & Heater
Qty 2

Image used for illustration purposes only

Codes and Standards

cETL Listed

NFPA 70, 99, 110

NEC 700, 701, 702, 708

OSHPD and Seismic Certified CBC 2019, CBC 2016, IBC 2018, IBC 2015, IBC 2012, IBC 2009, ASCE 7-10, ASCE 7-16, ICC-ES AC-156

Description

Generac's contactor type transfer switches are double-throw robust switch construction with inherent interlocks to ensure safe positive transfer between power sources. The contacts are silver composite for long life, resisting pitting or burning. The switches are rated for full load transfers in mission critical, emergency, legally required, and optional power systems.

The microprocessor based controller provides the customers with the flexibility to program a comprehensive group of set points to match the application needs. The controller has two programmable inputs and one programmable output as standard and is available with an optional expansion board for up to four programmable inputs and outputs. The LCD displays real time and historical information with time-stamped events. The integrated plant exerciser can be configured in off, daily, day of week, biweekly, and monthly intervals with user selectable run time. Standard features of the controller include three phase sensing on both sources, phase unbalance, phase reversal, load shed, emergency inhibit, and communications.

TX301 Series Transfer Switch

100 – 400 Amps

Contactor Type · Open and Delayed Transition

STANDARD FEATURES

GENERAL

- Small Footprint, Results in Easy Mounting and Installation for Reduced Time and Costs
- Cable Entry is Top or Bottom
- Double-Throw, Stored Energy Transfer Mechanism
- Can be Electrically Isolated while Energized
- Graphical LCD-Based Display for Programming, System Diagnostics and Help Menu Display Mimic
- Diagram with Source Available and Connected LED Indicator
- Method of Transfer: Open with Inphase Transition
- Mechanically Interlocked to Prevent Connection of Both Sources
- Modbus® RTU Communications
- TXC 100 Controller
- Operating Temperature -4 ° to 158 °F (-20 ° to 70 °C)
- Removable Top and Bottom Plates for Ease of Entry
- Voltage Agnostic*
- High Withstand and Closing Ratings
- Heater Kit Standard on All 3R Enclosures
- Auxiliary Output Includes: Two Wire Start, Signal Before Transfer, Fault, and a Programmable Relay Output
- Auxiliary Input Includes: Permissive Inputs (24 VDC)
- General Alarm Indication
- 2 Year Standard Warranty
- IBC 2018, 2015, 2012, 2009

VOLTAGE AND FREQUENCY SENSING

- Three Phase Under and Over Voltage Sensing on Normal and Emergency Sources
- Under and Over Frequency Sensing on Normal and Emergency
- Selectable Settings: Single or Three Phase Voltage
- Sensing on Normal, Emergency and Load 50 or 60 Hz
- Phase Sequence Sensing for Phase Sensitive Loads

Start Circuit

- 2-Wire Start
- 3-Wire Start From C Contact for Circuit Monitoring

Digital Outputs

- Signal Before Transfer (Elevator)
- General Alarm

Digital Inputs

- Emergency Inhibit (Permissive & Load Shed)
- Go to Emergency
- Manual Generator Retransfer

CONTROLS

- Front Programmable Control Reduces PPE Needs and Arc Flash Hazard
- Built in Battery Backup - Increases Switch Reliability and Reduces Switch Transition Time to Alternate Source
- Battery Backup Able to Power the Controller for up to 60 Minutes in the Event of No Source Availability
- Generator Battery Backup for Controller
- Accessible USB Port for Easy Data Downloads, Firmware Updates without Requiring PPE, Reducing the Risk of Arc Flash
- All Amp Nodes Offered with Delayed Transition
- Heater Programmable through Control for Desired Temperature and Humidity Settings
- Front Accessible Customer Connections
- Time-Stamped Event History Log
- Programmable Exerciser - Daily, Weekly, Bi-Weekly, Monthly

* 480 V 3-Wire Systems Must be Specified at Time of Ordering for Transformer Kit to be Included

CONFIGURABLE OPTIONS

- Chicago Code Kit
- 3R Padlockable Cover for Controller (Standard on 3R Enclosure)
- CTs for Integrated Metering
- Heater Option for Temperature and Humidity Control (Standard on 3R Enclosure)
- Time Delay in Neutral Transition (TDN), or Inphase with a Default to Time Delay in Neutral Transfer
- Expandable Input/Output Board Module Includes: 4 Relay Outputs and 4 Optically Isolated Inputs
- IBC Seismic Certified/Seismic Rated
- 2 Year Extended Limited Warranty
- 5 Year Basic Limited Warranty
- 5 Year Extended Limited Warranty
- 7 Year Extended Limited Warranty
- 10 Year Extended Limited Warranty

Engineered Options

- Transient Voltage Surge Suppressor (TVSS)
- NEMA 4X Stainless Steel (304) Enclosure
- Manual Generator Retransfer Switch
- Go to Emergency Switch

Conversion Kits

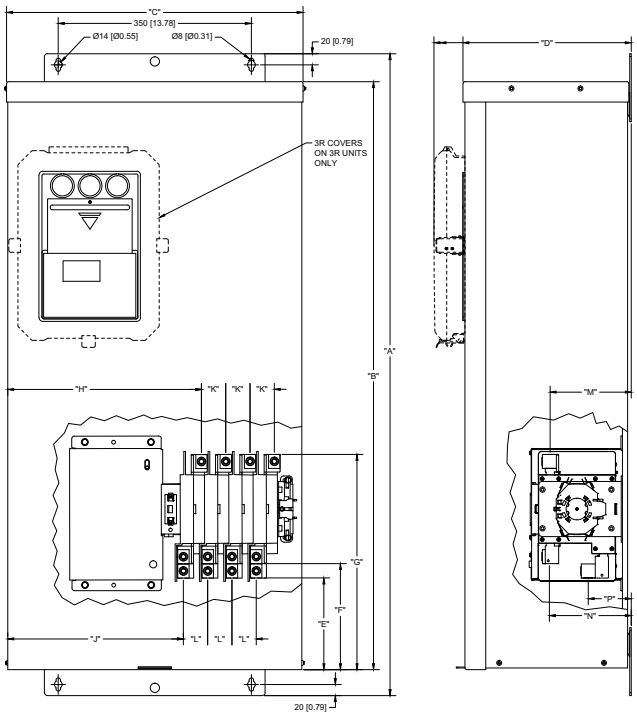
- 480 V Transformer Kit for 3-Wire Systems
- NEMA Type 1 to 3R Kit

TX301 Series Transfer Switch

100 – 400 Amps

Contactor Type · Open and Delayed Transition

UNIT DIMENSIONS*



Non-Service Entrance Rated, Contactor Type, Open and Delayed Transition, 100 – 400 A

Description	in (mm)														Cu/Al					lbs (kg)
	A (Height)	B (Height)	C (Width)	D (Depth)	E (Dim)	F (Dim)	G (Dim)	H (Dim)	J (Dim)	K (Dim)	L (Dim)	M (Dim)	N (Dim)	P (Dim)	Normal 75 °C Wire	Standby Source 75 °C Wire	Load 75 °C Wire	Neutral Connection	Ground Connection	Weight
100A NON SER NEMA 1	35.6 (903)	31.7 (806)	21.4 (544)	12.0 (305)	9.3 (236)	10.3 (262)	18.1 (460)	3.7 (93)	5.1 (129)	1.5 (38)	1.7 (44)	5.8 (148)	5.8 (148)	4.8 (122)	(1) 2/0 - 14	(1) 2/0 - 14	(1) 2/0 - 14	(5) 2/0 - 14	(2) 1/0 - 14	105.8 (48)
100A NON SER NEMA 3R	35.6 (903)	31.7 (806)	21.4 (544)	14.1 (358)	9.3 (236)	10.3 (262)	18.1 (460)	3.7 (93)	5.1 (129)	1.5 (38)	1.7 (44)	5.8 (148)	5.8 (148)	4.8 (122)	(1) 2/0 - 14	(1) 2/0 - 14	(1) 2/0 - 14	(5) 2/0 - 14	(2) 1/0 - 14	110.2 (50)
150A NON SER NEMA 1	35.6 (903)	31.7 (806)	21.4 (544)	12.0 (305)	9.3 (236)	10.3 (262)	18.1 (460)	3.7 (93)	5.1 (129)	1.5 (38)	1.7 (44)	5.8 (148)	5.8 (148)	4.8 (122)	(1) 250 - 6	(1) 250 - 6	(1) 250 - 6	(4) 350 - 6	(2) 250 - 6	116.8 (53)
150A NON SER NEMA 3R	35.6 (903)	31.7 (806)	21.4 (544)	14.1 (358)	9.3 (236)	10.3 (262)	18.1 (460)	3.7 (93)	5.1 (129)	1.5 (38)	1.7 (44)	5.8 (148)	5.8 (148)	4.8 (122)	(1) 250 - 6	(1) 250 - 6	(1) 250 - 6	(4) 350 - 6	(2) 250 - 6	121.3 (55)
200A NON SER NEMA 1	35.6 (903)	31.7 (806)	21.4 (544)	12.0 (305)	9.3 (236)	10.3 (262)	18.1 (460)	3.7 (93)	5.1 (129)	1.5 (38)	1.7 (44)	5.8 (148)	5.8 (148)	4.8 (122)	(1) 250 - 6	(1) 250 - 6	(1) 250 - 6	(4) 350 - 6	(2) 250 - 6	116.8 (53)
200A NON SER NEMA 3R	35.6 (903)	31.7 (806)	21.4 (544)	14.1 (358)	9.3 (236)	10.3 (262)	18.1 (460)	3.7 (93)	5.1 (129)	1.5 (38)	1.7 (44)	5.8 (148)	5.8 (148)	4.8 (122)	(1) 250 - 6	(1) 250 - 6	(1) 250 - 6	(4) 350 - 6	(2) 250 - 6	121.3 (55)
300A NON SER NEMA 1	51.4 (1,305)	47.5 (1,206)	24.4 (621)	12.0 (305)	9.8 (249)	11.6 (295)	20.4 (519)	4.6 (116)	6.3 (161)	2.3 (59)	2.3 (59)	6.5 (166)	6.5 (166)	3.3 (84)	(1) 600 - 4 or (2) 250 - 1/0	(1) 600 - 4 or (2) 250 - 1/0	(1) 600 - 4 or (2) 250 - 1/0	(5) 600 MCM - 4 or (10) 250 MCM - 1/0	(2) 250 - 6	174.2 (79)
300A NON SER NEMA 3R	51.4 (1,305)	47.5 (1,206)	24.4 (621)	14.1 (358)	9.8 (249)	11.6 (295)	20.4 (519)	4.6 (116)	6.3 (161)	2.3 (59)	2.3 (59)	6.5 (166)	6.5 (166)	3.3 (84)	(1) 600 - 4 or (2) 250 - 1/0	(1) 600 - 4 or (2) 250 - 1/0	(1) 600 - 4 or (2) 250 - 1/0	(5) 600 MCM - 4 or (10) 250 MCM - 1/0	(2) 250 - 6	178.6 (81)
400A NON SER NEMA 1	51.4 (1,305)	47.5 (1,206)	24.4 (621)	12.0 (305)	9.8 (249)	11.6 (295)	20.4 (519)	4.6 (116)	6.3 (161)	2.3 (59)	2.3 (59)	6.5 (166)	6.5 (166)	3.3 (84)	(1) 600 - 4 or (2) 250 - 1/0	(1) 600 - 4 or (2) 250 - 1/0	(1) 600 - 4 or (2) 250 - 1/0	(5) 600 MCM - 4 or (10) 250 MCM - 1/0	(2) 250 - 6	174.2 (79)
400A NON SER NEMA 3R	51.4 (1,305)	47.5 (1,206)	24.4 (621)	14.1 (358)	9.8 (249)	11.6 (295)	20.4 (519)	4.6 (116)	6.3 (161)	2.3 (59)	2.3 (59)	6.5 (166)	6.5 (166)	3.3 (84)	(1) 600 - 4 or (2) 250 - 1/0	(1) 600 - 4 or (2) 250 - 1/0	(1) 600 - 4 or (2) 250 - 1/0	(5) 600 MCM - 4 or (10) 250 MCM - 1/0	(2) 250 - 6	178.6 (81)

UL 1008 Withstand and Closing Ratings

Ampere Rating	Specific Breaker (kA)**	Fuse Rating (Class J)
100	35	200 kA
150	42	200 kA
200	42	200 kA
300	65	200 kA
400	65	200 kA

* All measurements are approximate and for estimation purposes only. Specification characteristics may change without notice. Please contact a Generac Power Systems Industrial Dealer for detailed installation drawings.
** See Specific Breaker List available on GENconnect.

Generac Power Systems, Inc. | P.O. Box 8 | Waukesha, WI 53189
P: (262) 544-4811

Part No. A0000354447
Rev. C 06/02/2021

TX Series Transfer Switch

TXC-100

Automatic Transfer Switch Controller

- Automatic Transfer Switch Controller
- Up to 480 VAC, 50/60 Hz
- Single and Three Phase
- cETLus Recognized Component
- Tested to UL 1008

Image used for illustration purposes only

Codes and Standards

Not all codes and standards apply to all configurations. Contact factory for details.

cETLus Recognized per UL 1008

NFPA 37, 70, 99, 110

NEC 700, 701, 702, 708

Description

Generac's TXC-100 microprocessor based controller provides customers with the flexibility to program a comprehensive group of set points to match the application needs. The controller has 2 programmable inputs and 1 programmable output as standard and is available with an optional expansion board for up to 4 programmable inputs and outputs. The LCD displays real time and historical information with time-stamped events. The integrated plant exerciser can be configured in off, daily, day of week, biweekly, and monthly intervals with user selectable run time. Standard features of the controller include three phase sensing on both sources, phase unbalance, phase reversal, emergency inhibit, and communications.

TX Series Transfer Switch

TXC-100

Automatic Transfer Switch Controller

STANDARD FEATURES

GENERAL

- Graphical LCD-Based Display for Programming, System Diagnostics and Help Menu Display Mimic Diagram with Source Available and Connected LED Indicator
- Time-Stamped Event History Log
- Programmable Exerciser - Daily, Weekly, Bi-Weekly, Monthly
- Methods of Transfer Include: Open with Inphase Transition Only, Time Delay in Neutral Transition, or Inphase with a Default to Time Delay in Neutral Transfer
- Modbus® RTU Communications
- Operating Temperature -4 ° to 158 °F (-20 ° to 70 °C)
- Voltage Agnostic*
- Integrated Anti-condensation Heater Control
- Auxiliary Output Includes: 2WS, SB4T, Fault, and a Programmable Relay Output
- Auxiliary Input Includes: Permissive and Loadshed Inputs (24 VDC)
- Expandable Input/Output Board Module Includes: 4 Relay Outputs and 4 Optically Isolated Inputs
- Front Programmable Control Reduces PPE Needs and Arc Flash Hazard
- Built in Battery Backup - Increases Switch Reliability and Reduces Switch Transition Time to Alternate Source
- Rechargeable Lithium-ion Battery Backup Able to Power the Controller for up to 60 Minutes in the Event of No Source Availability
- Accessible USB Port for Easy Data Downloads, Firmware Updates without Requiring PPE, Reducing the Risk of Arc Flash
- All Amp Nodes Offered with Delayed Transition
- General Alarm Indication
- Heater Programmable through Control for Desired Temperature and Humidity Settings
- Front Accessible Customer Connections and Battery without Arc Flash Exposure
- Auxiliary Generator Battery Backup for Controller

VOLTAGE AND FREQUENCY SENSING

- Three Phase Under and Over Voltage Sensing on Normal and Emergency Sources
- Under and Over Frequency Sensing on Normal and Emergency
- Selectable Settings: Single or Three Phase Voltage
- Sensing on Normal, Emergency and Load 50 or 60 Hz
- Phase Sequence Sensing for Phase Sensitive Loads

PROGRAMMABLE I/O PARAMETERS

Outputs:

- Source 1 – Two Wire Start
- Source 2 – Two Wire Start
- Engine Exercising
- Engine Warmup
- Signal Before Transfer (Elevator Contact)
- General Alarm
- Source 1 Good
- Source 2 Good

Inputs:

- Permissive (Emergency Inhibit)
- Remote Engine Fast Test
- Remote Engine Normal Test
- ATS Timer
- Initiate Demand Response

* 480 V Delta Must be Specified at Time of Ordering for Transformer Kit to be Included

AVAILABLE OPTIONS

- Chicago Code Kit
- 3R Padlockable Cover for Controller (Standard on 3R Enclosure)
- Emergency Inhibit
- Selectable Retransfer
- Manual Generator Retransfer
- Type 1 to 3R Conversion Kit
- Heater Option for Temperature and Humidity Control (Standard on 3R Enclosure)
- Input/Output (I/O) Module
- Current Measurements**
- Power in kW**
- Power Factor**

** When Equipped with Current Transformers

Generac Power Systems, Inc. | P.O. Box 8 | Waukesha, WI 53189
P: (262) 544-4811

Part No. A0000354456
Rev. A 06/18/2020

SPECIFIC BREAKER LIST
TX301 Series Transfer Switch

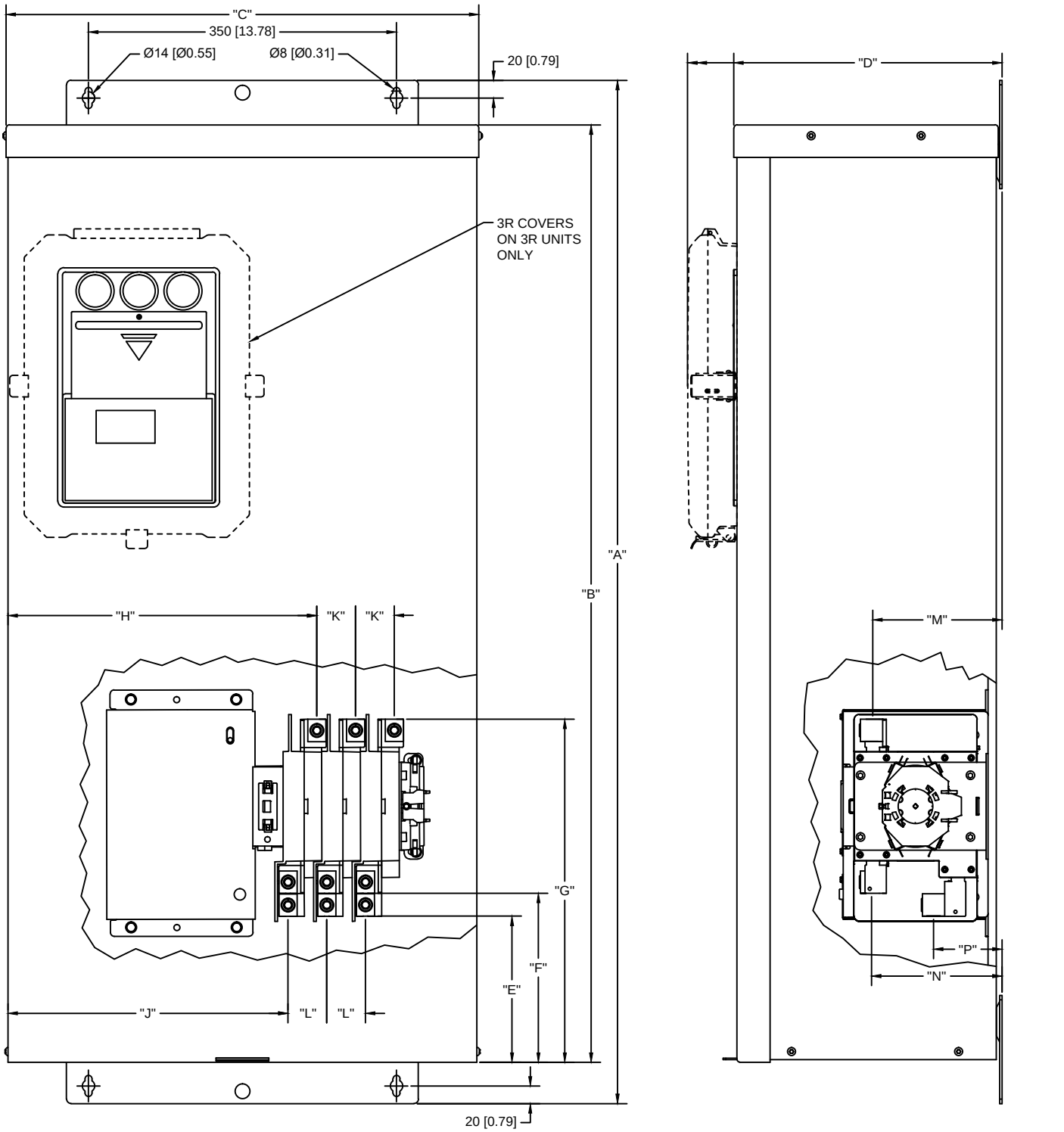
TX301 Series Switches Covered:

200A up to 480V

Short-Circuit Withstand and Closing Fuse Ratings				
When protected by a fuse of the specific fuse class and maximum ampere rating as marked below, this transfer switch is suitable for use in a circuit capable of delivering the short-circuit current at the maximum voltage marked.				
Switch Ampere Rating	**Transfer Switch Short-Circuit Current Rating (RMS Symmetrical Amperes x 1,000)**	**Voltage (Volts AC, Maximum)**	**Fuse Class**	**Rating (Amperes)**
200	200	480	J	200

Specific Circuit Breaker Manufacturer and Type Listing					
When protected by a circuit breaker of the specific manufacturer, type, and ampere rating as marked below, this transfer switch is suitable for use in circuits capable of delivering short-circuit current at the maximum voltage marked.					
Switch Ampere Rating	**Transfer Switch Short-Circuit Current Rating (RMS Symmetrical Amperes x 1,000)**	**Voltage (Volts AC, Maximum)**	**Manufacturer**	**Type**	**Circuit Breaker Rating (Amperes Maximum)**
200	25	480	Square D	BJ, BG, BD	125
200	42	480	Square D	HD, HG, HJ, HL, HR	150
200	42	480	Square D	JG, JJ, JL, JR	200
200	30	480	Eaton	FD, FDC, FDCE	200
200	30	480	Eaton	FDE, HFD, HFDE	200
200	42	480	Eaton	EGE, EGC	125
200	42	480	Eaton	EGH, EGS	125
200	35	480	Eaton	HJD, JD, JDB	200
200	35	480	Eaton	JDC, JGC, JGH	200
200	35	480	Eaton	JGS, JGU, JGX	200
200	35	480	Eaton	LGC, LGH, LGS	200
200	35	480	Eaton	LGU, LGX	200
200	35	480	GE/ABB	SGL, SGP	125
200	42	480	GE/ABB	SEL, SEP, PE_N	150
200	42	480	GE/ABB	PE_H, PE_L	150
200	42	480	GE/ABB	THLC1	150
200	42	480	Siemens	3VA52_6	200

This transfer switch does not include short-time current ratings.

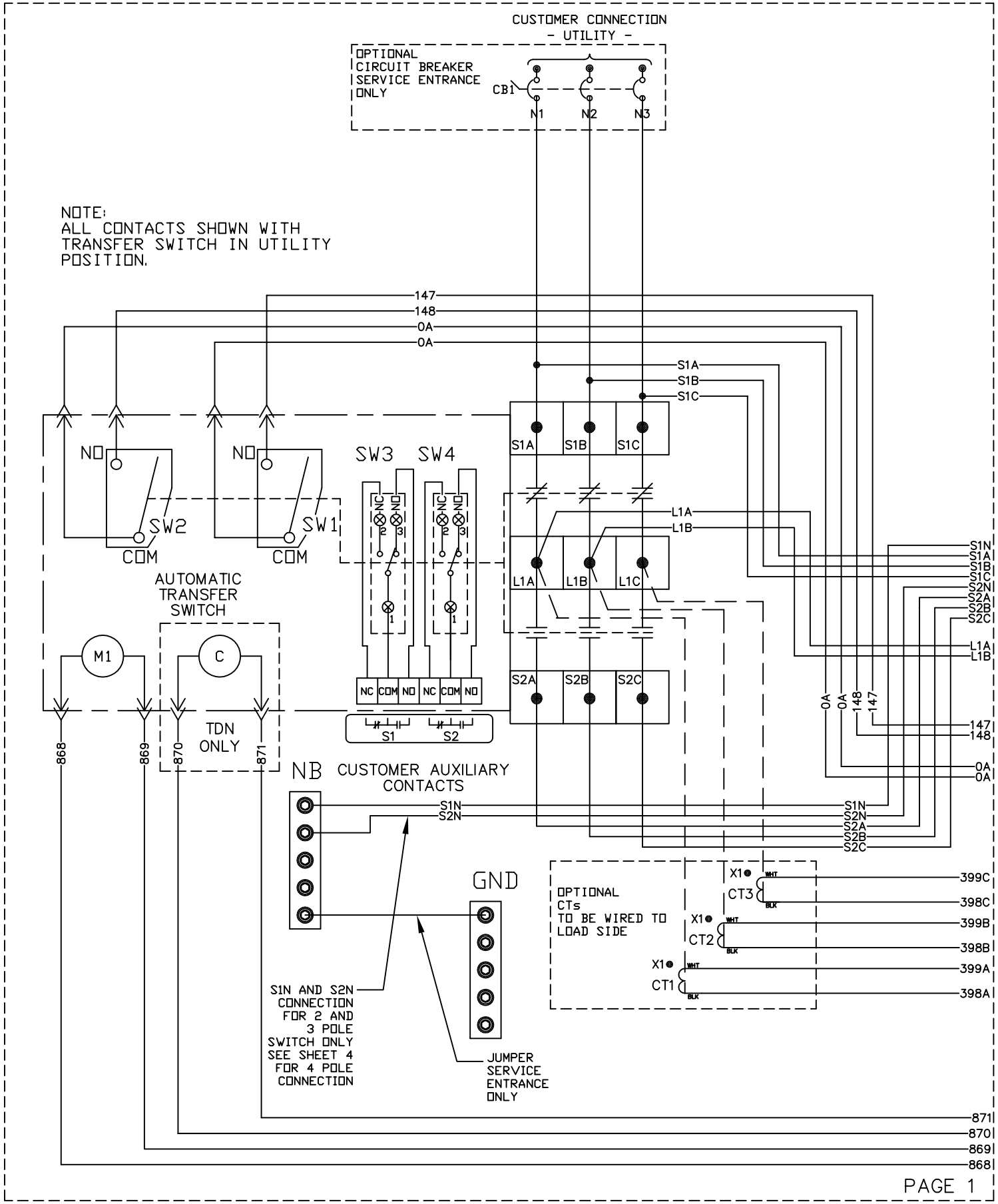


ALL DIMENSION ARE: mm [inches]

DESCRIPTION	HEIGHT "A"	HEIGHT "B"	WIDTH "C"	DEPTH "D"	DIM "E"	DIM "F"	DIM "G"	DIM "H"	DIM "J"	DIM "K"	DIM "L"	DIM "M"	DIM "N"	DIM "P"	WEIGHT
100A NON SER NEMA 1	903	806	538	305	226	252	471	348	315	44	44	149	149	79	48kg
	[35.55]	[31.71]	[21.16]	[12.00]	[8.89]	[9.91]	[18.54]	[13.70]	[12.40]	[1.73]	[1.73]	[5.88]	[5.88]	[3.11]	105.6lbs
100A NON SER NEMA 3R	903	806	538	355	226	252	471	348	315	44	44	149	149	79	50kg
	[35.55]	[31.71]	[21.16]	[13.99]	[8.89]	[9.91]	[18.54]	[13.70]	[12.40]	[1.73]	[1.73]	[5.88]	[5.88]	[3.11]	110.0lbs
150A NON SER NEMA 1	903	806	538	305	237	263	460	348	315	44	44	153	153	83	53kg
	[35.55]	[31.71]	[21.16]	[12.00]	[9.31]	[10.34]	[18.12]	[13.70]	[12.40]	[1.73]	[1.73]	[6.04]	[6.04]	[3.26]	116.6lbs
150A NON SER NEMA 3R	903	806	538	355	237	263	460	348	315	44	44	153	153	83	55kg
	[35.55]	[31.71]	[21.16]	[13.99]	[9.31]	[10.34]	[18.12]	[13.70]	[12.40]	[1.73]	[1.73]	[6.04]	[6.04]	[3.26]	121.0lbs
200A NON SER NEMA 1	903	806	538	305	237	263	460	348	315	44	44	153	153	83	53kg
	[35.55]	[31.71]	[21.16]	[12.00]	[9.31]	[10.34]	[18.12]	[13.70]	[12.40]	[1.73]	[1.73]	[6.04]	[6.04]	[3.26]	116.6lbs
200A NON SER NEMA 3R	903	806	538	355	237	263	460	348	315	44	44	153	153	83	55kg
	[35.55]	[31.71]	[21.16]	[13.99]	[9.31]	[10.34]	[18.12]	[13.70]	[12.40]	[1.73]	[1.73]	[6.04]	[6.04]	[3.26]	121.0lbs

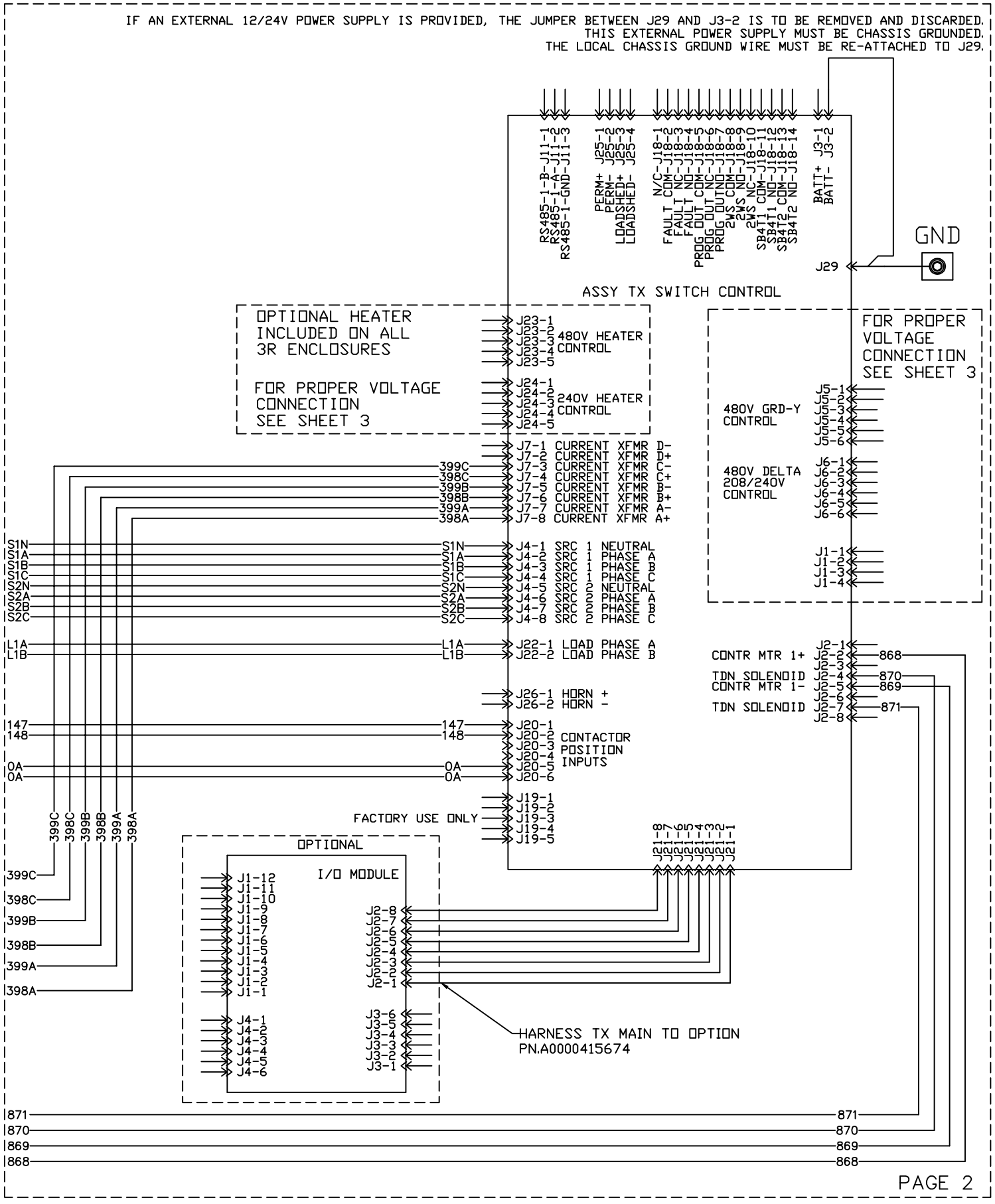
REVISION: D
REVISION DATE: 10/06/2020

ID TX SWITCH NON SERVICE ENTRANCE 3-POLE 100A-200A
A0000430682 (DRAWING: A0000561085)
NOT TO SCALE



PAGE 1

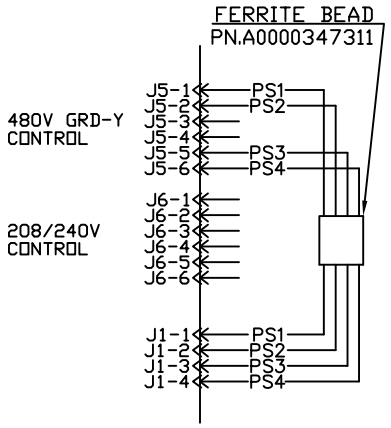
SCHEMATIC - DIAGRAM



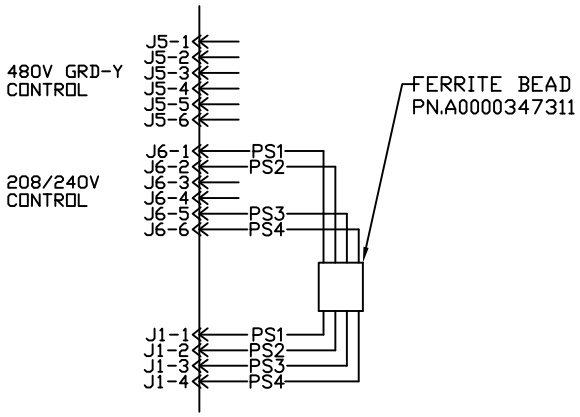
SCHEMATIC - DIAGRAM

TX CONTROL TRANSFER SW

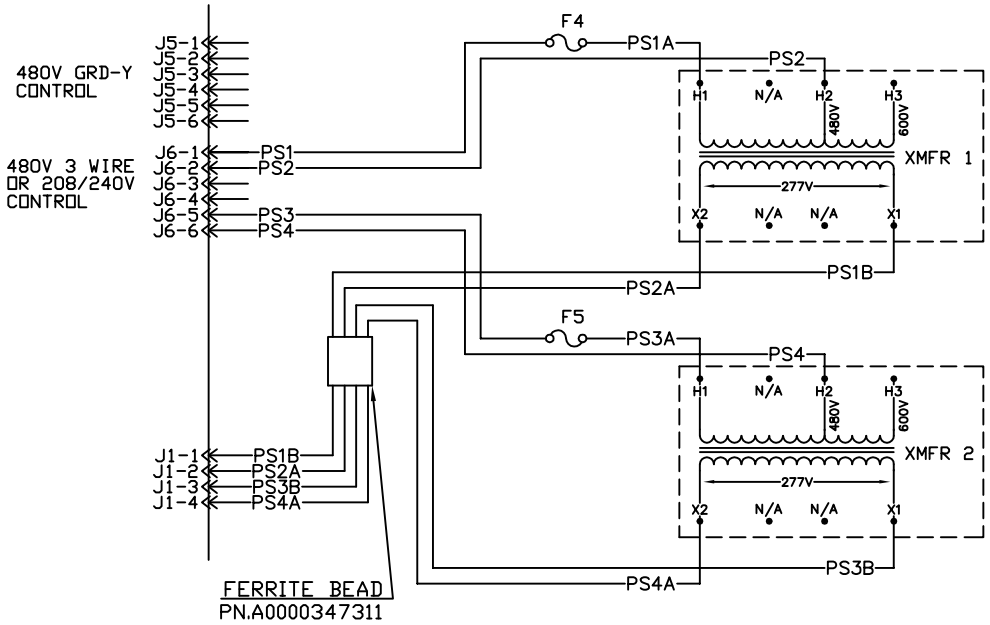
480V GRD-Y CONTROL



208/240V CONTROL

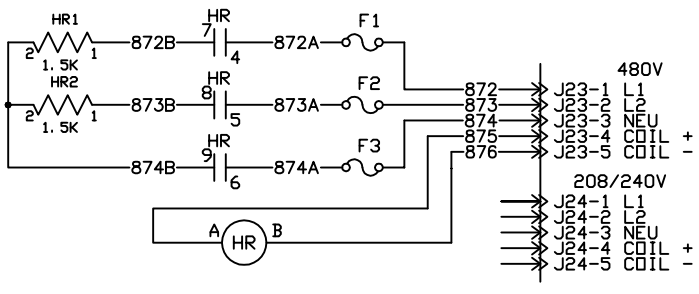


480V 3 WIRE CONNECTION WITH TRANSFORMERS



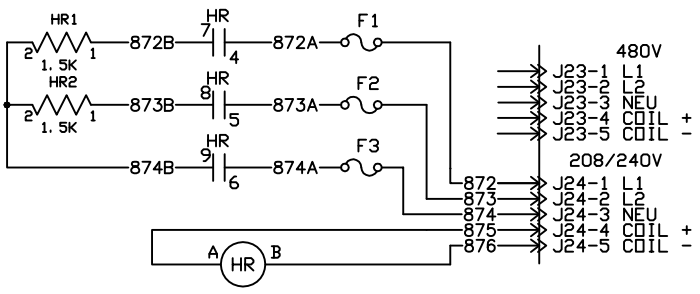
480V HEATER CONTROL

OPTIONAL HEATER
INCLUDED ON ALL 3R ENCLOSURES



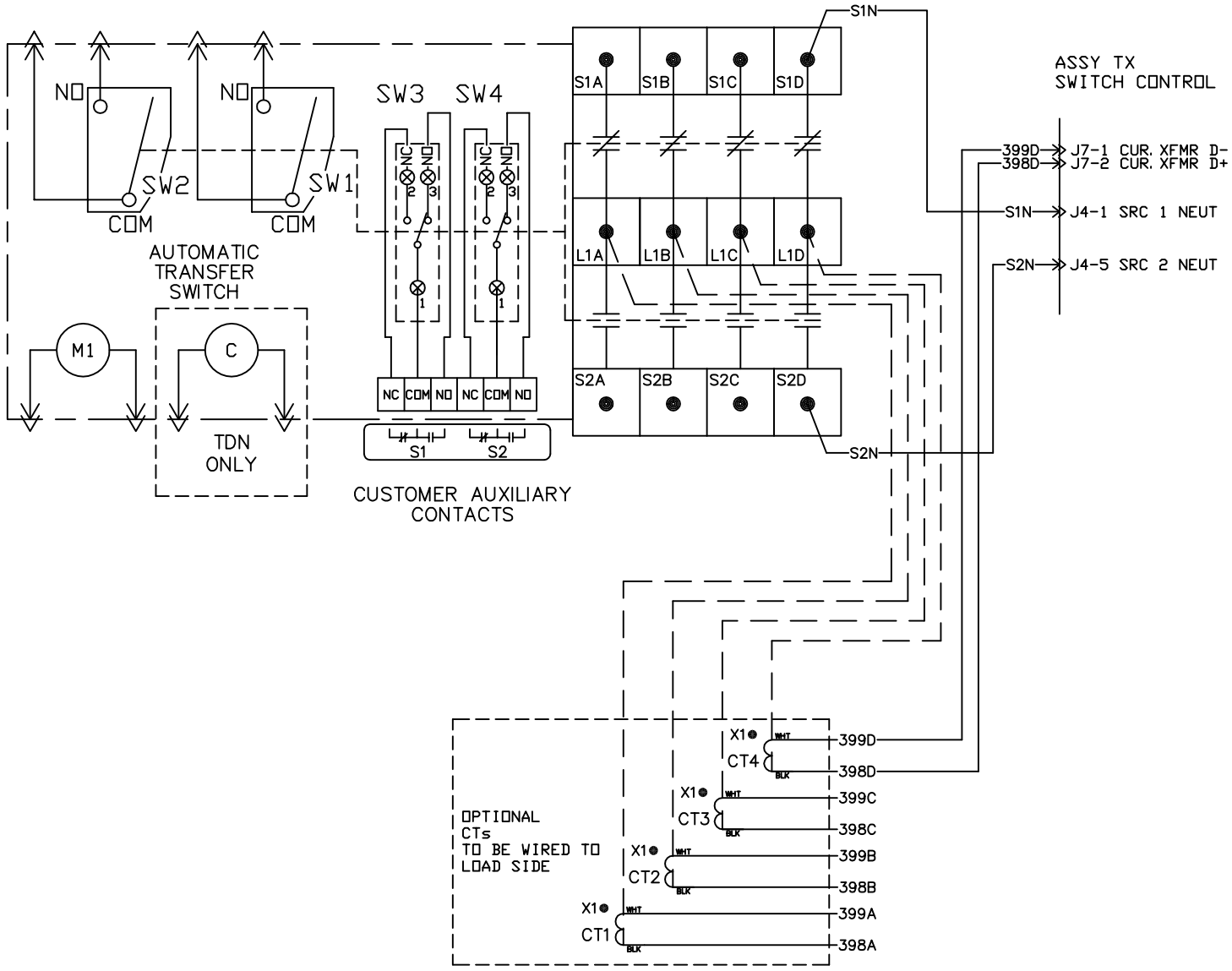
208/240V HEATER CONTROL

OPTIONAL HEATER
INCLUDED ON ALL 3R ENCLOSURES



SCHEMATIC - DIAGRAM
TX CONTROL TRANSFER SW
DRAWING #: A0000347533

4 POLE SWITCHED NEUTRAL CONNECTIONS



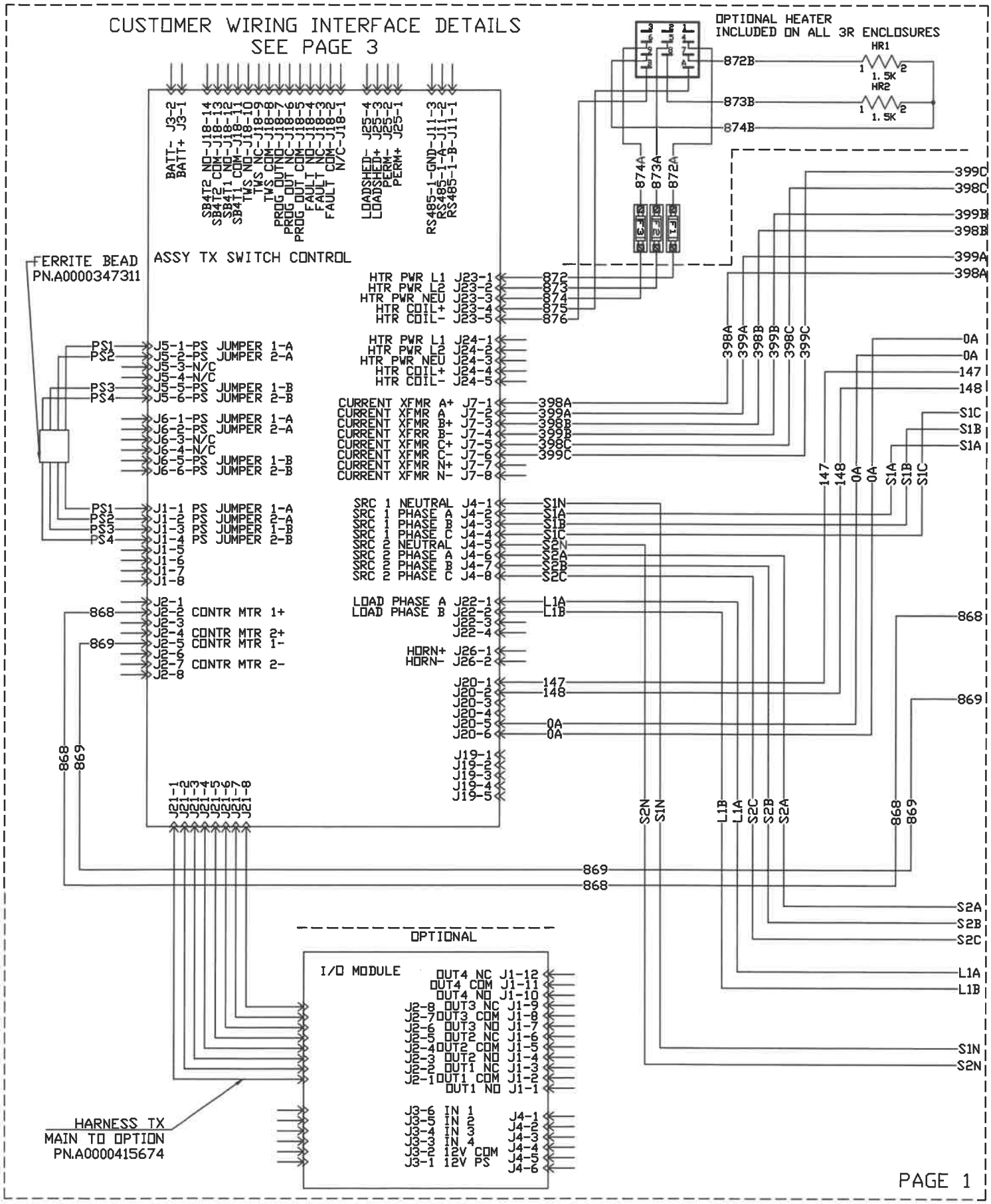
SCHEMATIC - DIAGRAM

REVISION: CN-0040082D

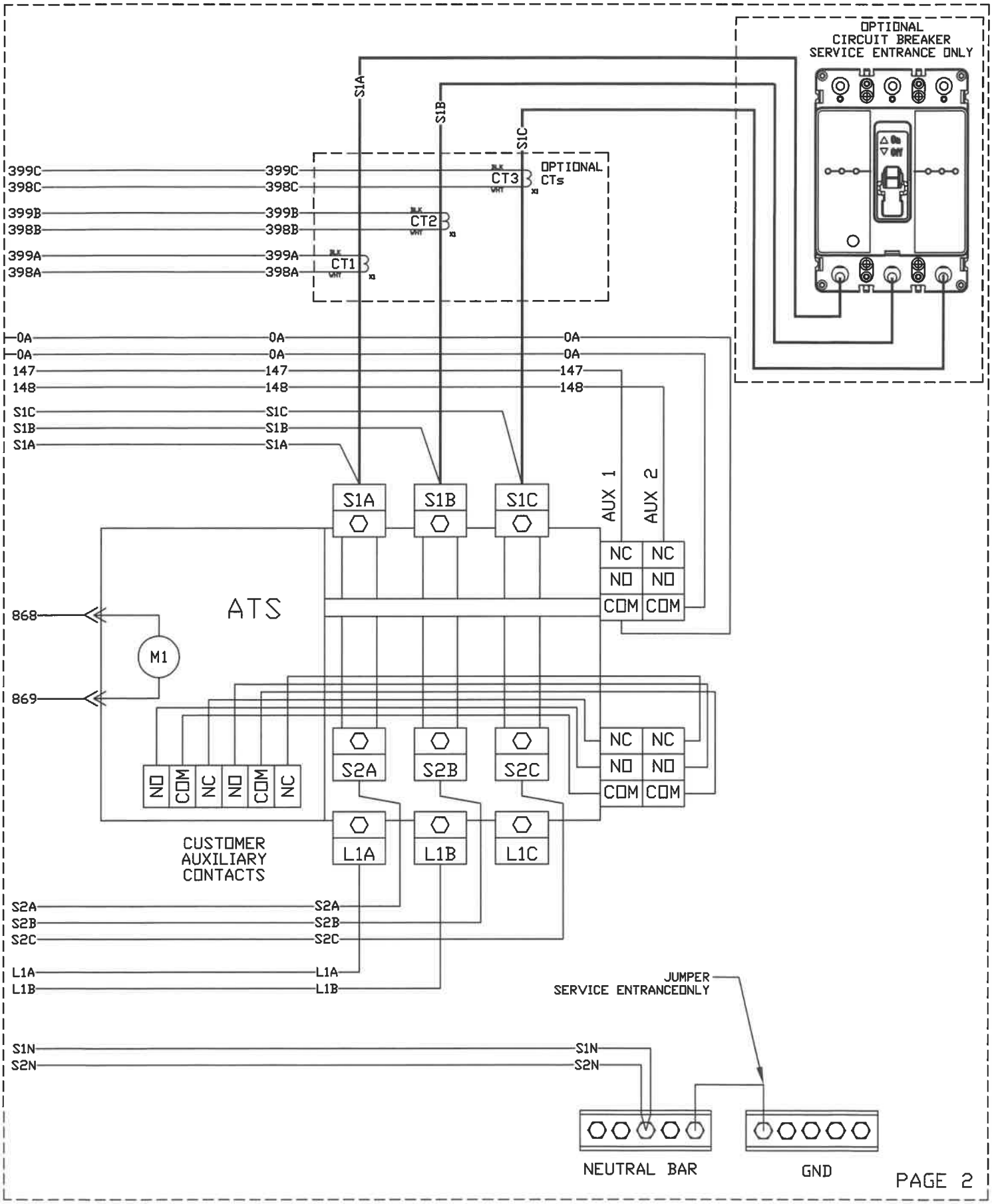
DATE: 8/17/20

TX CONTROL TRANSFER SW

DRAWING #: A0000347533



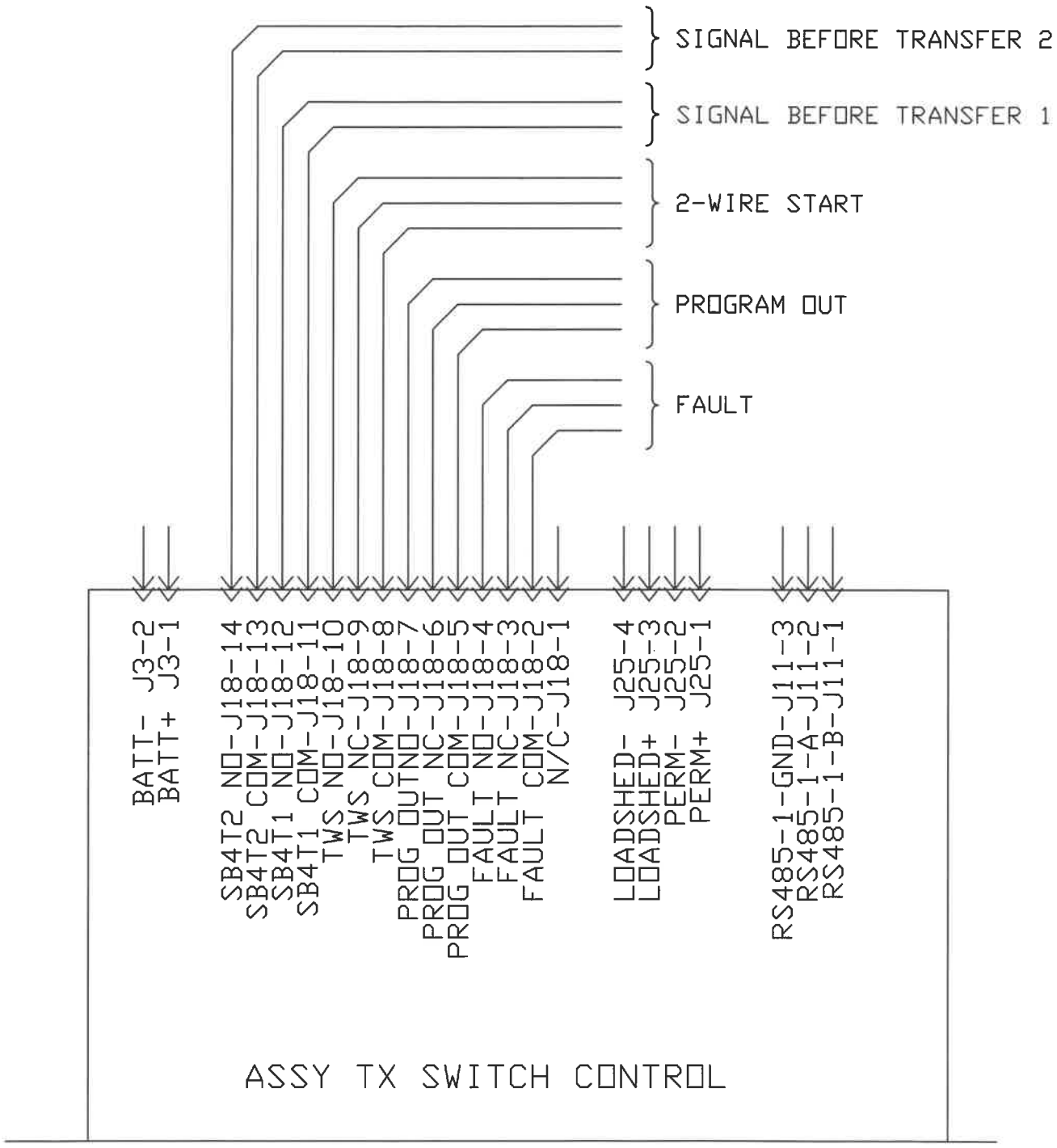
WIRING - DIAGRAM
TX CONTROL TRANSFER SW
DRAWING #: A0000347534



WIRING - DIAGRAM

TX CONTROL TRANSFER SW

DRAWING #: A0000347534



WIRING - DIAGRAM
TX CONTROL TRANSFER SW
DRAWING #: A0000347534

REVISION: A
DATE: 1/29/20

Generac Power Systems 5 Year (5C) Limited Warranty Extension for Industrial Transfer Switch Systems

Generac and purchaser hereby amend ("Amendment") the term of the original warranty for the transfer switch ("Original Warranty") from the term originally stated in the Original Warranty to a term of five (5) years ("Term Extension"). If purchaser's Original Warranty had already expired, this Amendment revives the Original Warranty and replaces its term with the Term Extension. This Amendment also amends warranty coverage in the Original Warranty to the coverage listed below from years 1-5 ("Coverage Extension"). The Coverage Extension shall not retroactively apply to cover any warranty work performed before the date of the Amendment. For clarity purposes only, the amended warranty is stated below in full.

For the period of warranty noted below, which begins (or began, whichever applicable) upon the successful start-up and/or on-line activation/registration of the unit, Generac Power Systems, Inc. (Generac) warrants that its transfer switch will be free from defects in material and workmanship for the items and period set forth below. Generac will, at its discretion, repair or replace any part(s) which, upon evaluation, inspection and testing by Generac or an Independent Authorized Service Dealer, is found to be defective. Any equipment that the purchaser/owner claims to be defective must be evaluated by the nearest Independent Authorized Service Dealer.

Warranty Coverage in Year(s) 1-5
Parts, Labor and Limited Travel

Guidelines:

1. Unit must be registered and proof of purchase available.
2. Any and all warranty repairs and/or concerns must be performed and/or addressed by an Independent Authorized Service Dealer, or branch thereof. Repairs or diagnostics performed by individuals other than Independent Authorized Service Dealers not authorized in writing by Generac will not be covered.
3. Warranty is transferable between ownership of original installation site.
4. Generac may choose to repair, replace or refund a piece of equipment in its sole discretion.
5. Warranty only applies to permanently wired and mounted units.
6. Enclosures are warranted for the first year of ownership only. Damage caused after receipt of transfer switch is the responsibility of the owner and is not covered by this warranty. Nicks, scrapes, dents or scratches to the painted enclosure should be repaired promptly by the owner.
7. Proof of performance of all required maintenance must be available.
8. Travel allowance is limited to 300 miles maximum or seven and one half (7.5) hours maximum (per occurrence, whichever is less) round trip from the nearest Independent Authorized Service Dealer. Any additional travel required will not be covered.

The following will NOT be covered by this warranty:

1. Costs of normal maintenance (i.e. associated part(s), adjustments, installation or start-up).
2. Damage to the transfer switch system caused by accidents, shipping, handling or improper storage.
3. Damage/failures caused by operation with loads or installations other than what's recommended or specified by Generac. Unauthorized modification/misapplication will not be warranted unless authorized by Generac in writing.
4. Rental equipment used while warranty repairs are being performed and/or any extraordinary equipment used for removal and/or reinstallation of transfer switch (i.e. cranes, hoists, lifts, etc.).
5. Planes, ferries, railroad, buses, helicopters, snowmobiles, snow-cats, off-road vehicles or any other mode of transport deemed not standard by Generac.
6. Failures due to normal wear and tear, accident, misuse, abuse, neglect, improper installation, or improper sizing.
7. Damage to any covered components or consequential damages caused by the use of a non-OEM part will not be covered by this warranty.
8. Damage related to rodent, reptile, and/or insect infestation.
9. Repairs or diagnostics performed by individuals other than Independent Authorized Service Dealers not authorized in writing by Generac.
10. Steel enclosures that rust as a result of improper installation, location in a harsh or salt water environment, or are scratched where the integrity of applied paint is compromised.
11. Fuses, light bulbs and any related labor.
12. Units sold, rated or used for "Prime Power," "Trailer Mounted" or "Rental Unit" applications as defined by Generac. Contact an Independent Authorized Service Dealer for definitions.
13. Failures caused by any act of God or external cause including without limitation, fire, theft, freezing, war, lightning, earthquake, windstorm, hail, water, tornado, hurricane, or any other matters which are reasonably beyond the manufacturer's control.
14. Shipping costs associated with expedited shipping.
15. Any incidental, consequential or indirect damages caused by defects in materials or workmanship, or any delay in repair or replacement of the defective part(s).
16. Any unit built/manufactured prior to 2014 models.
17. Overtime, holiday or emergency labor.
18. Living or travel expenses of person(s) performing service, except as specifically included within the terms of a specific unit warranty period.

THIS WARRANTY SUPERSEDES ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. SPECIFICALLY, GENERAC MAKES NO OTHER WARRANTIES AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY IMPLIED WARRANTIES WHICH ARE ALLOWED BY LAW, SHALL BE LIMITED IN DURATION TO THE TERMS OF THE EXPRESS LIMITED WARRANTY PROVIDED HEREIN. SOME JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. PURCHASER'S SOLE AND EXCLUSIVE REMEDY AND GENERAC'S ONLY LIABILITY SHALL BE THE REPAIR OR REPLACEMENT OF PART(S) AS STATED ABOVE. IN NO EVENT SHALL GENERAC BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, EVEN IF SUCH DAMAGES ARE A DIRECT RESULT OF GENERAC'S NEGLIGENCE. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU COULD ALSO HAVE OTHER RIGHTS FROM STATE TO STATE.

FOR AUSTRALIA ONLY: Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.
FOR NEW ZEALAND ONLY: Nothing in this warranty statement excludes, restricts or modifies any condition, warranty right or remedy which pursuant to the New Zealand Legislation (Commonwealth or State) including the Fair Trading Practices Act of 1986 or the Consumer Guarantees Act 1993 ("CGA") applies to this limited warranty and may not be so excluded, restricted or modified. Nothing in this statement is intended to have the effect of contracting out of the provisions of the CGA, except to the extent permitted by that Act, and these terms are to be modified to the extent necessary to give effect to that intention. If you acquire goods from Generac Power Systems or any of its authorized resellers and distributors for the purposes of a business, then pursuant to section 43(2) of the CGA, it is agreed that the provisions of the CGA do not apply.

GENERAC POWER SYSTEMS, INC. • P.O. BOX 8 • Waukesha, WI, USA 53187
Ph: (888) GENERAC (436-3722) • Fax: (262) 544-4851

To locate the nearest Independent Authorized Service Dealer and to download schematics, exploded views and parts lists
visit our website: www.generac.com

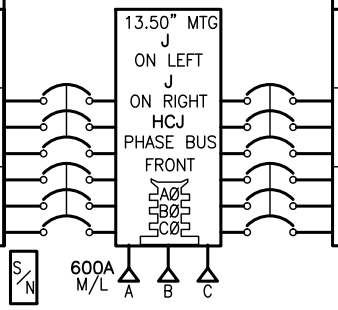
Part No. 0J4305 Revision H (4/21)

PANEL 'GEN'

Seq #	Qty	Product Description
1	1	**Designation :** PANEL GEN **Product Details :** 1 - I-Line ML Panel (INTERIOR)-I-Line Panelboard Consisting of 208Y/120V 3Ph 4W 60Hz SCCR: 22kA Fully Rated Main Lug Only: 600A Incoming Conductors: 1 - (2) #2 - 500kcmil Bus: 600A Rated Copper: Tin Plated CU Ground Bar 27" of Mounting Inches Type 3R/5/12Box: 48H x 32W x 11.75D Incoming: Bottom Trim w/ Box Box Cat No: HCJ3248WP Ref. Drawing PBA475 Type: HCJ Feeders: 2 - 125A/3P HD 2 - 200A/3P JD Optional Features: Standard Panel (Box Ahead),Copper Solid Neutral,Copper Ground Bar,Standard Mains and Feeders Mechanically Restrained Branch User Placement 1 - HCJ3248WP-PNLBD ENCLOSURE I-LINE 3R 48H 32W **Estimated days to ship, excluding transit:** 15 working days after customer release to manufacturer. See Conditions of Sale.

REV	DESCRIPTION	BY	DATE	–	----	--	--/--/--
–	----	--	--/--/--	–	----	--	--/--/--

CKT NO	ACCESSORIES	TYPE	RATING AMP/P	PHASE BUS CONN
	4.50" BLANK			
1		HD	125/3	A B C
3		JD	200/3	A B C



PHASE BUS CONN	RATING AMP/P	TYPE	ACCESSORIES	CKT NO
			4.50" BLANK	
C B A	125/3	HD		2
C B A	200/3	JD		4

PHYSICAL DATA

ENCLOSURE Type 3R/5/12
FRONT CAT#: Trim w/Box
BOX CAT#: HCJ3248WP
DIMENSIONS:
48''(1219mm)Hx32"(813mm)Wx11.75''(298mm)D
WIRE BENDING SPACE:
TOP – 10.66"(271mm)
BOTTOM – 16.50"(419mm)
LEFT SIDE – 5.27"(134mm)
RIGHT SIDE – 5.27"(134mm)
PBA: 475
BUSSING: 600A RATED COPPER BUS
Tin Plated
OPTIONAL FEATURES:
BRANCH USER PLACEMENT
Copper GROUND BAR
COPPER SOLID NEUTRAL

ELECTRICAL DATA

SYSTEM: 208Y/120V 3Ph 4W 60Hz
System Ampacity: 600A
22kA SYMS. SCCR
MAIN: MAIN LUGS : 600A
Bottom FEED
INCOMING CONDUCTORS(S) PER NEC, CEC, NOM:
Wire Bending Space:
Phase Lugs:1 – (2) #2 – 500kcmil
----------BRANCH SUMMATION----------
2 – 125A/3P HD 2 – 200A/3P JD

JOB NAME:	Johnson family generator 21-0049	EQUIPMENT DESIGNATION:	PANEL GEN
JOB LOCATION:		EQUIPMENT TYPE:	I-Line (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	(Q2C)	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			SQUARE D by Schneider Electric
DATE:	June 04 2021		
DRAWING STATUS:	QUOTE	DWG# OQ-2548569-69981435-01	PG 1 OF 1 REV –

REV	DESCRIPTION	BY	DATE				
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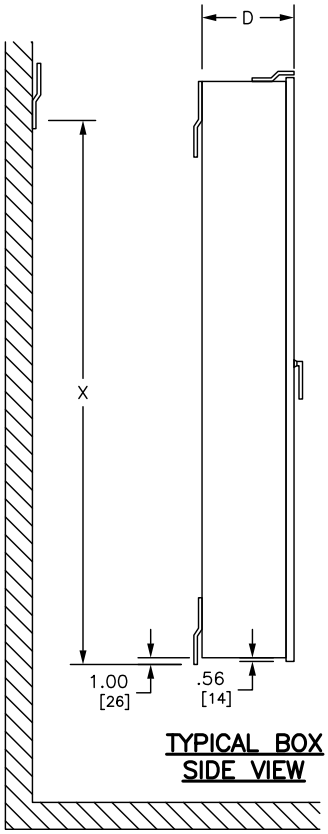
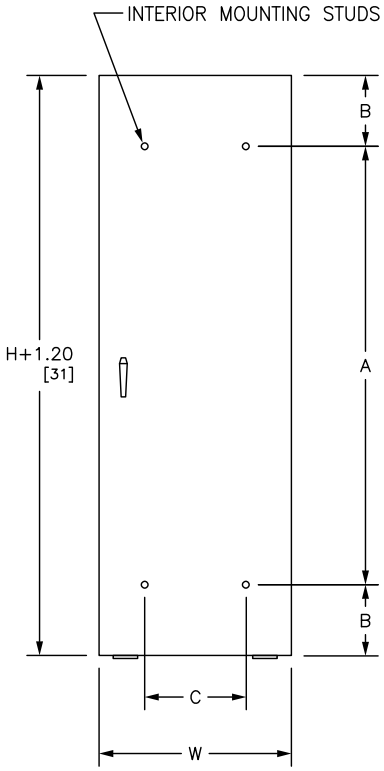
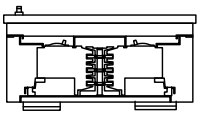
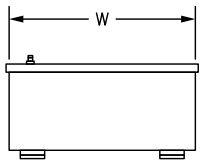


TYPICAL BOX
SIDE VIEW



TYPICAL FRONT VIEW





TYPICAL ENDWALL

REFER TO DP CATALOG CLASS 2110 FOR ADDITIONAL INFORMATION

I–LINE PANELBOARDS MEET THE APPLICABLE REQUIREMENTS OF UL AND CSA.

BOX: GRAY BAKED ENAMEL FINISH ELECTRODEPOSITED OVER CLEANED PHOSPHATIZED STEEL. INCLUDES HINGED COVER. MOUNTS TO WALL WITH MOUNTING CHANNEL AND SWINGABLE MOUNTING BRACKET.

LOCK: CHROME–PLATED HANDLE LOCK. NSR–251 KEY CHANGE. NO PROVISIONS FOR PADLOCK.

DUAL DIMENSIONS: INCHES
MILLIMETERS

ENCLOSURE CATALOG NUMBER	H		W		D		A		B		C		X	
	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
HC2652WP	52.00	1321	26.89	683	9.75	248	29.00	737	11.50	292	16.50	419	46.40	1179
HC2665WP	65.00	1651	26.89	683	9.75	248	38.00	965	13.50	343	16.50	419	59.40	1509
HC2674WP	74.00	1880	26.89	683	9.75	248	47.00	1194	13.50	343	16.50	419	68.40	1737
HC2683WP	83.00	2108	26.89	683	9.75	248	56.00	1422	13.50	343	16.50	419	77.40	1966
HC2692WP	92.00	2337	26.89	683	9.75	248	65.00	1651	13.50	343	16.50	419	86.40	2195
HCJ3248WP	48.00	1219	33.14	842	11.75	298	29.10	739	9.45	240	22.00	559	43.40	1102
HCJ3273WP	73.00	1854	33.14	842	11.75	298	47.10	1196	12.95	329	22.00	559	68.40	1737
HCJ3291WP	91.00	2311	33.14	842	11.75	298	65.10	1654	12.95	329	22.00	559	86.40	2195
HC4250WP	50.00	1270	43.19	1097	12.95	329	29.10	739	10.45	265	30.00	762	44.40	1128
HC4259WP	59.00	1499	43.19	1097	12.95	329	38.10	968	10.45	265	30.00	762	53.40	1356
HC4268WP	68.00	1727	43.19	1097	12.95	329	47.10	1196	10.45	265	30.00	762	62.40	1585
HC4286WP	86.00	2184	43.19	1097	12.95	329	65.10	1654	10.45	265	30.00	762	80.40	2042

NOTE: NEMA TYPE 3R/12 ENCLOSURE FOR HCN, HCJ, AND HCP I–LINE PANELBOARDS.

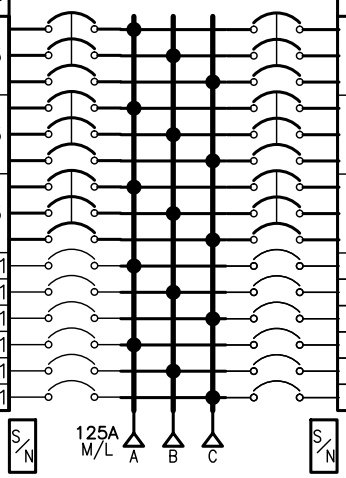
JOB NAME:	———	EQUIPMENT DESIGNATION:	———
JOB LOCATION:	———	EQUIPMENT TYPE:	I–LINE HCN,HCJ,HCP TYPE 3R/12
DRAWN BY:	———	DRAWING TYPE:	———
ENGR:	———		
DATE:	JULY 2020		
DRAWING STATUS:	———	DWG# PBA475	PG 01 OF 01 REV

PANEL 'EM3'

Seq #	Qty	Product Description	Price Each	Subtotal
1	1	**Designation :** **Product Details :** 1 - NQ ML Panel (INTERIOR)-NQ Panelboard Consisting of 208Y/120V 3Ph 4W 60Hz SCCR: 22kA Fully Rated Main Lug Only: 125A Incoming Conductors: 1 - #6 - 350 kcmil AL Ground Bar Bus: 225A Rated Aluminum: Tin Plated 30 Circuit Interior Type 1,Box: 32H x 20W x 5.75D Incoming: Bottom Trim: Flush - Hinged Box Cat No: MH32BE Front Cat No: NC32FHR Ref. Drawing: PBA701HR Feeders: 1 - 100A/3P QOB-VH 2 - 30A/3P QOB-VH 3 - 20A/3P QOB-VH 12 - 20A/1P QOB-VH Optional Features: Standard Panel (Box Ahead),Blank Endwalls,Standard Solid Neutral,Standard Ground Bar 1 - MH32BE-PANELBOARD ENCLOSURE/BOX TYPE 1 32H 20W 1 - NC32FHR-NF PANEL HINGED TRIM FLUSH 20WX32H,T-1 **Estimated days to ship, excluding transit:** 15 working days after customer release to manufacturer. See Conditions of Sale.		

REV	DESCRIPTION	BY	DATE	–	----	--	--/--/--
–	----	--	--/--/--	–	----	--	--/--/--

CKT NO	ACCESSORIES	TYPE	RATING AMP/P
1		QOB–VH	100/3
3			
5			
7		QOB–VH	30/3
9			
11			
13		QOB–VH	20/3
15			
17			
19		QOB–VH	20/1
21		QOB–VH	20/1
23		QOB–VH	20/1
25		QOB–VH	20/1
27		QOB–VH	20/1
29		QOB–VH	20/1



RATING AMP/P	TYPE	ACCESSORIES	CKT NO
30/3	QOB–VH		2
			4
			6
20/3	QOB–VH		8
			10
			12
20/3	QOB–VH		14
			16
			18
20/1	QOB–VH		20
20/1	QOB–VH		22
20/1	QOB–VH		24
20/1	QOB–VH		26
20/1	QOB–VH		28
20/1	QOB–VH		30

PHYSICAL DATA

ENCLOSURE Type 1
Flush – Hinged
FRONT CAT#: NC32FHR
BOX CAT#: MH32BE

DIMENSIONS:
32''(813mm)Hx20"(508mm)Wx5.75''(146mm)D

WIRE BENDING SPACE:
TOP – 5"(127)mm
BOTTOM – 9.26"(235)mm
SIDE – 6.13"(162)mm
PBA: 701HR

BUSSING: 225A RATED ALUMINUM BUS
Tin Plated

OPTIONAL FEATURES:
BLANK ENDWALLS
ALUMINUM SOLID NEUTRAL
ALUMINUM GROUND BAR

ELECTRICAL DATA

SYSTEM: 208Y/120V 3Ph 4W 60Hz
System Ampacity: 125A
22kA SYMS. SCCR

MAIN: MAIN LUGS : 125A
Bottom FEED
INCOMING CONDUCTORS(S) PER NEC, CEC, NOM:
Wire Bending Space:
Phase Lugs:1 – #6 – 350 kcmil

----------BRANCH SUMMATION----------

1 – 100A/3P QOB–VH
2 – 30A/3P QOB–VH
3 – 20A/3P QOB–VH
12 – 20A/1P QOB–VH

JOB NAME:	MSU Johnson Family generator panel	EQUIPMENT DESIGNATION:	
JOB LOCATION:		EQUIPMENT TYPE:	NQ (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	(Q2C)	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			SQUARE D by Schneider Electric
DATE:	June 24 2021		
DRAWING STATUS:	QUOTE	DWG# OQ-2612357-71828909-01	PG 1 OF 1 REV –